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Role of the Land-Based Private Sector in Low-Emission Development: An Indonesian Case

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Abstract: The land-based private sector is a critical player in reducing emissions in Indonesia. While the Indonesian Government has undertaken various national efforts to reduce the rate of deforestation and land degradation, the involvement of land-based private sectors are still minimal. Using content and thematic analysis, this study explores why land-based private sector is not leading to low carbon development in Indonesia. More specifically, this study aims to: (1) analyse two key policies critically shaping the land-based private sector's involvement in low emission development in Indonesia; (2) identify the land-based sector's practices to engage in the development of low carbon policies in the East Kalimantan Province in Indonesia; and (3) conduct a participants' perceptions analysis to identify the critical factors influencing their involvement in low emissions development. The results show that even though the Government has adopted several mandatory regulations to support the land-based private sector's participation in emission reduction activities, to date, only a handful of businesses are actively involved in emission reduction efforts. The key barrier identified is the lack of incentives for the businesses to implement low emission programs/activities. This study offers four specific policy recommendations that could support land-based private sector involvement in low emission development in Indonesia. These include (1) establishment of an independent monitoring agency; (2) incentives for ecologically sustainable companies that meet predetermined standard criteria; (3) strict and fair sanctions as disincentives for companies that ignore regulations, and (4) building capacity of the land-based private sector to adopt and develop innovative low emission practices.

Keywords: land-based private sector; emission reduction; policy; low emission development; Indonesia

1. Introduction

Indonesia is a major contributor to global greenhouse gases (GHG) emissions [1]. According to Jupesta et al. [2], the primary emissions in Indonesia come from forest and peatland fires and deforestation. The Indonesian Ministry of Environment and Forestry [3] data show that agriculture, forestry, and land-use change represent approximately 60% of Indonesia's annual emissions. The Government of Indonesia (GoI) has committed to unconditionally reducing 29% and conditionally (with international support) up to 41% of its emissions of greenhouse gases compared to business as usual (BAU) or without the intervention of mitigation actions by 2030 [4]. However, the country is unlikely to meet its targets without effectively reducing deforestation and forest degradation [5].

Successful implementation of emission reduction from deforestation and forest degradation involves various actors at both local and national levels [6]. Although the private sector is one of the three major pillars in low emissions development besides governments and communities [7], initiatives and endorsements in Indonesia are usually from government, non-governmental organisations, and international organisations. There is a lack of private sector's involvement in planning and implementing low emissions development

despite their operational production processes directly impacting deforestation and forest degradation in Indonesia. As a result, the roles of private sector in the reduction in emissions in Indonesia were not well defined and had not been distinctly mentioned [8].

Since the Paris Agreement in the 21st Conference of the Parties (COP) in 2015, the role of private sector in low carbon emissions development has started to get recognised in international policies [9]. Tacconi and Muttaqin [9] revealed that as the private sector is a strategic actor in economic development, it is necessary to consider the private sector's contribution to the national reduction in emissions to undertake concrete actions underpinning development, resulting in lower emissions. Similarly, Nie et al. [10] mentioned that environmental regulation and innovation in the private sector can help improve underdeveloped areas. Hence, it is crucial to involve the private sector in reducing emissions as industrial practices have a significant role in climate change mitigation [7] while contributing to the economic development in Indonesia [11]. However, to the best of our knowledge, this issue has not been explored thoroughly for Indonesia.

This study contributes to this knowledge gap by examining why private sectors (forestry, mining, and palm oil corporations) are not substantially contributing to low emissions development at Indonesia's sub-national level. There are three broad objectives of the paper: (1) critically examine two fundamental existing policies of Indonesia's emissions reduction target to understand the scope for the land-based private sector involvement in low emission development; (2) identify to what extent the land-based private sector practices have actively engaged in low emission development at a specific sub-national level of Indonesia; and (3) conduct a participants' perceptions analysis to identify critical factors influencing private sector involvement.

2. Literature Review

2.1. The Concepts of Development: Economic, Sustainability, and Green Development

Three fundamental development concepts emerge in the context of development. They cover economic, sustainability, and green development. Economic development is a process to obtain better living conditions and an escape from social and economic problems, such as poverty [7]. This statement supports Solow [12] who argues that innovation in the long run directly impacts economic growth. This Solow assertion is also supported by diverse types of research [13–15]. However, the importance of environmental preservation or sustainable development is ignored in this term [7]. As Chen and Taylor [16] mentioned, nations in the early stages of development and performing high economic growth rates are frequently associated with environmental degradation. The increasing use of innovations and technologies often has negative impacts and becomes a significant concern in environmental degradation [17].

