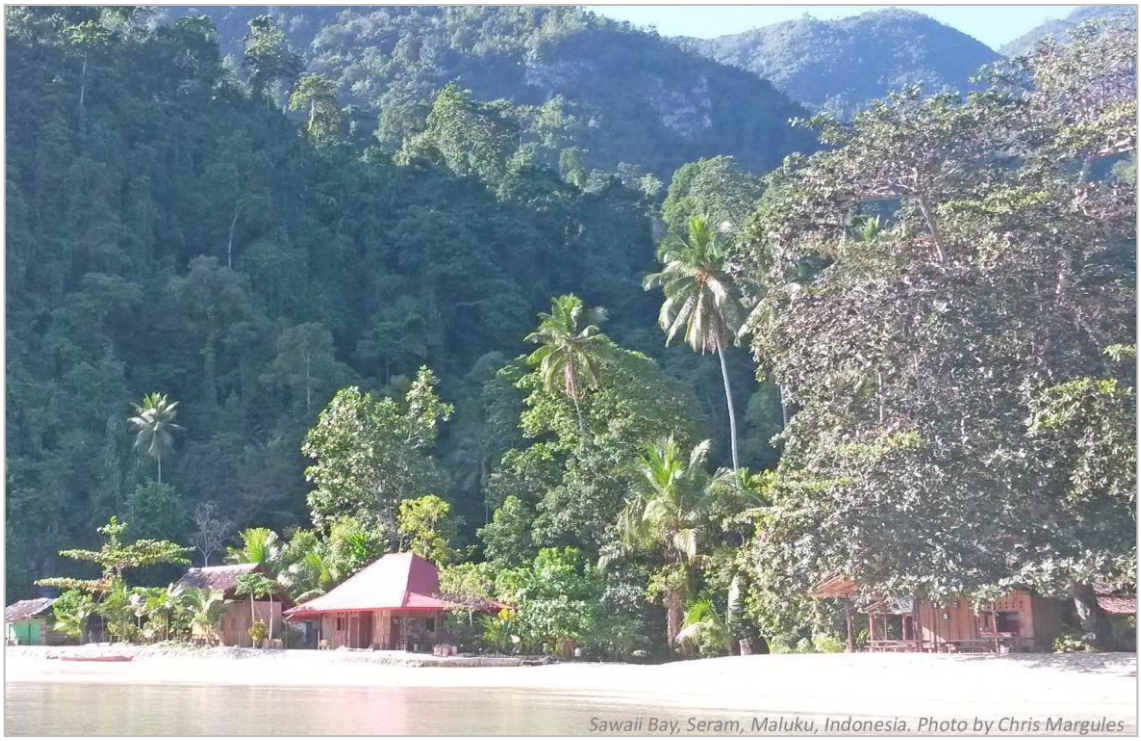
Auditing the Governance of Natural Resources in Indonesia


Sawaii Bay, Seram, Maluku, Indonesia. Photo by Chris Margules

Dwi Amalia Sari

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Verily, with every hardship, comes ease.

[94:6], Qur'an - Surah Ash-Sharh (The Relief)

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Ethics Statement

This PhD research was performed under James Cook University Human Research Ethics Committee Approval number H7288.

Statement on the Contribution of Others and Authors' consent to include publications as part of this PhD Thesis			
Thesis Title	***Auditing the Governance of Natural Resources in Indonesia***		
Name of Candidate	**Dwi Amalia Sari**		
Chapter number and title	**Details of publication(s) on which chapter is based:**	**Nature and extent of the intellectual input of each author, including the candidate**	**I confirm the candidate's contribution to this paper and consent to the inclusion of the paper in this thesis**
Chapter 1: **Auditing the governance of natural resources: An overview**	Chapter is the literature review and the original work of the candidate	Dwi Amalia Sari is the primary author for the manuscript, and was responsible for conceptualization, methodology, validation, investigation, writing original draft, visualization, review & editing.	Dwi Amalia Sari Signature:
Chapter 2: **Criteria and indicators to audit the performance of complex, multi-functional forest landscapes.**	Chapter is the original publication. Sari, D. A., Margules, C., Boedhihartono, A. K. & Sayer, J. A. (2018). Criteria and indicators to audit the performance of complex, multi-functional forest landscapes. In S. Bell & S. Morse (Eds.), *Routledge Handbook of Sustainability Indicators* (pp. 407-426). London, UK:	Dwi Amalia Sari is the primary author for the manuscript, and was responsible for conceptualization, methodology, validation, investigation, writing original draft, visualization, review & editing. Jeffrey A. Sayer and Chris Margules both contributed to conceptual background, review, and editing. Agni K. Boedhihartono contributed to review,	Dwi Amalia Sari Signature: Jeffrey A. Sayer Signature: Chris Margules Signature:

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Abstract

Achieving sustainability is a noble aspiration in any nation. Implementing it in tropical developing countries is, however, problematic. Sustainability is all about achieving a balance between the economic, environmental, and social aspects of natural resource use. Tropical areas account for a significant portion of the world's levels of oxygen production, carbon and biodiversity assets. However, these assets are mostly located in developing countries, whose goal is often to use natural resources for economic development. Globally, societies wish to conserve important resources through sustainable use and management, yet they often find it challenging to balance both development and conservation objectives. This situation calls for effective governance: the collaborative processes of actors (people and/or organizations) trading off their different agendas to achieve the most optimal collective goals.

In Indonesia, governance for sustainable natural resource use poses some challenges regarding policy coherence, adequate participation, agile reflexivity and fit for purpose structure. Coherent policies should be in evidence among Indonesia's four different government levels: 548 districts, 34 provinces, 58 ministries, and many international initiatives. Indonesia also ought to accommodate the adequate participation of the many governance actors: government agencies, businesses, Non-Government Organizations (NGOs) and traditional societies. These actors originate from and participate in many different industry sectors, such as forestry, agriculture, mining, industry, trade, infrastructure and housing. Moreover, the country is prone to conflicts among widely diverse territories throughout its archipelagic regions. Conflicts occur between natural resource users, in overlapping land ownership, and because of biased representations of certain people or organizations in the policy or decision-making arena.

In this thesis, I assess the effectiveness of governance using performance auditing for the public sector as a tool. Effective governance of natural resource uses is a nationwide initiative. Auditing is a process of verification between the criteria (what should be) and the condition (what is). Performance auditing is designed to assess the economy, efficiency, and effectiveness of either a program, entity, project, or system. Public sector auditing is a mechanism for evaluating public sector entities within a country by its Supreme Audit Institution (SAI). I argue that routine assessment on the effectiveness of governance for sustainable natural resource use helps ensure that the governance arrangement is adequate for all stakeholders to achieve common goals despite their other different agendas. Hence, assessing the effectiveness of governance for sustainability

ought to be embedded in the mechanism of public sector auditing to accommodate regular verifications by a dedicated and professional institution. Auditing the multi-actor, multi-level and multi-sectoral sustainability governance arrangements of a country as diverse as Indonesia, however, is quite problematic. I therefore suggest auditing at a landscape-scale in several different locations in Indonesia.

My research questions are:

1) What are the important considerations for auditing the governance of sustainable natural resource use in Indonesia?
2) What is the state of the existing governance arrangements in Indonesia since it declared commitments to certain international initiatives?
3) How can we assess the coherence, effectiveness and efficiency of an overarching policy, adopted through an international initiative, in a location that already has complex multi-actor governance arrangements within multiple sectors, and across four different levels?
4) How can we assess the effectiveness of appropriate stakeholder participation and reflexivity of conflicting international and national initiatives, in a multi-actor governance setting, across multiple sectors, and across four different levels?
5) How can we develop a more appropriate structure for effective governance of natural resources in Indonesia?

Over the course of my research, I developed my analytical frameworks for auditing and assessing the effectiveness of governance arrangements. To capture the diversity of Indonesia, I selected several different landscapes as case studies, which pose similar issues relating to effective governance principles.

The landscapes used in my case studies were:

1) Kampar Peninsula, which is a peat landscape. This is where the new national policy regarding peat conservation has conflicted with previously established policies relating to economic development in different sectors. The national peat conservation policy has also not yet been devolved properly into regulations at the local- and provincial-levels. This location is my case study for exploring policy coherence.
2) Sendang is an example of where multiple conflicting interests both from local and international initiatives, exist simultaneously in one landscape. This landscape is my case study for assessing appropriate stakeholder participation

and agile reflexivity; and

3) The provinces of Riau, South Sumatera, West Nusa Tenggara and Maluku, are among the landscapes where a substantial global initiative, applying the United Nations Sustainable Development Goals (SDGs) is to be implemented using a top-down regulation, despite the fact that each of the landscapes is distinctly different from one another. These landscapes represent the cultural, biological, and economic differences between western (Riau, Sumsel) and eastern (Maluku, NTB) Indonesia. These landscapes make up my case study for determining the most suitable governance arrangement for use in different parts of Indonesia.

I conducted my assessment using commonly accepted standard auditing procedures from the International Standards of Supreme Audit Institutions (ISSAI). This standard is widely adopted by SAIs around the world such as the Australian National Audit Office (ANAO) and Indonesia's Supreme Audit Board (BPK) who then adjust these standards to reflect their own local country requirements. Performance auditing procedures involve mechanisms for data verification and data creation to produce four types of evidence: documentary, testimonial, physical and analytical evidence. I also used Gephi 0.9.2 software for Actor Network Analysis to support my analytical evidence, and ArcGIS for mapping.

From my analyses, I found that improvements can be made for more effective governance of natural resource use in Indonesia. These include:

1) There are four important aspects to be considered in assessing the effectiveness of a governance arrangement: policy coherence, adequate participations of all governance actors, agile reflexivity to anticipate uncertainty and mitigate conflicts, and a fit for purpose governance structure which enables all three previous elements to coexist.
2) There is room for improvement of Indonesia's governance arrangements for implementing the United Nations (UN) Sustainable Development Goals (SDGs) so that the country can achieve this global agenda by 2030.
3) Indonesia should optimize its existing public sector auditing mechanisms to assess the policy coherence, adequate participation, agile reflexivity, and fit for purpose structure of its governance arrangement.
4) Given Indonesia's existing nested social structure, the most appropriate governance structure would adopt four levels that reflect

that social structure. Such a structure could be an effective tool to mitigate Indonesia's incoherent policies, lack of governance actors' participation and slow reflexivity towards uncertainty and conflicting situations.

Important and more global lessons to share from my research include:

1) Sustainability is a dynamic concept and therefore, governance for sustainability must also be dynamic. Effective governance can, and will, change as the sustainability balance alters due to many unpredictable factors. Consequently, it is crucial to review and assess the effectiveness of governance arrangements on a regular basis. Regular audit processes help detect unpredicted changes so that stakeholders can respond more appropriately, and in a timely manner. Hence, a proper audit mechanism needs to be incorporated into the structure of Indonesia's governance arrangements.
2) Auditing by landscapes instead of by nation-wide sector or government institutions (as currently practiced) can be a very useful mechanism for assessing governance for sustainability. The governance structure of Indonesia is so broad and complex that an audit over the entire country would most likely lose its focus and therefore be a futile endeavor.
3) Achieving sustainability requires decision makers to make unavoidable trade-offs. Conservation of natural resources has to be traded off against the reality of the need to address economic pressures. Effective governance is only a tool for achieving more optimized trade-offs. I found that reviewing and assessing the effectiveness of governance arrangements on a regular basis helps detect unpredicted negative consequences and enables stakeholders to respond more appropriately, and in a timely manner. It is not, in any measurement, a panacea for eliminating trade-offs altogether.

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CHAPTER 1. The governance of natural resource use, effective governance, and the structure of this thesis

Chapter 1. The governance of natural resource use, effective governance, and the structure of this thesis.

Sustainability is one of the most challenging issues for contemporary societies. As the world's population is predicted to reach more than 9.7 billion by 2050 (United Nations Department of Economic and Social Affairs, 2019) and about 25% of the world's population suffer from relative poverty and food scarcity (Jolliffe & Prydz, 2019), the exploitation of natural resources for economic activities such as agriculture, industry, housing, and infrastructure is unavoidable (Frank et al., 2021; Pearce et al., 2013). This, however, comes with a price: the loss of biodiversity and ecosystem services and the increased impact of climate change on human livelihoods (Karki et al., 2021; Levin et al., 2012). Hence, sustainability revolves around balancing the environmental, social, and economic aspects of development (Paletto et al., 2008; Perera & Vlosky, 2006; Ranjbari et al., 2021). Choosing to use natural resources in a sustainable manner means that development initiatives will invariably entail some environmental and social impacts (Chhatre & Agrawal, 2009; Marsiglio & Privileggi, 2021). The challenge is to optimize the trade-offs between environmental, social, and economic aspects of land use, so that natural resources are used in a way that minimizes damage to the environment,society, and economic prosperity (Suwarno et al., 2018). Balancing the economic, environmental and social aspects of development among all the stakeholders while accommodating the different international initiatives into a country's specific development endeavors requires governance (Domokos & Parragh, 2020; Monkelbaan, 2018): the collaboration of different governance actors—government, businesses, local communities, and Non-Government Organizations—to compromise all actors' individual agendas under certain predetermined rules, in order to achieve their shared goals (Bernstein, 2017; Glass & Newig, 2019; Niestroy & Meuleman, 2015).

Natural resource governance is most challenging in the tropics. Almost all countries located in the tropics are pursuing development for a more improved economy and more secure livelihoods (Clémençon, 2021; Sachs et al., 2019; Sachs & Warner, 2001). These tropical developing countries, however, are also where two-thirds of global biodiversity hotspots are located (Myers, 2003 (Ball et al., 2021)). Five hundred and sixteen million hectares of tropical forest produce 70% of the world's oxygen (Keenan et al.,2015) and contain one third of the world's carbon reserves (Saatchi et

al., 2011). Since natural resource use in the tropics has the potential to affect the well-being of the entire global population, some international initiatives have been established by organizations, offering 'recipes' for more sustainable development (Haque, 1999). Developing countries are encouraged to ratify global initiatives such as the United Nations Framework Convention on Climate Change (UNFCC) for mitigating climate change, Reducing Emission from Deforestation and Degradation (REDD) for reducing deforestation and reserving carbon, and the United Nations (UN) Sustainable Development Goals (SDGs) for development that balances social, environmental and economic goals, which incorporates both global public goods such as biodiversity protection and carbon storage, and domestic goals such as reducing or eliminating poverty, and increasing food security (Horstmann & Hein, 2017; Kallies et al., 2010; United Nations General Assembly, 2015).

While these initiatives on their own might lead to improved sustainability, orchestrating them all in one tropical developing country as diverse as Indonesia is problematic (Nurrochmat et al., 2014). Indonesia is regarded as being among the tropical developing countries with the natural resource 'curse': rich in natural resources yet most of its people are poor (Sachs & Warner, 2001). Indonesia's rainforest is the world's second largest after Brazil (Brockhaus et al., 2012); its oil and mineral deposits are ranked as the world's 19th richest; and its fertile soils grow the world's most extensive oil palm plantations. In 2019, all of these riches meant that Indonesia was ranked as having the16th highest Gross Domestic Product (GDP) in the world. Indonesia has also ratified almost all international initiatives aiming at achieving sustainable development, including the SDGs, REDD+, and the UNFCC (Mulyani & Jepson, 2013; The Republic of Indonesia, 2016; UNDP Indonesia, 2015). Such initiatives, however, have little significance to Indonesia's overall balance of economic, environmental, and social achievements. The country is ranked 109th of 186 in its GDP per capita (2018), 70th of 117 in the Global Hunger Index (2019), and among the top five for highest deforestation rates in the world (United Nations Food and Agriculture Organization, 2020). One factor to help explain this paradox is its governance (Gellert, 2021; Rahayu et al., 2021; Yanuardi et al., 2021). Indonesia is ranked 85th of 180 in the Corruption Perception Index (2019), and ranked 88 of 193 countries in the e-Government Development Index (eGDI) 2020 (United Nations Department of Economic and Social Affairs, 2020) suggesting a lack of effectiveness in the current governance arrangement (Amano et al., 2018).

I argue that Indonesia should adopt more effective governance for the use of natural resources. I also propose that Indonesia sets its own mechanism to assess the

governance effectiveness, such as those by the Corruption Perception Index and eGDI, in more detail and a more frequent manner to quickly identify any dynamic in the natural resource governance arrangement in Indonesia.

Governance

Since its proliferation in the early 1970s, the term "governance" has been used to explain the wide spectrum of interactions among different roles and actors. Some experts refer to governance loosely as all collaborative processes where actors—people and organizations—are driven towards the same goals (Ansell & Torfing, 2016). Others argue that governance should accommodate processes of collaboration and decision-making among stakeholders and other governance actors to achieve collective long-term goals, despite different individual agendas (Kooiman, 1993; Rhodes, 1997). Ostrom et al. (1992) proposed self-governance, where she argued that for a governance arrangement to work, stakeholders should be given freedom to self-govern themselves. Ackerman (2004) and Kooiman (2003) argued that co-governance: participative processes among all stakeholders including society, is a more effective form of governance in an era dominated by the media. Hajer (2009) also acknowledge the rising problem of the media dominating everyday discourse, arguing that governance should set the boundaries for the intertwined relationships between politics and media. Nevertheless, he suggested authoritative governance as the most appropriate structure of governance for this era. Governance is defined as a spectrum of collaboration processes, ranging from authoritative, accommodating a decision-making body, through to self-governing, with no formal decision-making body, depending on the context.

Perhaps due to the broad spectrum, governance is often discussed from three perspectives (Biermann et al., 2014). A broad perspective is good governance. This terminology is often used to explain certain qualities and values embedded in the decision-making processes and the conduct of institutions, without specifically referring to any governance arrangement. These can vary among different institutions. For example, the World Bank proposes accountability and government effectiveness, yet some extra law-abiding principles are added such as political stability, no violence/terrorism, regulatory quality, rule of law, and control of corruption (Kaufmann, Kraay, & Zoido, 1999). The Organization for Economic Co- operation and Development (OECD) also supports accountability, transparency, and stakeholder participation. However, the OECD puts more emphasis on combatting corruption, as well as a legal and judicial framework (Agere, 2000). On the other hand, the United

Nations Development Programme (UNDP) seems to merge all the different frameworks into several principles such as participation, rule of law, transparency, responsiveness, consensus orientation, equality, effectiveness and efficiency, accountability, and strategic vision (UNDP, 2002). The Food and Agriculture Organization of the United Nations (FAO) agrees on accountability, transparency, and participation, but added effectiveness, efficiency, fairness/equity instead of coordination and capacity (FAO, 2011). The World Resource Institute formulated five principles of good forest governance: transparency, participation, accountability, coordination, and capacity (World Resource Institute, 2013).

A more designated view is effective governance, which focuses on the capacity of all governance actors—governments, businesses, local communities, and NGOs—within a specific governance arrangement, to negotiate their different agendas and achieve their shared goal(s) together. While certain qualities can be established to define good governance, effective governance is more about optimizing governance capacities, such as the actors themselves and the resources available, in negotiating different agendas and achieving shared goals (Biermann et al., 2014). Yet, resources and the capacities of governance actors change dynamically over time. Hence, unlike the qualities of a good governance arrangement, there are no universally applicable criteria for determining what constitutes effective governance, since the capacities are uniquely attributed to the governance actors or the resources.

Lastly, equitable governance focuses on ensuring equal distribution of resources and equal opportunities among the governance actors. Indonesia, however, is still struggling for the second stage, hence this thesis focuses on assessing the effectiveness of governance.

Effective governance for the use of natural resources in Indonesia

Natural resource governance has been studied from many perspectives and different angles. Hardin (1968) argued that larger populations would eventually compete for the use of natural resources, and that therefore public institutions ought to control the population. (Ostrom, 1990b) however, viewed natural resources as common pool assets, and proposed a social-ecological system as a mechanism to institutionalize governance actors at different levels (strategic, operational, and managerial) through the use of polycentric governance. Further, Bodin and Crona (2009) have argued that it is crucial that social networking, involving sectors such as industry and agriculture, be developed. More recently, Dale et al. (2013) recommended that governance systems for natural resources

should acknowledge each natural resource as a different domain, each with its own set of priorities and challenges.

Studies on effective natural resource governance in Indonesia do not agree on what effectiveness would look like. While all agree that Indonesia should implement more effective natural resource governance (Kelman, 2013; Korhonen-Kurki et al., 2013; Ruysschaert & Salles, 2014), Morita et al. (2020) using the Governance System Analysis matrix of Dale et al. (2013) suggested that the five structural elements (vision and objective setting; research and assessment; strategy development; implementation; and monitoring, evaluation and review) and three functions (decision-making capacity, connectivity, knowledge use) should be adopted as the criteria for effective governance. McCawley (2005) proposed four key elements of effective governance in Indonesia: strategy, detailed program, implementation and monitoring progress. These studies, while offering a useful methodology for assessing effectiveness, do not address the problem of incoherent policies arising from the adoption of international initiatives to local policies. Green (2009) and Sulistyawan et al. (2019) in contrast, have suggested decentralization and the establishment of new institutions as the keys for effective governance. However, neither answered the problem of natural resource optimization and reconciling conflicts among governance actors.

In my attempt to define the most appropriate criteria for effective natural resource governance in Indonesia, I studied how the literature defined the elements of effective governance. Ostrom (1990b) in her study of the governance of common pool resources, proposed several principles including multi-level institutions, appropriation or fair distribution, unambiguous rights and obligations, common agreement, applied sanctions, in-built mechanisms for conflict resolution, and delimited rights and monitoring. Rhodes (1996) suggested that in "self-organizing, interorganizational networks", effective governance should accommodate policy networks, reflexivity, and accountability. Agrawal et al. (2008); Cashore et al. (2007); and Gulbrandsen (2005) in their studies on forest governance suggested initiation, inclusiveness, participation, governance system, standards, and an international perspective. Kemp et al. (2005) and Voss & Kemp (2006) in their research on sustainable development at country-level, proposed three features: structure, participation, and reflexivity. Callahan (2006) suggested measurement, accountability, and participation for more effective governance of public sector government. Sørensen and Torfing (2009) in their research on meta-governance

networks for sustainable development, argued that effective governance should accommodate coherent policies, participation, coordination, legitimization, reflexibility, and interdependence or mutual trust. Glass and Newig (2019) recommend four qualities of effective governance which are participation, reflexivity, policy coherence, and adaptation and democratic institutions. Malik (2011) in his research on Islamic governance proposed three criteria of effectiveness: accountability, participation and transparency. From these studies, I conclude two overarching aspects are most crucial for determining the elements of effective governance: 1) the complexity of governance actor arrangements and 2) the factors in the formulation of these actors' shared goals.

Indonesia's complex governance actor arrangement originated from a long history of natural resource use. Initially, Indonesia was a bricolage of small kingdoms with independent territories, hierarchical social structures and embedded customary laws (Nurjaya, 2005). During the colonialism era, however, the use of natural resources was heavily controlled by the colonial government, thus starting the era of state-owned lands, the exploitation of natural resources and nationally applied laws and regulations (Galudra & Sirait, 2009). Since 1945, however, colonialism changed into a sovereign republic, small kingdoms became provinces or parts of provinces, while the state administration functions were controlled by the President and his ministers (Juwono, 2016). Only after 2004 did Indonesia embark on a more decentralized government model (Umar et al., 2020), where 43 ministries and 548 sub-national governments (34 provinces, 98 cities, and 416 districts) (Peraturan Menteri Dalam Negeri, 2017) were given the authority to issue their own regulations (Undang Undang Republik Indonesia, 2004, 2014). The change from one structure to the other has resulted in a fusion of monarchy, centralization, and decentralization arrangements implemented by the sub-national governments (Setiadi & Habibie, 2021). Hence, the governance actors are influenced by the customary law, national and sub-national rules and regulations. Adding more to this complexity, modern living expands the exploitation of natural resources to more sectors, such as agriculture, industrial forestry, mining and extracting activities, roads and housing. Likewise, globalization has welcomed the involvement of many other actors, including those from the international level, in different roles such as businesses and NGOs. Such complexity has prompted some challenges for shared goal formulation.

Policies from many different ministries and international initiatives are often conflicting when implemented at sub-national level due to the simultaneous use of natural resources (Harahap et al., 2017). Moreover, some actors are not given enough opportunity to contribute to the governance arrangement while others are too powerful or too dominant (Lestari et al., 2015). Also, conflicts among governance actors often escalate badly and mitigation of unpredicted events (such as natural disasters) is slow (Barron et al., 2009). Interactions among governance actors are often handicapped by the lack of a structure that engages all governance actors.

From this exercise, I identified four elements of effective governance for natural resource use in Indonesia. These elements are: 1) policy coherence, 2) appropriate participation, 3) agile reflexivity, and 4) a structure fit for purpose, as further explained below.

Policy coherence

Before effective governance arrangements can be contemplated, policies need to be coherent. Policy coherence involves concordance in the interpretation of an overarching policy, or policies, into rules and regulations for actual implementation by multiple actors in multiple sectors, and within different government levels (Forster & Stokke, 1999). If policies are incoherent, so too will be the rules and regulations that are drawn from them. Governance actors need an agreed overarching policy to interact with one another, as well as to reconcile and negotiate their different agendas in order to achieve shared goals. With incoherent policies, interactions for achieving some agendas would hinder the achievement of other agendas, since obeying one policy will result in violating other policies.

Previous studies have assessed policy coherence based on domains, such as sectors (Harahap et al., 2017), levels (OECD, 2017; Rodrigo et al., 2009), or topics such as health care or land use (May et al., 2006). By restricting the analysis only to certain domains, conflicts between those domains may be overlooked. Therefore, I expand my studies on the entire governance setting affecting the use of natural resources, which includes multiple sectors and multiple levels. To limit the scope, I assess the policy coherence only to a particular landscape each time.

Appropriate participation

For governance to be effective, all stakeholders need to participate in the decision-making appropriately. Active participation is a process of involving all stakeholders to harmonize their differences and agree on shared goals (Barry et al., 2010). Participation processes seek to communicate and accommodate different interests and perspectives into more acceptable decision-making (Heinelt, 2002). Yet participation, while a preferable option, is not always the most sensible choice and does not necessarily lead to more effective and timely decisions.

Especially in a complex governance setting such as transnational and meta-governance, participatory decision-making means extra costs, additional time, and the allocation of more resources (Carpentier, 2009; Sinclair, 2004). On many occasions, active participation hinders the achievement of goals (Rydin & Pennington, 2000). Instead of simply participating, effective governance requires an appropriate degree of participation, applicable to a particular governance setting, at a particular time (Botes & Van Rensburg, 2000).

Agile reflexivity

Effective governance should be responsive to an ever-changing environment. Reflexivity is having the ability and agility to respond to unpredictable changes (Voss & Kemp, 2006). Reflexive governance occurs when collaboration among actors enables them to anticipate uncertainty and mitigate conflicts and agree on trade-offs (Kemp et al., 2005). Reflexivity would provide mechanisms for reconciling the ecological and socio-economic aspects of development (Feindt & Weiland, 2018).

Kemp et al. (2005) argued that reflexive governance can only be accomplished when its actors: 1) adopt mutual collaboration among government and non-government actors; 2) integrate adaptive strategies for uncertainty; and 3) formulate a mechanism for optimizing the participation of different actors within dynamic settings.

A structure fit for purpose

I argue that governance structure is the most crucial element of effective natural

resource governance in Indonesia. Coherent policies are only possible if the decision makers are structured appropriately so that the authority to establish laws and regulations are limited to certain actors and are balanced with adequate controls (OECD, 2016; Ostrom, 1990a). Appropriate participation is executable if the governance structure provides adequate access for all actors to contribute in decision-making (Bracht & Tsouros, 1990; Dahl, 1973), and agile reflexivity is only feasible if the governance structure enables prompt coordination and efficient mobilization of resources among all governance actors (Glass & Newig, 2019).

Such a governance structure, however, is also a mixture of many pre-existing sub-structures which also need to be considered during the formulation of a more effective structure. Individual or private organizations interact with subordinates in a **private governance** (Brammer et al., 2012). When this private structure expands and organizational structures consist of hierarchies or chains of command, **regulatory governance** is formed. This is governing through a set of pre-agreed rules and regulations, implemented though vertical interactions (Rodrigo et al., 2009). Local governments in Indonesia—either provincial, district or municipality—are organizations providing regulatory governance. As the world becomes more complex and problems are unable to be solved in isolation, the governance actors interact in **network governance**. This is where the initially vertical interactions expand horizontally into non-hierarchical multi-sector relationships (Kooiman, 1993). An example of this is the governance setting among different ministries in Indonesia.

Collaborative governance is needed when the shared interests within the networks of sub-governances are no longer adequate to retain commitments among the actors. A collaborative governance setting enables governance actors to collaborate and negotiate common goals and decision-making to improve the commitments of this less binding or even voluntary governance (Ansell & Gash, 2008). Indonesia's Working Groups for achieving SDGs is an example of a collaborative governance setting.

Different types of collaborations on a broader scale such as a whole country, call for different types of governance settings. **Multi-level governance** is needed when collaborative governance is more formally binding. This governance consists of a hierarchy or chains of authorities, but each authority has a sub-governance setting. Indonesia's multi-level governance, for example, consists of ministries, provinces, districts, and municipalities (Bulkeley & Betsill, 2005).

Supranational governance is when several nations form an overarching governance

setting by signing a treaty of intergovernmental cooperation, such as the European Union (EU), and the Association of South East Asia Nations (ASEAN) (Sweet & Sandholtz, 1997). **Transnational governance** occurs when the interactions of supranational governance are bound with certain rules (formal) or costs (informal), which compensate for the privileges gained from accepting more responsibilities for achieving shared goals. The World Trade Organization (WTO) and the World Bank are among existing transnational organizations (Vogel, 1997). Last, but not least, is **meta-governance**. This type of governance refers to self-regulating sub-governance settings, such as those that apply within the UN with all its internal systems of organization and its country members. Meta-governance entails soft governing tools such as non-binding agreements and vague norms or standards. Thus, different kinds of actors and interactions call for different types of governance settings to effectively drive actors into achieving their shared goals (Sørensen & Torfing, 2009).

When assessing the effectiveness of natural resource governance in Indonesia, these pre-existing structures need to be acknowledged and accommodated in the recommendation.

Using a landscape-scale approach

At a landscape- (or seascape-) scale, the structure of governance is more easily identified than at broader scales (Sayer et al., 2008). A landscape is a spatial area within which many actors and stakeholders are interrelated, hence are required to compromise and achieve their own different agendas (DeFries, R. & Rosenzweig, C., 2010; Noss, 1983). Landscape approaches have been utilized as the underlying concept to solve multi-sectoral problems of competing interests over limited resources. (Sayer et al., 2015). The relatively narrow scope of a landscape simplifies the complexity of polycentric relationships among actors from different levels (Nagendra & Ostrom, 2012; Noss, 1983). Identifying influential individuals is also less difficult at a landscape-scale. Every landscape has its own characteristics and challenges that often require different governance approaches (Sayer et al., 2016). Hence, the scope of governance should be based on spatial collaboration of stakeholders (DeFries & Rosenzweig, 2010).

I have chosen to adopt a landscape approach in this thesis for the following reasons. Indonesia is socially, culturally, politically, and ecologically diverse. It varies substantially from place to place. There are more than 270 million people in Indonesia. Some cities mainly in the west suchas Jakarta, Surabaya, and Bandung are modern, rich, and populous (Firman, 2009). In contrast, parts of eastern Indonesia are much

more sparsely populated, and people may have difficulty accessing even the most basic facilities, such as electricity and clean water (Butler, 2011). Across Indonesia, there are more than 130 ethnic groups and seven practiced religions. The archipelagic territory of Indonesia spans 5,050 kilometers, accommodating more than 13,000 islands with different types of landscapes, from dense forest to dry savannah (Harmantyo, 2010).

Due to these social, cultural, political, and ecological differences, policy implementation in Indonesia varies among provinces. Understanding the coherence and complexity of governance settings at a national scale can be overwhelming, since what seems to work in one part of Indonesia, might not be as effective when it is implemented in other parts (Tadjoeddin, 2007). Using a landscape approach, I have focused my studies on a more realistic scale. This allows me to limit the complexity without having to reduce the scope of my analyses of governance settings.

Overarching research questions

A mechanism to enable assessments of the effectiveness of natural resources governance on a regular basis is necessary (Amano et al., 2018) to allow a country to quickly identify changes, make necessary adaptations and re-align them with both multi-level initiatives and the multiple actors' agendas. The assessments ensure that the achievement of the shared goal is still on track.

My thesis focuses on potential solutions to ongoing natural resource governance problems, using case studies located across Indonesia. Regardless of their contextual differences, all my case studies have a similar theme. They portray the struggles of stakeholders to accommodate international initiatives, such as the SDGs, REDD, and the Peatland Initiative, into the complex and conflicting governance settings that are already in place.

I selected and analyzed each case study based on the four elements of effective governance identified above: 1) policy coherence, 2) appropriate participation, 3) agile reflexivity and 4) a structure fit for purpose.

I addressed the following questions:

a. What is the scope and what are the important factors for assessing the governance of natural resources? (**Chapter 2**)
b. What is the state of existing governance in Indonesia at the time of its commitment to the international initiative on sustainable development goals (SDGs), and how does it affect the

implementation of that initiative? (**Chapter3**)

c. How to assess the coherence, effectiveness, and efficiency of an overarching policy, adopting an international initiative in a location that already has complex multi-actor governance, within multiple sectors from four different levels? (**Chapter 4**)
d. How to assess the effectiveness of participation and reflexivity of conflicting international and national initiatives in a multi-actor governance setting, within multiple sectors from four different levels? (**Chapter 5**)
e. How to develop a more appropriate structure for effective governance in Indonesia? (**Chapter 6**)

Research approach

There have been several approaches to assess the effectiveness of a governance arrangement. Alisjahbana et al. (2018) in her attempt to assess Indonesia's readiness for implementing SDGs created a list of questions for which answers are later scored and weighted. Janoušková et al. (2018) used open-ended questions in interviews, and conclusions are drawn from analyzing the tone of overall responses to each question. Morita et al. (2020) in her assessment of a governance system for SDGs in Indonesia used a matrix of criteria and qualitative valuation. Harahap et al. (2017) addressed the conflict of land allocation for multi-sectoral uses through a table of criteria and land mapping. While all the methods are justified and valid for their specific assessments, all these approaches require extensive data collections and therefore are resource-intensive. Adopting such approaches for a regular assessment of natural resource governance in a country as widely diverse as Indonesia might not be feasible, given the financial constraints and the need for timely reporting.

I therefore experiment with an audit mechanism. An audit is a verification of condition (what is) against criteria (what should be) using a set of professionally standardized procedures (Arens et al., 2012; Mautz & Sharaf, 1961). As a tool for professionals, auditing methodology is designed to deal with the cost-benefit dilemma through its mechanism of audit sampling and data collection. Sampled populations in auditing are those deemed to be the riskiest, or the most significant (American Institute of Certified Public Accountant, 1983, 2016). Hence, auditors are entitled to conduct analytical procedures and to establish their professional judgement to determine the audit population, as long as it is done in accordance with the professional auditing standards

(International Federation of Accountants, 2009). Such standards recognize four types of data: documentary, testimonial, observational and analytical data. Documentary data are all electronic or paper-based documents obtained from the auditee. Testimonial data are interviews and focus group discussion with any relevant informant. Observational and analytical data are those produced by the auditors themselves (GAO, 2018; ISSAI 2016a). These data from physical observation (for example inspection, walk-through) and analytics or analysis (Big Data Analytics, Financial Report Analysis) are most crucial for auditors during the determination of the sampled population (Guy et al., 1994). These data are used in three alternative audit assignments: i) a financial audit is designed to determine if the auditee's financial reports are prepared in accordance with the financial reporting standards; ii) a compliance audit is used for assessing the auditee's compliance with certain standards, rules and regulations. Among the compliance audit mechanisms is forest and oil palm certification (FSC, RSPO) and standardization (ISO series); iii) a performance audit is designed to provide an independent and reliable examination of whether auditees have achieved their objectives and intended results in the most economic, effective and/or efficient ways, or whether there is room for improvement (ISSAI, 2016c, 2016d; Kells & Hodge, 2010; Pollitt & Summa, 1997). Assessing effectiveness is one of the three aspects evaluated in a performance audit.

Standardized performance audit procedures include planning (audit objectives, questions, criteria, and methods), conducting (audit evidence and audit findings), reporting (conclusions and recommendations) and feedback. The Audit Objective is to assess the effectiveness of governance arrangements over organizations. Audit questions identify conditions under which objectives may be achieved. The questions should be answered using Audit Criteria of effectiveness which must be obtained through benchmarking the best practices, or referring to suitable theories. Auditors need to apply standardized procedures or Audit Methods to obtain Audit Evidence (a set of corroborative arguments) on actual governance arrangements. The gaps between Audit Criteria and Audit Evidence are the Audit Findings. To be acceptable, each Audit Finding needs to be supported by at least two of four possible types of corroborative Audit Evidence: testimonial, documentary, physical and analytical evidence (ISSAI, 2016b, 2016c). To enable detailed scrutiny, it is necessary that the audit scope and key problem areas are clearly defined and auditable within the time

frame and audit resources available (Figure 1).

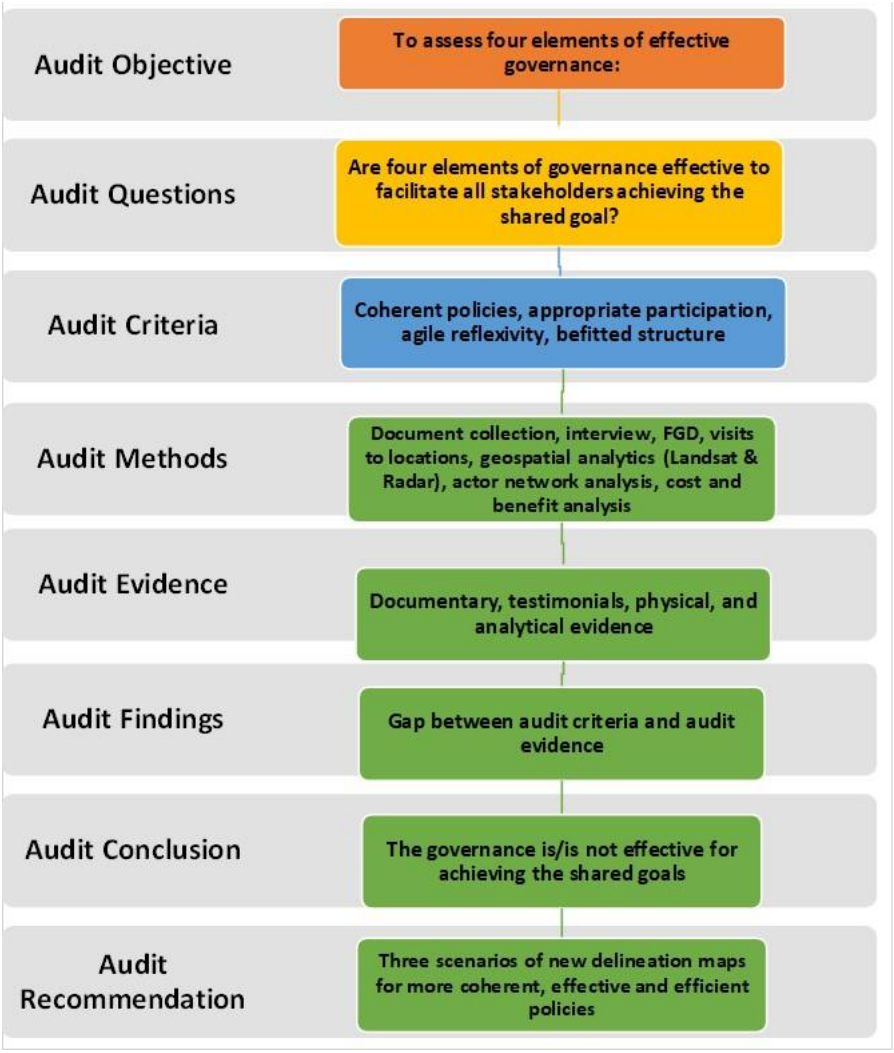

Figure 1. A diagram (Sari et al., 2018) showing the performance audit process, based on the International Standard of Supreme Audit Institutions (ISSAI). An audit process is initiated by defining the Audit Objective, from which the auditor develops the Audit Questions (has the audited object achieved its objective?) and Audit Criteria (what are the preconditions for an audit object to achieve its objective?). An auditor will apply Audit Methods to gather Audit Evidence (the factual condition of an audit object) for testing whether or not the criteria have been met (have the preconditions for an audit object to meet its objectives been achieved?) (FGD: Focus Group Discussions). The gaps between criteria and evidence are the expected Audit Findings. Finally, the auditor should analyze the findings to draw Conclusions and make Recommendations.

Analytical framework

Governance has been analyzed from many different paradigms. Hardin (1968) viewing governance from the perspective of a rationalist, argued that collaboration among people may lead to the act of competitiveness and "survival of the fittest". Stoker (1998) and Rhodes (1997) studied governance from a positivist view, establishing concepts of governance and how it developed as society changed. The studies of

Kaufmann, Kraay, and Zoido-Lobatón (1999), Ostrom (1990b) and Kooiman (1993) are more constructivist, exploring the practice of governance as organizational arrangements and theorizing an updated concept of governance. Exploring a different route, this thesis studied governance through a pragmatist's lens. I explored theories of governance and matched implementation to the real world to propose suggestions for the more sustainable use of natural resources (Dewey, 1916; Rorty, 1982). The findings are applicable only at a particular time and for a particular landscape (Stanley, 2005). I experimented with auditing as a novel instrument for assessing governance (Dewey, 1929; Eldridge, 1998). The audit encompassed multiple aspects of sustainability. The disciplines involved included environmental management, biodiversity conservation and political science, as well as ecology, sociology, hydrology (on the Kampar Peninsula) and accounting. Sustainability governance is a dynamic process of assessing and adjusting settings to relevant changes from multiple factors impacting on collaborative processes. Hence, a multi-disciplinary approach is needed to better understand the system and propose effective alternative solutions (Hopton et al., 2010; Janssen & Goldsworthy, 1996). Figure 2 illustrates my conceptual framework.

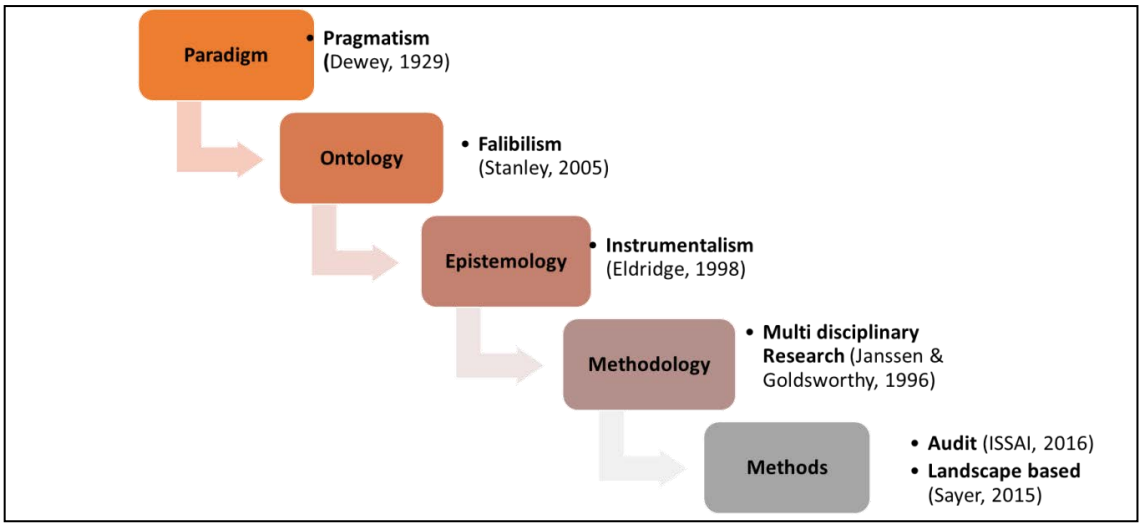

Figure 2. Conceptual framework of thesis.