Unlike economic development, sustainable development refers to any form of economic growth that does not harm the environment [18]. Based on this concept, many researchers seek to highlight how innovation could minimise environmental impacts contributing to climate change [17], and how it plays a key role in the sustainable development for all levels of communities [19,20]. In addition, governments in different countries have developed programs to underpin the development of climate change mitigation and technologies [21,22]. The meaning of this development arose in response to challenges, threats, and negative trends in the global economy. Its concept encompasses three principal dimensions of prosperity, economic, environmental, and social, which need to be synergised [23]. Hu [7] argues that this development could meet the needs of the present but neglect future generations' ability to meet their own needs. The development should not leave behind degraded ecosystem assets but leave them in good condition for forthcoming generations. Thus, sustainable development does not contemplate the concept of leaving enhanced environmental assets for the coming generations. The primary goal of sustainable development is to eradicate poverty and subsequent inequalities in all forms [24].

On the other hand, a green economy is a new form of development that uses an integrated approach toward economics, society, and ecology. This development constitutes a

profound criticism of the traditional development of sustainable development. By adopting green growth, developing countries may find a new way to achieve green innovation and avoid repeating the mistakes of the conventional forms of development [7]. Conceptually, the green economy has a broader focus to grapple with global warming, climate change, and sea-level rise. However, it is frequently translated into the narrower conceptualisation of low carbon emission development [25]. As Gibbs and O'neil [26] asserted, a significant component of the green economy involves low carbon initiatives and low carbon economy development using technology, innovation, and progress to overcome environmental problems. Many countries recently recognised close linkages between the prospects for sustainable economic growth and the need to transition to low-emission development.

2.2. The Importance of the Land-Based Private Sector Roles in Reducing Emissions in Indonesia

There have been significant endeavours to bring down carbon emissions at the global level over the past two decades. Since 1995, to reach parties' collective agreement grappling with climate change, the United Nations Framework Convention on Climate Change (UNFCCC) has an annual agenda to meet all parties at the COP. Several milestones were attained during the COP. In 2009 at COP 15 in Copenhagen, Denmark, Indonesia officially declared its commitment voluntarily to reducing emission, targeting around 26% compared to BAU by 2020 [4]. The commitment was internalised in some national policies, such as national action plans of greenhouse gasses (RAN GRK, in Indonesia acronym). In 2015, in the 21st COP held in Paris, resulting in the Paris Agreement, the Government of Indonesia committed to reducing GHG 29% unconditionally and 41% conditionally (with international supports) against a BAU scenario by 2030. The target mentioned in the Nationally Determined Contribution (NDC) was submitted to the UNFCCC in 2016 [9]. The Paris Agreement was the moment where the role of the private sector was raised for the first time at the international climate meeting to be actively involved in reducing emissions.

A large body of literature examines the role of engagement of the private sector in low emissions development. Lee, Min, and Yook [27] stated that the company's efforts to comply with international agreements within the UNFCCC are not limited to corporate performance, while consistent law enforcement to the private sector is an essential instrument of low-carbon development. Yang, Zhang, Jiang, and Sun [28] analysed how corporations in developing countries respond to green management's needs and measure corporate benefit upon adopting green management practices. The result explains that the corporates in developing countries could combine internal strategies and the external institution supports implementing low carbon development, leading to increased legitimation and competitiveness. Lee [29] previously researched exploring and investigating the processes of green management adoption at small and medium enterprises in the manufacturing industry. The study revealed that enterprises could adopt low carbon management by changing their strategy. Lee [29] also explained that for greener management, the factors of organisation structure, innovation capability, human resources, cost efficiency, and competitive advantages could influence institutional changes. Cadman et al. [30] examine how fiscal instruments can encourage private sector involvement in reducing emissions from deforestation and benefit smallholders. This study also identifies issues that affect the ability of the private to perform emission reduction-related activities. A similar fiscal instrument study was conducted by Dulal et al. [11]. The study states that the adoption and use of fiscal instruments are widely practised in Asian countries but are running very slowly and scaling less to facilitate the transition toward a green economy.

For Indonesia's case, the research suggests that the role of the private sector has remained crucial in reducing emissions. For example, Tacconi and Muttaqin [9] revealed that since the private sector is a strategic actor in economic development, considering the private sector to contribute to the national reduction in emissions is necessary to catalyse concrete actions underpinning development which results in fewer emissions. Similarly, Dulal et al. [11] stated that it is essential to involve the private sector since industrial practices result in enormous economic development progress. Its practices frequently

harm environmental sustainability due to the excessive consumption of natural resources. It brings a significant challenge during the transition era toward green development civilisation, whether economic development would deal with environmental issues such as climate change and ecological degradation.

In summary, scholars have discussed the relationship between low emission development and the role of the private sector from the perspective of environment and economic development. However, for the Indonesian context, since deforestation and land degradation contribute to the major emitter of GHG, the role of the land-based private sector becomes a vital area to research. There are three areas where this research can focus. First, it is crucial to evaluate the regulatory frameworks or policies the Government of Indonesia undertakes at the national and sub-national level and what policies the Government needs to support and guide in the low emissions development processes. Second, it is necessary to assess the existing land-based private sector activities in succeeding the implementation of low emissions development in Indonesia. Third, while the Government of Indonesia has committed to reducing emissions, the involvement of the land-based private sector is still lacking. This highlights the need to assess the point of view of stakeholders, including the land-based private sector on the low emission development perspective.

3. Research Methods

3.1. Research Logical Framework

A case study research approach from the qualitative perspective was used in this study. The case focused on the land-based private sectors, including forestry, mining, and palm oil corporations in the East Kalimantan Province of Indonesia. This province was selected as the research site for two reasons. First, at the sub-national level, many land-based businesses exist in this province, allegedly one of Indonesia's significant causes of deforestation [31]. Second, the GoI selected this province as a sub-national pilot project to reduce deforestation and forest degradation in Indonesia. Furthermore, in 2010, The Provincial Government of East Kalimantan declared the Green Kaltim Program actively to support Indonesia's emission reduction target and contribute to global climate change. The logical framework of this research presents in Figure 1.

3.2. Data Collection and Selecting the Sample

Data were collected by employing two techniques: open-ended qualitative questionnaires and a review of relevant documents. A total of forty respondents representing four different groups participated in this research. These included (1) the central Government, (2) the local Government of the East Kalimantan Province, (3) climate change practitioners, and (4) the land-based private sectors. The data collection was administered using online tools in a single stage for two weeks from 10 May to 25 May 2021. The participants also responded to demographic questions and provided their consent to use their responses in this research. According to Eisenhardt [32], using questionnaires for collecting data has several advantages. They are: (1) easier to get responses from a significant number of people, which could generate more generalisable findings, (2) helpful to provide meaningful data about the topic, and (3) allows the researchers to investigate emergent themes or to take advantage of opportunities which might be present in each situation [32]. As the study used human subjects, it was necessary to ensure that ethics approval was received before the commencement of the field study. Accordingly, written approval was obtained through Griffith University's Human Research Ethics Committee.
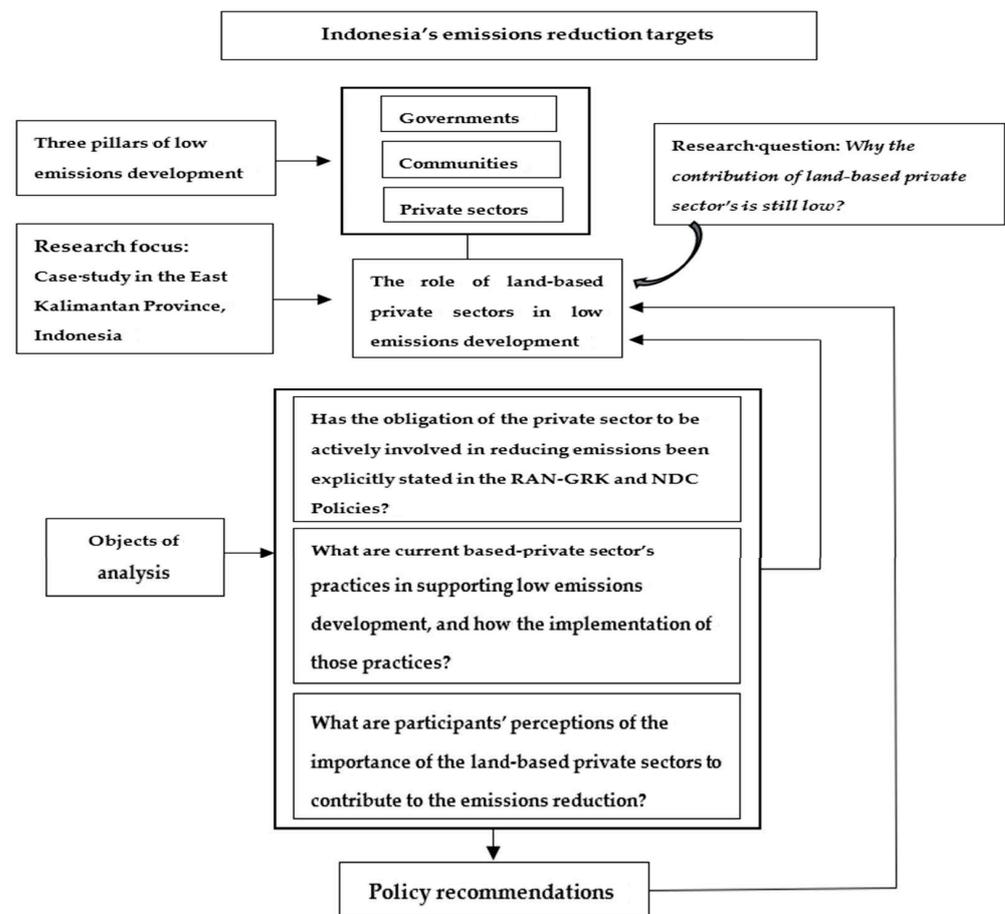
Figure 1. Research logical framework.