Thesis outline

Following this chapter, the thesis has six chapters. **Chapter 2** is about determining the scope of audit. I argue that forest governance needs to align with the global agenda of SDGs. Assessing the effectiveness and efficiency of governance arrangements will show whether or not there is such an alignment. Unfortunately, auditing the governance of natural resource use involving multiple actors from many sectors, within several

different jurisdictions, is an overwhelming task. Therefore, I argue for assessing governance at a manageable scale: that of a landscape. In **Chapter 3**, I introduce four landscapes in Indonesia and the governance of SDGs implementation. I synthesize four elements of effective governance: 1) policy coherence; 2) appropriate participation 3) agile reflexivity; and 4) a structure fit for purpose. In **Chapter 4**, I closely examine the first element of effective governance: Policy coherence. I assess the policy coherence, as well as effectiveness and efficiency, of a forested peatland landscape on the Kampar Peninsula, Riau. Indonesia has ratified the global Peatland Initiative, and now attempts to accommodate this agenda into the already complicated governance arrangements. In **Chapter 5**, I use actor network analysis to assess the effectiveness of the second and third elements of governance: Appropriate participation and Agile reflexivity within a particular landscape. This second landscape is in Sendang, South Sumatera, where international initiatives to conserve a wetland of international importance (a Ramsar site) and national actions to protect Sumatran tiger habitat conflict with the established development agenda. In **Chapter 6**, I closely analyze the current structure of governance arrangements for the implementation of SDGs in the four landscapes discussed in Chapter 3, and identify a structure that is more fit for purpose and is likely to accommodate the implementation of SDGs more effectively. In **Chapter 7**, I emphasize the key findings and the overarching messages I wish to convey to the readers of this thesis. I reflect on the contribution of this thesis to both the practice of public sector auditing and the body of knowledge of natural resource governance studies. Finally, I identify the **future directions** that this research may go in and I am hopeful that many more studies like this in the future will be continued by other researchers.

Chapters 2-6 of this thesis can be read separately as stand-alone publications. Three chapters have been published (Chapters 2, 4 and 5), one chapter has been submitted to a refereed journal (Chapter 3), and a version of Chapter 6 will be submitted for publication at a later date.

Thesis structure

Chapter 1: *The governance of natural resource use, effective governance, and the structure of this thesis.*
This is a preliminary chapter which introduces the research as one integrated study, despite its stand-alone chapters.

Chapter 2: Sari, D. A., Margules, C., Boedhihartono, A. K., & Sayer, J. A. (2017). Criteria and indicators to audit the performance of complex, multi-functional forest landscapes. In S. E. Bell & S. Morse (Eds.), *Routledge Handbook of Sustainability Indicators* (pp. 407-426). London, UK: Routledge.

Chapter 3: Sari, D. A., Margules, C., Lim, H. S., Sayer, J., Boedhihartono, A. K., Dale, A. P., MacGregor, C., & Poon, E. (submitted). Performance auditing to assess the effectiveness of the SDGs implementation: A study in Indonesia. *Sustainability*.

Chapter 4: Sari, D. A., Margules, C., Lim, H. S., Widyatmaka, F., Sayer, J., Dale, A. P., & MacGregor, C. (2021). Evaluating policy coherence: A case study of peatland forests on the Kampar Peninsula landscape, Indonesia. *Land Use Policy, 105,* 105396. doi:10.1016/j.landusepol.2021.105396

Chapter 5: Sari, D. A., Sayer, J., Margules, C., & Boedhihartono, A. K. (2019). Determining the effectiveness of forest landscape governance: A case study from the Sendang landscape, South Sumatra. *Forest Policy and Economics, 102*, 17-28. doi:10.1016/j.forpol.2019.01.014

Chapter 6: Sari, D. A., Margules, C., Riggs, R., Boedhihartono, A. K., Sayer, J., Dale, A. P., MacGregor, C. & Gunawan, L. A. (in prep.) *Four levels of governance: A proposed governance structure for more effective implementation of the SDGs in Indonesia*. Prepared for submission to a refereed journal.

Chapter 7: *Auditing the governance of natural resources in Indonesia: Where to from here?*
This is the concluding chapter, and a reflection of how future research should pursue and continue the journey.

During my doctoral studies, I was fortunate to have the opportunity to work with some colleagues on some related projects. I contributed to the following publications which, in many ways, enthused me and sharpened my focus on this thesis:

Riggs, R. A., Langston, J. D., Margules, C., Boedhihartono, A. K., Lim, H. S., **Sari, D. A**., … Sayer, J. (2018). Governance challenges in an Eastern Indonesian forest landscape. *Sustainability, 10*(1), 1-18.

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CHAPTER 2. Criteria and indicators to audit the performance of complex, multi-functional forest landscapes

In S. E. Bell & S. Morse (Eds.), *Routledge Handbook of Sustainability Indicators* (pp. 407-426). London, UK: Routledge.

CRITERIA AND INDICATORS TO AUDIT THE PERFORMANCE OF COMPLEX, MULTI-FUNCTIONAL FOREST LANDSCAPES

Dwi Amalia Sari, Chris Margules, Agni Klintuni Boedhihartono and Jeffrey Sayer

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CHAPTER 3. Performance auditing to assess the effectiveness of the SDGs implementation: A study in Indonesia

Chapter 3. Performance auditing to assess the effectiveness of the SDGs implementation: A study in Indonesia.

Abstract

Regular assessment of the implementation of Sustainable Development Goals (SDGs) is crucial for achieving the goals by 2030, yet approaches to assessing SDGs often require extensive resources and data. Here we use performance auditing as a novel approach to assessing the implementation of SDGs with limited resources and data availability. We argue that a country could assess its governance arrangement, instead of the 169 targets and 242 indicators, to ensure that the implementation was on track, and hence improve the likelihood of achieving the SDGs by 2030.

Indonesia is an archipelagic middle-income country facing challenges in data availability and reliability. These challenges limit the extent to which the achievement of SDGs can be assessed. We applied a standardized performance audit mechanism to assess the effectiveness of current governance arrangements and used Gephi 0.9.2 software for illustrating the regulatory coordination among public institutions.

We found that Indonesia's governance arrangements are not yet effective. This situation could improve if Indonesia: 1) synchronized its SDG regulations; 2) adopted a more fit for purpose governance structure; and 3) involved audit institutions in the current SDG governance arrangement.

Our study will help countries with limited resources and data assess their SDG implementation to achieve the targets by 2030.

Keywords: Governance audit, Indonesia, SDG, trade-off

1. Introduction

The United Nations (UN) Sustainable Development Goals (SDGs) is a powerful yet problematic concept. Sustainability is the process of living within environmental limits to reify ecological constraints (Robinson, 2004). Sustainable development, on the other hand, is the process of enhancing the quality of economic growth, where trade-offs between environmental, social and economic aspects of sustainability are sometimes unavoidable (Lafferty, 1996). When the UN established the SDGs, sustainability or sustainable development was broken down into 17 goals, in turn broken down into 169 targets and 232 indicators, to be achieved by 2030 (Bernstein, 2017; Sachs & Ki-moon, 2015). It is up to the implementing country which direction—sustainability or sustainable development—the SDGs are meant to take (Breuer et al., 2019). Hence, regular assessment of the achievement of SDGs targets and goals is crucial for a participating country to ensure the implementation of SDGs is always in the designated direction (Camacho, 2015).

Many approaches are used for assessing the implementation of SDGs. The International Council for Science suggests systems thinking and analysis to identify the interrelationships among SDGs goals and targets using a semi-quantitative matrix (Griggs et al., 2017). The Sustainable Development Solutions Network (SDSN), a UN entity, uses decision trees, normalization and weighting and aggregation of both official[1] and non-official data[2] (Sachs et al., 2019; Schmidt-Traub et al., 2017). The OECD uses unique progress comparison methods using data from the UN SDGs indicators and the OECD databases only (OECD Publishing, 2019). Moreover, Voluntary National Reviews (VNR) accommodate a wide range of approaches among different countries including gap analysis, multi-criteria analysis, thematic reviews and systems thinking. The databases however, are based on various sources including the country's own national statistics (Allen et al., 2018). The UN dedicates an SDGs Dashboard (https://www.sdgsdashboard.org/), an interactive website that enables stakeholders from any country to put their information regarding the SDGs into an online platform. All these assessment approaches require extensive data and resources to produce reliable analyses and results.

The need for reliable and extensive data and resources has made assessing the implementation of SDGs in Indonesia challenging. Obtaining reliable data in an archipelagic developing country, spanning more than 17,000 islands and populated by 275 million people is a major task

[1] Such as data from WHO, World Bank, OECD

[2] Such as data from civil society networks and peer-reviewed journals

(Rahadiana & Listiyorini, 2019; Taylor, 2020). Indonesia's administrative entities, 34 provinces, and 514 districts or cities with contrasting wealth and social capacity (Peraturan Menteri Dalam Negeri, 2017a), had complex tasks to perform even before the introduction of the SDGs (Soegiono, 2018).

Another challenge for assessing the implementation of SDGs in Indonesia, is its often-changing policy environment. Before committing to the SDGs in 2015, Indonesia's overarching policy had been the exploitation of natural resources (Li, 2007). This policy saw Indonesia grow to become one of the world's top 20 richest countries, yet its rapid deforestation rate is a global concern (Pirard et al., 2015). Once it committed to the SDGs, Indonesia began to participate more in climate change mitigation and environmental protection (Den Elzen et al., 2016). This shift in policy placed Indonesia on a rank of 98 out of 162 countries listed on the SDGs implementation index in 2016 (Sachs et al., 2016).

The policy changed again in 2017. Many existing long-term contracts for natural resource exploitation were invoked to further develop infrastructure (Dutu, 2016). The need to feed its large population (Neilson & Wright, 2017) has inevitably led to more development initiatives. Since 2017, Indonesia, partnering with China in the "Belt and Road Initiative", has constructed many infrastructure projects throughout the country (Negara & Suryadinata, 2018). Such policy changes require some trade-offs with environmental protection (Brown & Brown, 2020; Sloan et al., 2018), as reflected in Indonesia's SDGs implementation index (Sachs et al., 2018, 2019). Implementing the SDGs has made reconciling conflicts of interest in the use of natural resources a see-sawing affair (Dianjaya & Epira, 2020). Conflicting policies implies that abiding by one set of regulations may mean transgressing others (Engel et al., 2006; Lynch & Harwell, 2002). Achieving one goal may hinder the achievement of other goals (Nilsson et al., 2012).

This situation leads to two research questions:

1. Are current Indonesian governance arrangements effective enough to implement and achieve all 17 SDGs goals?
2. Is there room for improvement?

The objective of this study is to show how performance audits would allow Indonesia to assess the effectiveness of the governance arrangements it currently has in place, for implementing the SDGs. Our hypothesis is that the current governance setting in Indonesia is not effective enough for successful implementation. In other words, the collaborative processes among governments, businesses, communities, and NGOs to achieve shared objectives are currently not up to the

task of achieving all 17 SDGs. Priorities will have to be set and trade-offs will have to be made. We argue that the existing governance arrangements do not allow for different priorities among the many different communities of people and their different social, cultural and economic conditions, nor allow trade-offs to be made. To test this hypothesis, we assessed the effectiveness of the governance of SDGs implementation in four different provinces of Indonesia, as case studies, using audit methods.

This paper is structured in the following way. Section 2 provides background on the selected provinces and the reasons for nominating these as case studies. Together, they represent the diversity of environmental, social and economic regimes existing in Indonesia. Section 3 discusses the concept of effective governance and why it is important to assess the effectiveness of governance arrangements. We derived criteria for effective governance by evaluating existing governance frameworks and searching the literature. Section 4, the methods, provides details of the research methodology. Standardized audit methods by International Standards for Supreme Audit Institutions (ISSAI) were applied. We then used the criteria derived from those methods to assess the governance of SDGs implementation in the four provinces: Riau, Maluku, South Sumatra (Sumatera Selatan, or Sumsel), and West Nusa Tenggara (Nusa Tenggara Barat, or NTB). Section 5 presents the results, including audit findings and Section 6 is the discussion and conclusions. Typically, audit findings are supported by audit evidence, which is supplied in large part in narrative form. Therefore, some material that would usually be found in the discussion section of a paper is reported in the results section where it relates directly to audit findings.

2. Landscapes in Indonesia

Indonesia is an archipelago (Figure 1) that varies greatly from one place to another (Badan Pusat Statistik, 2020). Java is the most populated and prosperous island in Indonesia, and hosts the capital city, Jakarta (Azizi, 2020). Sumatra, Java's neighboring island to the west, is the second most populated. Both Riau and South Sumatra (referred to hereafter as Sumsel, a contraction of Sumatera Selatan) are found on this island. Rich in natural resources, its proximity to the capital city facilitates the distribution of wealth from Java to Sumatra. At the other extreme, Maluku and West Nusa Tenggara (referred to hereafter as NTB, for Nusa Tenggara Barat) are both made up of groups of smaller islands and are among the poorest provinces in Indonesia. Both are located a long way from Jakarta. They are situated in the Wallacea global biodiversity hotspot, named after Alfred Russel Wallace, the co-discoverer

with Charles Darwin, of the theory of evolution. Wallacea is rich in biodiversity and has many rare and endemic species (Sangadji, 2014).

Figure 1. Map of Indonesia and showing the location of the four provinces used in this study. Inset: Riau, Sumsel (a contraction of Sumatera Selatan, South Sumatra), NTB (Nusa Tenggara Barat, West Nusa Tenggara), and Maluku. Images from Google maps.

These four provinces have contrasting wealth, size and level of industrial development (Table 1). Riau is the fifth richest province in Indonesia. Some of the world's biggest corporations, including Asia Pacific Resources International Holdings Ltd (APRIL) and Chevron, operate in Riau (Sinabutar et al., 2014). Similarly, Sumsel is the seventh richest province (BPS Provinsi Sumsel, 2020). In contrast, Maluku is the third poorest province (BPS Provinsi Maluku, 2019), while NTB is the sixth poorest (BPS Provinsi NTB, 2018). The data and observations used in this study were collected from Riau between 2017 and 2019, from Sumsel between 2016 and 2019, and from Maluku and NTB between 2017 and 2019.

Table 1. Differences among four provinces in Indonesia 2016-2018

Description	Riau	Sumsel	Maluku	NTB
Wealth (Rupiah)	755 trillion	420 trillion	43 trillion	124 trillion
Population	6.34 million	8.1 million	1.7 million	4.8 million
Development focus	Oil, plantations, forestry, mining	Oil, plantations, mining	Tourism, fisheries, spices, mining	Tourism, fisheries, mining
Challenges	Corruption, inequalities, and climate change	Land use conflicts, deforestation, and climate change	Poverty, unemployment, and climate change	Poverty, natural disasters, and climate change

https://databoks.katadata.co.id/datapublish/2019/07/31/inilah-pdrb-34-provinsi-di-indonesia-pada-2018; (Hardjono, 2017; Peraturan Menteri Perindustrian Republik Indonesia, 2015; Rastika, 2014; Rijoly & Rum, 2017; Wijaya, 2016; Wulandari, 2016).

3. Effective governance

Many frameworks propose a recipe for what is considered to be "good governance" (Agere, 2000; FAO, 2011; Kaufmann et al., 1999; UNDP, 2002; World Resource Institute, 2013). While these frameworks provide valuable parameters for assessing governance, complying with all the criteria does not necessarily ensure the successful achievement of goals (Ansell & Gash, 2008). Effective governance—a step further than good governance—is the process of collaborations enabling all stakeholders in one specific governance arrangement, to compromise and achieve their collective goals despite their different individual agendas (Bommel et al., 2016; Sørensen & Torfing, 2009).

We identified the following four principles that are crucial for more effective governance of sustainable development in Indonesia (see Chapter 1): 1) coherent policies, 2) appropriate participation in policy-making and delivery, 3) agile reflexivity in decision-making, and 4) institutional structures that are fit for purpose (Glass & Newig, 2019; Kemp et al., 2005; Ostrom, 1990; Rhodes, 1997).

3.1. Policy coherence

The Organization for Economic Co-operation and Development (OECD) framework defines coherent policies as optimizing trade-offs for economic, social, and environmental dimensions of SDGs and synchronizing the objective of international initiatives with domestic policies (OECD, 2015, 2016, 2017, 2018). Picciotto (2005) and Nilsson et al. (2012) describe policy coherence as a condition in which both vertical policies—international, national, provincial and

local levels—and horizontal policies—environment, agriculture, mining, infrastructure and industry sectors—enable synergistic collaboration of governance actors for achieving collective goals. Lambin et al. (2014), describe synergistic collaboration as interactions between governance actors that are either substitutable for, or complementary with, one another. Policy coherence then is synergistic policies that originate from multiple levels and multiple sectors, which enable acceptable trade-offs for all stakeholders to achieve both their collective and individual agendas.

In Indonesia, the implementation of SDGs is exercised by more than 600 government institutions from multiple sectors at ministerial-, provincial-, and district-levels[3]. Synthesizing the regulations with the literature, we therefore determine that the criteria for policy coherence are:

1. Multi-level policy coherence occurs when policies from the SDGs, government legislation, Presidential Regulations, Ministerial Regulations, and Provincial Regulations, are synergistic towards one another[4].
2. Multi-sector coherence occurs when policies among different ministries regarding the implementation of SDGs are synergistic towards one another.

3.2 Appropriate participation

Participation is a process of making a collaborative decision among stakeholders about what they want, what the options are and what they plan to do to make it happen (Bracht & Tsouros, 1990; Sinclair, 2004). Appropriate participation, however, is about striking the right balance. Lack of participation leads to conflict among stakeholders and hinders the achievement of governance goals. Too much participation means extra work, extended time, and additional resources, which might not be worth the effort (Dahl, 1973; Fung, 2006). There are five levels of participation: 1) supportive, when the least powerful stakeholder, such as a local community, is granted power to control decision-making; 2) collective action, when all stakeholders form a partnership for decision-making; 3) joint decision-making, when all stakeholders contribute their ideas and options for making the most acceptable decision, 4) consultation, when some

[3] Indonesia has 54 ministries, each with 3-7 directorates, and 34 provinces, each with 8-15 departments/boards involved in SDG implementations.

[4] Up until 2021, none of the districts and cities have issued regulations on SDGs since the Presidential Decree only made it compulsory for provinces to issue regulations on SDGs.

dominant stakeholders become the decision-making body and offer some options to the rest, asking for feedback; and 5) information, when the decision-making body informs other stakeholders about decisions they have previously made (Arnstein, 1969; Wilcox, 1994b). Each decision-making process requires different levels of participation depending on which phase the participation is at, and which stakeholders contribute to the decision-making.

There are four phases of participation in a governance arrangement (Figure 2).

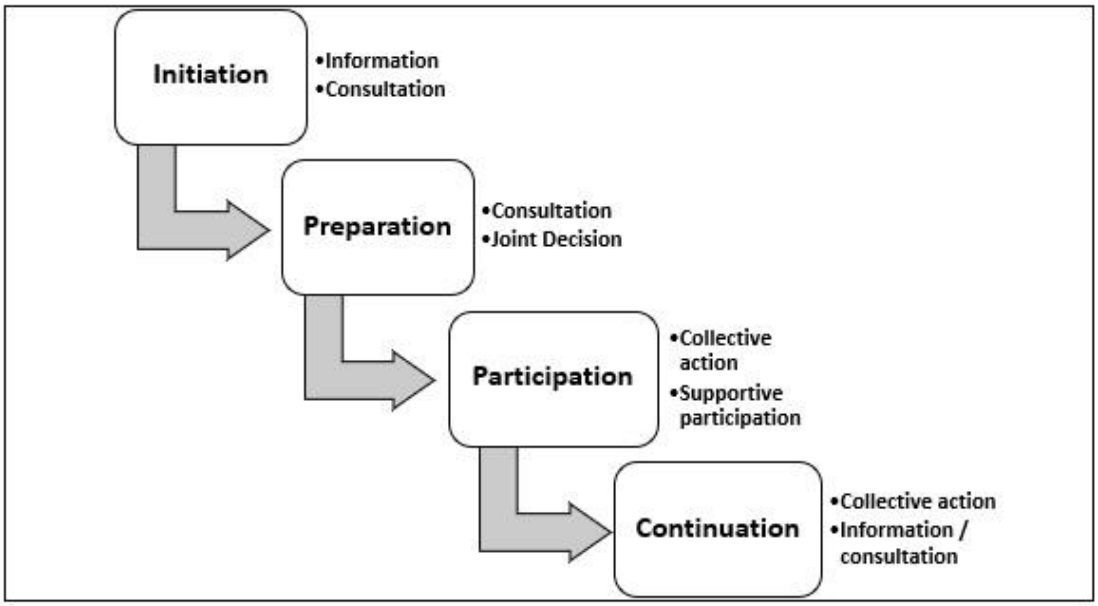

Figure 2. Levels of participation and the phases of governance (Arnstein, 1969; Bracht & Tsouros, 1990; Sinclair, 2004; Tritter & McCallum, 2006; Wilcox, 1994b).

The **Initiation** phase is the earliest stage where the ideas are introduced. At this stage, information and consultation are more appropriate as the decision-making is at the strategic level. The decision for ratifying SDGs and accommodating the targets into local governance arrangements, for example, does not need participation from every citizen of Indonesia.

The **Preparation** phase is when the collaborations and interactions of different stakeholders are thought through. At this stage, consultation and joint decision-making are more appropriate since the decision-making is at the managerial level. For example, the decision on designing the most effective governance arrangement for SDGs implementation should involve collaborations between all relevant government institutions, technical managers and experts, but does not need to involve all citizens.

The **Participation** phase is when governance is implemented. At this stage, collective action and supportive participation are the most appropriate since SDGs require all stakeholders to implement the goals and targets.

The **Continuation** phase is when governance has been implemented and has or has not reached its goals. At this stage, the level of participation depends on the success of previous stages. The level of participation can return to information and consultation if the current governance arrangement has successfully been implemented and new arrangements for other goals have been initiated. However, if it has not yet been successfully implemented, the level of participation can return to collective action and the process repeated (Sinclair, 2004; Tritter & McCallum, 2006; Wilcox, 1994a).

According to Indonesia's SDGs roadmap, Indonesia was in the implementation phase during the time of this study (2018/2019) (Ministry of National Development Planning, 2018). Implementation requires full participation of all stakeholders through either collective action or supportive participation (Wilcox, 1994b). Hence, the criterion for appropriate participation is whether the implementation of SDGs shows evidence of collective action or supportive participation among all stakeholders[5]. These include local communities (both regular societies and customary people (*adat*), governments, business actors, and NGOs from many different levels (international, national, provincial, district, sub-district and village) and sectors (such as healthcare, education, agriculture, industry, forestry, mining, and infrastructure).

3.3 Agile reflexivity

Reflexivity refers to the forward-looking, analytical, and investigatory mindset of trying to predict the long-term impact of, or problems or conflicts arising from, current actions of stakeholders (Feindt & Weiland, 2018; Voss & Kemp, 2006). Agile reflexivity is flexibility in finding solutions to policy problems and public service issues, especially in responding to the dynamics of public demands, preferences and socioeconomic conditions (Sørensen & Torfing, 2009). There are five elements in an agile reflexivity: 1) an in-depth, multidisciplinary understanding across social, economic, and environmental aspects of sustainability; 2) adaptive strategies and experiments for anticipating uncertainty; 3) anticipation of long-term impacts of

[5] Indonesia's SDG Secretariat through the Ministry of Informatics and Communications provides a website called One Data (Portal Satu Data) at https://data.go.id/ for everyone to participate in the achievement of SDGs. The Ministry of National Development Planning also authorizes the Ministry of Village, Development of Disadvantage Regions to distribute the SDG targets into local villages in all provinces in Indonesia.

potential failure of a sustainability approach; 4) collective goal formulation; and 5) collaborative strategy-making (van Zeijl-Rozema et al., 2008; Voss & Kemp, 2005). We further adjusted these five elements with Indonesia's governance arrangements to determine the audit criterion as follows.

Indonesia possesses agile reflexivity if the following conditions are met: 1) an in-depth understanding of the 17 SDGs is achieved among all stakeholders; 2) there is an embedded mechanism for anticipating uncertainty and conflicts among stakeholders regarding the implementation of the SDGs; 3) there is an anticipation and projection of future impacts and the possibility of failure during the implementation of the SDGs; 4) there is evidence of the participation of stakeholders in the adoption of Indonesia's SDGs and targets; 5) there is evidence of the participation of stakeholders in the formulation of Indonesia's strategy for achieving the SDGs and targets.

3.4 A governance structure fit for purpose

A governance structure that is fit for purpose is one that can support the multi-level and multi-sectoral coherence of policies, accommodate appropriate levels of participation and enable agile reflexivity in governance arrangements. In theory, there are three different structures of governance: hierarchical, co-governance and self-governance (Arnouts et al., 2012; Kooiman, 2003).

The practice, however, often demonstrates a mixture of the three: 1) Hierarchical governance is a vertically structured arrangement where the stakeholders are stratified in a hierarchy (typically top-down). To be effective, a hierarchical governance structure should have a governing body with sufficient power and authority to influence the behavior of other stakeholders, voluntarily or involuntarily through reward and punishment (Hill & Lynn, 2004). 2) Co-governance is a horizontally structured arrangement where all stakeholders possess relatively equal power. An effective co-governance structure should have an intermediary and/or an established mechanism to facilitate communication, coordination, and collective actions among stakeholders for accommodating both different agendas and shared goals (Kooiman & Bavinck, 2005). 3) Self-governance is a scattered arrangement where each of the stakeholders forms their own governance structure, and should have three pre-conditions: a) the establishment of a policy and governance structure that collaborates in a social political autonomy. An effective self-regulation is indirect and is not associated with particular stakeholders; b) the governance structure can accommodate unstructured collaboration, such as network governance, poly-centric governance and meta-governance; and c) the interactions among stakeholders are such

that these governance actors possess the autonomy to govern themselves spontaneously (Kooiman & Van Vliet, 2000; Ostrom, 2010).

The audit criterion for a governance structure that is fit for purpose was defined as:

a) If the governance structure is hierarchical, the only governing bodies are Indonesian government institutions. These institutions should be equipped with the authority to issue policies and regulations and should have sufficient power or influence to enforce implementation by all stakeholders with inducements or punishments (Bergh & Lawless, 1998).

b) If the governance structure is co-governance, the governing body is an actor who takes on the role of an intermediary, which is agreed to by all stakeholders. The intermediary should possess adequate authority to limit and balance the power of all governance actors to enable fair appropriation of power and influence among stakeholders (Ackerman, 2004).

c) If the governance structure is self-governance, none of the stakeholders are the absolute governing body. There should be a mechanism that allows all actors to have appropriate self-autonomy to form governance clusters and to enable intervention with other clusters if they are deemed to conflict with shared goals (Ostrom, 2005).

We adapted them for Indonesian conditions using the published report on SDGs implementation in Indonesia as of December 2019 (Republic of Indonesia, 2019). Table 2 summarizes these audit criteria.

Table 2. Criteria for effective governance arrangements for the implementation of SDGs in Indonesia, by the three types of governance structures described in Section 3.4.

Governance criterion	Hierarchical	Co-governance	Self-governance
Policy coherence	Government institutions hold the highest authority/responsibility to initiate SDG implementation.	All stakeholders are authorized and responsible for implementing SDGs. However, certain stakeholder(s) are/is nominated as the intermediary.	All stakeholders are authorized and responsible for implementing SDGs in silos. Every stakeholder has an absolute autonomy to form clusters or to intervene with other clusters if necessary.
Appropriate participation	Information and consultation	Collective action and supportive participation	Supportive participation

Agile reflexivity	Government initiates endeavors for: 1) socializing SDGs among all stakeholders 2) anticipating uncertainty and conflicts among stakeholders 3) anticipating future impacts and the possibility for failure 4) stakeholder participation 5) formulating the strategy for achieving the SDGs and targets.	Intermediary initiates endeavors for: 1) socializing SDGs among all stakeholders 2) anticipating uncertainty and conflicts among stakeholders 3) anticipating future impact and the possibility for failure 4) stakeholder participation 5) formulating the strategy for achieving the SDGs and targets.	All stakeholders initiate endeavors for: 1) socializing SDGs among all stakeholders 2) anticipating uncertainty and conflicts among stakeholders 3) anticipating future impact and the possibility for failure 4) stakeholder participation 5) formulating the strategy for achieving the SDGs and targets.
Structure fit for purpose	Strong state regulation & arrangement	Effective intermediary	Mechanism to allow intervention with other clusters if required.

4. Methods

We used a performance audit framework to assess the effectiveness of Indonesia's SDGs governance setting. There are other approaches for assessing governance, such as using quantitative scoring and qualitative checklists (Dearden et al., 2005; Santiso, 2001; Yont et al., 2018). While these methods are suitable for assessing governance, collecting reliable data in Indonesia is challenging due to the country's complexity (Lewis, 2015) and changing regulations (Negara, 2015). Auditing is more practical because it allows analytical procedures and an auditor's professional judgement as mechanisms to reduce complexity (American Institute of Certified Public Accountant, 1983). An audit is a comparison of "what should be" (the criteria) with "what is" (the condition), using at least two of four types of evidence: documentary, testimonial, physical, and analytical evidence (Mautz & Sharaf, 1961).

Following the standard performance audit framework of International Standards for Supreme Audit Institutions (ISSAI) this audit was conducted in eight stages (ISSAI, 2016a, 2016b):

1. **Audit objective** is the goal to be achieved. In this audit, the goal was to assess whether the current governance setting is likely to enable achievement of the 17 goals and 169 targets by 2030. This objective was then formulated into a researchable audit question.
2. **Audit question** "Is the current governance arrangement of SDGs implementation in Indonesia effective for achieving the 17 goals by 2030?"

3. **Audit criteria** were determined to be the four principles of effective governance described above: i) policy coherence; ii) appropriate participation; iii) agile reflexivity; iv) a structure fit for purpose.

4. **Audit methods** included: collecting documents, conducting interviews and validating the different data sources. We used the analytical tool, Gephi 0.9.2 to map the relevant actor network and provide an illustration of multi-actor interactions and the influence each actor has relative to the other actors (Bastian et al., 2009). Margules et al. (2020) provide an introductory overview of network analysis.

5. **Audit evidence** was derived from the material collected in the previous stage to support our portrayal of the actual conditions.

6. **Audit findings** were determined by comparing audit criteria with audit evidence and identifying any gaps between the two.

7. **Audit conclusions** were derived from similar audit findings that displayed certain patterns of problems.

8. **Audit recommendations** include any suggestions by auditors for more effective governance settings.

4.1 Audit techniques and Audit evidence

We applied different audit methods to collect audit evidence for each criterion. For the two parts of the criterion on policy coherence, data regarding the multi-level and multi-sectoral policies for the adoption of SDGs in Indonesia were examined. For multi-sectoral coherence, we identified which ministries are given responsibility to implement each goal and we mapped the regulations issued by these ministries for accommodating the SDGs. For multi-level coherence, we traced the derivation of the SDGs to government legislation, Presidential Regulations, Ministerial Regulations and Provincial Regulations.

Similarly, for the assessment of appropriate participation, we collected information from online journals, websites, media and databases to determine if there was some sort of online platform for participation of all stakeholders. We also conducted interviews with local communities, businesses, government officials and NGOs to confirm the previous information and collect any additional supporting documents or evidence.

For the assessment of agile reflexivity, we obtained documents on law, legislation and regulations from government institutions regarding the strategic policy for unpredictable

situations, conflicts and long-term trade-offs. We then conducted interviews with representatives of all stakeholder groups to verify if the written policy was actually implemented.

Likewise, we assessed the "fit for purpose" governance structure by gathering evidence of the interactions of multi-sectoral and multi-level policies through government documents, interviews and online websites, media or databases. From the regulations, we identified and mapped an actor network, using Gephi.0.9.2 software, to illustrate the governance structures available to support the implementation of the SDGs from ministries to local governments (Bastian et al., 2009).

5. Results (Audit findings)

Our findings revealed gaps between criteria and conditions as shown in Table 3. The evidence for the findings (Condition column, Table 3) is provided in the discussion of each criterion, below this table.

Table 3. Summary of audit findings.

Elements of Effectiveness	Criteria	Condition	Result
Policy coherence - Multi-level policy coherence - Multi-sectors policy coherence	Policies, from the SDGs, government legislation, Presidential Regulations, Ministerial Regulations and Provincial Regulations are synergistic towards one another. Policies among different ministries regarding the implementation of SDGs are synergistic towards one another.	The UN SDGs complements the relevant Basic Law, Government Regulations, Presidential Regulations, Ministerial Regulations, and Provincial Regulations. The hierarchical government structure proclaimed in the Constitution of 1945, however, contradicts the co-governance SDGs structure suggested by the UN and adopted by the Ministry of Development Planning Some ministries contradict each other due to the conflicting nature of their sectors. Ministry of Public Works, Ministry of Industry, Ministry of Agriculture and Ministry of Mining naturally contradict the Ministry of Environment & Forestry and Ministry of Marine Affairs	Non-coherent multi-level policies Non-coherent multi-sector policies

Appropriate participation	Indonesia moved to the SDGs implementation stage in 2018. Hence, the type of participation should be collective action or supportive participation	The types of participation applied in Indonesia are currently still at the consultation stage. Some provinces in Indonesia therefore improvise with their own mechanisms to enable more collective participation.	Lack of appropriate participation
Agile reflexivity	Multi-disciplinary understanding across social, economic, and environmental aspects of sustainability. Anticipation of uncertainty through adaptive strategies and experiments Anticipation of long-term impacts of potential failure of a sustainability approach Collective goal formulation, and Collaborative strategy making	Lack of in depth, multi-disciplinary understanding across social, economic, and environmental aspects of sustainability among stakeholders. Lack of adaptive strategies to anticipate uncertainty. Lack of anticipation of long-term impacts of the potential failure of a sustainability approach. Lack of collective goal formulation. Strategy making not yet collaborative.	Lack of agile reflexivity
Structure fit for purpose	The policy coherence, participation level and reflexivity mechanism should be reflected in a fit for purpose structure. Hierarchical governance should have strong state leadership and less participation; co-governance should accommodate an effective intermediary for more supportive participation; and self-governance should allow a mechanism for interference and equal contribution for collective action	Indonesia's governance structure is a mixture of co-governance and self-governance. The Ministry of Development Planning lacks the authority to become an effective intermediary for initiating participation. Hence, provinces having the obligation to implement SDG develop their own mechanism for SDG governance.	Structure is not fit for purpose

5.1 Policy coherence

Vertically, almost all policies regarding the adoption of the SDGs from the UN to the country, and on to the local level, are coherent (Table 4). The 17 SDGs complement Indonesia's long-term development planning (RPJP) and National Five-Year Development Planning (RPJMN), which is underpinned by the national strategy of "*Nawa Cita*" or the nine goals (Soleman & Noer, 2017). Some issues which have not yet been clearly addressed in both RPJP and RPJMN, such as gender equality and environment, are revealed by the SDGs, making it more likely that they will be addressed in future.

Table 4. Multi-level policies concerning SDG.

Rules/Regulations	Key instruments		Remarks
UN	UNSDG	17 Sustainable Development Goals	The UNSDG is synergistic with state principles, the constitution and the basic laws. Panca Sila and UUD 1945 have not yet specifically mentioned environmental issues and gender equality, hence the SDG complement both well. UU 25/2004 and UU 17/2007 are in substitution with the SDG since all the 17 goals have been devolved into these long term development planning. Meanwhile, UU 23/2014 about local governments gives a mandate for local governments to support the national development plans.
State Principles	Panca Sila	5 principles of Indonesia	
Constitution	UUD 1945	Constitution: Article 4 (1)	
Basic Law	UU 25/2004	Law on National development planning system	
	UU 17/2007	Long Term National Development Planning 2005-2025	
	UU 23/2014	Local governments	
Presidential Regulation	Perpres 2/2015	Mid Term National Development Planning 2015-2019 (RPJMN)	These presidential regulations are substitutable with the long term development plan. All the 17 SDG are incorporated in the RPJMN and RKP. The presidential regulation no 59/2017 has tied all the adoption of SDG with its guidance on the process for adopting and implementing SDG in Indonesia.
	Perpres 59/2017	Implementation of Sustainable Development Goals in Indonesia	
	Perpres 72/2018	Annual National Development Planning 2019 (RKP)	
Ministerial regulation of National Development Planning	Permen 38/2017 and Permen 112/2017	Strategic coordination team for SDG implementation	The regulations are in coherence with SDG and all the higher level regulations, except for the Constitution 1945. In the constitution, Indonesia's structure is hierarchical, however, the UNSDG and Permen 7/2018 propose for non hierarchical structure.
	Permen 7/2018	Coordinating, planning, monitoring and reporting the implementation of SDG	
Provincial regulation	Perda 7/2014	Mid Term Development Planning Riau Province 2014-2019	The provincial regulations are in complementarity with the SDG and its targets. All provinces have accommodated SDG and most of its 169 targets into its Mid Term Development Planning (RPJMD), especially for targets from goal 1 to 10. None of the provinces have managed to devolve all the 169 targets due to various technical reasons, such as inapplicability to local context and lack of data integration to produce the required statistics.
	Perda 9/2014	Mid Term Development Planning Sumsel Province 2014-2019	
	Perda 1/2019	Mid Term Development Planning Sumsel Province 2019-2024	
	Perda 2/2014	Mid Term Development Planning NTB Province 2013-2018	
	Perda 1/2019	Mid Term Development Planning NTB Province 2019-2024	
	Perda 21/2014	Mid Term Development Planning Maluku Province 2014-2019	
Provincial Governor Regulation	PerGub 34/2019	Annual Development Planning 2018 Riau	All annual development planning complement the SDG and its targets.
	PerGub 26/2019	Annual Development Planning 2018 Sumsel	
	PerGub 19/2019	Annual Development Planning 2018 NTB	
	PerGub 22a/2018	Annual Development Planning 2018 Maluku	

Indonesia's National Action Plan (RAN), on the implementation of the SDGs targets (Peraturan Menteri Perencanaan Pembangunan Nasional, 2018) is substitutable with the Annual Development Plan (RKP) 2018. The RKP is also the guideline for the Ministry of Finance to

plan the national annual budget (RAPBN) and for each ministry to apply for its annual ministerial budget (APBN) (Peraturan Pemerintah Republik Indonesia, 2017). Likewise, all four provinces have adopted the 169 targets from the RAN into their Provincial Action Plans (RAD).

Some ministries implement their specific SDGs programs only within a particular province. For example, the Ministry of Marine Affairs and Fisheries has its "Blue Economy" program in NTB; the Ministry of Environment and Forestry has its Peat Restoration and Conservation Program in Riau; the Ministry of Industry has its Special Economic Zone (KEK) in Sumsel; and the Ministry of Infrastructure has its development corridor project "Trans Maluku" in Maluku province. In all programs, the provincial governments have provided support and included the programs of the ministries in their own RAD[6] (Peraturan Presiden Republik Indonesia, 2019b). The provinces' RAD is also substitutable with the provincial five-year development plan (RPJMD) and the provincial annual development plans (RKPD). The RKPD is the guideline for allocating the available resources and budgeting the relevant programs and projects in the provincial Annual Budget Plan (RAPBD). This budget plan is established as the provincial Budget Plan (APBD) (Peraturan Menteri Dalam Negeri, 2017b). The annual reports of both ministries and provincial governments on SDG implementation and budget acquittals either complement or are substitutable with one another.

The only incoherence in multi-level policies is regarding the governance structure. The UN proposes non-hierarchical governance for the implementation of SDGs (Bernstein, 2017). In an effort to comply with this, Indonesia issued Presidential Regulation 59/2017 requiring the Ministry of National Development Planning (referred to hereafter as Bappenas) to take the lead on SDGs implementation in Indonesia (Peraturan Presiden Republik Indonesia, 2017). Responding to the task, Bappenas later issued Ministerial Regulation 7/2018 explaining the mechanism for coordinating collaboration among all stakeholders for implementing SDGs (Figure 3) (Peraturan Menteri Perencanaan Pembangunan Nasional, 2018).

[6] For example, the Ministry of Maritime and Fisheries has implemented the "Blue Economy" program in NTB province. The Department of Fisheries at NTB province needs to adjust the program to its own Action Plan (RAD) accordingly.

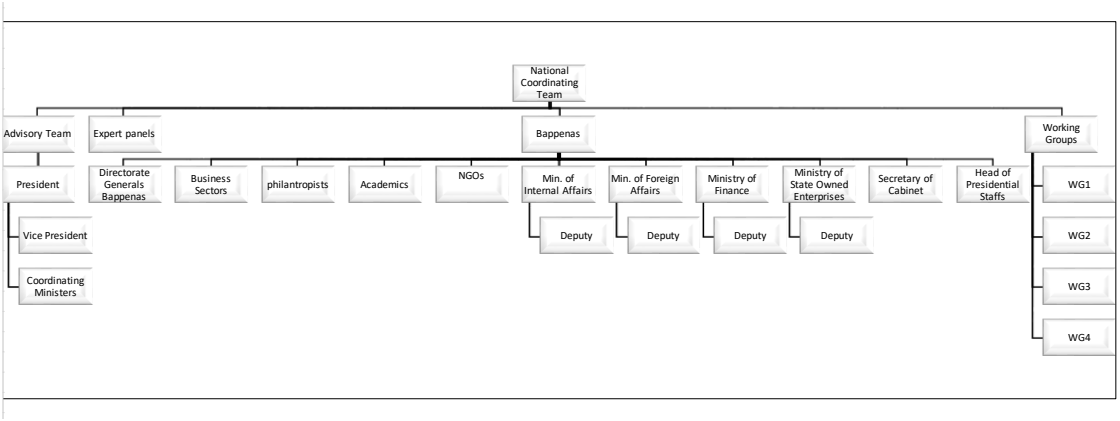

Figure 3. The co-governance structure arising from Presidential Regulation 59/2017 and Ministerial Regulation 7/2018, on the implementation of SDGs in Indonesia. Each Working Group (WG) has its own responsibility. WG1: Social Development; WG2: Economic Development; WG3: Environmental Development; WG4: Justice and Governance.

While authorizing Bappenas as the only coordinating ministry is coherent with the non-hierarchical governance[7] proposed by the UN, it contradicts the Constitution of Indonesia on political structure. The Constitution established five hierarchical levels of governance, where several coordinating ministries are designated to have higher authority than Bappenas, and other ministries have equal authority with Bappenas (Figure 4). Moreover, the Constitution stipulates that the Ministry of Internal Affairs is to lead and coordinate with provinces and districts or municipalities (Undang Undang Dasar Republik Indonesia, 1945). Presidential Regulation No 59/2017, delegating the role of leading and coordinating all ministries to Bappenas, contradicts this stipulation (Figure 4).