Purposive sampling processes were employed to produce the most valuable data in this research. Qualitative researchers, in most cases, purposively select a group of subjects to interview who are relevant to the research question(s) [33]. In a purposive sample, typicality, variety, accessibility, and learning opportunity are essential selection factors [34]. According to Etikan [35], purposive sampling does not need a set number of respondents; instead, the researchers can decide what needs to be known and find participants who are willing to provide information, knowledge, or experience [35,36]. This technique is the most effective when a researcher needs to study a specific aspect of a problem with relevant experts [36]. At the first stage, a few key individuals are selected based on select criteria [37]. At the second stage, the key chosen participants are contacted by other relevant individuals and experts. As Bah, Diallo, Demb, and Paulsen [38] stated, identifying other key participants can be conducted by asking help from the key informants or using snowball sampling (asking an informant to suggest another informant) [39]. All selected key participants are those who have lived experience related to the topic under investigation.

3.3. Profile of the Key Participants

Four key groups of participants were involved in this research (Table 1). The first group is the Central Government (CG) of Indonesia. This group includes the Indonesian Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*), which covers several important and relevant positions within the Environmental Fund Management Agency (*Badan Pengelola Dana Lingkungan Hidup atau BPDLH*), and the Ministry of Finance of the Republic of Indonesia (*Kementerian Keuangan Republik Indonesia*). The second group is the local government of the East Kalimantan Province that consists of Forestry Services (*Dinas Kehutanan*), Environmental Services (*Dinas Lingkungan Hidup*),

Development Planning Agency at the Sub-National Level (*Badan Perencanaan Pembangunan Daerah atau Bappeda*), Plantation Services (*Dinas Perkebunan*), and Energy and Mineral Resources Services (*Dinas Energi dan Sumber Daya Mineral*). The third group is climate change practitioners. This group consists of several Non-Governmental Organisations (NGOs) actively involved in reducing emissions targets in Indonesia. They are the Climate Change Council of East Kalimantan (*Dewan Daerah Perubahan Iklim or DDPI Provinsi Kalimantan Timur*), Conservation International (CI) Indonesia, The Nature Conservancy (*Yayasan Konservasi Alam Nusantara or YKAN*), and GIZ Forest and Climate Change (*GIZ Forclime*). The last group is participants from the land-based private sectors that consist of mining, forestry, and palm oil corporations.

Table 1. Participants' information.