[7]"governing through goals"

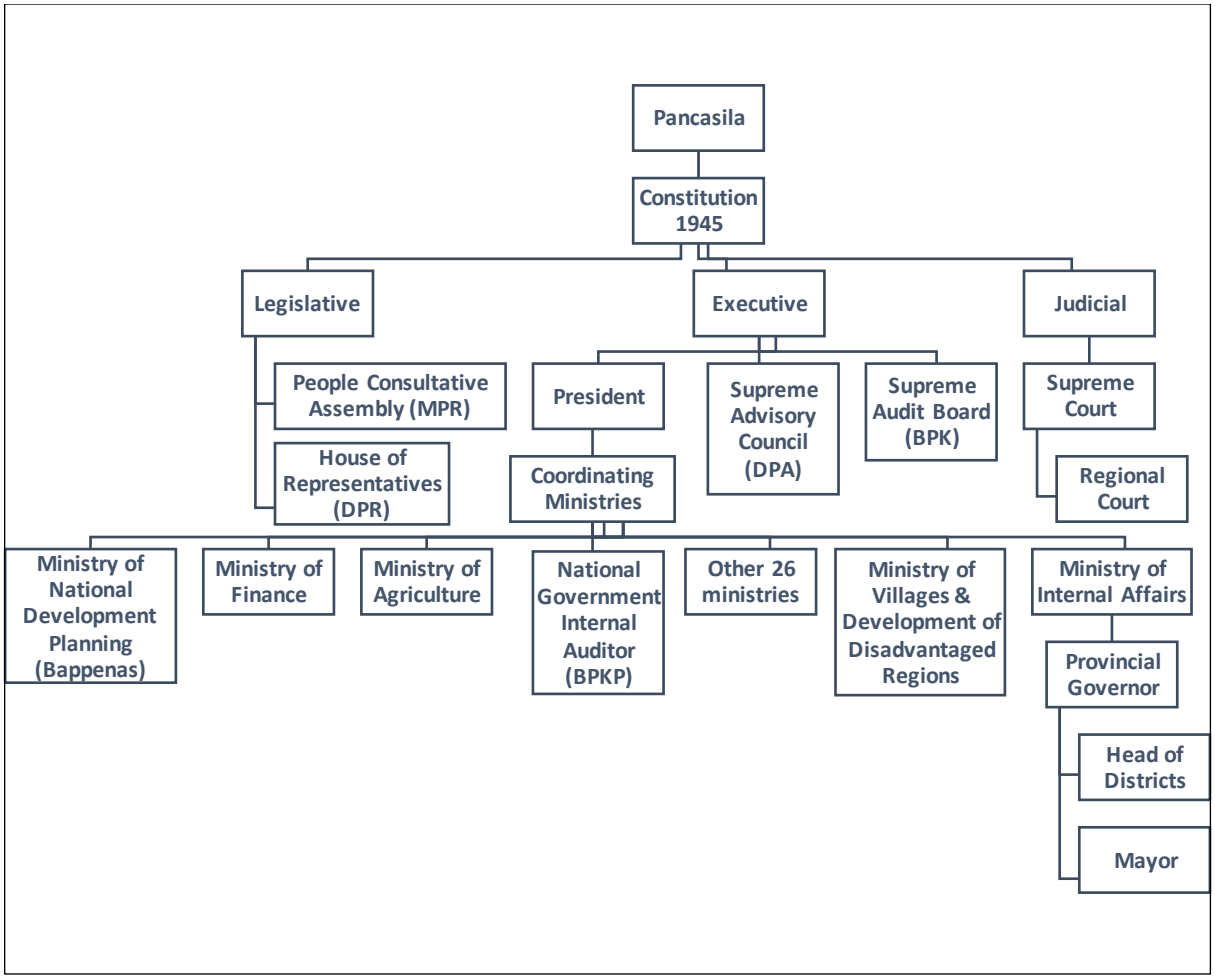

Figure 4. The hierarchical structure of the governance of Indonesia according to the Constitution of 1945. There are 34 ministries, but for simplicity we have shown only the six ministries most relevant to SDGs.

Horizontally, some policies for achieving the SDGs and their targets are incoherent. At the UN-level, some goals are synergistic with each other, and some require trade-offs (Griggs et al., 2014; Mainali et al., 2018; Nilsson et al., 2018). Goals such as 1 Eliminate Poverty, 2 End Hunger, 3 Provide Good Healthcare, and 4 Deliver Education, are likely to support one another. Yet, goals 6 Clean Water and Sanitation, 14 Life Below Water, and 15 Life on Land, potentially may conflict with goal 9 Industry, Innovation, and Infrastructure, or vice versa (Meadowcroft et al., 2005; Morrison-Saunders & Pope, 2013). Looking into the targets, similar potential contradictions are present; within the energy sector for example, about 69 targets are inconsistent with one another (Nerini et al., 2018). Nevertheless, these conflicting goals and targets seem less problematic—and even necessary at the UN-level—to accommodate the conflicting nature of sustainability itself.

When adopted by Indonesia at the national- and local-levels, the incoherent goals have made it hard for the relevant ministries to have synergistic policies. At the national-level, Indonesia—

through Bappenas—allocates SDGs and targets to the relevant ministries, who then adopt the goals into their specific SDGs action plans and ministerial strategic plans (Peraturan Menteri Pertanian, 2015a). Due to the presence of conflicting goals and targets, these ministerial plans also conflict with one another (Baskoro et al., 2018).

We provide examples from three ministries. The Ministry of Agriculture, having been allocated goal 2 End Hunger, is focusing on national food security. Its action plan and development plan include giving more permits for agricultural plantations (Peraturan Menteri Pertanian, 2015b). The Ministry of Industry, having been allocated goal 9 Industry, Innovation and Infrastructure, is focusing on producing more industrial products (Peraturan Menteri Perindustrian Republik Indonesia, 2015). These ministerial plans contradict the action plan of the Ministry of Environment and Forestry, which has been allocated goal 15 Life on Land. This ministry is focusing on conservation and restoration and one of its goals is to preserve forests as they are and to halt deforestation (Peraturan Menteri Lingkungan Hidup dan Kehutanan, 2015).

When these ministerial plans are implemented in any province, they clash further with the province's own local goals and targets. Riau is a rich province with its oil and mining concessions. The strategic plan of this province includes policies to ameliorate the plight of marginalized local Melayu people, to create more employment opportunities, and to facilitate a fairer distribution of wealth (Pemerintah Provinsi Riau, 2014). Riau's strategic plans are coherent with those of the Ministry of Industry but might contradict those of the Ministry of Agriculture and the Ministry of Environment and Forestry.

Sumsel is also a rich province with abundant natural resources including oil, minerals, and forests (BPS Provinsi Sumsel, 2020). Its development focus, however, is to resolve land uses conflicts and environmental degradation due to mining, mining exploration and plantation activities (Annur & Handayani, 2019). Sumsel's strategic plans are coherent with the Ministry of Environment and Forestry, but might conflict with activities of the Ministry of Industry and the Ministry of Agriculture.

In contrast, Maluku, being poor and remote but rich in natural resources, has focused on attracting more investors, improving livelihoods, and promoting education and healthcare. It also aims at more resilience in the face of climate change and natural disasters (BPS Provinsi Maluku, 2019). Maluku's plans are coherent with those of the Ministry of Industry and the Ministry of Agriculture, but not necessarily with that of the Ministry of Environment and Forestry. Likewise, West Nusa Tenggara (NTB) province, located on resource-poor islands with a history of earthquakes, relies heavily on tourism and focuses its strategic policies on social capital, tourism facilities, and self-resilience (Pemerintah Provinsi Nusa Tenggara Barat, 2019).

In the case of NTB, the ministerial strategic plans are complementary since NTB's own strategic plans are not closely aligned to those of the ministries.

5.2 Appropriate participation

Even though the adoption of the SDGs in Indonesia is officially in the implementation stage, our results show that participation is still at the consultation stage. Under Presidential Regulation 39/2019, every government institution in Indonesia ought to contribute its data to centralized databases: "One Data" and "One Map", which will be consolidated into a national website by Bappenas (Peraturan Presiden Republik Indonesia, 2019c). The official website "One Data" provides a national database of statistical information and all regulations issued (https://data.go.id/) while "One Map" is the database for land delineations and spatial information (https://tanahair.indonesia.go.id/portal-web).

Likewise, "SDG Indonesia One" is a platform to provide funding for SDGs infrastructure projects in Indonesia (https://ptsmi.co.id/id/sdg-indonesia-one/). The Ministry of Finance established PT Sarana Multi Infrastruktur (SMI) to raise voluntary contributions and/or funds from SDGs stakeholders and lend them to suitable companies interested in commencing projects. Besides the infrastructure projects, business actors are also invited to participate in the Indonesia Business Council for Sustainable Development (IBCSD) working group (https://www.ibcsd.or.id/updates/join-our-sdgs-working-group/).

Many international NGOs participate in SDGs implementation through some forums and platforms such as the International NGO Forum on Indonesia Development (INFID) and SDG Philanthropy Platform (SDGPP) (Hoelman et al., 2016; Nguyen, 2017). While the initiatives offer some opportunities for all stakeholders to contribute during the implementation stage, there is no evidence of collective actions or supportive participation among civil communities during decision-making (Rosand & Anderlini, 2019).

Neither IBCSD working groups nor INFID, which initially was designated to support government, business actors and NGO collaborations (Panuluh & Fitri, 2016) have yet been involved in collaborative decision-making with the government nor have they supported the participation of civil communities during implementation (Waage & Yap, 2015). Neither is there any evidence that local communities or citizens participate in the implementation of SDGs beyond the consultation phase.

The four provinces endeavor to establish their own alternative mechanisms for accommodating civil societies and customary people (referred to as '*adat*') in the provincial decision-making

process. In Riau, many NGOs at provincial-level assist societies to communicate their aspirations to the governor and the president on issues regarding environment and the rights of indigenous people (Forest People Programme, 2009; Jikalahari., 2015). In Sumsel, the governor himself communicates with both societies and customary people via Facebook pages and regularly visits communities[8]. In Maluku, the governor established bottom-up interactions by authorizing the spiritual or customary leaders to become government representatives, since this province is highly diverse and the governor himself is hardly a fair representation of all customary people (*adat*) and tribes (Rahawarin, 2013). In NTB, the governor used a religious approach by regularly praying at different mosques to gain support and grasp provincial community aspirations[9] (Oktara, 2015). NTB people are strongly Islamic so a governor who is a highly respected Islamic scholar is an effective form of leadership (Kingsley, 2012). While these attempts might work in the four provinces, the informal improvisations still need to be formalized into official arrangements to be sufficient and sustainable in the long run.

5.3 Agile reflexivity

Our findings on the five elements of reflexivity (Table 2) are as follows:

a) Lack of in-depth, multidisciplinary understanding across social, economic, and environmental aspects of sustainability among stakeholders. The SDGs are a novel concept and the translation into Indonesian "*Tujuan Pembangunan Berkelanjutan*" or "continual development goals" is hardly adequate to grasp all the nuances of sustainable development (Abdoellah, 2016). Indonesia's archipelagic territory also poses some challenges for adequate socialization throughout the regions. Capacity building programs, either through the UN Program, NGOs or government institutions simply cannot reach every stakeholder in some very remote places, who speak little or no Indonesian (Setiawan & Caroline, 2020). This is especially so since information and promotional activities are often conducted via national television and local radio (Tiara, 2018), which are still considered luxuries for 34% of Indonesians living with limited electricity and access to technology (Ahmad, 2019). Bappenas and the Provincial Planning Boards (Bappeda), which are expected to explain the concept locally in

[8] Governor Alex Noerdin. He was replaced by Governor Herman Deru in 2019. This research collected data during the Alex Noerdin governorship.

[9] Governor Tuan Guru Bajang Dr Zainul Majdi is also a respected Islamic scholar. This research collected information during his leadership in 2018. He has since been replaced by Zulkifliemansyah.

understandable ways, lack the capacity to fulfil this expectation. Our observation and interviews with some local communities in the four provinces showed that the SDGs is still a relatively foreign concept among local government officials and remains unfamiliar to many local communities[10].

b) Lack of adaptive strategies to anticipate uncertainty. Indonesia's top-down approach requires provinces to prioritize implementing national programs ahead of their own (Halimatussadiah, 2020). However, challenges such as different budgetary and resource capacities confronting different provinces, can potentially trigger unavoidable conflicts and uncertainties during the implementation phase (Handrian & Andry, 2020). Maluku, a low income province, could not afford to fund all 169 targets simultaneously, so has had to prioritize based on the availability of resources (Tuhumury & Wance, 2020). NTB, being exposed to a high risk of natural disasters, prioritizes funding for programs related to disaster anticipation and mitigation (Meflinda & Miftah, 2020). The rich provinces of Riau and Sumsel have different priorities, such as corruption, land use conflicts, inequalities, and environmental impacts (Octaleny et al., 2020; Willy & Prakoso, 2020). Bappenas does not have any mechanism to perform the multi-sectoral multi-level assessments of these conflicting priorities, while the Supreme Audit Board (BPK) has the mechanism (Undang-undang Republik Indonesia, 2003) but lacks the authority to link assessments to the implementation of SDGs.

c) Lack of anticipation of long-term impacts of potential failure. Bappenas has prepared some interventions if any institution fails to achieve its SDGs targets when the monitoring report is reviewed (Ministry of National Development Planning, 2018). The monitoring report is a summary of the level of achievement of 169 SDGs targets by each government or non-government entity (Peraturan Menteri Perencanaan Pembangunan Nasional, 2018). Hence, it provides information on current failure instead of anticipating any potential long-term impact or failure.

d) Lack of collective goal formulation. In all four provinces, Indonesia's goals and targets are designated by Bappenas. The National Discussion on Development Planning (Musrenbangnas) and Regional Discussion on Development Planning (Musrenbangda) are the two formal processes held by Bappenas and Bappeda, respectively, to understand stakeholders' aspiration and to facilitate discussions between governments

[10] For each province, we observed the capital city for at least a week to find evidence of banners, slogans and advertisements on SDGs-related programs. We also interviewed both local communities and government officials on their understanding of SDGs.

and other governance actors (Bappenas, 2014). However, there is no evidence that these companies, NGOs, and local communities were also involved in the process of adopting the SDGs into actual implementation strategies (Akbar et al., 2020).

e) Strategy-making is not yet collaborative. Most strategies for implementation are determined by Bappenas and provincial departments are obliged to comply. Neither businesses, NGOs nor civil societies are involved in determining the overarching strategy. There are some websites offering opportunities to anyone to provide feedback (https://www.sdg2030indonesia.org/). However, the level of engagement of these websites is low, suggesting that this effort is not popular enough to be effective. Some road shows and public hearings were also held to promote the SDGs as well as to gain public feedback (Akbar et al., 2020; Pratama et al., 2018). However, this effort is limited given the size of the Indonesian population.

5.4 Structure fit for purpose

According to the constitution, the governance structure of Indonesia is hierarchical (Figure 4). It is a multi-level arrangement where the government becomes the governing body and other stakeholders are influenced by the government's decision-making (Bergh & Lawless, 1998). The President holds the most power and influence, followed by the ministries, provincial governors, heads of districts and mayors. Even after the decentralization policy of 2004, ministries have more power than the provincial governors regarding their own portfolios (Peraturan Presiden Republik Indonesia, 2010). However, Presidential Regulation 59/2017 on SDGs implementation specified a co-governance model, where the President delegated power to Bappenas as the coordinator for other ministries implementing SDGs. Bappenas was given the role of intermediary between all stakeholders involved in the implementation of SDGs in Indonesia.

When we map both structures—the one according to the constitution, and the one resulting from Presidential Regulation 59/2017—onto the same diagram, we find that the governance arrangement is neither hierarchical nor reflects co-governance. Rather, the arrangement is more that of self-governance (Figure 5).

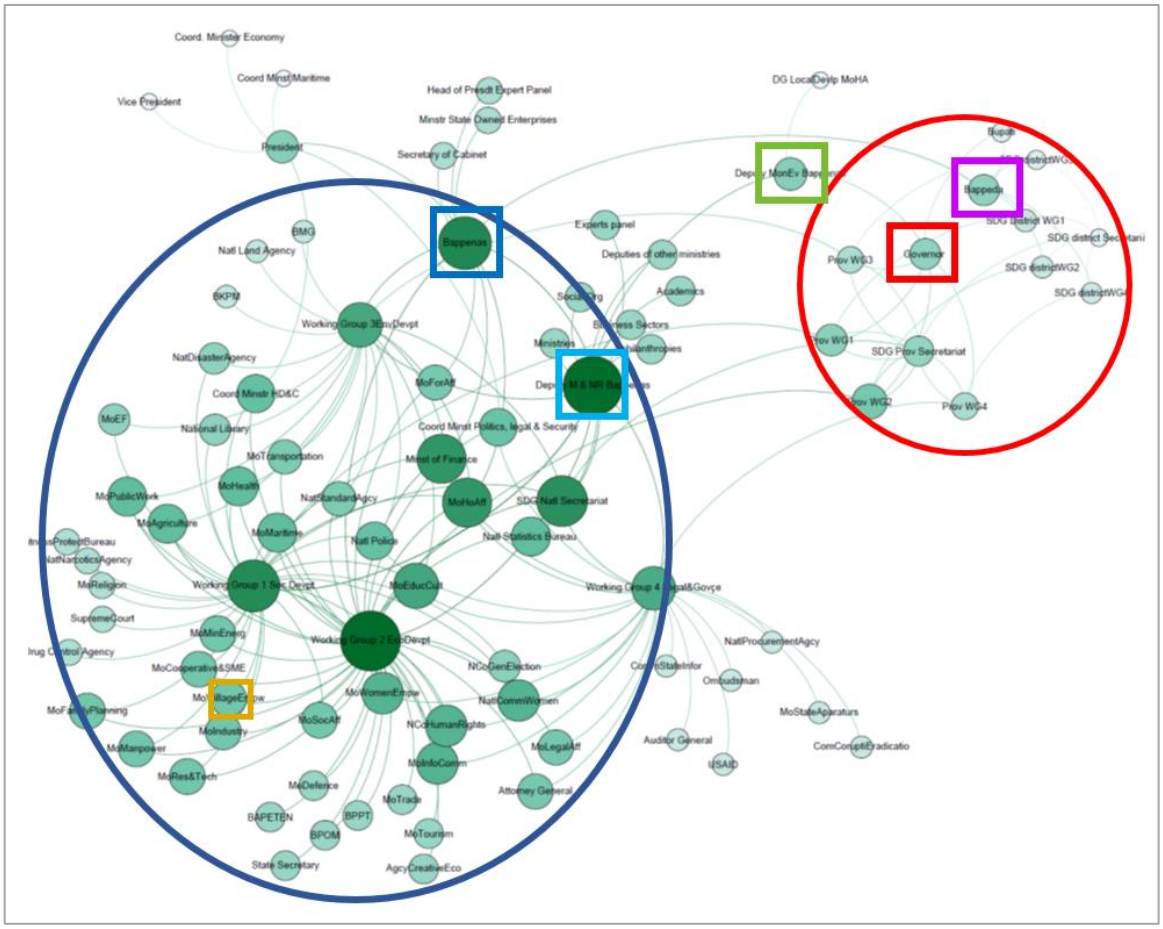

Figure 5. Self-governance arrangements for the implementation of SDGs in Indonesia, mapped using Gephi software, version 0.9.2 (Bastion et al, 2009). Instead of a hierarchy, the governance actors form two clusters: national (nodes inside the blue circle) and regional (nodes inside the red circle), where the national cluster is much larger with many more actors than the regional cluster. Within the national cluster, Bappenas and its Directorate of Planning (blue boxes) coordinate well with the national coordinating team and working groups. Within the regional cluster, Bappeda (purple box) and the provincial governors (red box) coordinate with local stakeholders. The only connection between Bappenas and regional governments is made through the Bappenas's Directorate of Monitoring and Evaluation (green box). This lack of connectivity has led the regional governments to become alienated from decision-making at the national level, forcing them to develop self-governance.

The national cluster (nodes inside the blue circle) is heavily weighted in size and complexity of actor interactions compared to the regional cluster (nodes inside the red circle). In the national cluster, Bappenas coordinates properly with the national coordinating team, such as the President, the ministries, the national working groups, and the national secretariat of SDGs. On the other hand, in the regional cluster, provinces and regional stakeholders have formed their own set of arrangements, which seem to be alienated from Bappenas and the national team. These two clusters are mediated by the only actor in this governance arrangement for connecting Bappenas with the regional governments, the Directorate of Monitoring and Evaluation (green box). Neither the Presidential Regulation nor the Ministerial Decree on SDGs provide direct access from Bappenas to the departments or boards at provincial-levels,

except through Bappeda (Provincial Development Planning) (purple box), who must first report to the heads of regional governments (provincial governor, Head of District (Bupati) and Mayor) (red box). These heads of regional governments will then authorize Bappeda to coordinate with other departments or boards at the provincial-level (Peraturan Menteri Dalam Negeri, 2017b). Provinces are the loci for implementing the SDGs, yet the provincial governments seem to be alienated from the whole arrangement because ministries and Bappenas have limited access to them.

Such an arrangement can be improved. Several ministries could assist with the coordination task due to the better access to regional governments that they have, courtesy of other Presidential and Ministerial Decrees (Peraturan Presiden Republik Indonesia, 2019a). The Ministry of Internal Affairs has a direct hierarchical link to all the regional governments for their supervisory and monitoring function (Peraturan Menteri Dalam Negeri, 2017a). The Ministry of Village and Development of Disadvantaged Regions (orange box in Figure 5) has direct programs and projects at the village-level (Peraturan Menteri Desa Pembangunan Daerah Tertinggal, 2019). Also, the BPK and the National Government Internal Auditor (BPKP) have established regular auditing functions (Undang-undang Republik Indonesia, 2003). Yet, none of the ministries are tasked with coordination and none of the audit bodies are assigned for monitoring, in either Presidential Regulation 59/2017 or the Ministerial Decree 7/2018. When these ministries and boards report to Bappenas, which has no direct access to other provincial boards and departments, collaboration and monitoring becomes cumbersome and inefficient.

5.5 Summary of the results

Based on the findings, we conclude that the current governance structures for the implementation of the SDGs at the UN-, country- and local-levels are not effective for achieving the 17 goals in Indonesia. Some multi-level and multi-sectoral policies are incoherent, which has meant that the governance structure has failed to encourage synergistic interactions among all stakeholders. This problematic structure has also resulted in inadequate participation and lack of reflexivity to respond to unpredictable situations, conflicting interests and trade-offs. The following findings and suggestions may help alleviate this situation.

1. SDGs would be easier to implement if they were coherent with the existing governance structure. Indonesia would find it simpler to adopt SDGs by adjusting them to fit its existing governance structure and not the other way around. The Constitution prescribes that Indonesia's political structure is hierarchical with a multi-level governance system, so Presidential Regulation 59/2017 should take this pre-existing structure into account

and adjust the regulation accordingly. This would provide Indonesia with a governance structure that is fit for purpose, helping to make goals achievable more synergistically by all stakeholders.

2. Performance auditing can be a useful tool for assessing the effectiveness of a governance structure for the implementation of the SDGs. Monitoring by Bappenas only provides information on whether the goals are achieved, based on reports, which may or may not reflect reality. Monitoring, however, cannot properly assess the cause of underachievement or verify the validity of the reports. As sustainability is dynamic, Indonesia would benefit from a mechanism to assess the governance of SDGs regularly. Indonesia's current political structure has already adopted a performance auditing mechanism through other government organizations such as BPKP (National Government Internal Auditor) and BPK (The Supreme Audit Board). It will be more effective if Bappenas incorporated the existing audit mechanisms of BPKP and BPK into its monitoring function.

6. Discussion and conclusions

Implementing the SDGs is a challenging task. Some of the 17 goals, 169 targets and 242 indicators inevitably contradict one another. Each participating country has its own unique challenges arising from its particular geographical, cultural, and socio-economic conditions, involving the collaboration of multiple stakeholders from multiple sectors within regional-, national- and international-levels.

Indonesia is a large country with a wide variety of environmental conditions and varied social, economic and cultural settings. Moreover, every SDGs stakeholder: governments (national, provincial and district), local communities, NGOs and the private sector, will most likely have their individual agendas despite the need to achieve SDGs targets collectively. Given Indonesia's diversity and complexity, it is important that the country adapt the SDGs concept and implementation style to suit Indonesia's unique context and challenges. Collaboration between all stakeholders requires an effective governance arrangement, which seems to be lacking based on the results of our analysis.

We propose performance auditing as an alternative mechanism to assess the effectiveness of the implementation of SDGs. Assessing such a broad topic as the SDGs with standard research approaches requires extensive databases and surveys which are problematic for some countries with limited funding and technological support. Auditing can be a more economical tool since it

includes validating and producing reliable data from analytical evidence, as is demonstrated in this paper.

Our finding suggests that Indonesia has initiated some meaningful and costly endeavors for implementing the SDGs as part of its international obligations, but it has not yet succeeded, because it has not yet aligned the SDGs governance arrangements with its existing governance arrangements. The adoption of SDGs in a country with an already existing governance arrangement as complex as that of Indonesia requires appropriate adaptation.

To achieve this, Indonesia should address the four aspects of effective governance: policy coherence, appropriate participation, agile reflexivity and a structure fit for purpose. Policy coherence occurs when all rules and regulations can be implemented simultaneously in either a substitutable or complementary manner towards one another. Appropriate participation is fulfilled when each stage of the implementation phase is conducted with an appropriate degree of civil participation. Agile reflexivity is achieved when the implementation of SDGs accommodates mechanisms for reconciling conflicts and mitigating uncertainties. Lastly, a structure fit for purpose is achieved when all the other three aspects can be accommodated into a formal organizational structure. If adopted, these four aspects of governance would help equip Indonesia—as well as other countries—with governance arrangements that can better mitigate the challenges inherent in the SDGs, of balancing the economic, environmental, and social aspects of conservation and development.

We believe this problem of implementing SDGs in a widely diverse country is not exclusive to Indonesia. African countries are also facing challenges due to a lack of effective governance (Asmal et al. 2020) and we argue that this novel auditing approach can be a valuable contribution for resolving such an important issue. Thus, we are optimistic that our method for assessing Indonesia's governance arrangements will assist other countries facing similar problems to create more effective governance structures for the implementation of the SDGs. We hope our findings inspire any participating country to implement the SDGs more effectively, as well as to contribute to the governance auditing body of knowledge.

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CHAPTER 4. Evaluating policy coherence: A case study of peatland forests on the Kampar Peninsula landscape, Indonesia

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Evaluating policy coherence: A case study of peatland forests on the Kampar Peninsula landscape, Indonesia

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ABSTRACT

Conflicting policies relating to the management of multi-sectoral, multi-level and multi-actor forest uses often result in ineffective policy implementation. Methods for assessing policy coherence, however, are limited and often require an extensive evidence base which is not always available. In Indonesia, this has often led to conflicts between government agencies and other forest stakeholders. Businesses, NGOs and local communities struggle to comply with all of the conflicting or overlapping regulations that relate to the use of forested landscapes. Even if they succeed, the cost of implementation can be excessive. Improved methods for assessing policy coherence could assist governments and other stakeholders to navigate policy complexity and to avoid the potentially high costs of policies that are antagonistic to one another. We propose an audit of policy coherence at the landscape scale as a way of addressing this problem. We test this idea with an experimental policy audit on the Kampar Peninsula, a peat landscape in Pelalawan district, Riau Province, Indonesia. Indonesia has participated in the UN global peat initiative since 2015 and has created a peat protection policy to control the exploitation of peat with regulation No 57/2016. This regulation and the various instruments devolved from it has been a source of confusion and conflict among stakeholders. We applied commonly accepted performance auditing standards to assess the coherence, effectiveness and efficiency of regulations from other sectors and in different jurisdictions with the new peat regulation No 57/2016 and its derivatives. To aid our audit assessment, we overlaid radar and Landsat images to depict delineations of peat protection and cultivation zones according to different legislation. Our audit revealed incoherent mapping of peat protection zones on the Kampar Peninsula, which has led to ineffective and inefficient implementation of policies. We then propose three alternative protection and cultivation scenarios to that proposed by the government. Our results show that any of these alternative scenarios would provide a policy that is not only more coherent, but that also would result in more effective and efficient policy implementation. This policy audit method should have wide potential application for auditing best practice and policy effectiveness in complex landscapes across the globe and should have immediate application in helping to resolve the current issues on the Kampar Peninsular.

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1. Introduction

Peatlands are one of the most fragile natural resources, yet peat uses impact multiple actors in many sectors at different levels (Andriesse, 1988). Peats are laid down over thousands of years from the remains of imperfectly decomposed plants (Paavilainen and Päivänen, 1995; Posa et al., 2011; Turetsky et al., 2015). Consisting of more than 70% water (Hooijer et al., 2010), peats are anaerobic ecosystems where the height of water tables need to be constantly maintained so that the peat is always wet (Wösten et al., 2008). Undisturbed, peatlands are rich in biodiversity and are estimated to store almost one third of all global terrestrial carbon (Page et al., 2011). Yet, once peat is drained for other uses, this lowers the water table, making the peatland susceptible to drying and subsidence (Holden, 2005; Hooijer et al., 2012). The carbon stored in the peat is oxidized and released into the atmosphere as carbon dioxide, a green-house gas (GHG), leaving the peat dehydrated, sometimes in an irreversibly damaged condition (Pickup, 2017). The peatlands lose much of their biodiversity and become prone to fires (Dohong et al., 2017). Indonesia, possessing the largest peat areas in South East Asia, holds 88.5 Gt carbon pools in its peatlands (Page et al., 2011). Its peatland uses involve multiple stakeholders; governments, businesses, NGOs and local communities, each with different agendas. These actors originate from many different sectors such as forestry, agriculture, trade, industry, and housing, within four different jurisdictions; district, provincial, national and international (Glauber, 2017). Peatland stakeholders are bound to comply with all the relevant regulations, which often involves a complex hierarchy (Fig. 1) in each of the relevant sectors (Manuamorn and Raina, 2020). The delicate nature of peatland hydrology and the complexity of peat use arrangements have led to conflicts among peat stakeholders in Indonesia (Astuti, 2020; Goldstein, 2020).

Since 2016, a government regulation on the use of peat, (PP) no 57/2016, has been implemented (Setiawan and Faroby, 2017). This represents a more strict peat protection and restoration policy than the one that had previously been in place. The Ministry of Environment & Forestry issued some derivative regulations to govern the technical aspects of implementation. Ministerial Decree no 130/2017 stipulates the mapping of peat protection or peat cultivation zones and Ministerial Regulation no P.16/2017 establishes the mechanism for land swaps where existing cultivation activities occur on any designated protection zones (Peraturan Menteri Lingkungan Hidup RI, 2017; Surat Keputusan Menteri Lingkungan Hidup dan Kehutanan, 2017a). This was a drastic change. Before the 1970's the policy was to encourage selective logging on peatland (Pickup, 2017). From the 1970s to 2005 the policy was to support industrial exploitation for oil palm and timber plantations (Giesen and MacDonald, 2018). Only in 2006 did Indonesia establish the National Strategy of Peatlands Management (Kementerian Lingkungan Hidup, 2012). After the catastrophic smoke haze produced by peat fires in 2015, President Joko Widodo announced Indonesia's commitment to the Global Peatlands Initiative, part of the United Nations Convention on Climate Change (UNCCC) (MENA report, 2017). The president also established the Nationally Determined Contribution (NDC) on reducing GHG emissions by 29% in 2030 (Tacconi, 2018), with a nod to the use of peatland conservation to improve its carbon reserves (Leifeld and Menichetti, 2018).

This change of policy towards increased peat protection and restoration has created some controversies (Harrison et al., 2020; Yusran et al., 2017). In Indonesia, policies are devolved to regulations and technical guidelines at ministerial, provincial, and district levels for implementation (Sati, 2020). Policy changes can result in overlapping and sometimes conflicting implementation arrangements, especially when the impact of a previous policy continues to be felt at lower levels even after the new policy has been established (Schrier-Uijl et al., 2013). Likewise, policies are also parts of the national strategy (Nawa Cita). Yet, the strategy of awarding land rights to marginalized communities (Nawa Cita 5) and accelerating the economic development of some strategic sectors such as infrastructure, forestry, agriculture and industry (Nawa Cita 7) (Rohman and Wahono, 2020; Sa'adah and Soetirto, 2020), may not always align with the stricter peat protection policy (Syamsi, 2015). Moreover, governments, businesses, NGOs and local communities are stakeholders with different and sometimes contrasting interests. The use of peat should encompass the interests not only of governments, but also businesses, NGOs and the local communities (Ward et al., 2020). This implies the need to achieve the most efficient peat use arrangements to optimize both economic and other benefits for all stakeholders (Bruch et al., 2016). Peatland governance in Indonesia needs to take into account not only hydrological and ecological aspects, but also the coherence of policies among relevant sectors so that all stakeholders gain the most effective and efficient land use arrangements within a specific landscape (Manuamorn and Raina, 2020).

In this study we conducted a comprehensive analysis and assessment of the new peatland arrangements on the Kampar Peninsula, Riau. We aim to understand if:1) the current policy arrangements for peatlands in Indonesia are coherent, effective and efficient and; 2) if there is room for

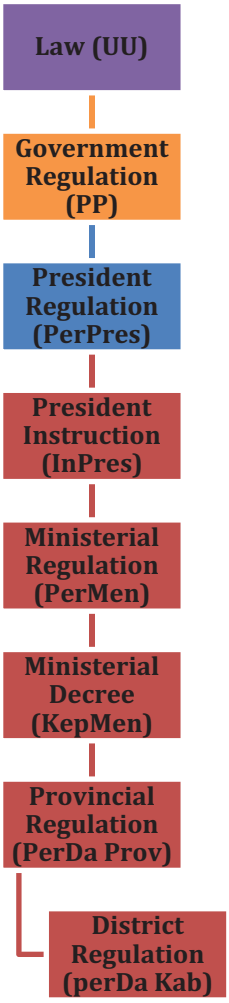

Fig. 1. Policy implementation through legislation at different hierarchical levels in Indonesia. From Law or "Undang-undang" abbreviated as UU, policies are devolved down to Government Regulations or "Peraturan pemerintah" abbreviated as PP, Presidential Regulations or "Peraturan Presiden" abbreviated as Perpres, Presidential Instructions or "Instruksi President" abbreviated as InPres, Ministerial Regulations or "Peraturan Menteri" abbreviated as PerMen, Ministerial Decrees or "Keputusan Menteri" abbreviated as "KepMen", Provincial Regulations or "Peraturan Daerah", abbreviated as Perda Prov, and District Regulations or "Peraturan Daerah Kabupaten" abbreviated as Perda Kab (Undang Undang Republik Indonesia, 2011).

improvement, what kind of arrangements would lead to more effective and efficient policy implementation?. Such an integrated assessment, however, requires extensive databases and information from many stakeholders from multiple sectors within four jurisdictions (Barry et al., 2010). Auditing is a mechanism of assessment which accommodates four types of data and wide array of techniques to verify, analyse or even produce new information (Power, 2003). Hence, our objective was to assess the potential use of auditing as an alternative mechanism to evaluate the coherence, effectiveness and efficiency of policies using the peatlands of the Kampar Peninsula and arrangements flowing from regulation no 57/2016 as a case study.

This paper is structured in following way. Section 2 sets the context: the landscape, its stakeholders, and the regulatory arrangements for five different sectors within four jurisdictions. Section 3 describes the audit mechanism for assessing policy coherence, effectiveness and efficiency. Section 4 presents the audit findings (results) on the coherence of the peat protection policy, its effectiveness and its efficiency. Section 5 represents the overall discussion and conclusions. We expect that this research to contribute to the body of knowledge on understanding policy coherence, effectiveness and efficiency, and that it will help to improve the peat use arrangements on the Kampar Peninsula.

2. Kampar Peninsula and the regulatory arrangements

A landscape is a spatially designated area in which different interests and uses are conflicting and/or coexisting (Sayer et al., 2005). Kampar Peninsula is 681,152 ha of wetlands, of which almost 200,000 ha are peatlands more than 10 m deep (Hooijer et al., 2015). The peninsula stores 43 million tons of carbon (Antomi and Ristalia, 2019). Some conservation NGOs such as Birdlife International and Fauna & Flora International (FFI) have identified the area as a conservation priority (Birdlife International, 2018; Fauna and Flora International, 2017). However, substantial parts of the peninsula were placed under concessions held by APRIL (Asia Pacific Resource International Limited) and APP (Asia Pulp and Paper), during the period when exploitation was the government priority (Forest People Programme, 2009). Under these concessions and permits, APRIL and APP have installed drains, cleared the wetlands and planted acacia. Other companies have planted extensive areas of oil palm in some parts of the peninsula. Modern palm oil processing plants and pulp and paper mills have been established in the area (Hooijer et al., 2015; Tonks et al., 2017). These activities now contradict the new peat protection policy No 57/2016. Under this policy, both APP and APRIL will now have to relocate some of their estate crops to the swapped land outside peat protection zones (Fig. 2). Local communities (migrant workers and indigenous Melayu) that live within newly designated peat protection zones will have to abandon their settlements without being provided with land elsewhere (Suwondo et al., 2018).

Companies such as APP and APRIL operate under business permits, location permits, and environmental permits. Business permits, which authorize commercial entities to conduct specified business activities, are given by the relevant ministries such as the Ministry of Environment and Forestry (timber plantation), the Ministry of Agriculture (other plantations), the Ministry of Industry (manufacture & industry), and the Ministry of Trade (export/import) (Peraturan Menteri Kehutanan, 2007; Peraturan Menteri Perdagangan Republik Indonesia, 2017; Peraturan Menteri Pertanian, 2013; Peraturan Pemerintah Republik Indonesia, 2015). Location permits authorize commercial entities to conduct businesses in specified locations. The authority for granting location permits depends on which jurisdiction the peatland is in. Central government ministries are responsible for issuing location permits for peatlands located in more than one province; the provincial governor is responsible for granting permits for areas located in more than one district but within one province; and heads of district or *Bupatis* can grant permits for areas located wholly within their own districts (Peraturan Menteri Agraria dan Tata Ruang, 2015a). Similarly, environmental permits give environmental impact clearance for commercial entities to operate businesses. This permit is given only by the Ministry of Environmental Impact Controls or its provincial or district agencies depending on whether it is located in two or more provinces, two or more districts within one province or wholly within a single district (Peraturan Pemerintah Republik Indonesia, 2012).

Before being given permits, companies need to first obtain forest or land concessions. The Ministry of Environment & Forestry holds the authority for governing peat areas, which are designated and regulated as "forests". As forests, peatlands are classified into three types, depending on the purpose. Conservation forests are established for conservation purposes only such as wildlife sanctuaries. Protection forests are areas allocated for generating non-timber forest products, and production forests are designated for timber production (Peraturan Pemerintah Republik Indonesia, 2007; Undang Undang Republik Indonesia, 1999). Other typical land uses such as oil palm plantations, infrastructure, building and local community settlements, are assigned as "non-forest" land. Tenure rights are issued by the Ministry of Agrarian Affairs and Spatial Planning (Peraturan Presiden Republik Indonesia, 1996). Approvals for conversions of land from "forest" to "non-forest" categories are authorized by the Ministry of Development Planning (Peraturan Pemerintah Republik Indonesia, 2002). Problems arise when the determination of peatland uses has not been based on accurate databases and integrated decision making. Tenure rights for peat users overlap due to the different maps used by different ministries. Incidents such as fires, flooding, carbon emissions, loss of habitat and social conflicts, proliferate following the lack of environmental and social consideration to the neighboring areas upon the establishment of peat exploitation for production forest or non-forest land (Hooijer et al., 2015; Pramudya et al., 2020; Suwarno et al., 2018).

3. Methods

3.1. Audit framework

An audit is a verification of conditions against relevant standards. It is achieved by collecting two or more of four types of evidence; corroborative documentary, testimonial, analytical, and physical (Mautz and Sharaf, 1961a; Power, 1997). Auditing policy coherence, however, is not yet a common practice. Policy coherence has been defined as synchronization or synergy, or consistency among many interrelated policies so that they achieve their shared goals (May et al., 2006; Picciotto, 2005; Sianes, 2017). A coherent policy is achieved when multiple policies interact to complement one another or can be substituted for one another (Forster and Stokke, 1999; Sianes, 2017). Multiple policies, some of which cover gaps in other policies, are considered to be complementary, while interchangeable or substitutable policies can be substituted for one another. In contrast, incoherent policies, where interactions between policies oppose one another are considered to be antagonistic (Lambin et al., 2014; OECD, 2015).

Performance audits are typically assignments with the objective of assessing certain performance qualities of audit subjects, such as effectiveness and efficiency. Such an audit refers to verification processes taken by auditors to ensure that the subjects are in accordance with the agreed standards of effectiveness and efficiency. "Effective" is defined by the achievement of targeted goals and outcomes, whilst "efficient" refers to the optimum process for achieving those goals and outcomes. Following the same train of thought, a coherent policy is created when multiple policies interact to complement one another or can be substituted for one another (Forster and Stokke, 1999; Sianes, 2017). A standard is a set of criteria to which the audit refers (ISSAI, 2016a; Rosa

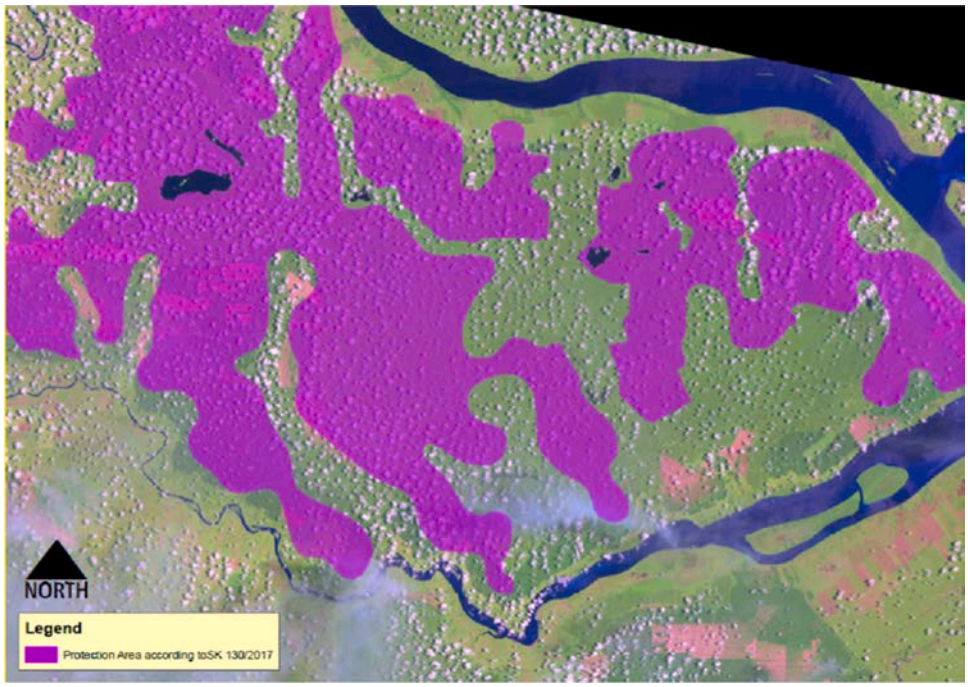

Fig. 2. Delineation of peat on the Kampar Peninsular according to the Ministry of Environment and Forestry Decree no 130/2017. All purple areas are the protection zones to be cleared of any cultivation activity and restored. All the green areas are cultivation or potential cultivation zones. Blushed pink areas are existing infrastructure such as factories and settlements. This map will be referred to as the Ministerial Map for the rest of the paper. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

et al., 2014).

We adopted a performance audit framework from the ISSAI (International Standards for Supreme Audit Institutions) for reasons of practicality and replicability (Domokos and Parragh, 2020).[1] Studies on policy coherence assessments are based on either, scoring and ranking procedures (Duraiappah and Bhardwaj, 2007) or descriptive evaluations (Collste et al., 2017). While these approaches have been used successfully in other studies, they rely on accurate and available data. In Indonesia, data are often incomplete or inaccurate and therefore such assessments are questionable (Rahadiana and Listiyorini, 2019). Likewise, previous studies of policy coherence have focused on either multiple sectors such as agriculture, forestry, biofuels & climate (Harahap et al., 2017), multiple levels (Smith, 2004), or multiple actors (Cloete, 2018). While focusing on sectors, levels and actors may provide more in depth analysis, our endeavor to understand and improve peatland governance in this complex landscape requires a holistic multi-sectoral, multi-level and multi-actor analysis. Audit procedures allow the production of data from analytical and physical evidence. Moreover, all information must be validated using verification techniques. Audit procedures help overcome the problem of poor databases and lack of accuracy that are commonly faced using quantitative assessment such as balance score cards or checklists (Arens et al., 2012). A standardised performance audit framework consists of eight steps (Fig. 3). (1) Audit objectives set the purpose of audit assignments while (2) audit questions phrase these objectives into researchable questions. These questions determine what kind of (3) audit criteria are to be used in describing effectiveness and efficiency. These criteria are then ground checked using generally accepted (4) audit methods, such as data verification, reconciliation, interview, technology assisted analysis, and observation. Each method results in four types of (5) audit evidence: documentary, testimonials, physical, and analytical evidence. Any disparity between criteria and audit evidence is considered (6) an audit finding. Similar findings that contribute to an overarching pattern is an (7) audit conclusion. Auditors respond to this conclusion by suggesting some (8) audit recommendation (Government Auditing Standards (2018) GAO Government Auditing Standards, 2018; Grönlund et al., 2011).

3.2. Audit Criteria

Audit criteria are what auditors use to measure existing conditions against. In other words, do existing conditions meet established criteria?

3.2.1. Policy Coherence

The first criterion is coherence. Since auditing standards do not yet accommodate policy coherence, we adopted the following theoretical definitions into our designated criteria of policy coherence. 1) multi-level policies are deemed to be coherent when the UNFAO guidelines on peat conservation and restoration exhibit complementary or substitutable interactions with the national policy of "Nawa Cita", basic Law (UU), Government Regulation (PP), Presidential Regulation (PerPres), President Instruction (InPres), Ministry of Environment and Forestry's Regulation and Decree, Provincial Regulation and District Regulations. 2) multi-sectoral policy coherence is achieved when the peat policy under the forestry sector is complementary or substitutable with policy from other influencing sectors: agriculture, trade and industry.

We studied the literature and policy documents to determine the criteria of coherent regulations regarding peat protection and restoration policies in Indonesia both horizontally (sectors) and vertically (levels). We identified important issues that PP 57/2016 addresses in its articles and then drew conclusions on coherence among levels (from UNFAO guideline to the district regulations) and among sectors (from different relevant ministries) (Fig. 4). We analysed and summarized how the peat protection/conservation policy should be devolved into the regulations at lower government levels and be accommodated into each ministry's regulations.

Since one of the regulations, ministerial decree 130/2017, delineates peat areas into illustrative maps, we produced some maps depicting the delineation as written in the higher legislation (Government Regulation 57/2016) to check the multi-level coherence of both the delineation maps. We obtained and verified the location permits (plantations/production forests and Restorasi Ekosistem Riau (RER)), existing maps of wildlife sanctuaries from the Ministry of Environment & Forestry (Wildlife Sanctuaries), a map of rare biodiversity habitats from some

[1] ISSAI has been practiced widely by Supreme Audit Institutions (SAIs) in more than 70 countries worldwide. Its auditing principle is considered the most flexible to be implemented in different organization.

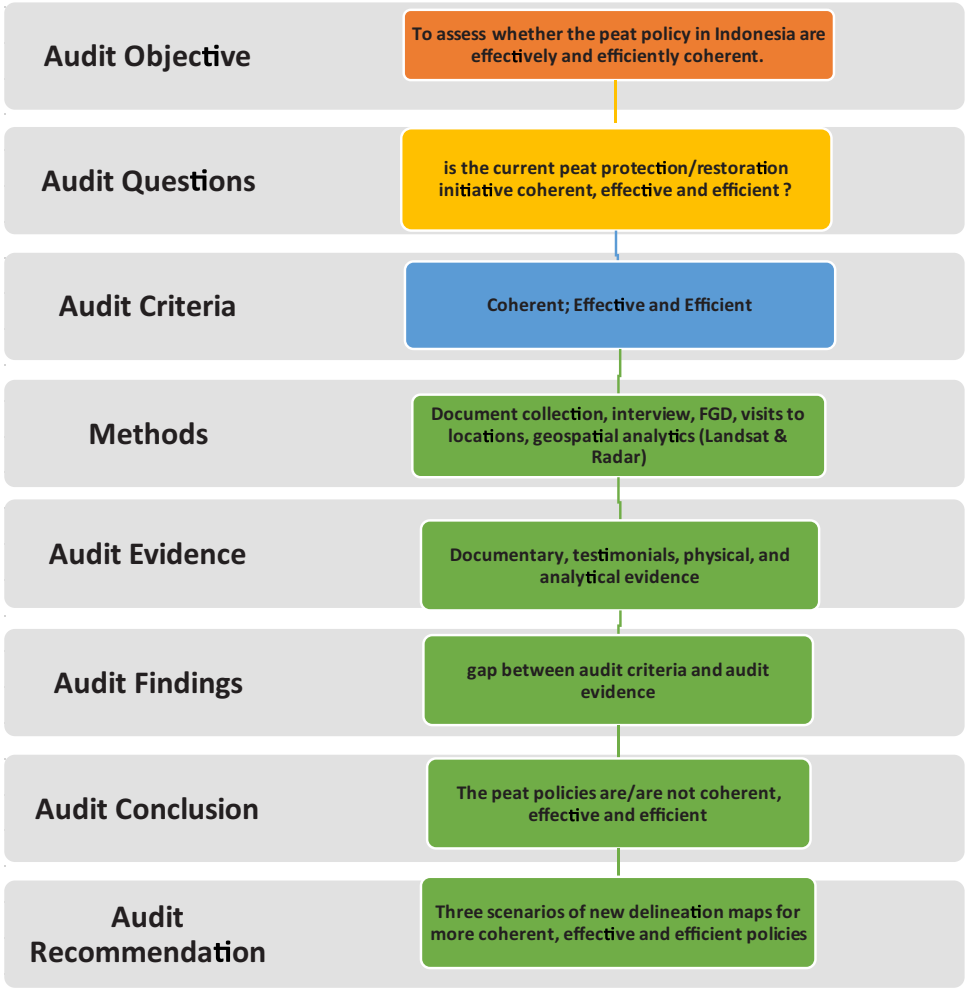

Fig. 3. Audit objectives set the purpose of audit assignments. Audit questions phrase these objectives into researchable questions. Audit criteria are characteristics to be nominated in describing effectiveness and efficiency. Audit methods are techniques such as data verification, reconciliation, interview, technology assisted analysis, and observation used by auditors to obtain audit evidence including: documentary, testimonials, physical, and analytical evidence. Any gap between criteria and audit evidence is considered audit findings. An audit conclusion is reached when similar findings contribute to an overarching pattern. Auditors respond to this conclusion by suggesting some audit recommendation.
A standardized performance audit framework adapted from US General Audit Office Government Auditing Standards (2018) (Government Auditing Standard, 2018) and ISSAI (2016b).

conservation NGOs (Biodiversity Conservation), a map of High Conservation Value Forest (HCV Forests) from RER and maps of the location of migrant and Melayu settlements.[2] We then produced land use maps using mapping software ARCGIS 10 and Global Mapper 15 and overlaid this existing land use map with the protection zones shown in Fig. 2 as stipulated in Ministerial Decree No 130/2017 (Fig. 5). This map allowed us to determine if the delineation from the ministerial decree is coherent with the criteria for protection/cultivation zones as stipulated in higher ranked legislation (Law and Government Regulations).

3.2.2. *Policy effectiveness*

The second criterion is the effectiveness of these interrelated policies. Effective policies occur when the policy goals are achieved (Collste et al., 2017). Indonesia, in its national strategy for peat management, established that the peat policy should aim at achieving a sustainable functioning peat ecosystem to support the livelihoods and the welfare of Indonesians now and in the future (Kementerian Lingkungan Hidup, 2012). Thus, the effectiveness of the peat protection and restoration policies needs to be assessed from the perspective of the stakeholders (Langston et al., 2019; Margules et al., 2015). Hence, our objective was to determine if the new peat policies support the welfare of organizations (governments, NGOs, and companies) and the welfare and livelihoods of community groups (migrants and indigenous Melayu people). For this second question, we conducted in depth interviews and focus group discussions (FGD) with the representative of stakeholders. We compared the data from interviews and FGD with the relevant policy documents and literature to assess if the answers during interviews and FGD were justified or whether some compromises due to conflicting locations need to be made. We then used ARCGIS for depicting the most effective locations according to the peatland users and incorporated them to the already available map from the criteria of policy coherence. This map illustrates the preference of land users.

3.2.3. *Policy efficiency*

The third criterion is the efficiency of the policies. Efficiency occurs when expenditure generates the most output (Skærbæk, 2009). An efficient policy is achieved when the policies surrounding forecasted budgets result in the most output (Bertoldi and Mosconi, 2020). Hence, our criterion for efficiency is best represented by the scenario with the most hectares to be conserved which will result in the least money being spent on land swap compensation once the unit cost per hectare is established.[3]

Fig. 7 is the map we use to illustrate scenarios of land use assignment (i.e. protection and cultivation zones) to assess policy efficiency in terms of land swap costs. We incorporated as closely as possible every article characterizing protection zones and cultivation zones as stipulated in Law 32/2009, Law 37/2014, and Government Regulation (PP) 71/2014

[2] We obtained a baseline map of the current location of land uses from APRIL, however, we validated and synchronized the location with other maps by Hooijer et al. (2015), Miettinen (2009), and Forest People Programme (2009).

[3] As of July 2020, the regulation about unit cost per hectare land swap has not yet been issued.

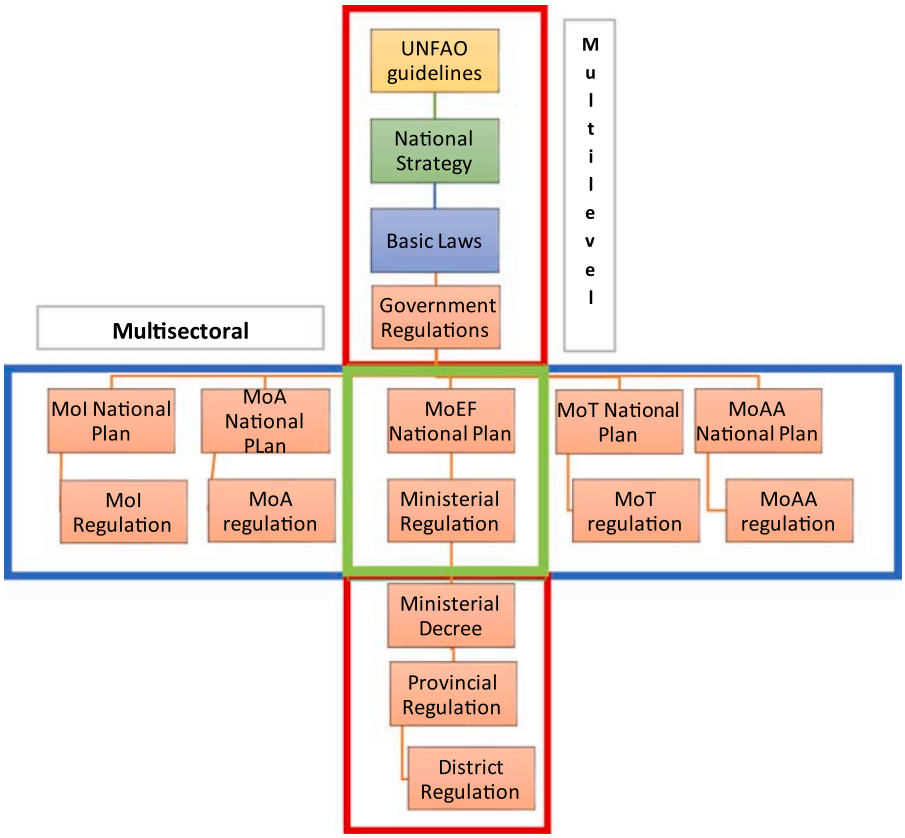

Fig. 4. Multi-sectoral/multilevel policies in Indonesia. The national Peat protection and restoration policies should align with multilevel policies such as the UNFAO guidelines on peat protection and management, Indonesia's national peat protection strategy, basic law, government regulation, presidential regulations, ministerial regulations/decrees, provincial regulation and district regulations (red box). Likewise, the peat policies should also be synergistic with the national strategic plans of four other ministries under different sectors. Ministry of Industry (MoI) for the palm oil/pulp & paper industries; Ministry of Agriculture (MoA) for the oil palm plantations; Ministry of Trade (MoT) for imports/exports commodities, and Ministry of Agrarian Affairs and Spatial Planning (MoAA) (blue box). The Ministry of Environment & Forestry (MoEF) plays a central role both in the multilevel and multisectoral policies (green box). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

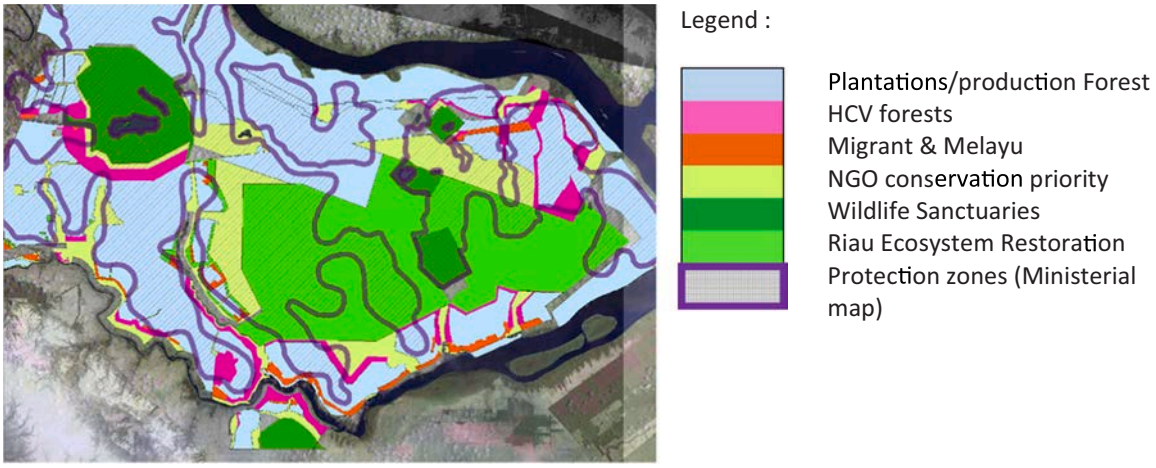

Fig. 5. map of existing land uses overlaid onto the ministerial map of protection zones. Many parts of the ministerial map (shaded areas inside the purple lines) are located within plantations or production forests and the migrant/ Melayu settlements. Meanwhile some of the cultivation zones (non-shaded areas outside the purple lines) are located in existing restoration areas (Riau Ecosystem Restoration/RER) and the High Conservation Value (HCV) forest. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

as amended with PP 57/2016 into a map. We developed three possible scenarios based on different mapping tools & techniques based on the following considerations. 1) The Indonesian government has not yet have available data on peat depth and peatland cover[4] (Gewin, 2017). 2) Techniques and tools for assessing peat depths vary according to different consideration such as costs, level of accuracy, and types of information needed (Minasny et al., 2018). 3) The government has not yet established which method is the most acceptable for mapping peatland (Peraturan Menteri Lingkungan Hidup RI, 2017), hence, it is necessary to explore several techniques and tools for obtaining comparable delineations.

The first scenario used data on land use and peatland mapping from 2016 as spatial imagery from that year is relatively cloud-free. Data were extracted from Landsat imagery Path 125 Row 60, Path 126 Row 59 and Path 126 Row 60. The second scenario used information on land cover

[4] Indonesian government held a Peat Prize Competition on 2017 for the best method of measuring peat depth and extent. The winning method will be used in a national peat depth measurement in 2020. However, with the COVID 19, the budget for this measurement is cancelled.

mapping using the Landsat image 8 Operational Land Imager (OLI) Thermal Infra-Red Sensor (TIRS) from 2018. The third scenario used Spaceborne Imaging Radar-C (SIR-C) images for better visualization of existing infrastructure (Palacio et al., 2018). ASTER satellite data were used to develop a Digital Elevation Model (DEM) enabling the modelling of land cover and infrastructure patterns (Hively et al., 2018). These spatial scenarios, however, are only meant to demonstrate a method for calculating the efficiency of implementing a policy. There are other methods that may have resulted in more accurate mapping (Rahman et al., 2017; Vernimmen et al., 2019), but they were not available for this study.

In this way, three maps were derived of peat protection areas, which all align with Government Regulation 57/2016. For each of these scenarios, we calculated the hectares of land swap needed to make up for removing plantations, infrastructure and settlements from the potential protection zones and compared them with the Ministerial Protection zones. The differences in land area between each Scenario and the Ministerial Protection zones reflect the savings, in hectares, achieved for each alternative scenario. Land swap costs are measured in hectares needing to be purchased if the plan of removing any established plantations or infrastructure currently within protection zones is to proceed.

3.3. Audit evidence

To answer the audit questions, we collected audit evidence through a series of data collection, verification and analysis steps (Mautz and Sharaf, 1961a; Trodden, 1996). Documentary data such as regulations, local spatial planning policies, existing maps, sustainability reports, biodiversity maps, and online materials (databases, e-news, youtube videos, and social media such as instagram, twitter and facebook) were collected from governments, NGOs and companies. The validity of the data was checked by corroborating the documentary data with testimonial data. We conducted interviews and a series of focus group discussion involving a total of 231 persons from different stakeholders (representing seven NGOs, two companies, ten local governments, four central government ministries, one migrant community and two groups of indigenous Melayu). The data were then revalidated with an auditor from an independent audit firm [5] and an environmental expert from the Conservation Strategy Fund.[6] Fieldwork and interviews were conducted during the period May-July 2017; November-December 2017; March-April 2018 and June-July 2018.

4. Results (audit findings)

Details of the results of our audit are explained under the headings of policy coherence, effectiveness, and efficiency below. In summary (Table 1), we found that the new peat protection policy is complementary with, or substitutable for, four Basic Laws, seven Government Regulations and seven Presidential Decrees, but has not yet been translated properly into coherent implementation guidelines even though there are five ministerial regulations, two ministerial decrees, two provincial regulations and three district regulations (Table 2). The implementation guidelines from the Ministry of Environment and Forestry also do not align well with at least 13 regulatory instruments from four different ministries (Table 3). This includes the Ministry of Agriculture (Long Term Planning, one agricultural law one ministerial decree), the Ministry of Industry (Long Term Planning, one Industrial Law, one government regulation, one ministerial decree); the Ministry of Trade (Long Term Planning, one Trade Law, one ministerial decree); and the Ministry of Agrarian Affairs (Long Term Planning, one Agrarian Law, one ministerial decree). Based on the interviews, Focus Group Discussion, physical observations, and our mapping of the stakeholders' preference locations, we also found that the delineation of the ministerial map is not effective for these stakeholders because it compromises their goals (Fig. 5). Our maps using Landsat and Radar, portray more efficient options for incorporating all the stakeholders' preferences. They show that more coherent, effective and efficient delineations for peat zoning on the Kampar Peninsula is in the middle section (Fig. 8). Further explanation for these findings is below.

Table 1
Summary of audit findings.

Criterion	Condition	Audit findings
Coherence	**Multi-level**: The global peat protection initiative is adopted well by legislation at the strategic level through the following instruments (national policy of Nawa Cita, Law 32/2009, Law 37/2014, Government Regulation 71/2014, its amendment 57/2016, and President Instructions). However, this policy has not yet been coherently adopted at lower levels through ministerial regulations, some of which are contradictory, for example Minister of Environment Forestry regulation P.18/2017, ministerial decrees 130/2017 &129/2017, provincial regulation 10/2018 and district regulation 1/2012. See Table 2 **Multi-sector**: The peat protection and restoration policy challenges strategic policies from other sectors, such as Industry, trade and agriculture. See Table 3	Incoherent multilevel and multi-sectoral policies
Effectiveness	Conservation NGO (FFI), companies (APRIL and APP), migrant workers, and peat experts suggested that the delineation of protection and cultivation zones is not appropriate. A coalition of other NGOs including Greenpeace, Rainforest Action Network, and Eyes on the Forest, support the delineation, yet suggest that the land swap program should be terminated because it will degrade forests in other part of Indonesia.	Ineffective implementation among stakeholders
Efficiency	The major portion of the proposed protection zones coincides with existing plantations/production forest, which will require a substantial budget for the land swap scheme.	Inefficient delineation and land swap

4.1. Policy coherence

4.1.1. Multi-level coherence

Policies and regulations from the international to the district level are not coherently established (Table 1). Policies between UNFAO and the government regulations are either substitutable for or complementary with one another. Environmental issues are only vaguely addressed in the Nawa Cita national strategy, even though the national policy of peatland management was established in 2006 (Kementerian

[5] The audit firm was assigned by the Sustainability Advisory Committee (SAC), an independent advisory board hired by APRIL, to determine if the corporation has operated in a sustainable way. We validated our conclusions concerning opinions about APRIL and other commercial businesses from interviews and FGD with the stakeholders (migrant/Melayus, NGOs, governments) by testing that they conformed with the conclusion drawn by the auditors during their audit assignment.

[6] Dr. Mubariq Ahmad is an environmental economist who used to be the executive director of WWF Indonesia (2003–2009) and a senior consultant for climate change policy at the World Bank. He validated our conclusion about the existing conflicts among governments, APRIL/APP, and the local Melayu people since the exploitation era began in the 1970s.

Table 2
Multi-level policies on peat protection and restoration initiative.

Policy sector	Key instruments		Remarks
Basic Law	UU 5/ 1990	Conservation of Biodiversity and Ecosystems	UU 37/2014 Article 12 (a): protection zones include protection of soil and land function and 12(b) restoration of soil and land functions. Article 13 (b) explanatory paragraphs page 9: Cultivation areas include production forests, smallholder's forests, agriculture land, fisheries,mining areas, local community land, industrial sites, tourism sites, religious areas, education, and defence force locations
	UU 41/ 1999	Forestry	
	UU 32/ 2009	Environmental protection and management	
	UU 37/ 2014	Land and water conservation	
Government Regulation	PP 68/ 1998	Natural reserve and conservation zones	Aligned with UU 37/ 2014, Government Regulation (PP) 57/ 2016 in article 9 (4) mentions that any area with: (1) three meters peat thickness (2) specific/endemic species (3) protected species (4) peat ecosystem is nominated as **peat protection zones**. Article 9 (6): if any peatland fails to comply with the regulation regarding peat protection zones, the minister will established the areas as **Cultivation zones**.
	PP 45/ 2004	Forest protection	
	PP 26/ 2008	National spatial planning	
	PP 37/ 2012	Watershed management	
	PP 73/ 2013	Wetlands	
	PP 71/ 2014	Protection and management of peat ecosystem	
	PP 57/ 2016	amendment of PP 71/ 2014	
Presidential Regulation	Keppres 32/1990	Management of protection zones	Overall, the presidential regulations suggested that peat protection zones should be prioritized in areas with existing peat ecosystems or peat hydrological functions. Any area that does not fit into the description of either one of them shall be categorised as cultivation zones. Note that these regulations are from the 1990s, yet they complement well, the later peat protection and restoration policies of 2016.
	Keppres 82/1995	Peatland development for agriculture in Central Kalimantan	
	Keppres 80/1999	Guidelines for planning and management of peatland development zones at Central Kalimantan	
Presidential Decree /instruction	Inpres No 2/2007	Acceleration of rehabilitation and revitalisation of peatland development zones in Central Kalimantan	The Presidential Instructions suggested that Indonesia should optimise existing development/ cultivation zones and delay the granting of new land permits other than for forest protection. This legislation complements the peat protection and restoration policies of 2016 (PP 57/2016).
	Inpres No 10/2011	Indicative maps on delays for granting new permits	
	Inpres No 6/2013	Indicative maps on delays for granting new permits	
	Inpres No 8/2015	Indicative maps on delays for granting new permits	

Table 2 (*continued*)

Policy sector	Key instruments		Remarks
Minister of Envronment & Forestry Regulation	P.30/ 2016	Procedures of performance evaluation for sustainable production forests and legality verification for timber products.	In general, the Ministry of Environment & Forestry attempts to adopt the measures on peat protection and restoration, yet, the ministry has failed to translate this into implementation. SK 130/2017 showed cultivation zones overlapping with ares of over 3 m peat thickness and areas with protected species, while protection zones are include production forests and migrant and Melayu settlements. This also contradicts P.14/2017 article 16(2), which states that conversion from cultivation zones to protection zones shall be conducted under certain circumstances: (1) evidence of peat ecosystem function (2) any ecological urgency to conduct peat protection or restoration (3) any ecological urgency to reserve peatlands in certain regions, district, or provinces (4) evicence of protected species. Likewise, P.14/ 2017 stipulated that a map of peat hydrological units should inform the location, existence, and total areas of peat ecosystems, yet the map of hydrological units as described in SK 129/ 2017 failed to disclose such information.
	P.14/ 2017	Procedures for inventory and determination of peat ecosystem function	
	P.15/ 2017	Procedures of water table measurement of peat ecosystem compliance point	
	P.16/ 2017	Technical guidelines for restoration of peat ecosystem function	
	P.17/ 2017	Changes over P.12 /2015 related development of industrial plantation forest	
Minister of Envronment & Forestry Decree	SK 129/ 2017	Determination of Peat Hydrological Unity map	
	SK 130/ 2017	Determination of Peat Ecosystem Function Map	
Province of Riau Regulation	Perda 6/ 2018	Procedures for state crops plantations	The province stated its focus on estate crops plantations, most of areas are residing inside the protection zones
	Perda 10/2018	Spatial Planning Riau Province 2018–2038	In the spatial planning map, Riau province allocates most of its land for industry and agriculture. Such a map, however, is not coherent with the ministerial map.
District of Pelelawan Regulation	Perda 1/ 2012	Medium Term Development Plan District Pelelawan 2011–2016	District of Pelelawan has a medium term plan for development of the technopolitan zone of Pelelawan. This plan, however does not sit well with the national policy for peat protection and restoration.
	Perda 1/ 2017	Medium Term Development Plan District Pelelawan 2016–2021	
	Perbup 32/2015	Management and Development of Technopolitan zone Pelelawan	

Table 3
Multi-sectoral policies concerning sustainable use of peatland. It can be seen that the goals of the ministries of Environment & Forestry, Agriculture, Industry, Trade and Agrarian Affairs are potentially conflicting.

Policy sectors	Policy main goal	Background	Key instruments		Remarks
Forestry	Sustainable use of peatland resources	Indonesia's massive deforestation rates and fire hazards	UU 32/2009	Environmental protection and management	The regulations revolve around the intention to protect and restore peatland. Some strict provisions include not giving any forest concessions to timber or plantation companies.
			UU 37/2014	Land and water conservation	
			PP 71/2014	Protection and management of peat ecosystem	
			PP 57/2016	amendment of PP 71/2014	
			P.14/2017	Procedures for inventory and determination of peat ecosystem function	
			P.15/2017	Procedures of water table measurement of peat ecosystem compliance point	
			P.16/2017	Technical guidelines for restoration of peat ecosystem function	
			P.17/2017	Changes over P.12 /2015 related development of industrial plantation forest	
			SK 129/2017	Determination of Peat Hydrological Unity map	
			SK 130/2017	Determination of Peat Ecosystem Function Map	
Agriculture	food supply stability, increasing production, optimisation of degraded land for agriculture	National food sufficiency	UU 39/2014	Plantations	The overarching policy is to enhance the national food security through more exploitation of peatland for oil palm plantations
			PermenTan 14/ 2009	Guidelines for the utilisation of peatland for oil palm cultivation	
Industry	positive growth of manufacturing industry by 0.5% each year	Indonesia targeted to create more employment	UU 3/2014	Industry	The overarching policy is to enhance manufacturing industry including pulp and paper. The Ministry of Industry has promoted, in Ministerial regulation 42/2017, the export of raw products such as pulp and non timber materials. Such a regulation is an incentive for the timber industry to produce more, hence, contradicting regulations issued by the Ministry of Environment Forestry.
			PP 44/2016	List of business fields that are closed for investment and business fields that are conditionally open for investment	
			PermenPerind 42/2017	Procedures of awarding recommendation for raw material exports (pulp, recycled paper and non timber material)	
Trade	Increasing exports from manufacturing goods by 3–8% each year	Indonesia need to have a surplus Trade Balance	UU 3/2014	Industry	Aligning with the Ministry of Industry, the Ministry of Trade has targeted a surplus balance of international trade. This is potentially antagonistic with the peat policy
			PermenDag 97/ 2015	Guidelines for importing forest products	
Agrarian Affairs	More land for local communities	One of the national goals is to provide more local land ownership	UU 26/2007	Spatial Planning	The Ministry of agrarian affairs wants to give more land ownership to local communities. This also does not sit well with the peat policy
			PermenATR	Systematic inventory of land registration	

Lingkungan Hidup, 2012) and the basic law on environmental protection and management number 32/2009 was issued in 2009 (Undang Undang Republik Indonesia, 2009). However, Indonesia's commitment to the global peat protection initiative complements well the later establishment of a peat protection program by the Ministry of Environment & Forestry (UNDP Indonesia, 2015). Likewise, the UNFAO guidelines on peat protection and restoration (FAO, 2012) are substitutable with government regulation (PP) 71/2014, as this regulation adopted most of those guidelines (Peraturan Pemerintah Republik Indonesia, 2014). Law (UU) number 37/2014 about soil and water conservation, complements Government Regulation (PP) 71/2014 and its amendment PP 57/2016, as that law strengthens the protection of peatlands by placing them in the "Soil" category, which has protection and conservation status.

While the global peat protection initiation is adopted at the national level, we found that the policy was not adopted at lower levels through ministerial regulations. Some of the ministerial regulations are contradictory with each other (Table 2). Some ministerial legislation is antagonistic with the government regulations. For example, article 9 (4) of Government Regulation (PP) 57/2016 states that any areas with: (1) three meters of peat thickness (2) endemic species (3) protected species and/or (4) peat ecosystem function, should be placed within peat protection zones. Furthermore, article 9 (6) stipulates that any areas not satisfying these four criteria should be placed within cultivation zones (Table 2, row 2) (Peraturan Pemerintah Republik Indonesia, 2014, 2016). Likewise, article 13(b) of Basic Law (UU) 37/2014 explains that cultivation zones include production forests, smallholder forests, agricultural land, fisheries, mining areas, local community land, industrial sites, tourism sites, religious areas, education, and defense force locations (Undang Undang Republik Indonesia, 2014). However, when these regulations were used to derive an actual protection zone and cultivation zone map, it was found to be antagonistic with the peat zone mapping in ministerial decree (SK) 130/2017, creating potential conflicts between different government agencies as well as the stakeholders (Fig. 5). The ministerial map depicts some cultivation zones in areas of thick peat and existing conservation areas, while some protection zones are depicted in production forests and existing settlements (Surat Keputusan Menteri Lingkungan Hidup dan Kehutanan, 2017a). Because hydrology is such an important aspect of peatland functioning, maps of hydrological units are crucial in the planning and management of these areas. However, we found that different regulations require maps of hydrological units with different levels of information content. For instance, Article 7 (1) of Government Regulation (PP) 57/2016 stipulates that maps of peat hydrological units should provide information about criteria pertaining to its (a) location, existence, and total area as well as (b) chemical, physical, biological and hydro-topographic

characteristics, among other technical details. Yet, Ministerial Regulation 14/2017 only required the map of peat hydrological units to show the location, existence, and total area of the peat ecosystem, ignoring important hydrological, physico-chemical and ecological information on these units (Peraturan Menteri Lingkungan Hidup dan Kehutanan, 2017). Further, mapping of peat hydrological units in ministerial decree (SK) 129/2017 also failed to accommodate the above information as required by Government Regulation (PP) 57/2016 and Ministerial Decree (SK) 130/2017 (Surat Keputusan Menteri Lingkungan Hidup dan Kehutanan, 2017b). Furthermore, the multitude of maps depicting the hydrological units of peatlands did not reflect the actual peatland hydrology of the Kampar Peninsular (Hooijer et al., 2015). This mismatch in maps with actual peatland hydrology results in planning and management decisions that are detrimental to peatlands and exposes them to the dangers of declining water levels, flood risk, habitat destruction and increasing fire risk (Page and Waldes, 2008; Parish, 2002).

Other antagonistic interactions were found when the ministerial legislation was devolved further down to the province and district levels. While both PP and ministerial decrees allocated some areas of Kampar Peninsula as protection zones, Riau Province in its provincial regulation on spatial planning has designated most of Kampar Peninsula as production forest (Peraturan Daerah Provinsi Riau, 2018). Similarly, Pelelawan district in its spatial planning has a vision of creating a technopolitan or a technology-based city (Febrian et al., 2017). The masterplan includes creating access from the proposed location of the technopolitan to Futong port located on the eastern edge of the peninsula (Badan Pengkajian dan Penerapan Teknologi and Pemerintah Kabupaten Pelelawan, 2012). Such a road, however, would cut across some of the peat protection zones.

Summary of the multi-level analysis is presented in Table 2.

4.1.2. Multi-sectoral coherence

Interactions among multi-sectoral policies surrounding peat protection initiative are potentially antagonistic (Table 3). According to ministerial strategic plans 2015–2019, the Ministry of Industry aimed to increase the growth of agro industries including pulp and paper. The Ministry of Agriculture targeted increasing the national food supply by five percent. Likewise, the Ministry of Trade was keen to increase exports and reduce imports, aiming for more of a surplus on the international trade balance (Peraturan Menteri Perdagangan, 2015; Peraturan Menteri Perindustrian Republik Indonesia, 2015; Peraturan Menteri Pertanian, 2015). These strategic plans, however, challenge the Ministry of Environment & Forestry policy on peat protection and restoration. This Ministry's strategic planning called for conservation through the establishment of national parks or wildlife sanctuaries, and the sustainable use of forests through the suspension of forest licenses (Peraturan Menteri Lingkungan Hidup dan Kehutanan, 2015). Adding yet more complexity was the Ministry of Agrarian Affairs' strategic planning. While it supported the Ministry of Environment and Forestry in not giving new forest licenses to business entities, the Ministry of Agrarian Affairs targeted the granting of land certification to local communities for fairer land distribution (Peraturan Menteri Agraria dan Tata Ruang, 2015b).

These potentially antagonistic interactions are also reflected in derivative legislation. Supporting the peat protection initiative, The Ministry of Environment and Forestry issued P.8/2014 to prevent new concessions being granted over peat forests (Peraturan Menteri Kehutanan, 2014). On the other end, the Ministry of Trade, in attempts to increase exports and reduce imports, also established ministerial regulation no 31/2016 to limit importing second hand products including recycled paper (Peraturan Menteri Perdagangan Republik Indonesia, 2017). These regulations have impacted the pulp and paper industry, since paper companies need to import more recycled paper to replace wood chips, the raw material for pulp mills now in short supply due to the suspension of logging concessions (Suwondo et al., 2018; Widyantoro et al., 2006). The Ministry of Industry, in an attempt to increase the manufacturing of industrial products, has since issued its own ministerial regulation designed to facilitate the export of pulp and paper from recycled paper and non-timber material (Baskoro et al., 2018; Peraturan Menteri Perindustrian, 2017). The assessment of multi-sectoral coherence among ministries is summarized in Table 3.

4.2. Policy effectiveness

The peat protection policy has not been effectively implemented (Table 1). Whilst almost all stakeholders we interviewed in this study expressed their support for the government initiative to protect peatlands, most stakeholders agreed that the delineation of peat protection and cultivation zones could be improved. Conservation NGOs (FFI, Birdlife International), companies (APRIL and APP), migrant workers, and peat experts all suggest that the delineation of protection and cultivation zones is inappropriate. A coalition of other NGOs including Greenpeace, Rainforest Action Network, and Eyes on the Forest support the delineation but argue that the land swap program should be terminated because it will degrade the forest in other locations, for example Kalimantan and Sulawesi (Koalisi Anti Mafia Hutan, 2019). Meanwhile some Melayu people support the new peat policy but strongly oppose the delineation and the land swap program since they refuse to relocate to some other place.

Both companies and migrant workers had reservations about the delineation of peat protection and cultivation zones. Rapid and unpredictable land allocation changes by the Ministry of Environment and Forestry has been a source of tension between the ministry and both APRIL and APP ever since the issuance of the ministerial regulations on peat (Saputra, 2017). According to APRIL,[7] the protection zone should be excluded from their concession since they had valid licenses for another 30 years to manage these areas. The conflict escalated as both APP and APRIL failed to submit revised business plans as requested (Prihatin and Syaprianto, 2017; Saputra, 2017). The ministry later suspended the business permit of RAPP (Riau Andalan Pulp and Paper), one of APRIL's biggest subsidiaries, forcing it to pause production and lay off 4600 workers (Yuniartha, 2017). Migrant workers, mostly satisfied with working for APRIL or APP as their wages are above the government's minimum (Pusat Kajian Antropologi UI, 2015) appealed to the Supreme Court whose decision revoked the land swap regulation (Mahkamah Agung Republik Indonesia, 2017). However, the court decision has not yet been executed. According to another ministerial regulation, number P30/2014, the companies are still obliged to relocate their businesses to other locations if the ministry establishes that their current locations conflict with the national interest, which includes peat protection. Both the companies and the Ministry are now operating in a period of uncertainty under conflicting regulations (Purwawangsa, 2018).

Conservation NGOs such as FFI are also not optimistic about the prospect of implementing the ministerial map. Kampar peninsula has high biodiversity value. The RER area alone is a sanctuary for 718 species, including 122 plants, 70 mammals, 300 birds, 89 fish and 107 amphibians and reptiles (Goenarto and Gunaryadi, 2018; Osaki and Tsuji, 2016). About 48 of them are on the IUCN red list of critically endangered species, including the plants, Meranti Bakau (*Shorea platycarpa*) and Resak Paya (*Vatica teysmanniana*), the mammals, the Sunda Pangolin (*Manis javanica*) and the Sumatran Tiger (*Panthera tigris sumatrae*), and the birds, Storm's Stork (*Ciconia stormi*) and the White-winged Duck (*Asarcornis scutulata*) (Birdlife International, 2018; RER-FFI, 2016). Conservation of these species requires areas of habitat large enough to support viable populations and adequate food supplies, which should be separated from intrusive human activities (Margules

[7] We interviewed APRIL's CEO, RAPP's senior management officer, and APRIL's owner's son separately on December 2016 and in a board meeting in March 2018.

and Pressey, 2000; Sulistyawan et al., 2017). Both APRIL and APP have made commitments designed to ensure that their forestry activities would sustain this biodiversity (FERN, 2015; RGE, 2015). APRIL developed its Sustainable Forest Management Policy (SFMP) in 2014, committing to 'one hectare of planting, for one of conservation'. APRIL also established a program to restore areas of degraded peatland under an agreement with the Ministry of Environment and Forestry "Restorasi Ecosystem Riau" (RER) (Ceruti, 2016). This restoration initiative, working together with conservation NGOs such as Flora & Fauna International, supports the conservation of many rare species of plants and animals listed as vulnerable or endangered by IUCN that occur in the area (RER-FFI, 2016). Likewise, APP established a Kampar Carbon Reserve in 2010, to protect 15,640 ha of peat forest ecosystem (Glauber, 2017; Nsenkyiere and Simula, 2000). APP spends significant funds on its Belantara Foundation, which supports conservation NGOs conducting environmental activities such as biodiversity protection (Yan, 2017). Unfortunately, the ministerial map is problematic as it crosses proposed an existing conservation areas. The habitats of IUCN red listed species are scattered across the peninsula (TFCA Sumatera, 2017). Fragmented biodiversity protection areas disrupt habitats and food chains (Wibisono and Pusparini, 2010), threaten the connectivity of habitat for wide-ranging species such as the tiger (Kelly et al., 2013) and fragment the habitat of many other species (Morrison-Saunders and Pope, 2013). The patch shaped peat protection zones in between cultivation zones without any connecting corridors will expose the habitat of protected biodiversity to more frequent contact with non-conservation land users (Sunarto et al., 2012).

Likewise, the ministerial map itself is controversial. The map has essentially divided the peat swamp into disconnected patches. Some experts believe that an integrated ecosystem function requires that peat lands, water, and the biota should not be dissected by activities such as plantations, housing or other infrastructure (Evers et al., 2017; Hooijer et al., 2015; Posa et al., 2011). Others claim that cultivation in between protection zones is possible, provided that a sufficient buffer zone exists to separate protection and cultivation areas from one another (Evans et al., 2019; O'Driscoll et al., 2014; Yallop and Clutterbuck, 2009). However, the ministerial map is unlikely to be a viable alternative. Peat needs to retain its water table and is reliant on rainwater to keep it saturated. Most peats in South East Asia are dome shaped, where excess water is absorbed during the wet season and is distributed to neighboring shallower areas during the dry season. On Kampar Peninsula, peat domes are mostly located at the midsection of the peninsula as this section is, on average, more than 5 m deep (Hooijer et al., 2015). The ministerial map divides the peat swamp into disconnected patches, with some of the areas of highest peat thickness not included in the protection zones (Fig. 6). Any new cultivation zone will require peat to be drained. This oxidizes the carbon and releases GHG (Hooijer et al., 2015). Such an endeavor carries a high risk of failure, incurs high costs for all stakeholders involved (Uda et al., 2017), and will make Indonesia struggle even more to achieve its NDC (Nationally Determined Contribution) (Nieminen et al., 2018; Schrier-Uijl et al., 2013).