Participant's Code	Gender	Organisation
		Group 1: The Central Government (CG) of Indonesia
CG-1	Female	The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*)
CG-2	Male	The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*)
CG-3	Male	The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*)
CG-4	Female	Environmental Fund Management Agency (*Badan Pengelola Dana Lingkungan Hidup*)
CG-5	Male	The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*)
CG-6	Female	The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*)
CG-7	Male	The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*)
CG-8	Male	Ministry of Finance of the Republic of Indonesia (*Kementerian Keuangan Republik Indonesia*)
		Group 2: The Local Government (LG) of East Kalimantan Province participants
LG-1	Male	Forestry Services (*Dinas Kehutanan*)
LG-2	Male	Environmental Services (*Dinas Lingkungan Hidup*)
LG-3	Male	Development Planning Agency at Sub-National Level (*Bappeda Kalimantan Timur*)
LG-4	Male	Environmental Services (*Dinas Lingkungan Hidup*)
LG-5	Male	Plantation Services (Dinas Perkebunan)
LG-6	Male	Environmental Services (*Dinas Lingkungan Hidup*)
LG-7	Male	Energy and Mineral Resources Services (*Dinas Energi dan Sumber Daya Mineral*)
		Group 3: Climate Change Practitioner (CCP) Participants
CCP-1	Male	GIZ Forclime
CCP-2	Male	Climate Change Council of East Kalimantan (*Dewan Daerah Perubahan Iklim Provinsi Kalimantan Timur*)
CCP-3	Male	The Nature Conservancy (*YKAN*)
CCP-4	Male	GIZ Forclime
CCP-5	Male	The Nature Conservancy (*YKAN*)
CCP-6	Male	Conservation International—Indonesia
CCP-7	Male	The Nature Conservancy (*YKAN*)
		Group 4: The Private Sector (PS) participants
PS-1	Male	Coal Mining PKP2B
PS-2	Male	REA Kaltim Plantations & Group
PS-3	Female	PT. SLJ Global TBK
PS-4	Male	Asia Pulp and Paper Sinar Mas
PS-5	Male	PT. Gunung Gajah Abadi
PS-6	Male	PT. Astra Agro Lestari
PS-7	Male	PT. Karawang Ekawana Nugraha
PS-8	Male	PT. Chevron Pacific Indonesia
PS-9	Male	PT. REKI-Hutan Harapan

Source: Authors' compilation.

3.4. Method of Analysis

This study used content analysis to analyse all relevant documents. Questionnaire-based qualitative data were tabulated using Microsoft Excel and then analysed using thematic analysis. Thematic analysis is an approach for systematically identifying, organising, and offering insight into patterns of meaning across a data set or the examination of one aspect of a phenomenon in depth [40]. This analysis method is appropriate for this study since it allows the researcher to sight or share meanings and experiences.

This research used the six-phase approach to thematic analysis based on Braun and Clarke [40]. The first step is familiarising with the data. In this activity, the collected data were identified as to whether the data set's content was relevant to the research questions. The second step involves generating initial codes by providing a label for a feature of the data potentially relevant to the research questions. The third step is searching for themes. In this step, the coded data were reviewed to identify similarities and overlaps between codes to reflect and describe a coherent and meaningful pattern in the data. The next step is reviewing potential themes, including reviewing whether it is a theme or just a code, e.g., does it tell something useful about the data set and the research questions? What are the boundaries of this theme (what does it include and exclude), and are there enough meaningful data to support this theme? Do the data lack coherence? Before producing the report, the last step is defining and naming themes by defining a clear focus, scope, and purpose to provide a coherent overall story about the data.

4. Results

This results section is divided into three parts. In the first sub-section, the existing policy supports in encouraging the land-based private sectors' involvement in low emissions development were analysed. Current land-based private sectors' practices in the East Kalimantan Province in supporting low emissions development programs are presented in the second sub-section. Finally, the last sub-section highlights the key participants' perceptions of why the land-based private sectors are crucial to contributing to Indonesia's emissions reduction.