Different preferences were in evidence among the rest of the stakeholders on the Kampar Peninsula. The indigenous Melayu people and environmental NGOs support the peat protection policies but with some

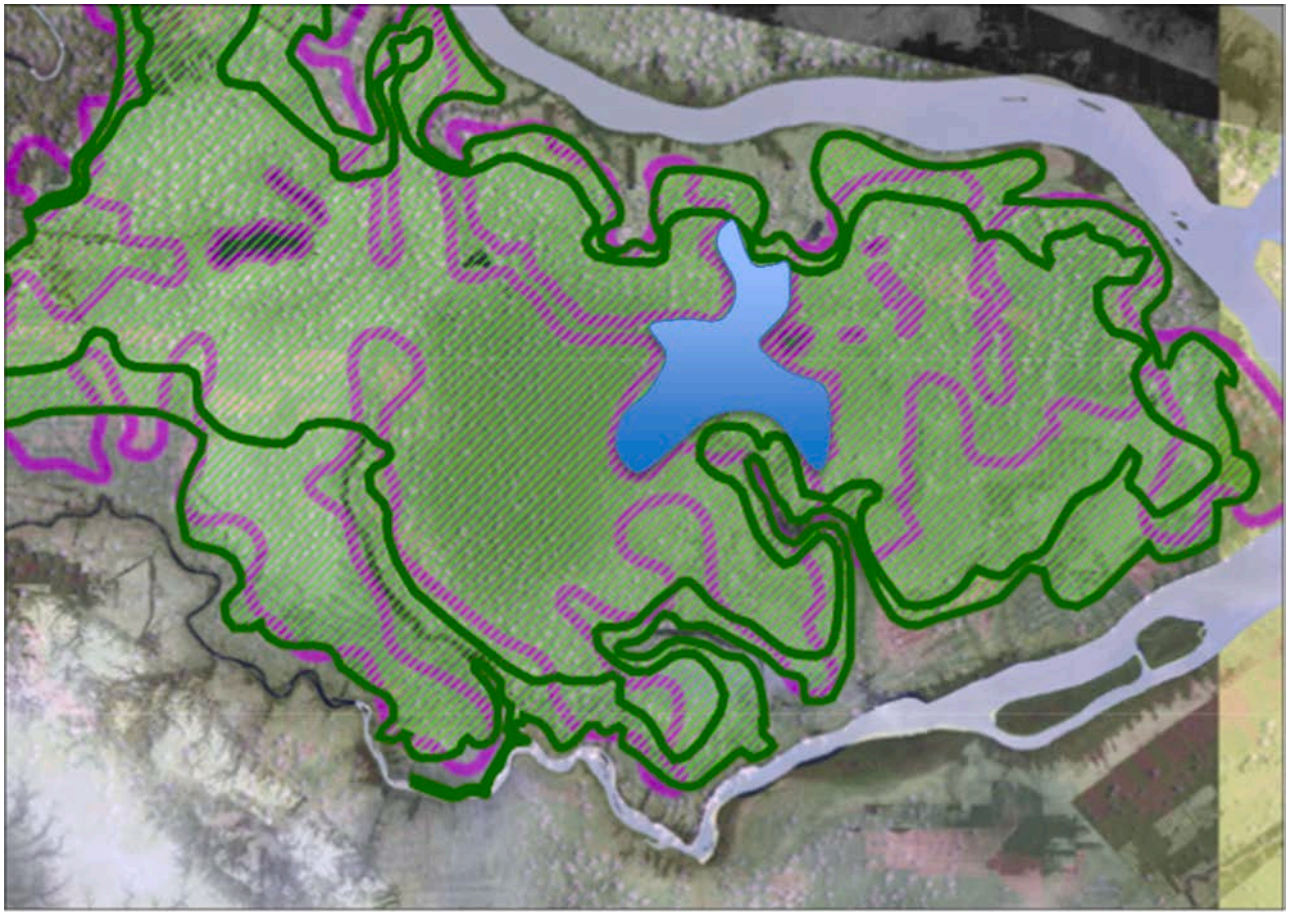

Fig. 6. Peat depth map (mapped by DELTARES, Hooijer et al., 2015), overlain with the peat protection zones according to the ministerial map. Areas inside the outer green lines are peat with 2–5 m depth, areas inside the inner green line are peat of more than 5 m depth, while areas inside the purple lines are the ministerial protection zones. The map shows that the ministerial protection zones cut across the peat areas dividing them into patches, and exclude some areas of peat more than 5 m deep (blue shade). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

concerns. Some of the Melayu are already in conflict with the companies since they claim that the government allocated some of their land for plantations (Forest People Programme, 2009, 2011). The traditional owners of Kampar Peninsula did not own land title deeds and therefore lost their lands when the companies obtained their concessions from the government in the 1990s (Hardjono, 2017; Salim, 2018). On the other hand, NGOs with different interests have different attitudes towards the new policy. Greenpeace, Wetlands International, Rainforest Action Network, and WWF Indonesia support the peat protection and restoration agenda since they claim that APRIL and APP are responsible for the deterioration of the peatland ecosystem on the peninsula (Bank Track, 2015). Forest Peoples Programme (FPP) advocates that the companies settle any conflicts with the Melayu people regarding land acquisition and compensation (Forest People Programme, 2011). Similarly, local NGOs such as Jikalahari and Walhi demand that the companies give more compensation to local government and local communities in return for past impacts on peatlands (Jikalahari, 2015; Miettinen, 2009; Raflis, 2010; WWF Indonesia, 2008). Hence, Melayu people and the coalition of NGOs have no objections regarding the delineation of peat protection and cultivation zones according to the ministerial map.[8] However, these stakeholders opposed the land swap program. Most Melayu people only demand that the government and the companies respect the land they possess and provide more facilities such as healthcare services, schools, jobs and infrastructure (Forest People Programme, 2009; LPAD, 2016; Pusat Kajian Antropologi UI, 2015). The environmental NGOs are opposed to the companies, expanding their exploitation in other parts of Indonesia. These NGOs believe that in the past both APRIL and APP have degraded the environment and violated some local rights on the peninsula. Therefore, these companies should not be allowed to continue their business within the peat conservation areas or in any other locations (Eyes on the Forest, 2018; Koalisi Anti Mafia Hutan, 2019).

4.3. Policy efficiency

The new peat policy has also not been implemented efficiently (Table 4). According to Ministerial decree 130/2017, protection zones which are demarcated upon an existing land area that is utilized for economic activities such as plantations, settlements and infrastructure should be offered monetary compensation or land swap. However, based on the map shown in Fig. 7, the major portion of the proposed protection zones coincides with existing plantations or production forest, which will require a substantial budget for the land swap scheme. As a result, the implementation of the peat protection and restoration policies is inefficient.

We identified three possible scenarios of peat zoning, which might result in greater efficiency (Fig. 8). Each scenario was based on land use mapping from remotely sensed imagery. In scenario 1, peat areas were identified from 2016 Landsat imagery. In scenario 2 peat areas were identified from 2018 Landsat imagery, where some changes were detected. In scenario 3, however, peat areas were identified from radar imagery from 2018 for clearer images on buildings, infrastructure, and any manmade constructions. All scenarios were randomly validated with interviews, existing maps and limited observations.

The overlap of non-peat land use (e.g. cultivated areas) with identified peat areas indicates the size of the area involved in a land swap. We calculated the areas required to be compensated for the land swap based on the ministerial map (Ministry in Table 4) and our proposed three scenarios. These costs are expressed as land area in hectares as the government regulation has not yet set the costs per hectare, which may vary from year to year and among different locations. These calculations are shown in Table 4.

Scenario 1 is the most inefficient option compared to other scenarios, in terms of hectares needed for the land compensation or land swap. We mapped all peat areas that existed in 2016 (areas inside the black line) and overlaid this with the existing land use map to identify areas that would need to have cultivation activities removed. The peat protection area of this scenario (391,557 ha) is 13% larger than the total protection areas according to the ministerial map. However, this delineation would require 32% less land to be compensated compared to the ministerial map, as it overlaps with only 120,840 ha currently occupied by other land users (plantations 117.035 ha, and migrants/Melayu 3805 ha).

By contrast, Scenario 2, based on remaining peat areas mapped with Landsat data from 2018, is less expensive than Scenario 1 but more expensive than Scenario 3 below. By 2018, some of the peat areas from Scenario 1 appear to have been drained and planted with acacia or oil palm. Thus, suitable areas for peat protection zones cover of only 281,843 ha, or 18% less than the Ministerial Map. We overlaid existing land uses on to our Scenario 2 mapping. Only about 49,469 ha or 72% less than the ministerial map, are needed for the land compensation to plantations (48,867 ha) and migrants (602 ha).

Scenario 3, based on radar imagery from 2018 and our physical examination, is the least expensive. According to the Radar imagery from 2018, even some areas in Scenario 2 have since been drained so severely that any restoration might not be economically, or even technically feasible. Thus, we remapped the protection zones and calculated the areas with cultivation activity inside this protection zone which would need to be relocated. In Scenario 3 the peat protection zone consists of 251,953 ha or 27% less than the Ministerial map. Likewise, areas to be compensated are only 39,666 ha or 78% less than the ministerial map.

4.4. Summary of results

From the audit findings presented above, we conclude that a re-zoning of the peatlands might deliver a more effectively and efficiently coherent policy. Protection and cultivation zone mapping at ministerial, provincial and district level would be improved if it aligned more closely with government regulation PP 57/2016. Re-zoning should also facilitate the least disturbance to business activities so that the Ministries of Agriculture, Trade, and Industry can pursue their own targets. Most importantly, the re-zoning should contribute to reducing conflicts among organizations and community groups as well as optimizing the costs of any land compensation or land swap. This would accommodate more coherent policies, be more acceptable to stakeholders (policy effective), and optimize the budget (policy efficient).

If the mapping shown in Fig. 8 was adopted, it should result in environmental benefits (repair peat hydrology, provide ecological habitats and reduce carbon emissions), be cost-effective and be likely to reduce conflicts between different stakeholders. Locating protection zones in the midsection of the peninsula can potentially maintain peatland water tables, reduce fire risk and lower the cost of managing that risk since the companies will minimise the risks to their plantations, which surround the protection zone.

5. Discussion and conclusion

Effective, efficient and coherent policies are crucial for successful implementation. Policies across multiple levels and sectors need to consistently establish a shared goal with clear notions of trade-offs, priorities, impacts on stakeholders, and funding. These qualities of a shared goal ought to be accommodated adequately in derivative legislation. Multi-level and multi-sectoral regulations need to be substitutable for, or complementary with, one another, stakeholders ought to be able to synergistically interact with each other, and the budget for implementation should aim to achieve the most output for the least cost. The use of standard audit procedures to assess the coherence, effectiveness and efficiency of policy implementation is a potential new

[8] We conducted interviews with the representative of Melayu people, and the NGO coalition and we validated their information with document and interviews with Forest Management Unit Riau and APRIL.

Table 4
Overlap of proposed peat protection or restoration zones and potential land swap compensation.

Land users to be compensated in the event of land swap	Ministry (total protection areas: 345,563 ha)	Scenario 1 (total protection areas: 391,557)	Scenario 2 (total protection areas: 281,843)	Scenario 3 (total protection areas: 251,953)
Plantation/Industrial forest	175,446.00	117,035.00	48,867.00	39,532.00
Migrant/Melayu	2590.00	3805.00	602	134
Total hectares to be compensated	**178,036.00**	**120,840.00**	**49,469.00**	**39,666.00**
		0.68	0.28	0.22
		57,196.00	128,567.00	138,370.00

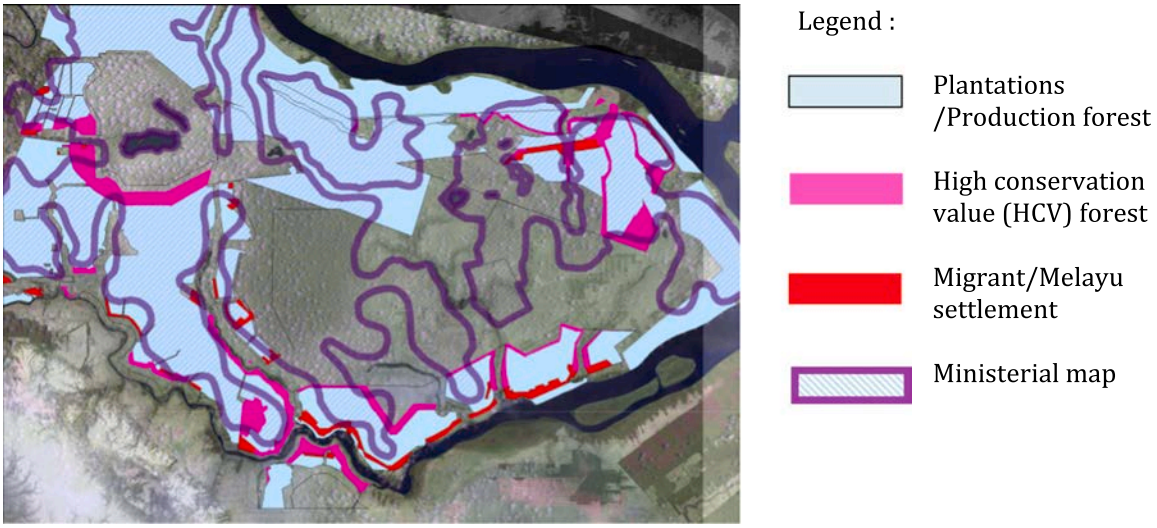

Fig. 7. The location of stakeholders' preferences overlaid with the Ministerial Map. The land swap for plantations would be very large considering the portion of the proposed peat protection zones which overlap with the existing concession areas belonging to the companies.

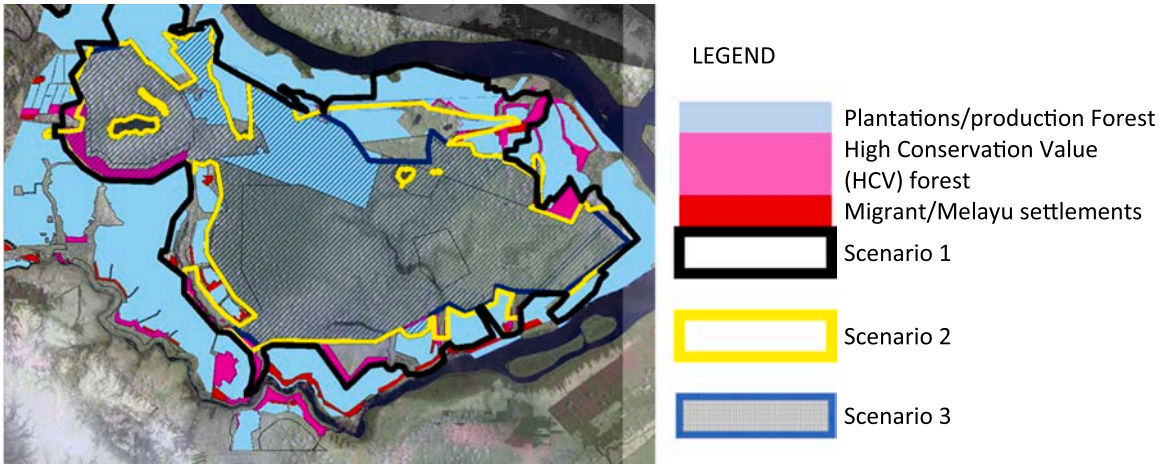

Fig. 8. Three scenarios for peatland conservation or restoration. Scenario 1 (most expensive), Scenario 2 (moderate option), and Scenario 3 (least expensive option).

method for evaluating policies and assessing the likely success of implementation.

The complexity of auditing the effectiveness of countrywide government policies may be mitigated by auditing at landscape scales. This new approach would enable auditors to understand complex arrangements over a manageable area such as a landscape as well as to recognize specific challenges that might occur in different landscapes due to conflicting preferences of different governance actors. As illustrated with the case of the Kampar Peninsula, the landscape governance audit helped reconcile the different interests of multiple governance actors within this area more objectively.

Using an auditing approach, this study has shown that the overall performance of government policies on peat protection zoning can be improved. Our audit confirmed that the peat zoning according to ministerial decree 130/2017 is incoherent with other regulations both vertically (multi-level) and horizontally (multi-sectoral).

The auditing approach also allowed us to assess three different scenarios against the scenario set by ministerial decree 130/2017 that resulted in the Ministerial Map. We were able to objectively quantify the relative land compensation costs of three scenarios. Scenario 1 would require land compensations of 120,840 ha, while scenarios 2 and 3 would need to compensate 49,469 and 39,666 ha respectively. Compared to the 178,036 ha needed according to the Ministerial Map, the Ministry of Environment and Forestry could avoid compensating

57,196 ha (Scenario 1), 128,567 ha (Scenario 2) and 138,370 ha (Scenario 3) if it revised the protection zone map.

Furthermore, the mapping exercise revealed additional complexities in the current management of peatlands. Some of the protection zones designated to be relieved of any cultivation activities are currently occupied and would require technically difficult and expensive restoration, whilst some of the cultivation areas supposedly available for other uses are actually peat swamps. Mis-identification of land uses can lead to conflicts between different government agencies as well as stakeholders. The three alternative protection zone scenarios all map protection zones that are surrounded on their edge by cultivated areas. In this respect, careful thought still has to be given to the issue of sustainable water extraction from these protection zones to the surrounding plantations or agricultural land to ensure that the newly protected peatlands do not drain excessively, counteracting the purpose of (PP) no 57/2016 (Wösten et al., 2008).

In the next stage of this study we will attempt to quantify the costs and benefits, both financial and environmental, of alternative options based on the maps above. We will then develop an audit model to demonstrate how these costs and benefits can be traded-off to achieve long-term goals for this peat landscape.

Land use policies, land use conflicts and multi-sectoral and multi-level governance arrangements lead to a level of complexity that requires an integrated approach that enables different stakeholders to try finding a solution they can all abide by. The auditing approach we have presented in this study is a potential new method that can help to deal with such complexity.

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CHAPTER 5. Determining the effectiveness of forest landscape governance: A case study from the Sendang landscape, South Sumatra

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Multi sectoral audit

ABSTRACT

We propose an approach to studying the effectiveness of governance arrangements to deal with complexity in forest landscapes. Using a landscape approach and standard performance audit procedures, we (1) describe the interactions among multiple sectoral actors (2) evaluate the effectiveness of governance arrangements to deal with complexity in a forest landscape, and (3) suggest recommendations for more effective multi sectoral forest landscape governance.

We conducted a pilot effectiveness audit in the Sendang (Sembilang Lalan Dangku) landscape of South Sumatra, Indonesia. Conservation activities in Sembilang and Dangku need to be reconciled with developments in Lalan; a new feeder port, an established oil processing facility, and expanding oil palm plantations.

We found that two sets of governance settings coexist in Sendang. By regulations, governance arrangements are highly centralised around the Ministry of Environment and Forestry. Yet, in implementation, government authorities and their influence are not as stipulated; companies bypass the regulations, informal patronage arrangements have a major influence on outcomes, and there is no effective intermediary institution to liaise with all governance actors.

We suggest three possible strategies to rationalise the regulatory framework for more effective implementation. (1) Align the regulations to more closely match implementation (2) invest in additional resources, budgetary, human, technological, and law enforcement (3) a hybrid of the first two with some additional resources and some regulatory changes because major change is expensive and time-consuming. To determine the most appropriate strategy, another audit on the efficiency and economy of each option is required.

This research will contribute to alternative mechanism for mitigating conflicts among multi sector governance actors as well as to the body of knowledge.

1. Introduction

Forests are subject to multiple interests and utilised in diverse ways. Government agencies, businesses, non-Governmental Organizations (NGOs) and local communities all have their own agendas such as conserving the environment, preserving the social values of forests, and generating income from commercial uses (Sayer et al., 2015; World Resource Institute, 2013). Appropriate governance settings should achieve a balance between development and conservation (Bhattarai and Hammig, 2004; Giessen and Buttoud, 2014). Government agencies with their regulatory authority, NGOs with non-statutory influence through civil society, local communities and commercial entities with licenses to use forest resources all need to collaborate to achieve a fair system of utilisation (Nagendra and Ostrom, 2012). Rules and regulations (Meidinger, 2006) as well as effective intermediary institutions, described by Ostrom (1990) as nested enterprises, have to reconcile differences between multiple governance actors including businesses, communities and NGOs (Sahide et al., 2016). Effective governance is achieved when synergistic rules and regulations promote mutually respectful interactions among governance actors in achieving their different goals (Agrawal et al., 2008; Lambin et al., 2014).

Forest and land regulations in Indonesia, however, are determined by multiple authorities and regulatory bodies, each of which has complex complementary or antagonistic relationships towards the

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others (Lambin et al., 2014). The Ministry of Environment and Forestry (MoEF) shares its authority designating land uses with the National Land Agency (Undang Undang Republik Indonesia, 1999), while the National Agency of Planning and Development's authority in forest or non-forest title transfer partially overlaps with both the National Land Agency (Peraturan Presiden Republik Indonesia, 2015b; Undang Undang Republik Indonesia, 1960) and the MoEF (Peraturan Presiden Republik Indonesia, 2015a). The National Agency of Geospatial Information is supposed to regulate spatial arrangements through its 'One Map' policy (Undang Undang Republik Indonesia, 2011), however this project has only recently been initiated and its implementation is taking time (Wibowo and Giessen, 2015).

In the complex governance setting found in Indonesia, conflicts are frequent. Land ownership is in constant dispute (Setiawan et al., 2016). Local communities often view forests as their own property (Boedhihartono and Sayer, 2012), under either traditional customary rights (Colfer and Resosudarmo, 2002; Davidson and Henley, 2007) or Islamic principles (Sait and Lim, 2006; Sardar, 2014). Pre-existing ownership claims often overlap with later entitlements decreed by ministries or local governments (Nurrochmat et al., 2015). Even among government institutions, land tenure is often unclear, since each authorised institution uses its own map for the issuance of licenses or permits (Riggs et al., 2016).

Assessing the effectiveness of governance by evaluating forestry sector in isolation from other sectors has failed to capture these multi sectoral conflicts. Companies have been audited through certification schemes (Silva-Castañeda, 2012), each ministry and every local government is audited by the Indonesia's Supreme Audit Board (BPK) (Asmoko, 2015; Badan Pemeriksa Keuangan, 2017), and the majority of NGOs' have published their accountability reports for public scrutiny (Astuti and McGregor, 2015) Yet, ongoing conflicts regarding land utilisation between companies, local communities, and governments prove that these audits are not effective (Boer and Pratiwi, 2016; Yasmi et al., 2009). Where governance is so fragmented (Achmad Nurmadi, 2017), a new approach to audit that explicitly acknowledges the interconnected multisectoral reality is needed to help improve overall governance (Sari et al., 2018). However, the magnitude of the scope of a multisectoral audit is unfeasible for a routine audit assignment (Ramanan, 2014) because it would cover too great an area. However, auditing at a landscape scale is feasible. Since a forest landscape is a spatial designation in which multiple actors with multiple interests contest and compromise over the utilisation of resources (Sayer et al., 2005), it is an appropriate setting for tackling the multisectoral problem.

In order to help develop such a mechanism, we audited the effectiveness of the governance arrangements in the Sendang landscape of South Sumatra, Indonesia, as a case study. We assessed the coherence of regulations and the effectiveness of their implementation in reconciling conservation interests with the expansion of oil palm plantations, community forestry, oil production and the establishment of an Exclusive Economic Zone. Sendang as a landscape was delineated by the Zoological Society of London (ZSL) in its project KELOLA Sendang (https://www.zsl.org/conservation/regions/asia/kelola-sendang-%E2%80%93-protecting-sumatran-tiger-habitat). This landscape is located in the districts of Musi Banyuasin and Banyuasin, referred to collectively as MUBA: two districts in the province of South Sumatra. The delineation is based on the fact that ecosystems in these areas are interdependent. The three locations are part of the same watershed from Dangku all the way to the Bangka sea through Lalan and Sembilang (Fig. 1). Any land use changes in one location will affect ecosystems of the other locations (Luttrell et al., 2018; Sinaga, 2015). We designed the audit to assess the effectiveness of the regulatory framework in mediating competing claims on this landscape and to be replicable by any trained auditor. Although large parts of the landscape are allocated for private use, the objective of our audit was to determine whether the optimal public good resulted from the governance arrangements in place. Private activities yield externalities and the purpose of a landscape audit is to determine whether governance is adequate to ensure that these externalities do not deplete public goods values of the landscape.

2. Theoretical framework

There is a growing literature on the governance of forests (Edwards and Giessen, 2014). Forest governance, the structures and interactions of government, public, and private actors, within a forest setting (Giessen and Buttoud, 2014) has developed from a sectoral approach (Rametsteiner, 2009) to an integrated multi sectoral approach (Giessen and Krott, 2009; Sahide et al., 2015). In recent decades forest governance has tended to move from centralised single level arrangements to multi-level decentralised arrangements (Krott and Hasanagas, 2006; Maryudi and Sahide, 2017). There has been an evolution from highly structured monolithic governance arrangements to decentralised poly-centric arrangements (Ostrom, 2005). Forests which benefits are allocated by the government to the users without exclusive ownerships, are deemed as common pool resources (Ostrom et al., 1994). The interactions among many actors at many levels (Susanti and Maryudi, 2016) reflect the reality of polycentricity; where interactions among multiple forest actors determine forest outcomes (Ostrom, 2010). Ostrom's theories provide a solid foundation for common Pool Resource (CPR) analysis, yet may be problematic in relation to more complex intersectoral systems.

2.1. Polycentric governance

Ostrom (1990) suggested three levels of analysis for commonly used resources. Constitutional level is where legislatures, regulatory agencies and courts establish a platform of constitutions, regulations and rulings. Collective level is the second layer where certification bodies, standard-setting organizations, communication forums and trade chambers set collective rules. Lastly, operational level is where local actors set collective rules for resource access, monitoring, and legal enforcement. However, these three levels do not accommodate more complex governance settings such as multinational, multisectoral, and those with ambiguous determination between common pool or private right resources. Thus, we referred to Dale et al. (2013) for analysing governance with sub domains (international, national, regional, and local), Sayer et al. (2015) for multisectoral landscape governance (mining, agriculture, forestry, conservation), and Cox et al. (2010) for the unclear determination between common pool resource and property rights in the same landscape.

From this literature, we derived the the following criteria for a polycentric governance system to be effective. (1) A formal multi-level institution with adequate authority and flexibility to liaise with every actor at all levels within each domain. This is referred to as a nested enterprise (Ostrom, 1990) or management coalition (Sayer et al., 2016).This effective intermediary organization provides the means to conduct the monitoring, appropriation, legal enforcement, setting of boundaries, and solving of disputes. (2) Clear and defined rights and obligations to enable the fair distribution and allocation of resources. Ostrom (2014) argued on defined CPR boundaries, however, Cox et al. (2010) added the importance of clearly defined rights and obligations among operational actors using the same resources, in a situation where the boundaries of common pool and private resources are ambiguous. (3) fair distribution of forest benefits through a justifiable allocation of access, time, place, technology and quantity of production among all actors. If the segregation between CPR and privately owned resource is unclear, actors at constitutional level should establish provision rules enforcing the justifiable allocations (Cox et al., 2010) (4) a common concern leading to a common agreement in which every operational actor can propose revisions or amendments to operational arrangements. Ostrom (2005) proposed the importance of a common agreement among governance actors, however, in a multisectoral arrangement Sayer et al. (2013) added the need of "common concerns" among actors in different sectors as an entry point of achieving the common

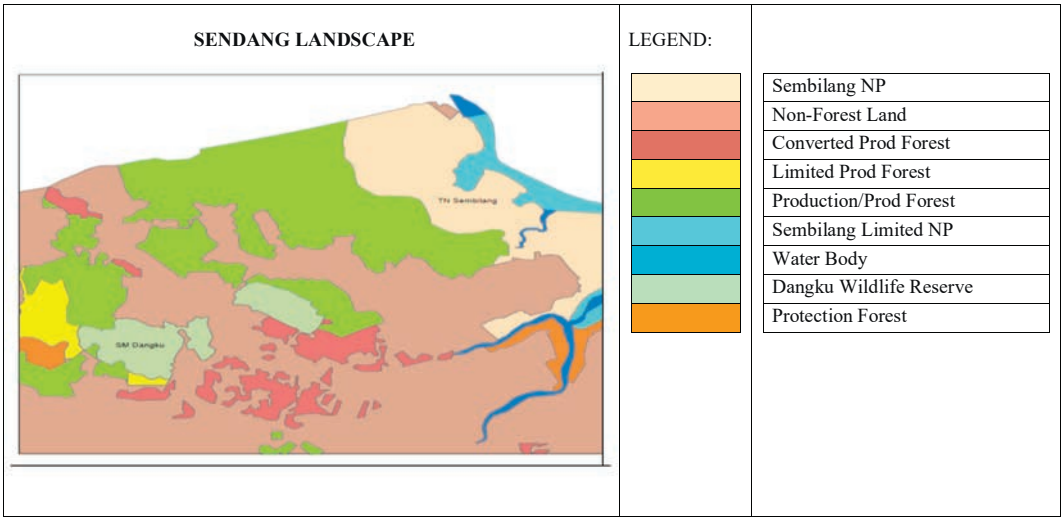

Fig. 1. Landscape Sendang (Sembilang Lalan Dangku).
A map of the Sendang landscape showing the Sembilang National Park (Sembilang NP) and Sembilang strictly conservation national park (Limited NP) situated in the northeast and the Dangku reservation (light green) in the southwest. Surrounding the areas are limited production forests (yellow), protection forest, which can never be converted into non-forest land (orange), production forest (lime green), non-forest lands which include plantations and privately owned lands and convertible production forests which can be converted into non forest land or protection forest. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

agreement. (5) Applied sanctions such as fines and punishments, imposed on actors breaching rules and regulations. In a multi-national governance system, Dale et al. (2013) added the need of public accountability where information are made open for public access, as a mechanism to ensure that adequate consequences are applied unanimously. (6) An in-build mechanism suffices to solve disagreements is crucial to resolve conflicts among appropriators, participants, or officials. (7) A mechanism to delimit rights of governance actors should exist so that the appropriators can impose operational rules. Non-operational actors should not overrule appropriators, and each operational actor should have equal rights and obligations. (8) Monitoring is needed to assess the system, ensuring that the regulations are implemented, appropriators are accountable, and the boundaries maintained (Ostrom, 1990, 2014).

Lambin et al. (2014) classified interactions among these actors into substitution, complementarity, and antagonism. Interactions where government authority is adequate to substitute other actors' roles in agenda setting, implementations, and monitoring enforcement are deemed to have substitutable relationships. Interactions where government partially has or shares its authority for those roles with other non-government actors are complementary, while those with government authority (policy/regulations) conflicting with other actors' arrangements (rules/standards/certifications) are considered antagonistic. We used this terminology to assess whether the existing governance setting was synergistic (substitution or complementary) and would therefore be likely to deliver sustainable governance. We adopted these eight principles as the criteria for the performance our audit of the Sendang landscape.

2.2. Performance audit of effectiveness

Performance auditing has been a useful mechanism to provide prompt independent and reliable examinations of whether auditees have achieved their objectives and intended results, or whether there is room for improvement. Performance audits consist of three parts, effectiveness (delivers desired outcome regardless of cost or effort); efficiency (delivers outcome for the least effort) and economy (delivers outcome for the least cost) (ISSAI, 2016d, 2016e; Kells and Hodge, 2010; Pollitt and Summa, 1996). Standardised audit procedures include planning (audit objectives, questions, criteria, and methods), conducting (audit evidence and audit findings), reporting (conclusions and recommendations) and feedback. The Audit objective is to assess the effectiveness of governance arrangements over particular systems, operations, programs, activities, and organizations. Audit questions identify conditions under which the objective may be achieved. Audit criteria should answer these questions. Effectiveness must be assessed by benchmarking against best practices or repeated assessment over time. Auditors need to apply standardised procedures or audit methods to obtain audit evidence or alternatively establish a set of corroborative arguments on actual governance arrangements. The gap between audit criteria and audit evidence are the audit findings (Fig. 2). To be acceptable, each audit finding needs to be supported by at least two of four potential types of corroborative audit evidence: testimonial, documentary, physical and analytical (ISSAI, 2016c). To enable detailed scrutiny, it is necessary that the audit scope and key problem areas are clearly defined and auditable within the timeframe and audit resources available.

Performance audits of effectiveness must be based upon benchmarks, which need to be proven empirically or be recognized as best practice (Franc et al., 2001; ISSAI, 2016d, 2016e; Pollitt and Summa, 1996). We adopted Ostrom's principles for sustainable common resource pools as benchmarks, for our audit criteria, since her research is based on empirical evidence of effective governance in landscapes worldwide over a long period of time (Kauneckis, 2014).

2.3. Forest landscape auditing (FLA)

We designed an audit of effectiveness of the governance arrangements within the Sendang landscape using Ostrom's theory of sustainable Common Pool Resources (CPR). We assessed how actors from different sectors and levels interact and influence each other (Nurrochmat et al., 2017; Prabowo et al., 2016) using standardised audit procedures for performance auditing (ISSAI, 2016a, 2016c, 2016e). We argue that these interactions should be synergistic to be able to achieve effective governance. This audit challenged conventional approaches to performance auditing, which deal with only one sector, have a country, province or district-wide scope and utilise qualitative in-depth analyses over a range of key areas (Bommel et al., 2016; INTOSAI WGEA, 2013; Turner, 2006). Instead, FLA proposes

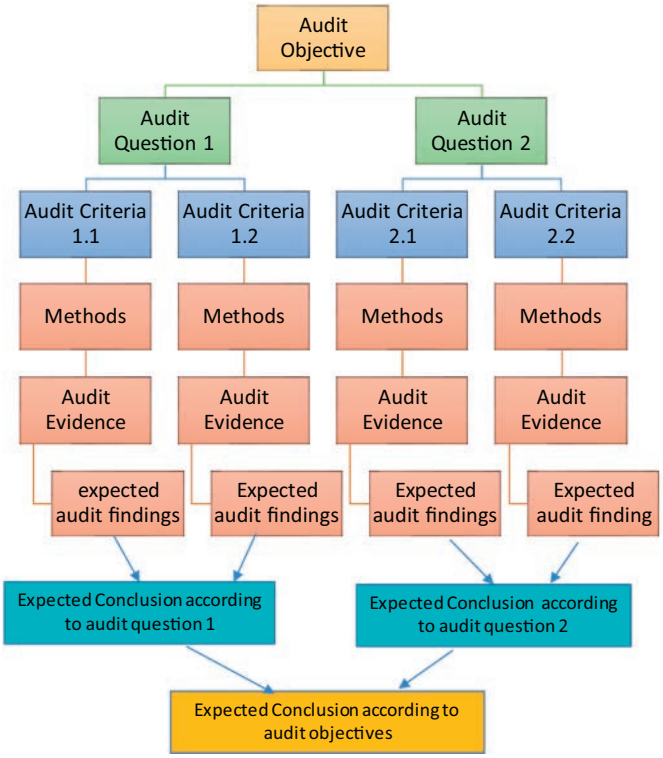

Fig. 2. Audit design matrix.
A diagram (Sari et al., 2018) showing the performance audit process based on the International Standard of Supreme Audit Institutions (ISSAI). An audit process is initiated by defining the Audit Objective, from which the auditor develops the Audit Questions (has the audited object achieved its objective?) and Audit Criteria (what are the preconditions for an audit object to achieve its objective?). An auditor will apply Audit Methods to gather Audit Evidence (the factual condition of an audit object) for testing whether or not the criteria have been met (have the preconditions for an audit object to meet its objectives been achieved?). The gaps between criteria and evidence are expected audit findings. Finally, the auditor should analyze the findings to draw Conclusions and make recommendations.

Table 1
Key differences between forest landscape audits and conventional performance audits.
Adapted from: ISSAI (2016a) and Sayer et al. (2015).

Subject	Forest landscape audit	Conventional performance audit
Scope	Landscape	district/province/national
Sector	Multi sectoral	One sector
Analysis	Actor Network Analysis	Qualitative In-Depth Analysis

auditing multi sectoral governance arrangements at a manageable spatial scale using actor network analysis (Table 1).

3. Methodology

3.1. Research framework

Each of the audit processes refers to the ISSAI 3200 audit design matrix (http://www.issai.org/en_us/site-issai/issai-framework/4-auditing-guidelines.htm). After commencing the study, it soon became apparent that there were two sets of governance arrangements applying in Sendang; one based on regulations and another reflecting the real nature of interactions and power relations in the landscape. Therefore, a performance audit was conducted on two data sets: (1) regulation, de jure, and (2) implementation, de facto. Both data sets aimed at achieving the same audit objectives, answering the same audit questions, and were tested against the same audit criteria. The audit objective was to assess the effectiveness of landscape governance in Sendang while the audit question was whether the governance arrangements in Sendang are synergistic and thus likely to be sustainable when measured against the audit criteria embodied in Ostrom's eight principles for sustainable common-pool resources management. We then applied standard audit methods (interviews, tracking back, cross-referencing documents, inspection, observation, actor network analysis, and focus group discussion.) to collect audit evidence (testimony, documents, physical, and analytical evidence). We used this evidence to look for gaps between the criteria and the data sets. These gaps were then formulated into expected audit findings. Based on the findings, we made conclusions on whether or not the governance arrangements in Sendang are synergistic. Finally, we made an overall conclusion on whether the governance arrangements in the Sendang landscape are effective and suggested some actions for improvements (Figs. 3 and 4).

3.2. Mapping the governance network

A crucial step in mapping these complex governance arrangements is to identify all the actors within three sub domains (local, national and international) and locate their positions within the Operational, Collaborative, and Constitutional levels of governance (Ostrom, 2010). Constitutional level actors are governments with the authority to make policies and regulations, such as the President, ministers, Provincial governors, Bupati (head of district), heads of departments and heads of offices. Collaborative actors are NGOs and international governments; those without the authority to make policies but who have significant influence through their capacity to promote standards, make agreements and MoUs as well as to initiate collaboration and promote public awareness. Operational actors are actors directly involved with land exploitation. A list of governance actors is provided in Appendix A and all acronyms and abbreviations are given in Appendix C.

We established two data sets. The first data set is regulations, de jure. All 81 regulations relevant to Sendang were scrutinizing line by line. Each regulation which mentioned certain keywords suggesting interactions between governance actors was used to help mapping the

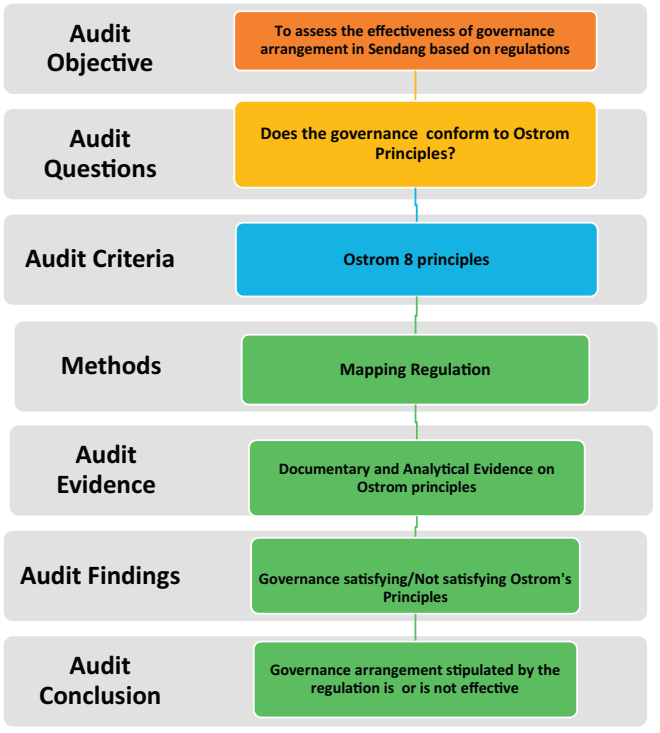

Fig. 3. Audit design matrix for regulation.

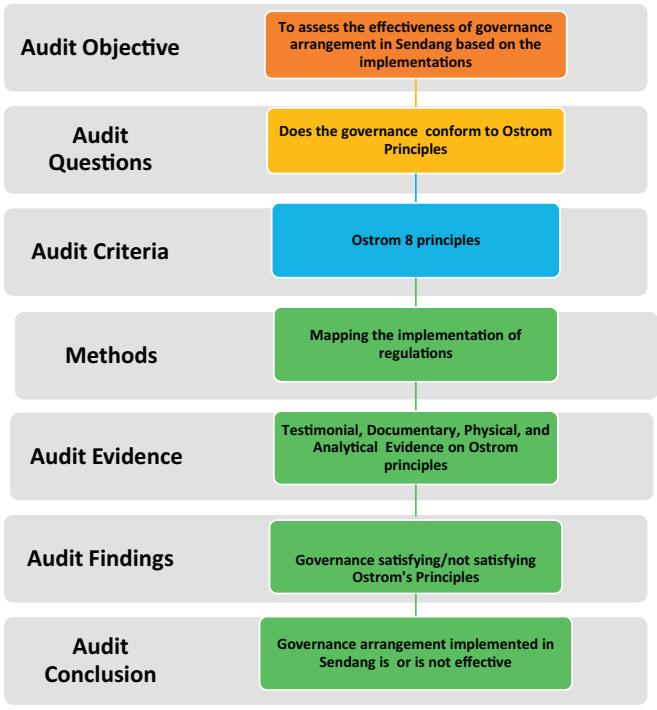

Fig. 4. Audit design matrix for implementation.
Figs. 3 and 4 adapted from ISSAI 3200 (2016c). Here the audit design matrix from Fig. 1 is applied to the process of Forest Landscape Audit (FLA). We used two sets of data: Regulation and Implementation, the audit matrices were designed separately for each.

actor network reproduced in Fig. 5 (the regulations are given in Appendix B). For example: in Ministry of Agriculture decree No 98/2013 article 21 it is stipulated that companies should apply for plantation permits to the provincial governor or the Bupati (district head). We input this regulation to Gephi by adding nodes "governor", "Bupati" and "Plantation Companies" and connecting edges (correlation line) from node "plantation companies" to the node "Sumsel governor" and "Bupati". We completed similar mapping for all of the 81 regulations before using the Gephi software to produce a multi-actors map.

We constructed the implementation, or de facto, data set by collecting audit evidence on each interaction as suggested by the regulations; the de jure network map. Interactions were verified by at least two forms of other collaborating audit evidence, such as testimonial, documentary (headlines, report books, maps, etc.), and physical (observation and inspection). Using the same example, we tested the implementation of Ministry of Agriculture decree No 98/2013 article 21 by interviewing the governor and a plantation company regarding the issuance of permits. We verified their stories by corroborating each testimony with the others before establishing the information as testimonial evidence. We also obtained sample documents on permit applications such as a set of approved company application documents and the recording of this approval into the district plantation department's database. These documents and testimonies are audit evidence for creating the implementation map. Not all of the regulations were tested in the same way. Restrictions on our access we were only able to examine some ministerial regulations through websites, online news and published information. Some other regulations require inspections and observation. For example, Law 5/1990 on conservation stipulates that in conservation forest areas, there should be no activities. To test this premise, we visited locations both to inspect (a visit for a short duration) and observe (several visits to understand what kind of activities exist in the conservation areas, who the actors are, how they interact with one another). With this information we then queried the head of the conservation forest to obtain further explanation. These observations and testimonies have supported the creation of the implementation network map.

The audit was conducted from November 2016 to January 2018. We interviewed and corresponded with 40 people, assessing 81 regulations, and reviewing numerous websites and databases. The interviews were conducted at Dusun Sembilang 1, Dusun Sembilang 2 and Desa Lalan (December 2016) for local communities; the office of Musi Banyuasin district at Sekayu (January 2018) and the representative office at Palembang for customary people (December 2017), provincial government at Palembang (December 2017) and NGOs in Jakarta (January 2018).

We analysed the two data sets using the Actor Network Analysis (ANA) software, Gephi 0.9.1. We used the Force Atlas[1] feature in Gephi to allocate connected actors into differentiated groups. We used the betweenness centrality feature[2] to produce a diagram showing the central actors within each differentiated group (Barthelemy, 2004; Goh et al., 2003). Eigenfactor analysis[3] was then used to measure the influence of every central actor over surrounding actors (Franceschet, 2010). The different sizes and colors in the diagrams indicate levels of influence and impact. Actors with most connections and central roles have bigger nodes and are distinguished from one another with different colors (Bastian et al., 2009). From the Gephi diagrams, we assessed the synergy of multisectoral actor networks. Lastly, we assessed if the governance of each data set is sustainable using the improved Ostrom's principles as criteria.

4. Results

4.1. Regulation data set

Fig. 5 shows the interaction among actors in the landscape based on 81 multisectoral regulations in the Sendang landscape. The governance interactions are regulated into three opposing poles and this renders coordination time-consuming and inefficient (Sahide and Giessen, 2015). In this situation, remotely positioned actors (local communities and customary people) lack options for collective decision making. Companies, with their need to act promptly and to generate income, lack the incentive to voluntarily apply regulations. The regulatory governance frameworks are further detailed in Appendix D. Each result was the condition we found in the regulatory frameworks against each criterion.

4.1.1. None of the actors possessed adequate cross sectoral authority nor flexibility to liaise with actors in different sectors

Ministry of Environment and Forestry possesses the multisectoral influence, however, it lacks the flexibility to interact with some of the alienated operational actors such as local communities and customary people (Myers et al., 2017). Likewise, The National Geospatial Agency at the constitutional level with authority to map land and forest boundaries also lacks the influence and the centrality to conduct such a task. In contrast, the KPH at the local level as well as the Sembilang National Park office and the Dangku Wildlife Reserve Office at national level have the flexibility to liaise with actors in different sectors. The KPH even has authority to liaise with licensees and other forest users. Licensees are business entities with concessions to utilise the forest areas for either timber, estate crops, or mining, during periods of time between 20 and 30 years (Peraturan Menteri Kehutanan, 2010; Peraturan Menteri Pertanian, 2007; Peraturan Pemerintah Republik Indonesia, 2010, 2012). Nevertheless, none of KPH, Sembilang National Park, or Dangku Wildlife Sanctuary has

[1] Force atlas is a feature to force the data into the nearest poles so that the diagram is more understandable.

[2] Betweenness centrality is an algorithm for measuring the distance between one point and many other points and for placing the point in the exact configuration among others based on the calculation.

[3] Eigenfactor is an algorithm for calculating impact factor. This algorithm is commonly used for calculating the impact factor of scientific journals. Nature, for example, has an Eigenfactor of 6, which suggests that this journal has influence over 60% of other journals or readers.

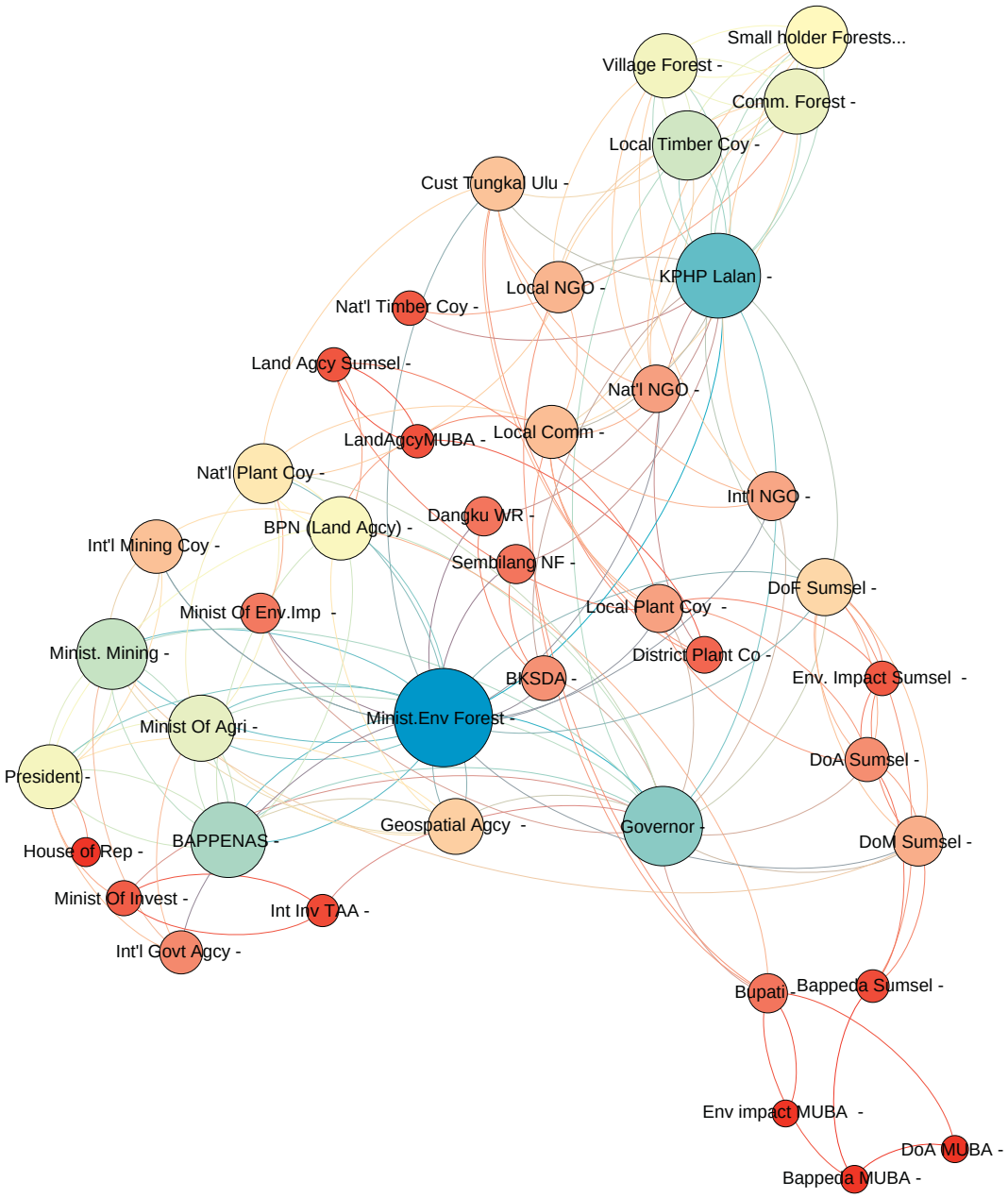

Fig. 5. Actor network analysis based on regulation.
Gephi 0.9.1 for the regulation data set. The strength of influence of one actor over others, based on Eigenfactor centrality values, is illustrated by each node's size and color gradation from blue to red. Eigenfactor centrality calculates influence by the number of connections and correlated centers each actor has over others. The bigger the size the more influence one actor has over others. Dark blue indicates the strongest influence with lighter blues indicating gradually less influence, with lighter shades of red indicating weaker influence and dark red indicating the least influence. Actors with nodes in other colors (light green, yellow, and light orange) are those with medium strength of influence. From the diagram, according to regulations, the Ministry of Forestry and the KPH Lalan are those with the most influence. The full names of the actors are given in Appendix C. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

the authority to become an intermediary for all governance actors in different sectors at multiple levels (Sahide et al., 2016). These institutions can liaise with forest users, plantation developers, local governments and MoEF (Peraturan Menteri Kehutanan, 2009a) but the authority to budget, make policies, and liaise with other ministers or the president falls under the authority of MoEF (Maryudi, 2016; Susila and Bourgeois, 2006).

The absence of a cross sectoral intermediary institution to justify appropriation (assuring fair distribution of benefits), has led some less well-resourced actors such as local communities and customary people to become distant and poorly connected to other actors. Moreover, none of the constitutional actors have the cross-sectoral authority to issue any regulations regarding appropriation (Maryudi, 2015).

4.1.2. Rights and obligations are unclear to enable the fair distribution and allocation of resources

Permits and licenses depend on whether the landscape falls under district, provincial, or central government jurisdiction (Sahide et al., 2016). For forest areas located wholly within a province, in one or more districts, companies or local communities can apply for forest utilisation permits from the governor (Peraturan Menteri Kehutanan, 2008b; Peraturan Presiden Republik Indonesia, 1996). If the proposed land is located in more than one province, the authority for both administration and permit issuance falls to the Ministry of Environment and Forestry (Peraturan Menteri Kehutanan, 2007b). In contrast, the issue of permits and the administration of non-forest land located in a

district, a province, or two or more provinces is more complex. The land agency administers the issuance of three types of land tenure. Right to Exploit (Hak Guna Usaha/HGU), for companies to exploit land for non-forest plantations, or mining and associated infrastructure, Right to Ownership (Hak Milik) for individuals or organizations to own lands privately, and Right to Use (Hak Pakai) for individuals or local co-operatives to exploit particular areas for private uses or small businesses, but without any right of ownership (Peraturan Presiden Republik Indonesia, 1996). These permits can only be issued if the land already has a Location Permit. This permit is issued by the Bupati (the head of district), provincial governor or relevant ministries (Agriculture, Mining and Infrastructure). Location permit confirms that the proposed use of the land conforms to local spatial plans. Land intended for plantation and mining requires an Environment Permit prior to applying for the location permit. The land agency can only issue a Right to Exploit if the location permit has attached to it a Plantation Permit or Mining License, which is another permit given by the local Bupati or provincial governor, or, if in more than one province, the Ministry of Agriculture (for plantations) or the Ministry of Mining and the President (for mining license within one province), or the President with the approval of the house of representatives for licenses in more than one provinces (Peraturan Menteri Agraria dan Tata Ruang, 2015; Peraturan Menteri ESDM, 2009; Peraturan Menteri Pertanian, 2015). Since detailed regulations on the One Map policies for local governments have not yet been established, this complex set of arrangements has the potential to be contradictory as each actor makes its own interpretation and map delineation which may not be consistent with those of other agencies. Appendix D.

4.1.3. Forest benefits is not justifiably allocated, due to problematic land tenure mechanism

Governance of land tenure in Sendang is antagonistic. The Dangku wildlife sanctuary and the Sembilang national park are both classified as Conservation Forests (Hutan Konservasi). These protected areas are administered by the Directorate of Natural Resources & Ecosystem conservation (DJKSDA), an entity under the Ministry of Environment and Forestry (MoEF) (Peraturan Menteri Kehutanan, 2009a; Peraturan Presiden Republik Indonesia, 2015c). In Lalan, oil palm plantations have been established on the non-forest areas, whilst KPHP (Limited Production Forest Management Unit) under the provincial department of forestry, administers forests in the Lalan area (Keputusan Menteri Agraria dan Tata Ruang/Kepala Badan Pertanahan Nasional, 2018; Peraturan Menteri Kehutanan, 2008a). In additions there are areas allocated as Village Forests (Hutan Desa) where local villagers can gain individual benefits from existing forests (Maryudi, 2012). There are also community plantation forests (Hutan Rakyat) which are commercial plantations owned by small local timber companies or cooperatives (Peraturan Menteri Kehutanan, 2012). Other areas are allocated as Community Forests (Hutan Kemasyarakatan) for local community groups in partnership with the KPH to utilise the timber and non-timber products (Peraturan Menteri Kehutanan, 2007a). There are also customary forests (Hutan Adat) where the Tungkal Ulu people, who retain their cultural and religious ties to the forest, are allowed to exploit limited forest products (Myers et al., 2017; Surat Edaran Menteri Kehutanan, 2013). The legal definition of each land category is ambiguous and the jurisdiction for administration is unclear. These land users are currently still in conflict, regarding the appropriation and the delineation of land categories.

4.1.4. A common concern at constitutional level is failed to materialised into a common agreement at operational level

President Joko Widodo has announced the national strategy Nawacita or nine goals including a sustainable development. This goal is translated into individual vision among different ministries and is derived into another set of objectives by local governments (UNDP Indonesia, 2015). However, a common agreement regarding a sustainable use of resources within a landscape is absent. Operational regulations are highly sectoral and are issued by ministries within the sector only.

4.1.5. Applied sanctions such as fines and punishments, as well as a mechanism to solve disagreement are not yet established

KPH by regulation can initiate a conflict resolution among forest users, however, fines and punishments are beyond its authority as an intermediary (Dirjen Planologi Kementerian Kehutanan, 2012). Formal law enforcement bodies such as the Indonesian Police (Kepolisian RI), the State Prosecution Office (Kejaksaan RI), and The Commission for Corruption Eradication (KPK) can only administer fines and punishments related to corruptions or criminal offense. There has been attempts for public accountability with the establishment of “One Map Policy” by the Geospatial Agency, however, it lacks the authority to impose fine or punishment towards other ministries (Mulyani and Jepson, 2013).

4.1.6. Some governance actors have more authorities than others

By regulation, the Ministry of Environment and Forestry is so dominant and influential that it is too big to delimit its rights. In contrasts, local actors such as local communities and local governments (Bupati or head of districts and its public officers) have limited influence and authorities in the governance system. These imbalance authorities are problematic, since the ministry has limited information about the locations of the land yet more power in the distribution and appropriation of land utilisation.

4.1.7. Monitoring is not yet sufficed for ensuring that the regulations are implemented, appropriators are accountable, and the boundaries maintained

Responsibility for “Monitoring” at the operational level is vaguely defined. Under the South Sumatra Department of Forestry, the KPH has authority to monitor operational and collective actors in the forestry sector. Nevertheless, this local institution lacks the centrality or influence to monitor actors from either the central government or other sectors.

In constitutional level, each ministry and local government has its own audit inspectorate responsible for conducting regular inspection and internal audit towards government units. Yet, this internal audit function is broadly targeted and not specifically aimed at monitoring the multi-sectoral governance system.

4.2. Implementation data set

Fig. 6 shows the de facto actor network based on what is really happening in this landscape. This effective actor network is quite different from the de jure one that is supposed to operate based on regulations. De facto, the Sendang landscape has antagonistic and incoherent land tenure and governance arrangements. Without proper law enforcement or ability to apply sanctions such as blacklists, fines, or prosecutions, opportunities have been opened for companies with more access to government agencies to bypass the regulations.

4.2.1. Unofficial actors are in complementarity one another and acting as a cross sectoral authority to liaise with actors in different sectors

Complementarity is evident in the unstructured interactions of oil palm plantation companies with almost every government actor. The South Sumatra governor and the national plantation companies seem to have a determining role in mediating among all parties as well as having the greatest influence over other actors. This reality is in complete contrast to what the regulations stipulate. The Ministry of Environment and Forestry has only half of the influence over other governance actors that regulations say it should have. National companies have strengthened their roles by operating through local subsidiary companies and eliminating lengthy regulations by utilizing their parent company's access to higher-level officials in local and national government. These actors -the governor and the national plantation companies are complementary

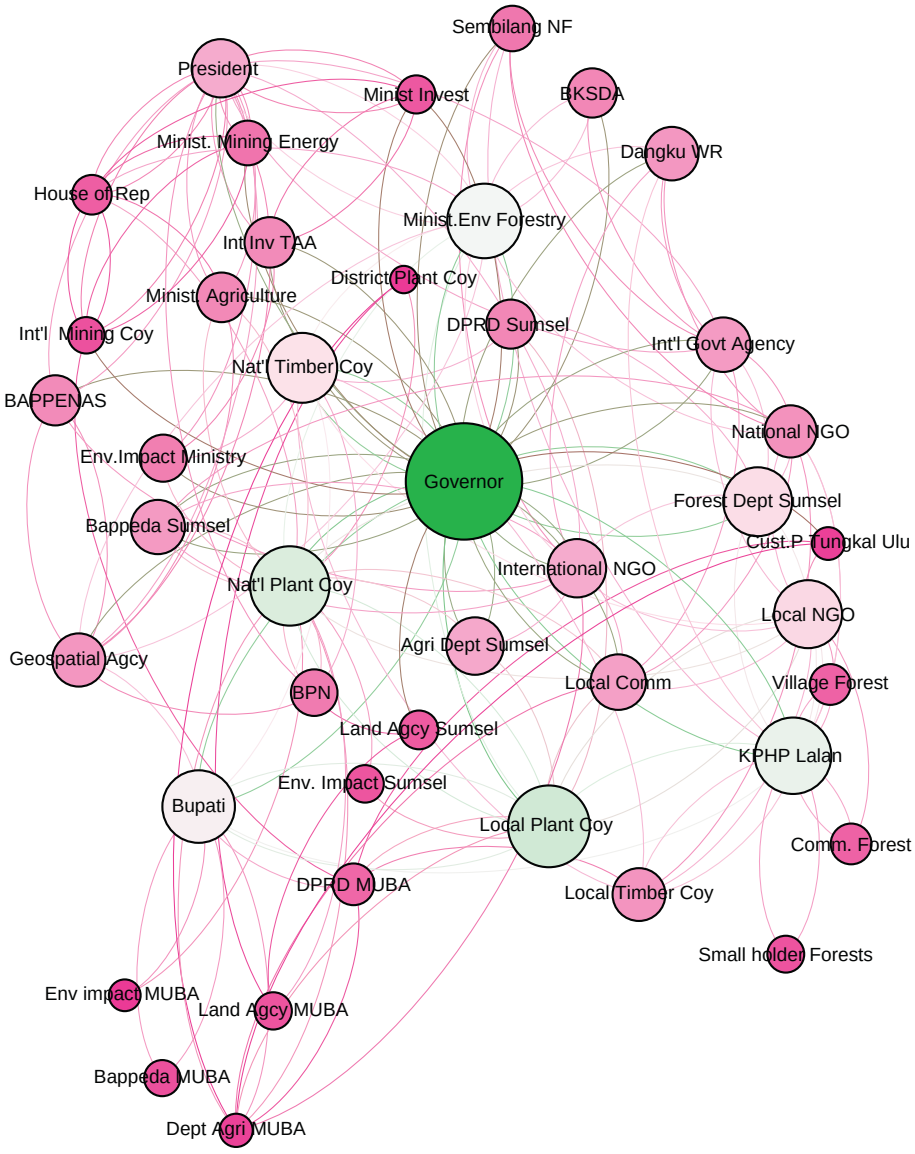

Fig. 6. Non-regulated actors in Implementation. Gephi 0.9.1 for the de facto implementation data set. The strength of influence of one actor relative to others, based on Eigenfactor centrality value, is illustrated by each node's size and color gradation from green to purple. Eigenfactor centrality calculates influence by the number of connections each actor has. The bigger the size the more influence one actor has over others. The more intense the green color, the stronger the influence. The more intense the purple color, the weaker the influence. Actors with nodes in other colors (light green, yellow, and light orange) are those with medium ability to influence. From the diagram, the governor of South Sumatra and the national plantation companies are those with most influence. Notice that there are two actors, DPRD (Senate) MUBA and DPRD South Sumatra (red boxes), which are not stipulated by the regulations as having direct influence in the landscape but which in reality do have considerable influence. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

towards one another in establishing more "effective" governance than what have been stipulated in the regulation.

4.2.2. Unclear regulations on distribution and allocation of resources have stimulated the emergence of informal patronage groups

The complexity of the intertwined regulations among ministries and the unclear authority between local and central governments has meant that the implementation of regulations is different from what is stipulated and intended in the regulations. Informal actors such as Local (DPRD) and National House of Representatives (DPR) members act as a patronage group for local and central institutions and operate outside the formal decision making processes. A self-organised implementation pattern has emerged which is not aligned with legal regulations.

Even after these improvisations, the implementation of regulations is still confused and not effective. Due to the absence of such a role in the regulations, the South Sumatra governor seems to have become a one-man nested enterprise.[4] While this may reduce the bureaucracy, his relative intimacy with certain actors has created conflicts during appropriation with some less well-connected users such as local communities. Actors with more access to appropriators are inevitably going to acquire more rights. Defining boundaries is problematic as actors with more access to influence and to resources, such as national business owners, seem to be able to bypass procedures and regulations. Access to common resources is negotiable in the absence of applied sanctions and clear boundaries.[5] Collective choice only exists in polarized groups with common interests who interact often, such as national and local plantation companies, the provincial department of forestry, the Governor, and the Bupatis. The KPH, the National Park and the Wildlife Reserve offices lack the centrality and the influence to conduct monitoring and so are ineffective as nested enterprises.

4.2.3. Forest benefits is also not justifiably allocated, due to antagonistic land use policies among ministries

In 2001, The Ministry of Environment and Forestry declared the 31,752 ha Dangku Wildlife Reserve in MUBA, primarily for the

[4] The governor explained that he only did what he needed to do for the sake of his province. He believes that as long as he does not take money from anyone for his own benefit, he should be able to do what he thinks benefits the population of the Province.

[5] In Lalan, six permits for timber companies inside the limited production forest overlap with the rights of utilisation of village forests (Wijaya, 2016b). Likewise, 19 permits for oil palm plantations overlap with timber concessions (Wijaya, 2016a).

conservation of Sumatran Tiger (*Panthera Tigris*) habitat (Wibisono and Pusparini, 2010). Yet, a Conoco Phillips oil field has been operating adjacent to the wildlife reserve under license from the Ministry of Mining since the 1990s (Kementerian Energi dan Sumber Daya Mineral, 2016). In 2003, a 202,896 ha National Park was established at Sembilang, to protect mangrove forests and mudflats which are habitat for birds migrating to and from Siberia (Boer and Pratiwi, 2016). This park is listed as a RAMSAR site of global significant for wetland conservation (The Ramsar Convention, 2018). Nevertheless, the Ministry of Investment in 2014 has given license to construct Tanjung Api-api, a modern feeder port project, about four kilometers south of the park (Dewan Nasional Kawasan Ekonomi Khusus, 2017). Tanjung Api-api is designated to become one of Indonesia's Exclusive Economic Zones (KEK) under the Ministry of Investment (Peraturan Pemerintah Republik Indonesia, 2014). In between Dangku and Sembilang. The Lalan forest area under the KPH has long been subject to conflict between oil palm companies and local communities (Susila and Bourgeois, 2006). Boundaries have never been satisfactorily delineated (Dinas Perkebunan Kabupaten Musi Banyuasin, 2016) because regulations stipulate that agriculture or other activities are strictly prohibited in limited production forests (Peraturan Menteri Kehutanan, 2009b). Yet, the Ministry of Agriculture since 2003 has issued plantation permit to national plantation companies to exploit this land.

4.2.4. Applied sanctions such as fines and punishments, as well as interactions and mechanisms to solve disagreement are non-existence

Plantation companies with direct accesses to almost all government actors bypass the Ministry of Environment and Forestry bottleneck by acting as their own intermediaries. Judging from the map of interactions in Fig. 6 it appears that the cumbersome and costly bureaucracy is itself one of the causes of opportunism and improvisation. Whilst this improvisation may improve communications, it raises concerns over verification and transparency among government institutions. The ability to bypass procedures and the lack of oversight is the likely cause of the problem of overlapping land ownership claims within this landscape. The fines and punishment system do not function to protect public goods values or ensure sustainability at the landscape scale. The most concerning finding is the absence of interactions among operational actors. Local communities seem to be the most passive actors, while NGOs concentrate on the forestry sector and lack interactions with ministries in other relevant sectors. There is poor coordination between local governments from different sectors, local communities, and the KPH.

5. Discussion and conclusions

A landscape – or seascape – perspective is needed to assess the governance effectiveness where there are complex governance arrangements with competing multi sectoral claims. Forest Landscape Audits can be utilised to assess the coherence of multi sector landscape governance. By identifying actor networks using tools such as Gephi 0.9.1, auditors can identify weaknesses and so recommend improvements to overall governance performance.

This Forest Landscape Audit has shown that the multi sector governance arrangements in place in the Sendang landscape, both according to regulations – de jure - and as they are implemented, – de facto - are not effective. The diagram representing multi-actor interactions based on regulations is significantly different from that based on implementation. The difference is due to the existence of informal actors not stipulated in the regulations and the improvisation made by actors seemingly to overcome the ineffectiveness of regulatory arrangements.

The following are some weaknesses of the governance arrangements in Sendang emphasizing differences between regulations and implementation.

a) The multi sectoral origins of regulations in Indonesia leads to antagonistic governance outcomes. None of the ministries has adequate authority to provide assurance on land tenure demarcation and permit or license applications. While the ministries' authorities on land permits and licenses depend on delineation and tenure, these central government institutions also lack the ability to coordinate with local governance actors such as departments of forestry, agriculture and mining, the provincial governor and the Bupatis, the local land agency and KPHP Lalan.
b) The impact of not having any regulation stipulating a cross sectoral institution with adequate authority and support is significant. The stipulated role of KPHs as intermediaries in the forestry sector is often neglected as they lack influence over the constitutional actors who make policies. Hence, the governor's de facto role in implementation. The governor of the province has become both the constitutional actor and the nested enterprise. The Governor, with the authority to issue permits, decrees and regulations, has violated the principle that rights be allocated impartially as he has filled the roles of appropriator, monitoring body, and enforcement agent. This arrangement allows for abuses of power. Likewise, the involvement of unregulated patronage actors (e.g. the local senate) is unhelpful as these actors should monitor the governor and Bupatis. The ministries and President should exercise their constitutional power and authority and should not become another nested enterprise themselves.
c) The lack of a cross-sectoral regulatory body to govern appropriation at the operational level is also a weakness. Land tenure is often overlapping, and regulations from one ministry are often in conflict with those of other ministries. The uncertainty over which authority determines land ownership has prevented effective appropriation of rights and obligations as well as inhibiting mediation over disputes. In the absence of legitimate dispute resolution mechanisms, actors seek mediation from political figures such as members of the senate.
d) The lack of law enforcement has made sanctions and punishments ineffective. The absence of mechanisms for monitoring and reporting has led to violations of the law. Illegality is not disclosed to the public and this leads to repeated infringements. Thus, actors with more resources, such as companies, bypass rules and regulations for their own financial benefit with little considerations for the rights of other actors.

6. Recommendations

6.1. Recommendation on governance

Based on our results, the following changes could improve governance arrangements in Sendang and elsewhere in Indonesia:

a) Better coordination and interaction among actors especially those sharing partial responsibilities such as the ministries, would be an improvement. A technology to enable direct/real time communications between central and local governments would also be of benefit slashing the bureaucracy and misinterpretations.
b) The creation of a nested enterprise or management coalition would improve the performance of governance. Lalan KPH and the office of the Sembilang National Park as well as the Dangku Wildlife Reserve should be the local and national level appropriator and be given authority by law to liaise with not only forestry but also with other sectors such as agriculture, mining, tourism, and infrastructure. It would enhance their capacity and influence if these institutions were linked with an expert advisory board from NGOs, local communities, businesses, and governments at local and national constitutional levels. This team should have adequate authority and access to (1) justify appropriation, define boundaries, apply sanctions, resolve conflicts and delimit rights during implementation at the operational level, (2) monitor the implementation of appropriation in the field and use social media to inform the public of events on the ground, (3) establish an interactive social media page

in which the public can make reports regarding misconduct. These reports could provide useful information for the nested enterprise body to conduct more detailed monitoring and for the collaborative actors to review the process of certification, standards and establishment of memoranda of understanding. (4) liaise with actors from other sectors and with operational actors, (5) monitor the policy of the governor, Bupatis, and ministers at a constitutional level, and (6) publish reports on governance effectiveness and communicate these to the local and national house of representative as well as to the public to ensure accountability.

c) Regular reports and information on violations of laws should be made available for public scrutiny. The Ministry of Environment and Forestry or nested enterprises -if any- could involve local NGOs to help monitor and liaise with all other actors to sanction the business activities of unscrupulous companies. Public awareness could also be developed through open source reports and newsfeeds. This would keep the public updated and involve them in the monitoring process.

d) An appropriate new law and a government regulation would help resolve land tenure disputes. Once resolved, land tenure ought to be reflected in the One Map which is to be produced by the Geospatial Agency. Governance would be improved if all ministries and local government departments then accepted and used these boundaries.

6.2. Recommendations for policy improvement

There are three generic strategies for aligning regulations with the implementations (ISSAI, 2016b). The first is investing in additional resources such as human, capital, infrastructure, and technology to upgrade the performance of existing institutions. Governance can then be improved without amending existing regulations. The Ministry of Environment and Forestry, for example, could invest in an online database jointly with the National Bureau of Spatial Planning and Development, the Ministry of Agriculture, the Ministry of Mining, and local governments to enable faster coordination and communication. The Second option is to restructure current regulations to balance controls and authority and address the issue of power differentials. Such adjustments could include the issuance of new decrees, for example to restructure nested enterprises and establish an expert team. Yet, restructuring regulations is a lengthy process, which does not always end up producing satisfactory results. A third strategy could be to combine investment and restructuring regulations. Some investments are made to support more effective implementation but amendments to regulations are needed to support change. While this seems to be more realistic, the reconciliation process is both time consuming and expensive.

Determining which of the three strategies is most suitable for Sendang requires further audits of efficiency and economic performance. A forthcoming study will undertake those audits, which will then help guide proposed changes to improve effectiveness. The improvement of governance in Sendang may be more difficult to achieve than in other parts of Indonesia. The governance reality in the landscape is heavily dependent on the agency of different actors. The power differentials among the people in different roles are not a function of the regulatory situation but rather a function of their position in social networks operating within the landscape. The formal regulatory system does not adequately deal with the personal characteristics of actors. The situation and power relationships in other landscapes may be different but the same basic principles need to be applied throughout Indonesia to achieve better governance of forest landscapes.

External agents, aid agencies and environmental NGOs have attempted to use landscape and jurisdictional approaches to resolve problems of lack of inter-sectoral coordination and poor governance. These external agents themselves lack the mandate or legitimacy to impose improved governance arrangements. Landscapes are often defined arbitrarily according to the goals of the landscape approach proponents and establishing governance arrangements for landscapes through such mechanisms as multi-stakeholder dialogues may conflict with formal government arrangements and may not be sustainable. Working at the level of jurisdictions runs the risk of perpetuating the patronage and other governance failures in the de facto governance systems operating at present. Rationalisation and simplification of the de jure multi-level governance arrangements is required if the dysfunctional outcomes apparent in Sendang are to be avoided elsewhere in Indonesia.

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Appendix A. Supplementary data

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CHAPTER 6. Four levels of governance: A proposed governance structure for more effective implementation of the SDGs in Indonesia.

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Abstract

Effective governance is crucial for successfully achieving the United Nations (UN) Sustainable Development Goals (SDGs) by 2030. In Indonesia, however, incoherent policies, inadequate participation of the governance actors, and unresponsive reflexivity have hindered the country in effectively implementing the 2030 agenda. One of the reasons is a governance structure that is not fit for the purpose of implementing SDGs in Indonesia (Chapter 3).

The implementation of SDGs relies on government institutions to initiate and lead the process, which does not sit well with Indonesia's existing socially interdependent structure. SDGs regulations in Indonesia categorize each governance actor into one specific role, either as government agencies, private sector entities or civil society organizations. Yet, Indonesia is a country where every individual is a member of several self-governing societies. This calls for an alternative structure for Indonesia to optimise its nested governance actors and to collaborate with each other in achieving the SDGs 2030 agenda.

We propose a governance arrangement for Indonesia structured into four nested levels. These are individuals, societies, intermediaries, and the state. We identify this structure as one criterion of effective governance and evaluate how this structure accommodates three other criteria of effective governance: policy coherence, adequate participation, and agile reflexivity. We test the effectiveness by assessing the current governance arrangements related to the operationalization of the SDGs in four provinces in Indonesia. We use standardized performance auditing as a novel approach for assessing the effectiveness of governance arrangements. Auditing includes a methodology for data collection, which is suitable for a diverse country with limited databases like Indonesia, to conduct regular assessments more efficiently. Applying audit techniques, each of the current governance structures of four provinces is analysed and mapped using Actor Network Analysis (Gephi 0.9.2). We then show how the four levels of governance might be used to develop a more effective governance arrangement.

We found the structure based on four levels of governance to be an alternative option likely to improve policy coherence, appropriate participation and agile reflexivity. Our study may be important for countries trying to implement the SDGs with similar social structures. We encourage the use of professional audit standards as a tool for assessing the effectiveness of governance arrangements and improving governance structure.

Keywords: SDGs, Islam, governance, fit for purpose, performance audit, Indonesia.

1. Introduction

The United Nations (UN) Sustainable Development Goals (SDGs) is a noble aspiration. However, its implementation poses some challenges to participating countries. The SDGs consist of 17 interrelated goals, 169 targets and 244 indicators of economic, environmental, and social aspects of sustainable development to be achieved by 2030 (Griggs et al., 2017; United Nations General Assembly, 2015). The tagline "leave no one behind" requires all actors from multiple sectors in three different levels: international, national and sub-national (Stafford-Smith et al., 2017) to participate in achieving the 2030 agenda ((Bernstein, 2017; Monkelbaan, 2018; UNDP, 2018) and calls for global partnerships for finance, technology, and capacity building (Biermann et al., 2017). Orchestrating many different actors into achieving 17 common goals requires governance: the processes of collaboration and partnerships among different stakeholders to achieve common goals despite their individual agendas (Glass & Newig, 2019). Effective governance is achieved when the governance arrangement in a specific place is adapted to suit the capacity of its governance actors to achieve common goals (Provan & Kenis, 2008; Sørensen & Torfing, 2009).

The SDGs themselves, however, do not address effective governance. Targets and indicators of SDG 17, Partnership for the Goals, are aimed at global partnerships among participating countries, but do not address the issue of how countries should govern the multi-actor partnerships within their own nations (United Nations, 2017, 2021). The United Nations Department of Economic and Social Affairs (UNDESA) attempts to establish 11 principles of effective governance for any country to successfully implement the SDGs (Bouckaert et al., 2018; UNDESA, 2018). The Organization for Economic Cooperation and Development (OECD) issued guidelines on better policy for development (OECD, 2015, 2016, 2018, 2019). While both

UNDESA and OECD have established a platform for all participating countries to achieve effective governance, the guidelines are not designed for specific countries. Much like the principles of good governance, UNDESA and OECD provide general guidelines on formulating strategies for achieving sustainable development. Guidelines on how a diverse country, with many different actors existing within the same governance arrangement achieves the 2030 agenda, are absent (Liang, 2018).

Such an absence is problematic for Indonesia. The country has the world's second largest area of tropical forests and is home for many threatened species on the IUCN Red List (Dwiyahreni et al., 2021; Goodrich, 2015). Many international initiatives have been taken to protect and conserve Indonesia's valuable forests and biodiversity (Gellert, 2021). As a lower middle-income country, however, Indonesia's most urgent priority is to provide for its 270+ million people (Hutagaol et al., 2019). Development has been at the top of an agenda to accelerate economic growth and reduce inequalities among its people (Sa'adah & Soetirto, 2020). For years, this archipelagic nation of more than 17,000 islands and 1,340 ethnic groups (Dewi, 2020), has been struggling to accommodate the interests of its many stakeholders. Its 500+ national and sub-national governments administer 33 provinces 416 districts, 98 cities, 7,094 sub-districts, 8,490 suburbs, and 74,953 villages, each with its own unique potential and challenges (Harmantyo, 2010).

For a country like Indonesia, an effective governance arrangement for orchestrating all actors into supporting the country achieving the 2030 agenda, is essential. Firstly, effective governance is needed to design coherent policies among its 500+ ministries and sub-national governments so that policies do not oppose one another (Dohong et al., 2018; Forster & Stokke, 1999). Secondly, effective governance is needed to persuade Indonesia's quarter of a billion people to participate in achieving the SDGs together (Winans et al., 2021). Lastly, an effective governance setting should embrace reflexivity: mechanisms to collaboratively seek solutions during potential conflicts and uncertainty (Greene & Park, 2021). This last is especially important considering Indonesia's widely diverse 1,340 ethnic groups (Van Klinken, 2003), and its susceptibility to natural disasters (Peterman & Cordes, 2021). One critical element to enable coherent policies, actor participation and reflexivity is a governance structure that is fit for purpose (Glass & Newig, 2019; McCawley, 2005; Morita et al., 2020; Nurrochmat et al., 2014).

Indonesia's current structure for implementing SDGs, however, has made effective governance challenging. The current regulations on SDGs nominated Bappenas (the

Ministry of National Development Planning), as the ministry responsible for integrating the SDGs and their indicators into national planning, monitoring the implementation at sub-national levels and reporting the results in both Voluntary National Reviews (VNR) and the annual SDGs report (Peraturan Menteri Perencanaan Pembangunan Nasional, 2018; Peraturan Presiden Repulik Indonesia, 2017). The ministry issued the National Action Plan, stating that all other ministries are responsible for initiating the implementation of SDGs according to their core competencies. Hence, the Ministry of Health, for example, is responsible for initiating collaboration with other actors implementing Goal 3, Good Health and Wellbeing. The Ministry of Agriculture is responsible for achieving Goal 2, Eliminating Hunger, while the Ministry of Education is designated to implement Goal 4, Education (Bappenas, 2017). This arrangement, however, is not coherent with Indonesia's constitution, where all the ministries have equal authority and only the coordinating ministers are equipped with the authority to direct certain ministries within his/her designated mandate (Undang Undang Dasar Republik Indonesia, 1945).

The SDGs regulations also failed to consider that Bappenas, as a ministry responsible only for national development, has limited resources and not enough access to all the national and sub-national governments. Usually, coordination between the ministries and the sub-government offices is maintained through the Ministry of Internal Affairs and the provincial or sub-national government development planning agencies (Bappeda) (Peraturan Menteri Dalam Negeri Republik Indonesia, 2015). Bappenas had 865 personnel (https://www.bappenas.go.id/id/profil-bappenas/sumber-daya-manusia1) when the Presidential Regulation on SDGs nominated it as the key actor to coordinate all the sub-national actors involved in implementing the SDGs (Peraturan Presiden Republik Indonesia, 2010). Bappenas attempted to compensate for this lack of capacity by establishing SDGs Working Groups, where the 17 goals are grouped into four clusters: Economic, Social, Environmental and Justice, and Coordination. These working groups accommodate the representatives of many stakeholders including local communities, universities, philanthropists, and business entities. Bappenas also established several SDGs centres to undertake administrative matters and manage the Non-Government Organisation initiatives and funding (Peraturan Menteri Perencanaan Pembangunan Nasional, 2018). Yet, there is no regular mechanism to monitor the implementation at the sub-national levels.

Another challenge is Indonesia's existing social structure, which places every actor into several nested roles, while the regulations on SDGs allocate each actor into a designated role. From birth, an Indonesian automatically belongs to many societies,

be it a household (*keluarga*), a neighborhood (*Rukun Tetangga* /RT), a community (*Rukun Warga*/RW) if he/she lives in the city, or a sub-village (*dusun*) if in the countryside, a suburb (*kelurahan*) if in a city, or a village (*desa*) if in the countryside. Furthermore, the individual is also listed as a citizen of a sub-district (*kecamatan*), a district (*kabupaten*) or a city (*kota*), and a province (Figure 1) (Peraturan Menteri Dalam Negeri, 2017).

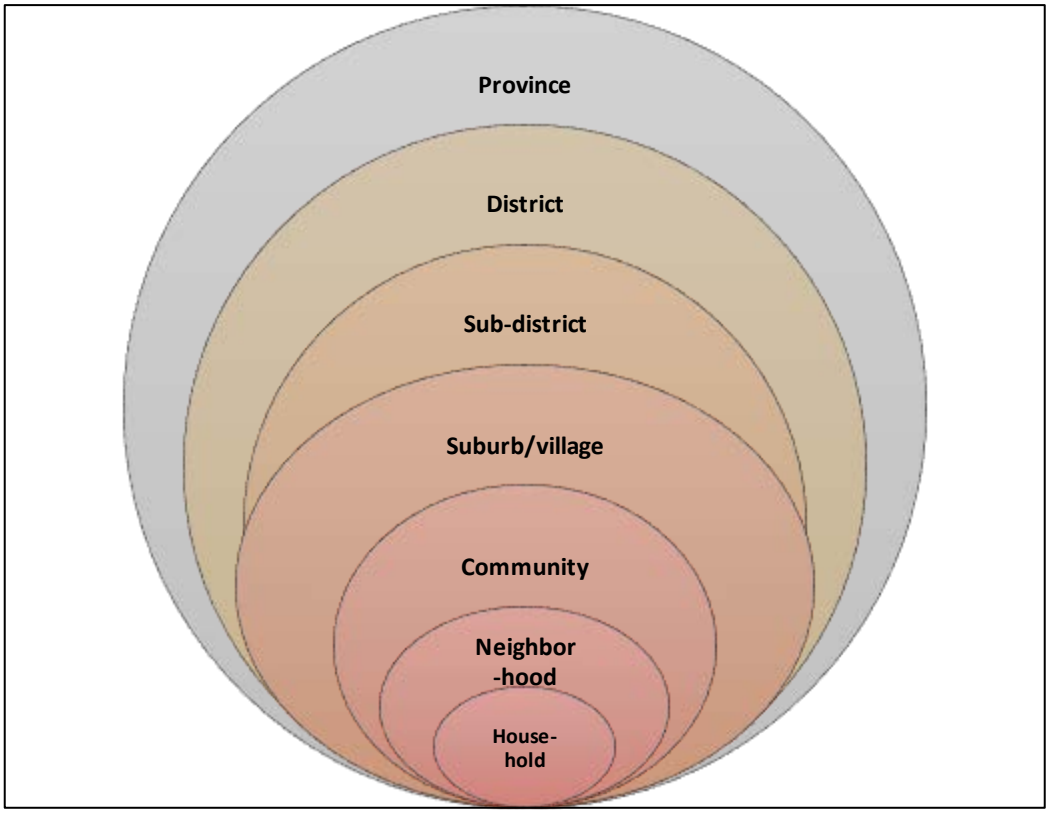

Figure 1. Indonesia's social structure (adapted from Peraturan Menteri Dalam Negeri (2017))

This Matryoshka-like social structure has created the opportunity for many different governance actors to develop their own interactions and collaborations without them having to be initiated by national or sub-national governments (Bowen, 1986). The current regulation, where the implementation of SDGs is led by Bappenas and the ministries conflicts with the existing nested society. This is reflected in Indonesia's Voluntary National Review (VNR) on the implementation of the SDGs. The report shows significant involvement of central government, business entities and non-government organizations (NGOs) (Republic of Indonesia, 2019). However, recent studies have shown that 76% of regional governments—provinces, districts, and cities—in Indonesia are not ready for the implementation of the SDGs and most

citizens in rural parts of Indonesia have not yet participated in the implementation of the SDGs (Affandi et al., 2019; Alisjahbana et al., 2018).

This paper aims at designing a more fit for purpose governance structure for progressing the SDGs in Indonesia. We have a hypothesis that since the regulations are unfit for implementing SDGs, the governance actors develop their own structure in an attempt to achieve compromise among actors. We test this idea by assessing the effectiveness of governance structures in four different provinces in Indonesia, each with its own unique challenges.

a. Riau is the fifth richest province in Indonesia. It includes many oil palm and wood pulp plantations, pulp and paper mills and oil wells, which are used by some ministries to help achieve their SDGs targets (Pemerintah Provinsi Riau, 2014). When Indonesia's policy shifted to favor the environment, the Ministry of Environment and Forestry established its peat restoration program here (Surat Keputusan Menteri Lingkungan Hidup dan Kehutanan, 2017). Land concessions for wood pulp plantations that had previously been awarded were deemed unlawful, and the governor of Riau was imprisoned for authorizing deforestation and issuing land permits on peatlands (Yunanda, 2019).

b. Sumsel is the seventh richest province. In 2014, the Indonesian government designated part of Sumsel as a Special Economic Zone (*Kawasan Ekonomi Khusus*/ KEK) (Peraturan Pemerintah Republik Indonesia, 2014) where a modern feeder port to Singapore was constructed by the Ministry of Industry (Dewan Nasional Kawasan Ekonomi Khusus, 2017). However, this port, under the Ministry of Environment and Forestry, is only four kilometers from a National Park that shelters migrating birds from Siberia (Surat Keputusan Menteri Kehutanan, 1992).

c. Maluku is one of the poorest provinces. An area of 279,598 square kilometers of its territory has been declared a Marine Protected Area (MPA) by the Ministry of Marine and Fishery Affairs (Estradivari et al., 2017; Kementerian Kelautan dan Perikanan, 2021). This province, however, has attracted many Foreign Direct Investment (FDI) projects under both the Ministry of Investment and its own provincial government (Azzahro, 2020; BKPM, 2020). The provincial governor faces protests from both international and domestic NGOs for his decision to sacrifice many biodiversity-rich sites to facilitate development (Kristiansen et al., 2021; Sasaoka, 2018; Wahyuni et

al., 2020).

d. NTB, another poor province, has long been established as a tourist destination by its provincial government (Pemerintah Provinsi Nusa Tenggara Barat, 2019). Yet, the Ministry of Mining and Energy has approved mining concessions by national and international companies (Awaludin, 2019), which potentially harm the tourism industry (Rachmawati, 2017).