4.1. Existing Policy Support in Encouraging the Land-Based Private Sectors' Involvement in Low Emissions Development

Indonesia has two fundamental policies related to the national emission reduction target. The first is National Action Plans of greenhouse gasses (hereafter, RAN-GRK based on the Indonesian acronym), ratified in the Kyoto Protocol in 2004. The second is Nationally Determined Contribution (NDC), ratified in the Paris Agreement in 2016. These two policies provide fundamental guidance regarding Indonesia's emissions reduction. The policies were critically analysed to understand whether they have comprehensively regulated the involvement of the private sector and explicitly or implicitly accommodated the land-based private sector involvement to achieve Indonesia's emissions reduction target.

RAN-GRK sets the mitigation targets based on Presidential Regulation No. 61 of 2011 on the RAN-GRK [41]. According to this policy, Indonesia committed to reducing emissions by 26% unconditionally or 41% conditionally (with international support) by 2020 compared to BaU (BaU is equal to 2.95 GtCO2e). The basis for these targets was Indonesia's Second National Communication to the UNFCCC, which mentioned that Indonesia emitted between 1.2 and 2.6 GtCO2e between 2000 and 2005 (average of 1.67 GtCO2e per year) and projected emissions to 2020 of 2.95 GtCO2e [41]. In the RAN-GRK, five key sectors become the focus of RAN-GRK, namely forestry and peatlands, waste, agriculture, industry, and energy and transportation. The most prominent emission targets are the responsibility of the forestry and peatland sectors since deforestation, and forest degradation is alleged to be the primary sources of emissions in Indonesia.

NDC sets a longer time frame. The transition to a low-emissions future after 2020 was set out in NDC as the GoI's commitment to the Paris Agreement. In this policy, Indonesia's emission reduction target is unconditionally 29% (834 MtCO2e) and 41% (1081 Mton CO2e)

conditionally by 2030 compared to the BAU (2869 MtCO2e) scenario. The priority sectors in the NDC are still the same as those in the RAN-GRK. The difference is that in the NDC, the GHG reduction from the energy and transportation sector gets more attention than RAN-GRK. A summary of GHG emissions reduction targets in the RAN GRK and NDC is provided in Table 2.

Table 2. GHG emissions reduction targets in the RAN-GRK and NDC by sector.

Sector	GHG Emission Reduction Targets							
	RAN-GRK				NDC			
	Target 26%		Target 41%		Target 29%		Target 41%	
	Juta ton CO2e	% of BaU	Juta ton CO2e	% of BaU	Juta ton CO2e	% of BaU	Juta ton CO2e	% of BaU
Forestry and peatland	672	22.78	1039	35.83	497	17.2	650	23.00
Waste	48	1.63	78	2.69	11	0.38	26	1.00
Energy and transportation	38	1.29	56	1.93	314	11.00	398	14.00
Agriculture	8	0.27	11	0.38	9	0.32	4	0.13
Industry	1	0.03	5	0.17	2.75	0.10	3.25	0.11
Total	767	26.00	1189	41.00	834	29.00	1.081	38.00

Source: The Ministry of Environment and Forestry [3].

However, these two policies have different scopes for land-based private sector involvement. Therefore, we first present the results of our analysis for RAN-GRK followed by NDC.

4.1.1. RAN-GRK

In Tables 3 and 4, the action plans outlined in the RAN-GRK for two groups, the forestry and peatland category and industry category, are presented. The last column in these tables shows if there is scope for private sector involvement by individual actions.

Table 3. RAN-GRK actions to reduce emissions in the forestry and peatland category.

No	Action	Objective	Indication of Emissions Reduction Targets (Million Tonne of CO2e)	Responsible Institution	The Land-Based Private Sector Involvement in Reducing Emissions (Yes or No)
1	Establishment of Forest Management Units (FMUs)	Develop 120 Forest Management Units	31.15	Ministry of Forestry	No
2	Planning for forest area utilisation and business improvement	- Licence new forestry business for the utilisation of timber forest product on the logged-over area of 2.5 million ha - Improve in non-timber forest products/environmental services	22.94 1.38	Ministry of Forestry	No (it does not specify how the licenced forestry industry contributes to reducing emissions)
3	Development of the utilisation of environmental services	Implement two demonstration activities of emissions reduction from deforestation and forest degradation in conservation areas	3.67	Ministry of Forestry	No
4	Inauguration of forest areas	Establish 25,000 km of the forest area boundary	123.41	Ministry of Forestry	No
5	Improvement, rehabilitation, operation, and maintenance of marsh reclamation network (including peatland)	- Improve marsh reclamation network of 10,000 ha - Rehabilitate marsh reclamation of 450,000 ha - Operate and maintain marsh reclamation network of 1.2 million ha	5.23	Ministry of Public Works	No

Table 3. *Cont.*

No	Action	Objective	Indication of Emissions Reduction Targets (Million Tonne of CO2e)	Responsible Institution	The Land-Based Private Sector Involvement in Reducing Emissions (Yes or No)
6	Management of peatland for sustainable agriculture	Research and development of land resources of 325,000 ha for agricultural land management development	103.98	Ministry of Agriculture	No
7	Development of agricultural land management in abandoned and degraded peatland areas to support plantation, livestock, and horticulture subsectors	Rehabilitate and revitalise abandoned and degraded peatland in farming areas and optimise the use of non-food croplands of 250,000 ha	100.75	Ministry of Agriculture	No
8	Implementation of a forest and land rehabilitation and forest reclamation in the prioritised watersheds	- Rehabilitate 500,000 ha of forest in the prioritised watershed	18.35	Ministry of Forestry	No
		- Rehabilitate critical areas of 1,954,000 ha in the prioritised watershed	71.71		
		- Plant 6000 ha of city forest	0.22		
		- Rehabilitate 40,000 ha of mangrove/coastal forest	1.47		
9	Development of social forestry	- Facilitate designation of Community/Village Forests management area of 2,500,000 ha	91.75	Ministry of Forestry	No
		- Facilitate setting up of business partnership in 250,000 ha of people's forest	9.18		
10	Forest fire control	Decrease number of hotspots in Kalimantan, Sumatera, and Sulawesi islands by 20% on average from 2005 to 2009, with the level of success of 67.20%	21.77	Ministry of Forestry	No
11	Forest investigation and protection	The handle of new cases of forest criminal actions (illegal logging, illegal mining, and fires); at least 75% are settled	2.3	Ministry of Forestry	No
12	Development of conservation and essential ecosystem areas and management of protected forests	- Improve management of essential ecosystem as life support by 10%	41.5	Ministry of Forestry	No
		- Control conservation and protected forest clearing in 12 prioritised provinces	49.77		
13	Enhancement of plantation forest activities	Reserve industrial plantation forest and people's plantation forest areas of 3 million ha	110.1	Ministry of Forestry	No

Source: Presidential Regulation No.61 of 2011 analysed [41].

Table 3 indicates that the RAN-GRK outlined thirteen actions to achieve emissions reduction targets in the forestry and peatland category. The outlined actions constitute policies that have specific goals and emissions reduction targets in each objective. However, none of these actions specifies/requires the involvement of the land-based private sector. The effectiveness of several actions to reduce emissions in this category of RAN-GRK policy was also assessed by Meehan et al. [5]. They found that Indonesia's ability to meet its international commitments depends on its capacity to reduce emissions from forests and peatland; however, there was limited evidence of whether the actions for forestry and peatland considered under this policy did reduce emissions.

Table 4. RAN-GRK actions to reduce emissions in the industry category.

No	Action	Objective	Indication of Emissions Reduction Targets (MTCO2e)	Explanation	The Land-Based Private Sector Involvement in Reducing Emissions (Yes or No)
1	Application of technological modifications	Compiled guidelines for the use of biomass and other technologies in the cement industry as a blended cement	2.75	This action is only intended for nine cement industries	No
2	Energy conservation and audits	The establishment of an energy management system in 9 cement, 35 steel, 15 pulp and paper companies	2.06	15 pulp and paper businesses have been involved	Yes (but limited only for some forestry companies)
3	Ozone-depleting substances removal	Removal of ozone-depleting substances in 4 sectors (refrigerant, foam, chiller, and fire extinguisher)	1.50		No

Source: Presidential Regulation No.61 of 2011 analysed [41].

The RAN-GRK also provided three actions for the industry category under the Ministry of Industry responsibility. It can be seen that the forestry industry was involved at a limited scale. Only 15 pulp and paper companies undertook the specified action. The mining and oil palm industries were not involved at all (see Table 4).

4.1.2. NDC

Compared to RAN-GRK, NDC is much more encouraging towards private sector involvement. Table 5 presents the key actions identified in the NDC for different sectors including an assessment of the potential of land-based private sector involvement.