Figure 2 is a map of Indonesia showing each of the four provinces.

Figure 2. Map of Indonesia showing the location of the four provinces used in this study. Inset: Riau, Sumsel (a contraction of Sumatera Selatan, South Sumatra), NTB (Nusa Tenggara Barat, West Nusa Tenggara), and Maluku. Images from Google maps.

We use a performance audit mechanism to assess the effectiveness of the governance structure in these four different locations. This audit mechanism includes four steps:

1. Determining the criteria or what the conditions should be;
2. Collecting evidence of the actual conditions;
3. Identifying gaps between criteria and the conditions; and
4. Suggesting actions that might reduce the gap between criteria and conditions, such as a different governance structure.

To that end, we pose two research questions:

1. Is the current governance structure in the four provinces effective for achieving the SDGs?
2. How could the structure be improved, to better fit the purpose of achieving the SDGs in Indonesia by 2030?

The significance of this study is two-fold. First, performance auditing is a mechanism for assessing the effectiveness of governance arrangements that uses limited data more efficiently than alternative methods. Second, the use of the "four levels of governance" is a novel approach for countries with nested stakeholders looking for a more fit for purpose governance structure.

This paper is structured as follows: Section 2 describes the conceptual frameworks used to determine a governance structure that might be more fit for Indonesia implementing and achieving the SDGs. Section 3 explains the audit methods, including the reason for choosing performance auditing as a tool for collecting and analysing the data. Section 4 presents the results, which portray the real conditions of the governance of SDGs in the provinces, and identify the gaps between criteria and the conditions. Section 5 is the conclusion and the proposed recommendations for improving the existing SDGs governance structure, to make it more fit for the purpose of achieving the SDGs by 2030.

2. Studies on effective governance structures

Current research on SDGs governance structures focuses on five approaches. Transition governance sees newly established goals such as the SDGs as significantly transforming the purpose of any existing governance system, and hence, those existing structures and arrangements should be replaced completely by new more fit for purpose innovations (Loorbach, 2010; Xue et al., 2018).

Network governance sees the SDGs as a complex, interrelated, and adaptive challenge. Stakeholders are encouraged to create formal and informal networks of collaborations so that the governance actors can collectively achieve common goals (Jones, 2002; Kapucu & Hu, 2020; Sørensen & Torfing, 2009).

Experimentalist governance views the implementation of SDGs as a reiterating process of adjustment and improvement among stakeholders. Thus, deliberative structures apply as long as the common goals are achieved (Búrca et al., 2014).

Meta-governance proposes adaptation through a mix of governance structures; hierarchical, network, and market-driven for stakeholders at different levels (Meuleman, 2018).

While these four approaches help us understand the range of different governance structures for SDGs implementation, they all consider stakeholders from the perspective of roles, categorizing each governance actor into one role, independent from the influence of other actors in other roles.

The fifth approach, Ostrom's polycentricity, sees governance from the perspective of stakeholders across all levels, but particularly operating at the local level. This governance structure views governance actors within clusters of decision-making, that are nested and interdependent (Ostrom, 1990b). However, Ostrom's nested polycentricity rests on the premise that governance actors will voluntarily self-govern themselves when using a common pool resource. The implementation of SDGs does not always involve common pool resources. Individuals and community groups do not always end up in voluntary participation. We therefore seek another approach which accommodates the structure of nested polycentricity but at the same time acquires a mechanism to bring all the governance actors to somehow contribute to the arrangement, with or without a common pool resource in the background.

We further experiment with four levels of governance for the following reasons. The nested structure in four levels of governance is very similar to the existing social structure in Indonesia, which is adhered to voluntarily by all Indonesians, regardless of their religion. About 203 million Indonesians are Muslims (Badan Pusat Statistik, 2020). Much Islamic teaching has long been embraced as part of the culture, and some Islamic laws have been adopted into Indonesia's legal system (Hakim, 2021; Kabib et al., 2021). Most Indonesians are also familiar with how the reign of Omar bin Khattab and Muhammad Al Fatih caliphates, using the four levels of governance, ruled a widely diverse territory including parts of Africa, Europe, and Asia, for several decades (Al-Munyawi, 2012; Handoko & Kayadibi, 2015; Jamsari et al., 2014).

2.1 Four levels of governance

Malik (2011), in his research on Islamic governance at the times of Caliph Omar bin Khattab and Muhammad Al Fatih, reconstructs the four levels of governance system to explain how Islamic governance successfully caters for agendas of multiple stakeholders using four different layers. Like Ostrom, all these four levels of

governance are structured in a Matryoshka-like formation (Figure 3). Yet, instead of Ostrom's local community being the smallest governance actor, the individual is the first governance level, within which the other three levels are nested. An effective four levels of governance requires every actor at each level to accomplish certain designated roles of that level (Islam, 2012; Khan, 2019). The four levels of governance have their roots on the teachings of the Quran, where Islamic scripture is used to urge all governance actors to commit to achieving common goals (Inalcik, 1973).

Level 1: Functioning individuals

Unlike other governance approaches, an individual is considered an entire governance level due to the multiple roles one might have. In a nested governance structure, an individual should fulfill the expectation of each of the roles they are categorised into. For example, as a member of society, an individual is expected to take on the role of a benevolent society member. If the person also works for the government, they not only take a role as part of a benevolent society but also should become an effective intermediary. If the same person works for the government as a governor or the President, he/she has an obligation to not only be benevolent and an effective intermediary, but also to be part of a fair State. To be able to step up to all these roles, the basic requirement as an individual is to be fully functioning to meet all their potential.

The scripture is full of teachings on how an individual should function well. The purpose of every person's existence is to give benefit to others. Individuals should always aim at collaborating with other individuals so that they can provide benefits to each other (Schumm & Kohler, 2006). This concept is then instilled in some religious practices. For example, the *zakat* (the compulsory contribution to society—either government or community—from individuals with monetary possession of more than 85 grams worth of gold) (Kaslam, 2009), and *Qurban* (individuals slaughtering a cow/goat/camel once a year to be given to eligible society members such as the poor, orphans, converts, travellers, and scholars) (Billah, 2021). These rituals are designed to motivate one to contribute to society and become a functioning individual.

Level 2: Benevolent society

When an individual is placed in a society, his/her role is not only to become a functioning individual but also to be benevolent: forming inter-society collaboration to optimize each other's potential (Levy, 2000). In the Indonesian context, society can

be community—either a collaboration of two or more individuals in a non-structured group such as the family (*keluarga*), and the neighborhood (RT); or a non-government organization (Manullang, 2021). The interactions of these different types of societies are also reflected in many rituals. For example, the *Salah* (prayers) is encouraged to be performed together with other people at a mosque five times a day. *Hajj* (pilgrimage to Mecca and Madinah) is also a collective practice which can only be performed together at a specific time and place. These ritual-enforced collaborations have trained Muslims to always form social interactions with others (Al-Krenawi & Graham, 2000).

Level 3: Effective intermediary institutions

Some individuals who are also part of societies, may work for some institutions. If so, their roles are no longer just functioning and benevolent. They also need to become effective intermediaries between the State and the societies. There are six types of institution:

1. Bureaucratic offices, such as the ministries and provincial departments/offices, who are given the mandate to coordinate the non-government Society and the State for specific affairs, such as agriculture, mining, forestry, industry, and infrastructure (Moosa, 1965).

2. Business entities, such as companies and other commercial organizations, bearing the obligation to nurture economic activities (Lewis, 1940).

3. Financiers such as the Ministry of Finance and the Central Bank, which are responsible for all finance, monetary policies, and tax affairs, relay monies from eligible individuals and society to the State, who will then use them for the welfare of all people (Hassan & Noor, 2020).

4. People's representatives such as the national People's Representative Body (DPR) and the provincial people's representative (DPRD) in Indonesia, are responsible for representing individuals and societies during interactions with other intermediaries or the state (Ari, 2016).

5. Regulatory and enforcement bodies. These include both audit offices and law enforcement offices, such as the Supreme Audit Board of Indonesia, the police, public prosecutors, and the corruption-eradicating committee (KPK) in Indonesia (Taimiyyah & Halim, 1985).

6. Counsellors and boards of experts such as the Supreme Advisory Council and the SDGs national or regional expert panels, having the obligation to provide feedback and suggestions to the State (Omar & Abu Samah, 2012).

Level 4: Fair State

The State is individuals having the highest authority in the whole government structure. The State's ultimate obligation is to preserve justice and the sovereignty of the country. A State is also the only actor with the authority to decide which issue should be prioritized. The underlying principles for sorting the priorities, however, should have been pre-established.

Figure 3 illustrates the nested four levels of governance.

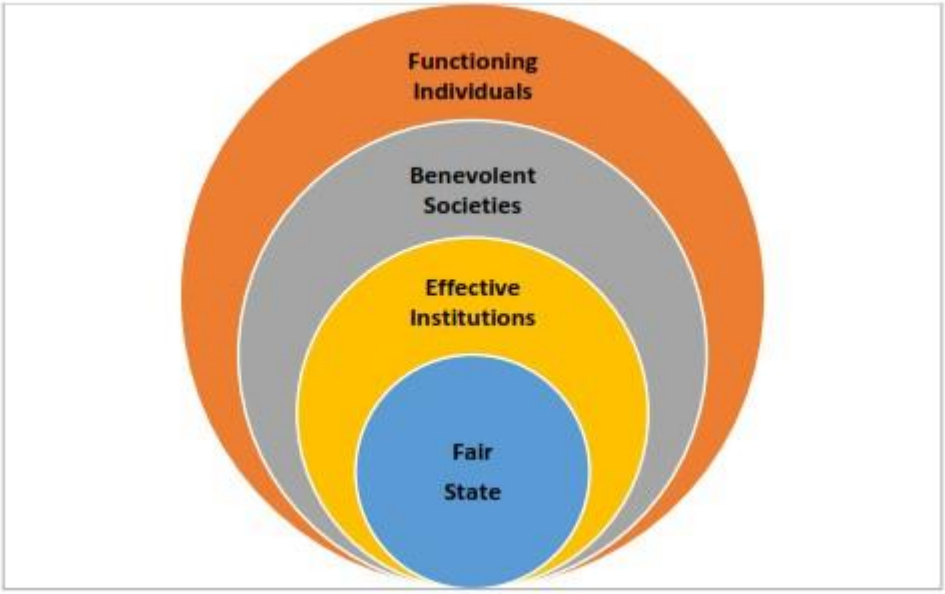

Figure 3. The nested four levels of governance (Malik, 2011). Effective governance is structured from the lowest level of Functioning individuals, built up to become Benevolent societies, Effective intermediary institutions and ultimately a Fair State.

We argue that these four levels of governance can be a valuable tool to analyse the most suitable structure for Indonesia, or at least, the four provinces we selected as our study sites. We therefore explore the characteristics of an effective governance structure in Indonesia and determine how the four levels of governance might help to mitigate the current challenges.

3. Methods

Auditing is the process of comparing actual conditions with what they are supposed to be, through the collection, verification, and corroboration of at least two of four types of evidence: documentary, testimonial, physical, and analytical (Mautz & Sharaf, 1961). Documentary evidence includes valid documents and databases obtained by auditors through some audit techniques such as trace back and recalculation. Testimonial evidence includes verbal or written statements from respondents during interviews, focus group discussions, and testimonies. Physical and analytical evidence are produced by the auditors themselves. Physical evidence can be obtained by witnessing an actual process or event. Analytical evidence is created by corroborating two or more types of audit evidence using some analytical procedures, such as software for Big Data Analytics and Actor Network Analysis. These procedures for producing evidence allow the auditor or researcher to collect more targeted data in an efficient manner, compared to traditional research methods which rely on pure primary data (Arens et al., 2000; Hooks, 2011).

Performance auditing is a mechanism for assessing the effectiveness or the efficiency of programs, activities or organizations (European Court of Auditors, 2017; ISSAI, 2016a). Auditors determine the audit criteria, collect audit evidence on the actual condition, identify the gaps between criteria and conditions, and propose recommendations for more effective performance (Pollitt & Summa, 1996; Power, 1997). Unlike financial audits and compliance audits where the criteria are predetermined from accounting standards and/or relevant regulations, in performance auditing, auditors must designate the audit criteria from the literature and current best practices (ISSAI, 2016c). In this study, we assess the effectiveness of the current governance structure for the implementation of SDGs in the four provinces, using the International Standard of Supreme Audit Institution (ISSAI) for performance auditing.

A standardised performance audit was conducted in four stages (Arens et al., 2012; ISSAI, 2016b). First, audit criteria were determined for the two research questions. Second, data were collected to be used as audit evidence. Third, gaps between criteria and existing conditions were identified. Fourth, recommendations to the stakeholders were proposed. In this study, we conducted the audit episodically from 2016 to 2019 in the four Indonesian provinces.

3.1 Audit criteria

An effective governance structure should overcome the challenges within the designated location according to the location's unique potential and capacity. We use challenges identified earlier in this paper as our reference for establishing the following three elements for successful implementation of the SDGs:

a. Policy coherence

Governance is the process of all actors collaborating to achieve their common goals under certain rules and regulations. In a polycentric governance arrangement, however, policy coherence is challenging due to the many self-governing clusters of stakeholders (Korhonen-Kurki et al., 2013; Maryudi & Sahide, 2017). Lambin et al. (2014) suggest that coherent policies require synergistic implementation, in which no policies are antagonistic towards one another. Ostrom (1990a) recommended that policy coherence ought to be enforced by some appropriator (such as legal enforcement), while Howlett and Rayner (2007) proposed a legally binding consensus among stakeholders.

Policy coherence in the four levels of governance approach, could be achieved with several mechanisms. At the State-level, the application of an overarching policy, commonly known as the *Maqasid al Syariah* or "the intention behind the law" is a binding consensus. According to the Quran, all rules and regulations issued should first be triaged by the five following priorities of *Maqasid*: 1) to protect religion; 2) to protect life; 3) to protect knowledge; 4) to protect wealth; 5) to protect human dignity. Hence, for example, in a situation of conflict where more taxes by a mining business are traded off against more polluted water, the State is obliged to adhere to the *Maqasid al Syariah*. The State should decide that water is more important than additional tax income, because protecting life ranks higher than protecting wealth (Auda, 2008; Jamal, 2016).

At the institution-level, the Board of Experts is responsible for providing all analyses and considerations before a decision is made. Relevant data and information are provided by the bureaucratic offices and the financiers, while people's representatives negotiate the community's interests with the State. The implementation of a decision is enforced by the regulator and law enforcement agency.

At the society-level, compromises can be made between communities and the business sector. Yet, any concession should be based on the overarching prioritisation as established by the State. This mechanism also helps provide some sort of

guidelines for all stakeholders to avoid escalating conflicts and for the State to ensure fairness in decision-making.

Indonesia also has similar principles for determining policy called the *Pancasila* or "the five principles". These are: 1) Belief in the one supreme God; 2) Humanity; 3) Nationality; 4) Democracy; 5) Social Justice (Al Marsudi, 2001). These principles originated from values that have long been embraced in Indonesia's culture. Social justice, for example, originated from the old saying "*gemah ripah loh jinawi*" or 'together achieving social welfare'. In the Constitution, it is established that every law and regulation in Indonesia ought to be based on *Pancasila* (Undang Undang Dasar Republik Indonesia, 1945). Yet, unlike the *Maqasid*, the numbers in *Pancasila* do not reflect priority. Hence, in a situation of conflict where policies are incoherent, Indonesia does not have any mechanism to provide guidelines for all governance actors to determine priorities and achieve compromises. (Iskandar, 2016).

b. Adequate participation

Adequate participation requires appropriate levels of communication among stakeholders, based on which stage a governance arrangement is at. The initiation stage, for example, requires participation in the form of information and consultation, while the preparation stage needs more involved participation such as joint decisions. Likewise, actors' contributions at the participation stage are sought for supportive participation, while at the continuation stage, it is down to collective actions, or even consultation and information when the goal has not yet been achieved, following supportive participation (Bernstein & Cashore, 2004; Wilcox, 1994). Indonesia is currently at the participation stage in the implementation of SDGs, hence the required adequate participation is through collective actions or supportive participation.

The four levels of governance rely heavily on the participation of societies. In contrast to Ostrom's polycentricity, where a local community is the smallest governance actor, this structure considers individuals – of which there are 270+ million Indonesians—as the most basic governance level. Most individuals will have already been allocated to a society through some religious rituals (*Salah*, *Zakat*, *Hajj*) or through public laws and regulations. Here the 'snowball effect' applies: a small society collaborates with other small societies forming a bigger society (Malik, 2011). Some of the societies are institutions with roles as intermediaries to convey the aspirations of the community to the State, and vice versa (Moosa, 1965). This nested structure ensures that the society is acknowledged and contributes to decision-making.

For adequate participation, it is crucial that intermediaries are found between the society and the State. Small societies should also have some connections to collaborate with one another to ensure benevolence. Analysis of that kind of arrangement requires a detailed mapping of every actor involved in the governance structure especially at the society-level.

c. Agile reflexivity

Agile reflexivity refers to a situation in which all governance actors can efficiently identify, and a mechanism can be adopted for finding, solutions or reaching some compromises over conflicts among them or uncertainties over natural disasters and global pandemics (Glass & Newig, 2019; Greene & Park, 2021; Rhodes, 1997; Voss & Kemp, 2006). A reflexive governance for the implementation of SDGs should display the following five characteristics (Voss & Kemp, 2005):

1. A unanimous understanding among stakeholders of what the SDGs are about, what Indonesia's current condition is, and what strategies have been established in Indonesia to achieve the 2030 agenda
2. Existing strategies for anticipating unpredictable situations
3. An embedded mechanism for mitigating the impacts of current development activities in the future
4. An integrated mechanism for the participation of all stakeholders in the policy-making process for the governance arrangements
5. Active participations of all stakeholders during the formulation of implementation strategies.

Using the four levels of governance, mechanisms for anticipating unpredictable situations are established from both the bottom-up and the top-down. In unpredictable situations, individuals quickly develop partnerships and form communities, which collaborate with other communities to form societies. At the same time, the State, with recommendations from the Board of Experts, establishes overarching priorities for mitigating unforeseen crises. The bureaucratic offices communicate these priorities to the societies and accommodate feedback from the societies about the strategies for mitigation. The people's representatives convey the feedback of marginalised communities to the State. The mitigation strategies are established in newly issued rules and regulations.

Funding comes from three sources: 1) Individuals, through direct *shadaqah* (voluntary donations); 2) Communities, through non-profit organisations dedicated to

collecting and distributing *shadaqah* from the willing and/or wealthy people to eligible people; 3) Intermediary institutions, such as the financiers using public funds, such as the compulsory individual tax (*zakat*), and the businesses' voluntary (*shadaqah*) or compulsory tax (*infaq*). The financiers are obliged to map these funding sources and initiate collaboration among the three sources for more effective spending. The regulatory/law enforcement bodies ensure that all expenditures of the collected funds are justified, and the strategies are adhered to.

We produced criteria in several stages. First, we identified the capacities in each province. Then, we identified the challenges regarding the lack of policy coherence, inadequate participation, and the lack of reflexivity. Finally, we designed a four-level governance structure which might overcome the challenges and maximise the potential of each province. A summary of our criteria is shown in Table 1.

Table 1. Criteria for a fit for purpose structure

Province	Capacities	Challenges	Criteria for a more fit structure
Riau	Oil and gas Mining Oil palm plantation Industrial forest Pulp and paper production Carbon-rich peatlands	Policy coherence between peat protection programs, agriculture, mining/oil lifting and industry. Participation: local communities and customary people are rarely included in the decision-making regarding land uses. Reflexivity for mitigating conflicts between local communities and the business entities.	The State should have established an overarching policy for Riau with the support of the Board of Experts and the regulatory/law enforcement bodies. The national ministry and the sub-national Departments of: Mining & Energy, Environment and Forestry, Agriculture, and Industry, should collaborate with each other to generate coherent regulations from an overarching policy, to negotiate their agendas. The Ministry of Villages should enable bigger societies to collaborate with smaller communities so that altogether these societies become more resourceful, communicating their concerns with the big companies. At the same time, the Ministry also ought to direct these societies into supporting the State's overarching policy.
Sumsel	Oil and gas Mining Plantation (rubber and oil palm) Ramsar Site (migrating birds from Siberia) & habitat for the critically endangered Sumatran tiger, *Panthera tigris sumatrae* Modern feeder port to Singapore	Policy coherence between conservation sites, plantations, mining/oil lifting and industry Participation: the lack of representation of customary people Reflexivity for mitigating conflicts among landowners, due to overlapping land ownership	The President (supported by the Governor and the Board of Experts) should establish the overarching policy for Sumsel to be adhered to by all the conflicting ministries under the support of regulatory/law enforcement bodies. The national ministry and the sub-national Departments of: Mining & Energy, Environment and Forestry, Agriculture, and Industry, should collaborate with each other to generate coherent regulations from an overarching policy, to negotiate their agendas. The Ministry of Villages should assist customary people to collaborate with bigger communities and NGOs to be more benevolent societies. Likewise, the

			House of Representatives should ensure that the local communities and the customary people are offered the fairest options in making compromises with the business entities and other landowners.
Maluku	Marine and forest conservation areas Mining industry Tourism	Policy coherence between conservation sites, mining industry, and tourism Participation: the lack of society representation of land uses in decision- making. Reflexivity for mitigating protests from international conservationists for sacrificing conservation areas for mining industry.	The President and the provincial governor should establish an overarching policy for Maluku with the support of experts and the regulatory/law enforcement bodies. The Ministry/Departments of: Mining & Energy, Environment and Forestry, Tourism, and Agrarian Affairs should communicate and collaborate in designing more coherent policies according to the President's overarching policy. The Ministry of Villages should assist small communities to collaborate with bigger societies and become more benevolent. The House of Representatives should ensure that any compromise with the business entities is fair and justified.
NTB	Tourism Mining industry	Policy coherence between mining industry and tourism Participation: the lack of society representation of land uses in decision-making Reflexivity for mitigating potential natural disasters.	The State should establish an overarching policy for NTB with the support of experts, Bappenas and the regulatory/law enforcement bodies. The Ministry/Departments of: Mining & Energy, Tourism, and Agrarian Affairs should collaborate with each other to generate coherent regulations from an overarching policy, to negotiate their agendas. The Ministry of Villages should assist small local communities to collaborate and integrate with bigger societies and become more benevolent and resourceful. The financiers, the business entities, and the regulatory/law enforcement bodies should develop a mechanism to interact with one another during uncertain times.

3.2 Data collection and gap analysis

The following stages of audit methodology were conducted in sequence. During the second stage—the data collection—we obtained documentary, testimonial, and physical evidence to identify the existing governance structures. In the third stage, we compared the audit criteria (stage 1) with existing conditions (stage 2) to identify any gaps between criteria and actual conditions under the current governance arrangements. In the final stage (stage 4), we proposed some recommendations that might result in a more fit for purpose governance structure, both for dealing with the current challenges in the four provinces, and for assisting Indonesia to achieve the SDGs targets by 2030.

During stages 3 and 4, we used Gephi 0.9.2 Actor Network Analysis to produce analytical evidence to support our analysis. Each governance actor is represented by a node (circle). The size of the nodes, calculated with Eigenvector centrality, reflects the influence of an actor relative to other actors in the whole governance arrangement (Franceschet, 2010). The interaction between one node and another is represented by a line and is scored relatively based on which nodes the line is connected to. Nodes with more connections and nodes connected to other well-connected nodes have more scores than others. These nodes and their connections in the whole arrangement are triangulated into a network of nodes and lines of different size and length. Bigger nodes reflect greater influences of a stakeholder over others. Shorter lengths represent closer relationships between one actor and the others. Table 2 explains the evidence-gathering process in detail.

Table 2. Data collection and Audit procedures.

Types of evidence	Audit procedures	Output
Documentary Evidence	Collecting government documents: Relevant regulations, National and provincial Action Plans; national and provincial mid-term and yearly development planning Annual budgets; ministerial and provincial budget acquittals Implementation reports by theprovinces and partner ministries, and the national monitoring reports by Bappenas (the Ministry of National Development Planning) Information from the internet regarding collaboration or partnerships between ministerial or provincial governments and other stakeholders such as NGOs, business entities, and local communities.	Based on the regulations and internet data. Identification of the existing network of interactions between actors Identification of existing governance structure in the ministries and the provinces
Testimonial Evidence	Corroborating the documentary evidence with testimonial evidence obtained from conducting interviews and focus group discussions with stakeholder representatives such as the Minister of Internal Affairs[1], the governor of Sumsel[2], government officials, NGOs, academics from local universities, and local communities.	Validated governance structure in the four provinces based on testimonial evidence from the respondent stakeholders.
Physical Evidence	Conducting physical observations at some locations in all four provinces, to test the claims in the documentary or testimonial evidence. For	Validated existing governance structure in the four provinces based on documentary, testimonial and physical evidence.

[1] One of the authors attended a national seminar in which the minister presented a speech. She managed to ask some questions related to this paper.
[2] The successor to the previous governor, who was jailed for corruption.

	example, in the SDGs report, Maluku claims it has achieved electricity connections, health workers' home visits and proper housing. We visited some locations in Maluku to validate these achievements.	
Analytical Evidence	Converting all the evidence into diagrams of the existing governance structures in the four provinces (Figures 4,5,6,7) to illustrate the centrality, network cohesion and network density of current governance structure using Gephi 0.9.2. Betweenness Centrality (Riggs et al., 2020). Comparing the diagrams of existing governance in the four provinces with the criteria of four levels of governance	Identification of the extent of actors' centrality, network density, and network cohesion to assess the effectiveness of the existing governance structures in the four provinces. Identification of changes needed if Indonesia intends to adopt the four levels of governance.

4. Results

Indonesia established only one Presidential Regulation and one Ministerial Decree as nation-wide guidelines for the implementation of the SDGs. However, each province has improvised a governance structure that distinguishes it from the others. Figures 4, 5, 6 and 7, are the Gephi diagrams we derived to assess the effectiveness of the existing governance structure implemented in each of the provinces. Figure 4 is the existing governance structure in Riau; Figure 5 is for Sumsel; Figure 6 is for Maluku; and Figure 7 is for NTB.

Overall, the existing governance structures in the four provinces are not yet fit for the purpose of implementing the SDGs. Each of the provinces has adopted its own governance structure for the implementation of the SDGs, which is quite distinctive from every other one. Yet, even with the newly adopted structures, the provinces fail to display either coherent policies, adequate participation, or agile reflexivity. Individuals hardly contribute at all; intermediaries are unable to facilitate adequate liaison between the societies and the state; instead, the institutions are concentrated among themselves, clustered into national and sub-national actors, and lack connections with societies and individuals. In all provinces except Sumsel, the state has a very insignificant role.

For practical reasons, governance actors are presented in different colours, as explained in the figure captions. The importance of an actor is represented by the size of the actor node. The bigger the node, the more important the actor. The distance between nodes reflects the closeness of one actor to the other. The closer the actors, the more intensely they collaborate with one another.

4.1 Riau

The governance structure in Riau (Figure 4) is not yet fit for the purpose of implementing the SDGs. The governance actors are segregated into national (left) and sub-national (right) clusters, with some intermediaries from business entities (yellow nodes), the People's Representatives (green nodes), several bureaucratic offices (orange nodes), SDGs centre (brown node), and the state (the President and the provincial governor) (blue nodes). Such an arrangement is problematic for the following reason.

Policy coherence seems quite unlikely to be achieved. Instead of the state, the most dominant actors in Riau are bureaucratic offices: Bappenas (the Ministry of National Development Planning) and Bappeda (the Department of Provincial Development Planning). The state, in contrast, has adopted Bappenas and Bappeda roles as the intermediaries. It is challenging for these two institutions to replace the state (the President and the provincial governor) in establishing an overarching policy, since the authority of Bappenas and Bappeda is only equal to other national and sub-national institutions, if not lower. For the same reason, both institutions also cannot issue orders to BPK (Supreme Audit Board) as the regulatory body to audit the SDGs implementation or the INP (Indonesian National Police) for providing legal sanctions to those violating the regulations. This arrangement in Riau lacks the necessary agency to enforce policy coherence during SDGs implementation.

Likewise, people's participation is very limited. Neither ministerial nor provincial regulations on SDGs implementation specifically mentions the contribution of individuals and society (Badan Pusat Statistik, 2020; Pemerintah Provinsi Riau, 2017; Peraturan Gubernur Riau, 2018). Despite having more than 1,200 communities and 6.4 million people, both individuals and the societies are marginalised at the sub-national level, and hardly interact with the national actors. Most government institutions become the intermediaries for other institutions; nevertheless, none, either at national- or sub-national levels, fulfils their duties as the intermediaries between the State (provincial governor and the President) and the societies. This lack of access

for the individuals and societies has made it almost impossible for them even to interact with the national-level actors, let alone to participate in decision-making.

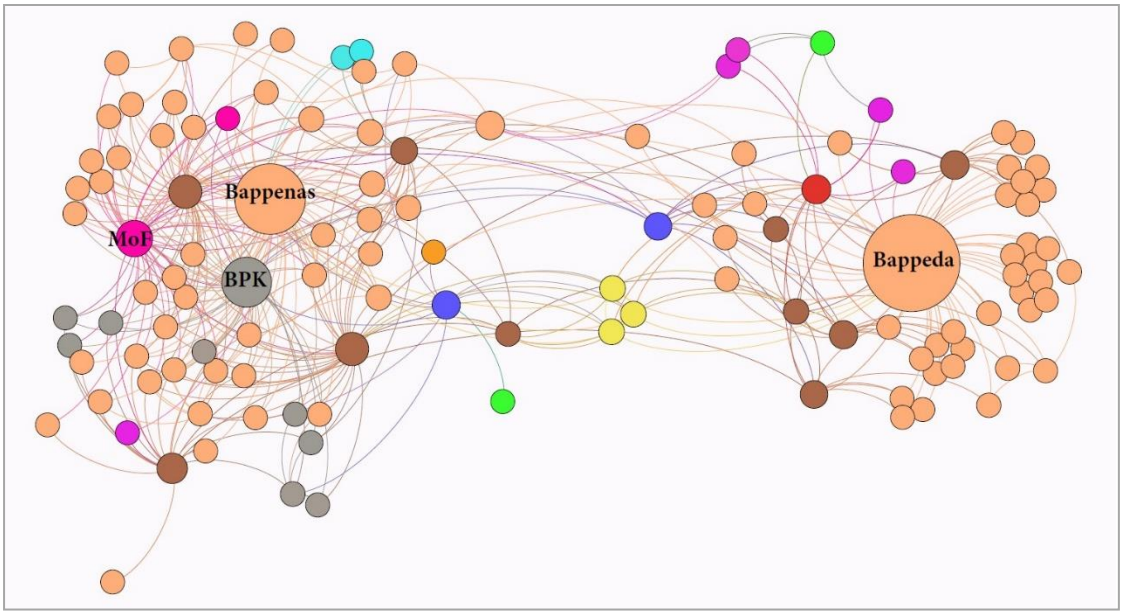

Figure 4. Governance Structure for the implementation of SDGs in Riau province. The red node represents the individuals (Riau People); purple nodes are the societies; orange nodes are bureaucratic offices including The Ministry of Development Planning (Bappenas) and the provincial Board of Regional Development Planning (Bappeda); yellow nodes are the private sector; pink nodes are the financiers (such as Ministry of Finance (MoF)); grey nodes are the law enforcement and audit bodies (such as Supreme Audit Institution (BPK)); turquoise nodes are the Board of Experts; green nodes are the People's Representative; brown nodes are the Working Groups and SDGs Centers; and blue nodes are the State. This structure will be less likely to have policy coherence, considering the small-sized blue nodes, reflecting the non-dominant role of the State, and the distance between the State and the experts (green nodes). This arrangement also shows a lack participation due to the insignificant role of individuals (red node) and societies (purple nodes) and how these actors are alienated from most of the intermediary ministries. It is also challenging to have agile reflexivity when the intermediaries are dominant actors, widely separated into national and sub-national groups.

Consequently, establishing reflexive mechanisms during unpredictable situations is also challenging. The business entities (yellow nodes) are closer to the State, national SDGs centre, and the national's People Representatives, than to the societies (purple nodes) or the individuals (red node). This lack of connectivity suggest that businesses prefer the State and the government institutions to the societies or individuals for settling land use conflicts and making compromises. The government institutions and the State, however, are unlikely to create acceptable compromises for local people since the national institutions do not interact with either individuals or societies. This leads to prolonged conflicts and escalated protests among the local communities (Utama, 2018).

4.2 Sumsel

In general, Sumsel province has a more appropriate governance structure (Figure 5) than Riau, yet such a structure is still not fit for successfully implementing the SDGs. Like Riau, the role of Sumsel's 8.5 million Individuals, 800+ local communities, and 170,000+ business entities are scarcely mentioned in either national or sub-national regulations (Badan Pusat Statistik, 2020; BPS Provinsi Sumsel, 2020). The governance is also clustered into two major groups, national (left) and sub-national (right). In between the two clusters are the societies (purple nodes), business entity (yellow node), SDGs centre (brown nodes) and several ministries (orange nodes).

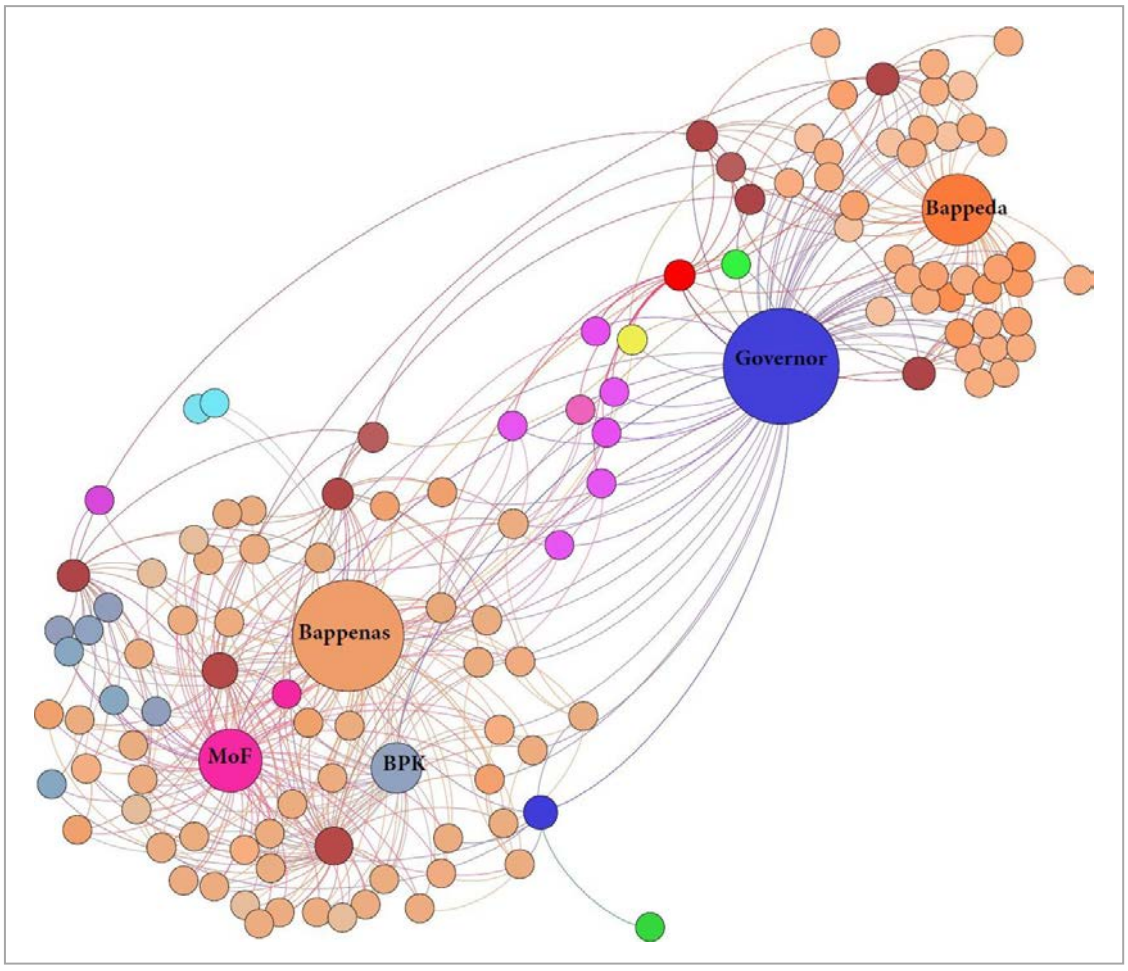

Figure 5. Governance Structure for the implementation of SDGs in Sumsel province. The red node represents the individuals (Sumsel People); purple nodes are the societies; orange nodes are the bureaucratic offices such as The Ministry of Development Planning (Bappenas) and the provincial Board of Regional Development Planning (Bappeda); the yellow node is the private sector; pink nodes are the financiers (such as Ministry of Finance (MoF)); grey nodes are the law enforcement and audit bodies (such as Supreme Audit Institution (BPK)); turquoise nodes are the Board of Experts; green nodes are the People's Representatives; brown nodes are the Working Groups and the SDGs Centers; and blue nodes are the State.

Unlike Riau, Sumsel has quite a mixed result on policy coherence. The State (provincial governor) has the most influence among all actors, however, the President is totally insignificant for decision-making on overarching policy. Rather than becoming intermediaries between societies and the State, almost all national and sub-national institutions except for the business entity have become intermediaries among themselves. Moreover, the provincial governor, who is supposed to be the State, has adopted the role of intermediary, along with the societies and the individuals and several bureaucratic offices. This governance structure may be able to establish policy coherence among sub-national actors since the provincial governor possesses the necessary influence and dominance over other actors. According to the Constitution, however, the provincial governor has slightly lower authority than the ministries and does not have any authority to give orders to the regulatory/law enforcement bodies. When a ministry issues a new regulation, sub-national actors including the governor ought to comply (Undang Undang Dasar Republik Indonesia, 1945).

Participation among stakeholders is also more inclusive than that in Riau. The societies and individuals are no longer alienated at one extreme but instead become intermediaries between national and sub-national institutions. This position allows both individuals and the societies to connect with national actors, unlike the situation in Riau. Yet, it is challenging for both individuals and societies to contribute to decision-making, since both have insignificant influence, and the most dominant national actor, Bappenas (the Ministry of National Development Planning), does not appear to interact with them at all. Even some national actors seem to be in a marginal position. The Board of Experts (BoE), which is supposed to be close to the State, is a long way from the President (blue node in the national cluster). Likewise, the national People's Representatives (green node) is isolated, its only interaction being with the President, when instead, it should be close to the societies and individuals.

The current governance structure in Sumsel is quite reflexive, though some changes might improve that. The individuals and the societies have close interactions with both the business entity and the provincial People's Representatives, enabling them to communicate and compromise during conflicts and disputes. Yet, none of the government institutions seems involved in that mechanism. Bappenas (The Ministry of National Development Planning) and Bappeda (the Department of Provincial Development Planning), are the most dominant actors for planning and designating development programs leading to changes in land uses, yet both are distanced from the individuals and the societies of Sumsel. Ministries and provincial departments involved in land use designation and land ownership have not yet adopted a

mechanism to communicate with all land users such as individuals, local societies, and business entities. This lack has jeopardised any compromises that might be made among the People's Representatives, the communities and the business entities, since what may have been resolved among these three actors might not have accommodated the government's agenda, which may, or may not agree with all the other stakeholders' agendas.

4.3 Maluku

Of all the four provinces, Maluku has a governance structure that is least fit for implementing the SDGs (Figure 6). Like Riau and Sumsel, the governance structure in Maluku is segregated into two clusters, national (left) and sub-national (right), yet no actors have taken roles as intermediaries connecting the two. Also, like Riau and Sumsel, the regulations overlook the roles of Maluku's 1.8 million people and 200+ local communities. Here, national and sub-national actors operate in isolation. In a structure like this, neither policy coherence, adequate participation nor agile reflexivity can be achieved.

Policy coherence cannot occur among the two isolated clusters. It is problematic for the ministries in the national cluster to communicate their strategies for SDGs implementation since the sub-national actors are barely connected with the national cluster. Bappeda and Bappenas (orange nodes) are the two most dominant actors, yet both are intermediaries with the same authority as any other ministry and provincial department. Neither Bappenas nor Bappeda have the authority to establish an overarching policy for other actors or to have the regulatory /law enforcement bodies to enforce all actors to comply with the policy. The role of the State (provincial governor and the President) is insignificant. From his position, which is the closest to the national cluster, the governor seems to initiate a connection between the two clusters yet fails. Worse, the President is alienated from most national actors.

Adequate participation is also not an option. Instead of becoming the intermediaries between the societies and the State, institutions in both national and sub-national clusters relate mainly to each other. Individuals (red node) and societies (purple nodes) have limited connections with sub-national institutions, and no connections at all with intermediary institutions at the national-level. Any decision-making at the national-level is made in isolation from the sub-national level and vice versa. Actors such as the people's Representatives (green nodes), the Board of Experts (turquoise nodes) and the business entities are also marginalised from the entire governance. In such a situation, agile reflexivity is a struggle. There is no mechanism for all

governance actors to connect and communicate with each other in times of conflict or uncertainty. Some actors are alienated and marginalised; some others are playing roles they are not entitled to. The societies (purple nodes) including the local communities and international conservationist NGOs have connections to negotiate with the local People's Representatives (green node), individuals (red node), the business entities (yellow nodes), and the provincial governor (blue node), yet, these actors have no mechanisms to connect and communicate with the ministries involved in decision-making on land uses in Maluku such as Bappenas (the Ministry of National Development Planning), the Ministry of Agriculture, the Ministry of Mining and Energy, and the Ministry of Environment and Forestry. Similar to Sumsel, this lack of national government involvement in conflict resolution in Maluku has made compromises on the designation of land uses in this area short-lived and temporary arrangement.

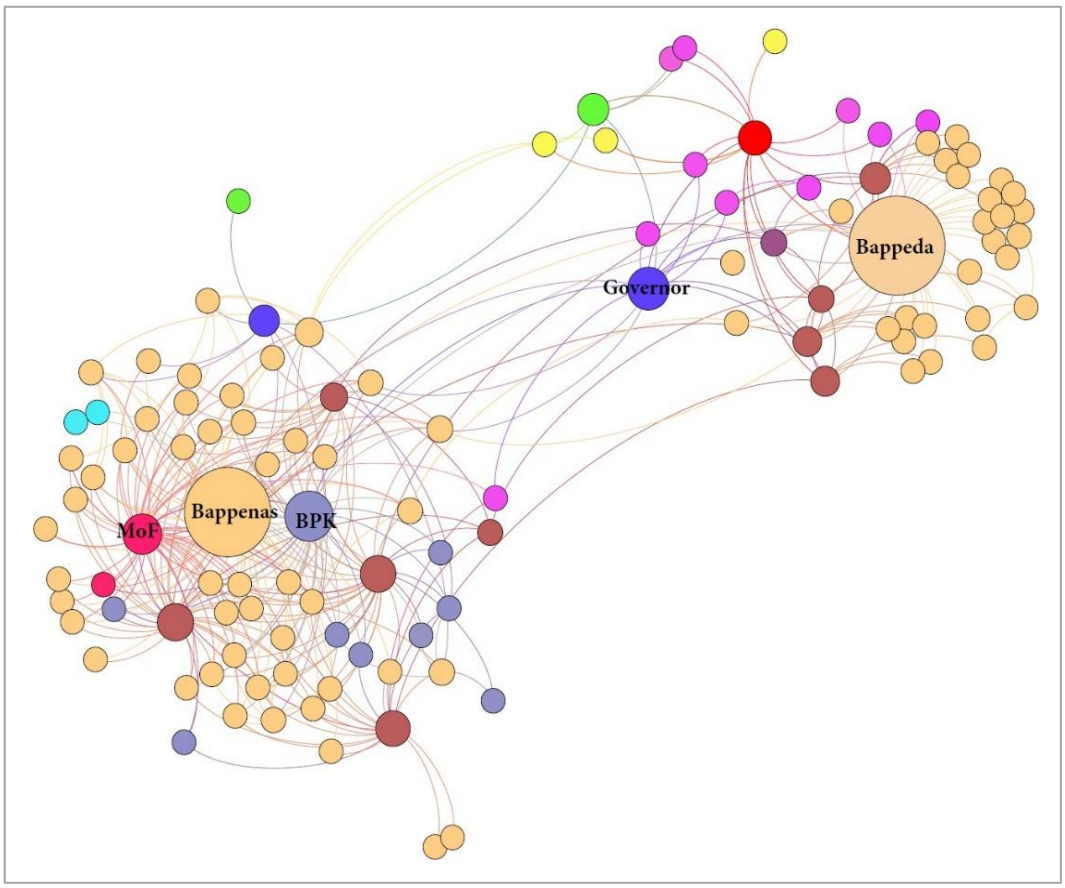

Figure 6. Governance Structure for the implementation of SDGs in Maluku province. The red node represents the individuals (Maluku People); purple nodes are the societies; orange nodes are the bureaucratic offices such as The Ministry of Development Planning (Bappenas) and the provincial Board of Regional Development Planning (Bappeda); yellow nodes are the private sector; pink nodes are the financiers (such as Ministry of Finance (MoF)); grey nodes are the law enforcement and audit bodies (such as Supreme Audit Institution (BPK)); turquoise nodes are the Board of Experts; green nodes are the People's Representatives; brown nodes are the Working Groups and the SDGs Centers; and blue nodes are the State.

4.4 NTB

As for the other provinces, the governance structure in NTB province is not yet fit for implementing the SDGs. All governance actors are divided into two clusters, the national (left) and sub-national (right) (Figure 7). Several actors in between the two main clusters, such as the provincial governor (blue node), the business entities (yellow nodes), the societies (purple nodes) and government institutions (orange nodes) are positioned to become the intermediaries.

Like the other three provinces, policy coherence in NTB is unlikely to be achieved with this structure. Two most dominant actors for implementing SDGs are Bappenas (the Ministry of National Development Planning) at the national-level and Bappeda (the Department of Provincial Development Planning) at the provincial-level (orange nodes). According to the Constitutions, Bappenas and Bappeda have the same authority in policy establishment as any other ministries or provincial departments, respectively. Neither Bappenas nor Bappeda, have the authority to impose decision-making on other ministries or departments, even if that decision-making is not coherent with Bappenas and Bappeda's current policy on the implementation of SDGs. Such an authority over other ministries or other provincial departments belongs to the State (the President and the provincial governor), blue nodes. Unfortunately, neither of them has the necessary influence and dominance over other governance actors to establish the overarching policies for all the ministries and provincial departments.

Participation, however, is mixed in NTB. At the sub-national level, the province has had a structure connecting individuals (red node), societies (purple node), the local People's Representatives (green node), the State (governor, blue node), the business entities (yellow nodes) and the bureaucratic offices (some provincial departments, orange nodes). Some of these departments are even fulfilling their roles as intermediaries between the State and societies. Though this structure could be improved, the fact that these actors have developed some mechanism to provide more access for often marginalised actors such as individuals and the societies (communities) is worth noting. At the national-level, however, such a pattern is absent. None of the national actors have adequate connections and communications with those at the sub-national level. The governor is in the role of intermediary but that is a futile endeavour. The President (blue node /national cluster) the national House of Representatives (green node) and the Board of Experts (turquoise nodes) are alienated from the whole arrangement.

Consequently, an agile mechanism for reflexivity during the implementation of SDGs is also not yet achieved. At sub-national level, the structure is quite accommodating for all actors to connect and communicate in time of conflict and uncertainty. NTB is one of the provinces very prone to natural disasters due to its geographical location. Hence, this province has had a solid structure connecting almost all sub-governance actors into a reflexive mechanism for anticipating uncertainties.

Such a structure, however, is risky. Natural disasters vary in extent. Not all disaster mitigation can be organised and anticipated only at the provincial level. During relatively small events, funding and resource mobilisation can be handled by the sub-national actors. However, during major events such as tsunami and earthquake, national actors need to be involved, especially for funding and resource allocation. BI (Central Bank of Indonesia) and the Ministry of Finance, the financiers (pink nodes), need to allocate portions of the State Budget (APBN) to support the province. Regulatory and law enforcement bodies such as BPK (the Supreme Audit Board) and the Indonesian National Police (grey colour) need to be mandated by the President to audit funding and resource allocation or to enforce the State's overarching policy and regulations following natural disasters.

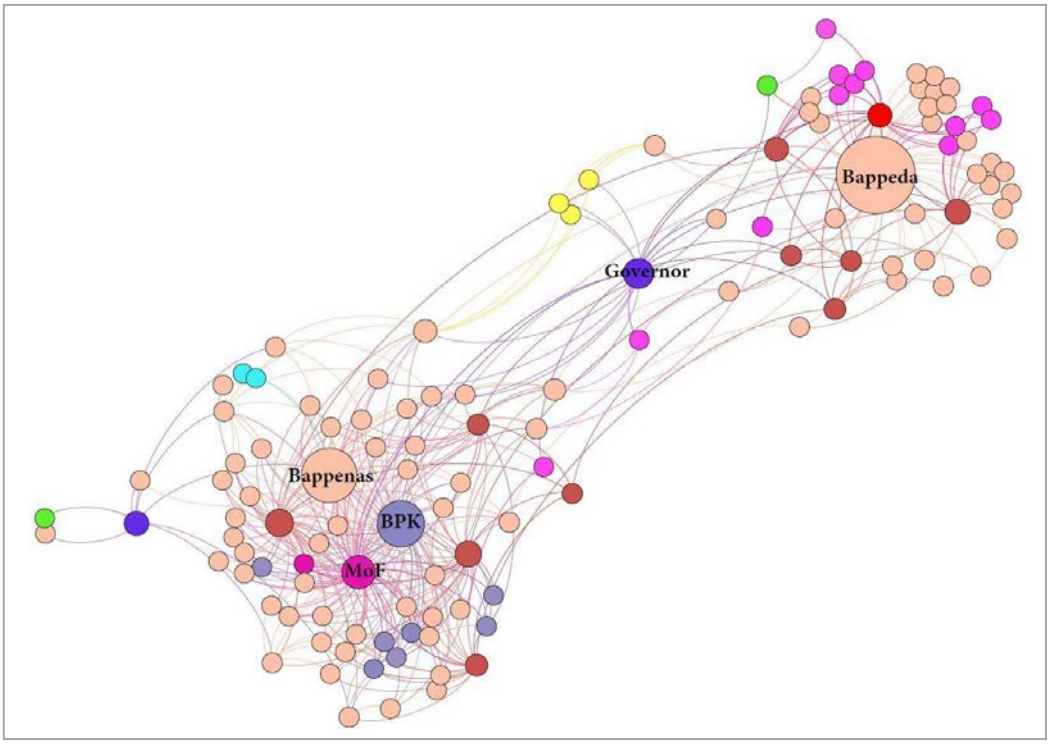

Figure 7. Governance Structure for the implementation of SDGs in NTB province. The red node represents the individuals (NTB People); purple nodes are the societies; orange nodes are the bureaucratic offices such as The Ministry of Development Planning (Bappenas)and the provincial Boardof Regional Development Planning (Bappeda); yellow nodes are the private sector; pink nodes are the financiers (such as Ministry of Finance (MoF)); grey nodes are the law enforcement and audit bodies (such as Supreme Audit Institution (BPK)); turquoise nodes are the Board of Experts; green nodes are the People's Representative; brown nodes are the Working Groups and the SDGs Centers; and blue nodes are the State.

5. Conclusion and recommendations

In conclusion, the current governance structure for the implementation of the SDGs in Indonesia is not yet fit for that purpose. There is a lack of individual people participating, arrangements are excessively complex and fall disproportionately on some ministries, and there are conflicts among government institutions when they attempt to implement the 17 SDGs with their 169 targets.

There is also a lack of adequate resourcing for implementation. These issues all indicate that the current governance structure is hindering the adequate implementation of the SDGs. Thus, achieving the 17 goals in Indonesia, as arrangements stand, is unlikely.

Below are several recommendations that might improve the overall system of governance and help to achieve the SDGs by 2030:

1. Indonesia could improve its current governance structure with a focus on greater subsidiarity to effect implementation of the SDGs. Indonesia is too large, too diverse, and it is too costly, to rely solely on its governments to implement the SDGs. The government could equip individuals and societies with more designated roles, capacities, and standing to collaborate effectively with other stakeholders. The government could determine whether individuals' and societies' competencies ought to be upgraded; regulate the guidelines on how individuals and societies contribute to the implementation of the SDGs; and establish third party funding mechanisms. Such mechanisms might require the business sector or NGOs to provide proper funding to individuals and societies working on issues, which are important for the those business entities or NGOs.

   Institutions such as the ministries and provincial departments could increasingly focus on being intermediaries between individuals, societies, and the State. Intermediary institutions could encourage societies and individuals to be the main actors and they could help to facilitate them with guidance and support.

   The State ought to take on the role of decision maker in situations of conflict, trade-offs, and unpredictable events. As such, the government could establish non-biased overarching principles to guide the State in determining which stakeholder should be prioritized.

2. Indonesia could more seriously consider the four levels of governance set out above, where the governance structure enables individuals and societies to

contribute to achieving collective goals. Adopting the four levels of governance would represent a closer fit to the existing Indonesian situation.
The people of Indonesia are already grouped into societies at different scales from household, neighborhood (RT), community (RW), suburb (*kelurahan*) or village (*desa*), and sub-district (*kecamatan*). It is unfortunate that Indonesia does not seem to have gained much benefit from this valuable form of social structure. Government institutions that are centralized, whether at the national- or provincial-level, have limited capacity to access the more implementation-focused local social levels.

An alternative arrangement, focusing on the nested four governance levels, could help to ensure that every governance actor contributes more effectively to the implementation of the SDGs. In such an arrangement, local people could work together making themselves functional; societies—both NGOs and non-organizational entities—are benevolent and support one another; institutions work synergistically and become effective intermediaries to connect the societies with the State; and the State— both President and the governors—execute their authority fairly.

3. Indonesia could establish overarching principles for the implementation of the SDGs. Neither of the SDGs regulations—the Presidential Regulation 59/2017, nor the Ministerial Decree 7/2018—include universal guidelines for building subsidiarity, reconciling conflicts, mitigating unpredictable situations, and resolving trade-offs. This has led different provinces to apply different mechanisms to cope with their own challenges, creating different governance structures.

   As a developing country with many valuable natural resources, both development and conservation aspects of SDGs are equally important. Since the SDGs include potentially conflicting targets, it is crucial to have a mechanism for sorting the order of importance during a situation of trade-offs (less achievement of one target due to pursuing others). Likewise, in a diverse country such as Indonesia, conflicts among different stakeholders due to cultural and geographical differences are unavoidable. Some areas with rich mineral reserves are culturally sacred (Walton, 2004), and many islands in Indonesia are so remote that even the connection of electricity is a luxury (Rumbayan, 2017).

   Moreover, Indonesia is prone to unpredictable events resulting from tectonic activities and unexpected outbreaks such as the current global COVID-19

pandemic. These situations might be resolved if Indonesia had a universally accepted mechanism to quickly decide priorities in the event of conflicts between SDGs targets.

Indonesia's five guiding principles, the *Pancasila*, could provide such a foundational mechanism. The establishment of *Pancasila* as overarching principles embedded in the Presidential Regulation regarding SDGs, might serve as a triage mechanism for determining priorities during the implementation of the SDGs.

4. The use of performance auditing as a mechanism to regularly assess the effectiveness of Indonesia's governance arrangement would make monitoring the implementation of SDGs more affordable for the country. A widely diverse nation, Indonesia is bound to be very dynamic. What seems to be effective at one time, might not be as successful when the circumstances change due to unpredictable situations, such as a global pandemic. Hence, a mechanism to assess whether Indonesia's governance arrangement is still effective to achieve common goals, is crucial.

   We propose that Indonesia uses the existing performance auditing mechanism conducted regularly by the Supreme Audit Board (BPK), as a mechanism to assess the effectiveness of SDGs implementation in Indonesia. BPK has had a mandate to conduct public sector auditing of every State-financed institution in Indonesia. Audit methodology is designated to optimize cost benefit, using tools such as professional standards, risk-based audits, and professional judgment. Performance auditing assesses whether an entity/program/project/initiative has been conducted in the most economic, effective, and efficient way, and if there is room for improvement. Instead of conducting stand-alone audits, Indonesia should require BPK to be the regulatory body and conduct performance audits on the governance of SDGs implementation to provide recommendations on improvements for more effective implementation.

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CHAPTER 7. Auditing the governance of natural resources in Indonesia: Where to from here?

Chapter 7. Auditing the governance of natural resources in Indonesia: Where to from here?

At the beginning of my research project, I wondered if it was possible to assess the effectiveness of natural resource governance in Indonesia on a regular basis. I argued that sustainable natural resource use is most challenging for a low income tropical country such as Indonesia where development is a priority (Lovina et al., 2017). Even more so with its widely diverse territory where the development priorities of one region may be different from others (Colfer & Resosudarmo, 2002). Effective governance is needed to reconcile the different agendas of many governance actors in achieving a shared goal (Bouckaert et al., 2018). I also argued that governance is very dynamic since its actors' agendas are influenced by many uncontrollable variables such as political tension among powerful countries, the pandemic and natural disasters (Sulistyawan et al., 2019). Therefore, I propose that the effectiveness of natural resource governance in Indonesia should be assessed on a regular basis, to always keep track of changes and to enable Indonesia to respond accordingly.

This thesis attempted to formulate an applicable mechanism to conduct regular assessments on the effectiveness of governance. I asked:

1) What is the scope and what are the important considerations for auditing the governance of sustainable natural resource use in Indonesia?

2) What is the state of the existing governance arrangements in Indonesia since it declared commitments to certain international initiatives?

3) How can I assess the coherence, effectiveness and efficiency of an overarching policy, adopted through an international initiative in a location that already has complex multi-actor governance arrangements within multiple sectors, and across four different levels?

4) How can I assess the effectiveness of appropriate stakeholder participation and reflexivity of conflicting international and national initiatives, in a multi-actor governance setting, across multiple sectors, and across four different levels?

5) How can I develop a more appropriate structure for effective governance of natural resources in Indonesia?

Answering my **first question**, I discovered that at the sub-national level, each region struggles to accommodate its local differences and to adjust to the top-down governance arrangements imposed by the national government, which often are also influenced by some international initiatives such as SDGs. Specifically, I found that: 1) for a country as complex as Indonesia, the sustainable use of its natural resources requires regular assessment of the effectiveness of natural resource governance. There are four important criteria that must be assessed for effective governance, namely: 1) policy coherence, 2) adequate participation, 3) agile reflexivity, and 4) a structure fit for purpose. I also found that the most feasible mechanism for such an assessment is through performance auditing (**Chapter 1**). Such an assessment, however, can be overwhelming, considering the massive scope of work involved. Hence, I proposed that governance auditing on the use of natural resources in Indonesia be done at a landscape-scale using a landscape approach. I explored this idea in detail by assessing forest governance in Indonesia (**Chapter 2**).

During my endeavor to answer **question 1**, I learnt:

1) There are existing audit mechanisms for the forestry sector in Indonesia, however each operates as a silo (McCarthy, 2012; Siregar et al., 2012). Opportunities to harmonize these audits into a more comprehensive and structured auditing mechanism are limited due to the existing rigid governance structure.

2) The governance arrangements of the forestry sector are intertwined with that of many other sectors such as agriculture, infrastructure, industry, trade, mining, and housing (Moeliono et al., 2009). Any analysis or assessment of the governance arrangement needs to accommodate these interrelations and the resultant complexity.

3) Simultaneous implementation of conservation and development initiatives, both by international and national regimes, will add more complexity to the governance arrangements. Therefore it is important to identify and analyze each of the initiatives adequately (Nurrochmat et al., 2014).

I suggested that when setting landscape boundaries, one should always account for three variables:

a) the existing audit mechanism that can help assess the current state of governance on a regular basis
b) multi-actor interactions within multiple sectors at many different levels, and their power or authority towards one another

c) all existing conservation and development initiatives and programs, and how they influence one another.

I proceeded to answer my **second question** in **Chapter 3**. I studied the state of the existing governance arrangements in Indonesia since it declared its commitments to certain international initiatives. Here, I chose SDGs as the international initiative, considering that Indonesia is deeply commited to this 2030 agenda and has already adopted the 169 targets and 17 goals into its long-term national development planning. I selected four regions for case studies and assessed the effectiveness of their governance arrangements, with a particular focus on achieving the 17 development goals of the SDGs.

I learned that:

1) Indonesia's governance arrangement for SDGs is not yet effective for accommodating the agenda of all its governance actors in achieving the 17 goals The policies are not yet coherent, some governance actors (such as local communities and NGOs) have not yet participated in the decision-making process regarding the implementation of SDGs, and there has been little evidence for the existing mechanisms mitigating conficts and unpredictable situations such as disease outbreaks, extreme weather events or natural disasters.

2) Indonesia has not yet adjusted its governance structure to cope with both the conflicting nature of the 17 goals and the conflicting interests of its SDGs actors. Achievement of one goal may be at the expense of, or decline in, other goals. I found that overall, the governance of the implementation of SDGs in Indonesia has not yet been effective in enabling stakeholders to achieve the 17 goals.

I proposed that Indonesia should improve its current governance structure. Effective governance aims at more coherent policies, more appropriate participation, and more agile reflexivity, which are enabled by a governance structure fit for achieving those purposes. I revisited this issue later in **Chapter 6.**

Answering my **third question**, I investigated how Indonesia might better optimize natural resource use arrangements through more coherent, effective, and efficient policies. In **Chapter 4**, I established a case study related to the uses of peatland areas and the establishment of the new UN peat protection initiative. The Kampar Peninsula is a forested peatland where pulp and paper companies, conservation priority areas,

and local communities, are all located in a newly declared government district called Pelelawan (Hooijer et al., 2015).

Again, I learned that ministries in Indonesia operate in isolation from other ministries and do not necessarily coordinate their policies with other government institutions at lower levels. Hence, when all the conflicting policies are handed down for implementation in a landscape, stakeholders respond differently, according to the impact that the conflicting policies have on their own agendas (Setiawan & Faroby, 2017).

I also learned that an integrated database to facilitate harmonization among different stakeholders is lacking and therefore, the impact of this peat protection policy on the existing governance setting has not yet been assessed. As yet, there is no alternative database as a source of information to assess and identify the coherence of establishing a new policy in different government institutions (Deininger et al., 2011). This lack of policy coherence among government institutions has hindered the optimum achievement of both stakeholders' interests and their shared goals.

I proposed auditing as a means of overcoming the lack of data, and as an alternative mechanism to regularly assess and improve the coherence of policy-making in Indonesia. This would provide some mechanism for stakeholders to negotiate and achieve their goals more effectively.

For my **fourth question**, I studied the participation and reflexivity of a multi-sector, multi-level, and multi-actor governance arrangement in a landscape characterized by three contrasting locations: Sembilang, Lalan and Dangku - collectively shortened to Sendang (**Chapter 5**). Sembilang is a national park inscribed on the RAMSAR list of sites, an international convention for the protection of wetlands and water birds (The Ramsar Convention, 2018). Lalan is an area designated for oil palm plantations; and Dangku is a wildlife conservation area protecting the habitat of the Sumatran Tiger (*Panthera tigris sumatrae*), a species listed as critically endangered by IUCN (Goodrich, 2015). In between Sembilang and Lalan is a modern feeder port servicing Singapore. On the border of Dangku and Lalan is an oil extraction operation (Kementerian Energi dan Sumber Daya Mineral, 2016; Peraturan Pemerintah Republik Indonesia, 2014).

I found that incoherent policies among ministries have resulted in conflicting interests in land use and that stakeholders have developed their own mechanisms to participate and anticipate conflicts of interest. For this landscape, I proposed that Indonesia make

some adjustments to both regulations and implementation strategies to better accommodate the necessary participation and reflexivity of stakeholders.

My fifth and **final question** was about formulating the most effective governance structure for natural resource use in Indonesia. For this purpose, I revisited the governance arrangements in the four provinces that were studied in **Chapter 3**. I determined that SDGs implementation in Indonesia is not effective because it lacks the structure required to catalyze policy, participation, and reflexivity into an effective arrangement. In my attempt to customize the existing governance structure, I learned that Indonesia has already embraced some of the values that could lead to effective governance such as *Ketuhanan (*religiosity), *Tepa Selira* (humanity) *Gotong Royong* (helping each other), *Musyawarah* (group discussion) and *Gemah Ripah Loh Jinawi* (social welfare), which are embedded in *Pancasila* (the five principles) that guide law-making (Bowen, 1986). I also identified that Indonesia, by customs and culture, has an existing nested polycentric governance (Li, 2001), and certain regulations have even established this polycentricity in the government structure (Peraturan Menteri Dalam Negeri, 2017). However, the majority of statutory regulations in Indonesia are top-down and hierarchical. The hierarchical governance structure devolves these existing values into different ministries, causing the implementation of such values to contradict one another. Indonesia's current governance structure has not yet adopted any mechanism for evaluation of the most appropriate governance arrangements for the implementation of policies and regulations, and this has hindered Indonesia's ability to achieve its goals.

I suggested an alternative governance structure for better implementation in Indonesia. By law and regulations, Indonesia applies a multi-level governance structure, where governments at district-, provincial- and ministerial-levels are the designated decision makers. This does not suit the concept of SDGs, which promote partnerships among all stakeholders.

To redesign the structure for more effective collaborations, I proposed that four nested levels of governance be recognized (Malik, 2011). These are: 1) functioning individuals, 2) benevolent societies, 3) intermediary institutions, and 4) a fair State. For the SDGs to be effectively implemented, every person needs to be functional, the societies need to be benevolent, institutions need to liaise with the State and the society, and the State—the head of government—needs to be fair and trustworthy.

During the research, I learnt some important lessons, which I believe are crucial and can be a valuable contribution to the body of knowledge of sustainability science, the auditing profession, and the government of Indonesia.

Overall, I concluded that:

1) Governance for natural resource use is not about natural resource conservation *per se.* Rather, it is a process of optimizing trade-offs between the economic, environmental, and social aspects of sustainability, as well as making compromises between the international and the national agendas. Every country might have different priorities over the uses of natural resources in any given location and every governance actor will have a different agenda towards the uses of natural resources. Effective governance arrangements would allow trade-offs to be made that are acceptable to, or at least can be tolerated by, every governance actor from any international, national or sub-national jurisdiction.

2) Auditing can be a useful tool for assessing the effectiveness of landscape governance. Indonesia lacks an integrated database that would help all stakeholders to communicate and negotiate their agendas using unbiased facts. Currently available statistics are outdated, and other data sources can be inaccurate. Auditing procedures allow data verification, and even data production, through a standardized mechanism. With appropriate auditing, the lack of integrated data does not affect the assessment of governance effectiveness.

3) Indonesia needs to first understand and improve governance arrangements at both the national- and the landscape-scale, before uncritically adopting many international initiatives using a top-down approach. The top-down approach at the national-scale for determining public policies is still very much influenced by the past era of centralization. While it might have worked in the past due to the authoritarian leadership of that time, this approach is no longer suitable in the current democratic era. As a part of the global society, Indonesia is eager to participate in international initiatives, yet as a low to middle income country, Indonesia has put more emphasis on the economic aspect of sustainability. Hence, at a landscape-scale the priorities vary. Landscapes are naturally dynamic and inherently different from one another. In many of the locations I studied, certain issues such as environment, disaster resilience, access to education and social conflict resolution are considered more urgent than simply economic development. The failure to integrate the different priorities and the

dynamic interactions of stakeholders into a more accommodating governance structure has made the overall interaction and collaboration ineffective.

Academic contribution

Prior to this study, the governance of natural resources has been assessed using either qualitative (Janoušková et al., 2018) or quantitative (Alisjahbana et al., 2018) methods. Both approaches are valid but require extensive data to be obtained, either through measurements of statistical and quantitative data, or through surveys, questionnaires and focus group discussions (FGD).

This study proposed the use of performance auditing as an alternative mechanism for conducting assessments of the governance of natural resources. This does not appear to have been done before. I used performance auditing techniques to develop criteria and produce data. During an audit, four types of data can be used to generated evidence: documentary, testimonial, observational and analytical. Using standard auditing techniques for validation and verification, researchers can generate alternative data. These procedures were explained in **Chapter 1** and in the methods sections of **Chapters 3** and **6**. Performance auditing has long been used by Supreme Audit Institutions (SAIs) such as the Australian National Audit Office (ANAO) and the US Government Accountability Office (GAO) to assess the performance of public institutions in managing their programs and activities (GAO, 2018). This study has successfully experimented with performance auditing as a tool for assessing the effectiveness of the governance of natural resources by many actors in multiple sectors, within four different levels.

Practical applications

As this thesis was being finalized, certain government institutions in Indonesia were starting to assess the policy coherence of existing governance arrangements to help them mitigate conflicting policies that were revealed by the unpredicted emergency of the COVID-19 pandemic. I am optimistic that in the near future, the implications of this study will also be valuable for other institutions in Indonesia, assessing the effectiveness of their governance arrangements, despite the limited resources and lack of data. I am also confident that other Supreme Audit Institutions can benefit from using performance auditing for assessing the governance of natural resources on a regular basis to help their countries with achieving more sustainable use of natural resources.

Where to from here?

There are some opportunities for further research. Research on assessing the effectiveness of governance arrangements is rarely done comprehensively due to the massive scope of the national-scale and the lack of appropriate data. As this research has demonstrated, such an analysis is quite doable using auditing at a landscape-scale; it opens the possibility of using such techniques and mechanisms for other purposes.

Performance auditing is useful for assessing three aspects of attainment: effectiveness, efficiency, and economic performance. Here I have only managed to explore the *effectiveness* of governance. I did audit an aspect of efficiency during my analysis on the Kampar Peninsula, but I did not have the chance to explore further by auditing its economic performance. This limitation affects the applicability of my findings. Actual implementation needs further analysis of certain issues. An audit of economic performance would have assessed the available alternatives for implementing the findings and calculated the predicted costs of each alternative.

An illustration of the value of three alternative peat protection options was given in **Chapter 4** (Kampar Peninsula). I initially found that the most effective delineation for peat protection areas is at the mid-section of the Peninsula. After the efficiency audit, I further nominated three alternative delineations at the mid-section and performed some calculations on the number of hectares that would be required for possible land swaps, should decision makers wish to remap the peat protection areas.

If I had had the opportunity to conduct a further audit on economic performance, I would have assessed the available options to identify the least cost option for implementing the selected delineation from the efficiency audit. For example, land prices in Papua are cheaper, but the costs of security and land entitlement can be high. In contrast, security and land entitlement are not a threatening issue in Sumatra, but the land price is high. Such information would be most valuable for decision makers with budget limitations in mind.

I suggest that future research should include further assessments of the economic performance and the efficiency of governance arrangements, so that governance indeed offers the most appropriate arrangement for all stakeholders.

The assessment of the effectiveness of governance arrangements can also be beneficial for research in other fields, for example, disaster mitigation and global pandemics. Many policies have been issued by many ministries simultaneously during the current COVID-19 pandemic. While extraordinary policies are necessary in extraordinary times, an assessment of the coherence of these policies from multi-sectoral ministries, at several different levels is

equally necessary for more successful implementation in the future. Governance auditing of the effectiveness of such policies would help decision makers align their policies for more effective implementation.

Assessing governance effectiveness is also potentially useful for conducting prospective auditing. This form of auditing is often used in, for example, medical research to predict the impact of certain new treatments on the metabolic systems of patients (Alam et al., 2014). Current natural resource audit practices, however, are retrospective, in which the compliance of an entity on implementing certain pre-established criteria is assessed. This retrospective auditing practice, while providing valuable information for future reference, does not prevent the entity from making ill-informed decisions. For a public sector audit entity, such a lack can be damaging and can cause severe material and social or spiritual adversity. The usefulness of prospective auditing (Gupta, 2009) should be investigated to provide predictions on the impacts on stakeholders, of the design of future policies before they are implemented.

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Appendix A. Governance actors in Sendang

Actors	Local (District and/or Province)	National	International
Constitutional	Governor or Bupati (Head of Districts)	President	UK Climate Change Unit (UKCCU)
	Local Senates (DPRD)	House of Representatives (DPR)	Norway International Climate and Forest Initiative (NICFI)
	Local Spatial Planning and Development Agency (BAPPEDA)	National Planning and Development Agency (BAPPENAS)	
	Department of Agriculture Province or districts	Ministry of Agriculture (Minist of Agri)	
	Local Environmental Impact Control Agency (BAPEDALDA)	Ministry of Environmental Impact Control (BAPEDAL)	
	Department of Mining	Ministry of Mining & Energy	
	Department of Forestry District or Province	Ministry of Environmental & Forestry	
	Department of Investments	Ministry of Investments	
	Head of Land Office at Provincial Level	Land Office Agency (BPN)	
	KPH Production Lalan	Sembilang National Park & Dangku Wildlife Reserve	
	Local Natural Resource Conservation Office (BKSDA Sumsel)	National Natural Resources Conservation Agency (BKSDA)	
	None (just a unit under BAPPEDA)	National Geospatial Agency (BIG)	

Operational	Bayu kahuripan Indonesia Panca Tirta Budi Agung Surya Cipta Kahuripan	MAKIN group / Gudang Garam Mega hijau Bersama Mentari Subur Abadi Lonsum/Salim Ivomas Pinangwitmas sejati Lonsum (Salim Ivomas Pratama) MAKIN group / Gudang Garam Swadaya Bakti Negara Mas	Conoco Phillips Wilmar International SMART (Sinar Mas International)
Operational	Tungkal Ulu Customary People Forest Villagers Small holder forester Community forester	None	None
Collaborative	Rambang Dangku Bersatu	AMAN Belantara Foundation	Zoological Society of London (ZSL) Deltares Japan International Cooperation Agency (JICA) German Society for International Cooperation (GIZ) The Sustainable Trade Initiatives (IDH) Wetland International SNV (Netherland Development Organisation)

Appendix B. List of multi-sector regulations in Indonesia

Institution	Regulation	Topic
Presidential Decree	Perpres 7/2015	Ministries Organisations
	Perpres No 17/2015	National Land Agency (BPN)
	Perpres No 16/2015	Ministry of Environmental Forestry
	Perpres No 45/2015	Ministry of Agriculture
	Perpres No 68/2015	Ministry of Mining Energy
	Perpres No 94/2011	National Agency of Geospatial Information (BIG)
	Perpres 66 /2015	National Agency of Planning and Development (Bappenas)
Mining Sector	UU 4 Thn 2009	Mining (Energy and Coal)
	PP23 Thn 2010	Mining Concession
	PP 24 Thn 2012	Mining Concession
	PP 1 Thn 2017	Mining Concession
Agriculture Sector	UU 18 thn 2004	Agriculture
	UU 39 Thn 2014	Agriculture
	UU 12/2009	Cultivation System Law
	Permentan 26 Thn 2007	Plantation Permits
	Permentan 98 Thn 2013	Plantation Permits
	Permentan 29 Thn 2016	Plantation Permits
	Permentan 14/2009	Peatland Utilisation
	Kepmentan 830/2016	The establishment of national agricultural development areas
Forestry Sector	UU 5 Thn 1967	Principles of Forestry
	UU 5/1990	Conservation Law
	UU 41 Thn 99	Forestry
	UU 32/2009	Environmental Protection
	PP No 27/1999	Assessment on Environmental Impact
	PP 34/2002	Forest Governance
	PP 44 Thn 2004	Forestry Planning
	PP 45/2004	Forest Protection
	PP 6 Th 2007/PP 3 Thn 2008	Forest Governance and Forest Management & Utilisation Planning
	PP 10 Thn 2010	Changing forest function
	Kepres 32/1990	Protected area management
	Kepmenhut 70/Kpts-II/95	Spatial Planning for HTI
	Permenhut no P.6/Menhut II/2009	KPH
	Permenhut no P.6/Menhut II/2010	Norms, standards, procedures, and Criteria of KPH
	Permenhut no P.49/Menhut II/2008	Hutan Desa
	Permenhut no P.37/Menhut II/2007	Hutan Kemasyarakatan
	Permenhut no P.3/Menhut II/2012	Hutan Tanaman Rakyat
	Permenhut P.50/Menhut-II/2010	Permits for Industrial Forest
	P.41/Menhut-II/2011	Standards for facilitating infrastructures for KPH Protection and KPH Production

Forestry Sector (cont.)	P.42/Menhut-II/2011	Standards for technical competency of KPH Protection and KPH Production
	P.54/Menhut-II/2011	Amendment of P.41/Menhut-II/2011
	Ministry of Internal Affairs Decree No61/2010	Organisational structure and job description of local KPH
	Kepmenhut 146/2003	Release of Forest
	PermenLHHut Nomor P.18/MenLHK-II/2015	Organisational structure and job description of Ministry of Environmental Forestry
	Ministry of Forestry Decree 6886/Kpts-II/2002	Standard and Procedures of Permits for Production Forest
	Permenhut P. 63/Menhut-II/2008	Governor recommendation for permit extension in natural and replanted forest
	Permenhut No 50/Menhut-II/2010	Procedures for Logging Permits in natural forest area
	Ministry of Forestry Decree no 3803tahun 2012	Establishment of Map for Production Forest Reserve
	Permenhut Nomor 1/2014	Delegation of authority on the administration of forestry-related matters to the governor
	Permenhut Nomor 3/2014	Technical guidance on the delegation of authority of the administration of forestry-related matters to the governor
	Permenhut Nomor 27/2014	Second amendment on Permenhut P.33 /2010 regarding the conversion of forest areas
	PermenKLH No P.8/2016	Organisational structure and job description of Operational Unit of Natural Resources Conservation
National Land Agency (BPN)	Law No5/1960	Agrarian Law
	Ministerial Regulation No 5/2015	Locaton Permit
	Ministerial Decree No 194/2018	Designated team for managing conflict of land associated with forest areas
	Ministerial Regulation No 8/2017	Guidance on substantive approval on the establishment of local regulation regarding provincial and regional spatial planning
	PP No 40/1996	Right to Exploit (HGU), Right to utilise buildings (HGB), and right to use Land (HPT)
Geospatial Agency (BIG)	Law 4/2011	Geospatial Information
	Ministerial Regulation 2/2012	Standards and procedures of the collection of geospatial data
	Ministerial Regulation 3/2012	Organisational structure of BIG
	Ministerial Regulation 9/2015	Open to public policy
Companies	UU No 40/2007	Company Law
	UU No 25/2007	Investment Law
	Ministerial Regulations No 79/2014	Procedures of Conflict Settlement for overlapping forest & land

(BAPPENAS)	UU 26 Thn 2007	Spatial Planning
	PP 26 /2008	National Spatial Planning
	Kepmen BAPPENAS 4/2016	Organisational structure of BAPPENAS
South Sumatera Province	Perda No 8 Thn 2008	Orgaisational Structure and Job Description of Departments
	Governor Regulation No 16/2017	Establishment of Green Growth Plan institution and ecoregion landscape governance partnership
	Governor Regulation No 18/2017	Network of local geospatial information South Sumatra province
	Perda No 16 Thn 2013	Organisational structure and job description of Forest Management Unit in Sumsel
	Governor Regulation No 48/2016	Organisational structure and job description of Department of Forestry in Sumsel
	Governor Regulation No 53/2016	Organisational structure and job description of Department of Agriculture in Sumsel
	Governor Regulation No 80/2016	Organisational structure and job description of Department of Landand Environment in Sumsel
Musi Banyuasin District	District Regulation No 8/2016	Regional Spatial Planning Musi Banyuasin 2016-2036
	District Regulation No 8/2016	Organisational structure and job description of local Department, Agencies, and Offices in Musi Banyuasin
	Bupati Regulation No 73/2016	Organisational structure and job description of Department of Agriculture in Musi Banyuasin
	Bupati Regulation No 63/2016	Organisational structure and job description of Department of Environment in Musi Banyuasin
	Bupati Regulation No 81/2016	Organisational structure and job description of Local Planning andDevelopment Agency (BAPPEDDA) in Musi Banyuasin
Banyuasin District	Bupati Regulation No 51/2017	Organisational structure and job description of administrator of Special Economic Zone Tanjung Api-api in Banyuasin
	District Regulation No 28/2012	Regional Spatial Planning Banyuasin 2012-2032
	District Regulation No 91/2017	Delegation of authority from Bupati to Administrator concerning permits, non permits, and investments in Tanjung Api-api

Legislation source: https://peraturan.bpk.go.id/

Appendix C. Acronyms or abbreviations used in Chapter 5, Figures 5 and 6.

Governor	The head of Sumsel Province
DoF Sumsel	Department of Forestry, Province of Sumsel
Bappeda MUBA	Department of Planning and Development, Districts of MUBA
Bappeda Sumsel	Department of Planning and Development, Province of Sumsel
BAPPENAS	National Planning and Development Agency, Republic of Indonesia
BKSDA	Natural Resources Conservation Bureau, Ministry of Environment Forestry
BPN (Land Agcy)	National Land Agency, Republic of Indonesia
Bupati	The head of MUBA districts
Comm. Forest	Areas for local community groups in partnership with the KPHs to utilize the timber and non-timber products
Comm. Plant Forest	Commercial plantations owned by small local timber companies or cooperatives
Cust Tungkal Ulu	Customary People of Tungkal Ulu, Districts of MUBA
Dangku WR	Dangku Wildlife Reserve, Ministry of Environment Forestry
District Plant Co	Plantation Companies with permits only for areas in MUBA districts
DoA MUBA	Department of Agriculture, Districts of MUBA
DoA Sumsel	Department of Agriculture, Province of Sumsel
DoM Sumsel	Department of Mining, Province of Sumsel
DPRD MUBA	The House of Representatives, Districts of MUBA
DPRD Sumsel	The House of Representative, Province of Sumsel
Env impact MUBA	Department of Environmental Impact, Districts of MUBA
Env. Impact Sumsel	Department of Environmental Impact, Province of Sumsel
Geospatial Agcy	Geospatial Agency Republic of Indonesia
House of Rep	The House of Representatives, Republic of Indonesia
Int Inv TAA	International Investor Tanjung Api-api
Int'l Govt Agcy	International Government Agencies
Int'l Mining Coy	International Mining Company—in this case, Conoco Phillips
Int'l NGO	International Non-Government Organization
KPHP Lalan	Production Forest Management Unit Lalan, Province of Sumsel
Land Agcy Sumsel	Local Land administrator within the Province of Sumsel
LandAgcy MUBA	Local Land administrator for areas within MUBA districts
Local Comm	Local Communities
Local NGO	Province /District Non-Government Organization
Local Plant Coy	Palm oil companies with permits for areas in a district or a province
Local Timber Coy	Timber companies with permits for areas in a district or a province
Minist Of Agri	Ministry of Agriculture, Republic of Indonesia
Minist Of Env.Imp	Ministry of Environmental Impact, Republic of Indonesia
Minist Of Invest	Ministry of Investment Republic of Indonesia
Minist. Mining	Ministry of Mining, Republic of Indonesia
Minist.Env Forest	Ministry of Environment Forestry, Republic of Indonesia
Nat'l NGO	National Non-Government Organization
Nat'l Plant Coy	Palm oil companies with permits for areas in more than one province
Nat'l Timber Coy	Timber companies with permits for areas located in more than one province
President	The President of Republic of Indonesia
Sembilang NF	Sembilang National Park, Ministry of Environment Forestry
Village Forest	Areas where local villagers can gain individual benefits from existing forests

Appendix D: Regulatory governance frameworks

Bappeda MUBA	District MUBA	Verifier for Spatial Designation for Permits (timber or plantation) located only in MUBA district
Bupati	District MUBA	Signatory for Plantation & Timber Permits located only in MUBA district
DoA MUBA	District MUBA	Signatory for Location Permits for Plantations located only in MUBA district
DPRD MUBA	District MUBA	Liaise with government from MUBA district and local communities
Env impact MUBA	District MUBA	Signatory for Environmental Impact Clearances for plantations located only in MUBA district
Land Agcy MUBA	District MUBA	Signatory for Right to Exploit for Plantations located only in MUBA district
BAPPENAS	National	Signatory for Spatial Designation for Permits (timber or plantation) located in more than one province
BKSDA	National	Report to the Minister of Environment & Forestry about the conservation of natural resources
BPN (Land Agcy)	National	Signatory for Land Right to Exploit for Plantations located in more than one province
Dangku WR	National	Liaise with governance actors relating to conservation of Dangku Wildlife Reserve
Geospatial Agcy	National	Verifier of area delineation for any permit
House of Rep	National	Co-signatory for Mining Concessions located in more than one province
Minist of Agri	National	Signatory for Plantation Concessions located in more than one province
Minist. of Env.Imp	National	Signatory for Environmental Impact Clearances for plantations located at two or more provinces
Minist. of Invest	National	Signatory for investments categorised as a national strategic program
Minist. of Mining	National	Verifier for Mining Concessions
Minist. Env Forest	National	Signatory for Timber Concessions located in more than one province
President	National	Signatory for Mining Licences
Sembilang NF	National	Liaise with governance actors relating to conservation of Sembilang National Park
Governor	Province	Signatory for Plantation & Timber Permits located in two or more districts
DoF Sumsel	Province	Verifier for Timber Permits located in two or more districts
Bappeda Sumsel	Province	Verifier for Spatial Designation for Permits (timber or plantation) located in two or more districts
DoA Sumsel	Province	Signatory for Location Permits for Plantations located in two or more districts
DoM Sumsel	Province	Verifier for Location Permits for Mining located in two or more districts
DPRD Sumsel	Province	Liaise with government from SUMSEL province and local communities
Env. Impact Sumsel	Province	Signatory for Environmental Impact Clearances for plantations located in two or more districts
KPHP Lalan	Province	Liaise with forestry-related actors within a province
Land Agcy Sumsel	Province	Signatory for Right to Exploit for plantations located at two or more districts