The NDC states that reducing emissions in the land-use sector will be carried out by involving the active participation of the private sectors. However, as can be seen from Table 5, the involvement of the land-based private companies in this policy is only focused on the forestry and peatland sector and only slightly involved in the waste sector. This policy also has not explicitly stated how the land-based private sectors could be actively involved. It indicates that supporting policies are needed that can directly regulate the land-based entrepreneurs to be more actively involved.

4.2. Current Land-Based Private Sectors' Practices in East Kalimantan Province in Supporting Low Emissions Development Program

Following a review of two important national policies, in this sub-section, we examine several land-based private sectors' practices that are currently practised supporting low emission development in the East Kalimantan Province. In the East Kalimantan Province, the land-based private industry includes 100 forestry companies covering 5,446,325 ha forest area, 358 big palm oil companies with 1,192,342 ha area, and 1404 mining companies with 5,227,136 ha area [42]. Based on East Kalimantan Provincial Government (2018) data, the total emissions of the East Kalimantan Province are 43.9 MtCOe, of which 57% comes from land-use change and forestry. This province will receive incentives from the World Bank of USD 110 million if the East Kalimantan Provincial Government succeeds in reducing carbon equivalent to 22 MtCO2e as stated in the Letter of Intent (LOI) signed in 2017. Thus, besides the local government, the involvement of the land-based private sector is a crucial factor in achieving the low carbon development target in East Kalimantan.

Table 5. Mitigation actions to achieve NDC targets.

Sector	Action	Explanation	The Land-Based Private Sector Involvement (Yes or No)
Forestry and Peatland	Reducing deforestation that consists of planned and unplanned deforestation - Improving the application of principles of sustainable forest management, both at natural forest and plantation - Rehabilitation of 12 million ha of degraded land - Restoration of 2 million ha of peat in 2030 - Peat fire control	In this category, the land-based private sector could be involved through targeted activities: - Avoiding deforestation inside and outside concession areas (146.60 MtCO2e) - Sustainable production forest management (e.g., reduced impact logging and timber legality verification system) (38.98 MtCO2e) - Land rehabilitation and reducing peat fire through rewetting and revegetating degraded peatland (234.47 MtCO2e) - Deforestation inside and outside concession areas (146.60 MtCO2e)	Yes (The land-based private sector could be involved)
Industry	- The cement industry carries out mitigation actions by reducing the "clinker to cement ratio" (blended cement) - Increased efficiency of the ammonia industry through optimising of natural gas utilisation and CO_2 recovery on the primary reformer - Other mitigation actions include improvement processes on smelters and scrap metal utilisation in the iron and steel industry.	In this category, the actions of reducing emission targets are only intended for the cement, ammonia, iron, and steel industry.	No (The land-based private sector is not involved)
Waste	- Solid waste management - Industrial liquid waste management - Domestic liquid waste management - Improving landfill gas application recovery - An increasing percentage of waste utilisation through composting and 3R (paper) - An increasing percentage of Refuse Derived Fuel	In this category, the land-based private sector could be involved in solid and liquid waste management and 3R processes in the paper industry	Yes (The land-based private sector could be involved)
Agriculture	- Use of low emission varieties in paddy fields - Application of more save water irrigation systems for rice fields - Livestock waste utilisation for biogas - Improving livestock	In this category, reducing emission targets is only intended for improving rice fields and livestock.	No (The land-based private sector is not involved)

Source: The First NDC Republic of Indonesia analysed.

Based on secondary data, this study found that several prominent land-based companies in the East Kalimantan Province already implemented ecological principles in their company activities. Several practices which are used as the legal basis of the private sectors' emission reduction activities are presented in Table 6 and described below.

4.2.1. Timber Legality Verification System (SVLK)

The Timber Legality Verification Systems, known as SVLK, is a system assuring the sustainable management of forest and timber legality through Sustainability Forest Management and timber legality certification [43]. This system constitutes a tracking system design to ensure the legitimacy of Indonesian timber sources circulating and trading. SVLK is applied as mandatory for all forest management units, state and private forests, and all types of wood processing and collection industries. This system aims to eradicate illegal logging, improve domestic forest governance [44], and enhance the competitiveness of Indonesian timber products. The benefits of implementing the SVLK include

building a positive image of Indonesia in the international world and expanding market share to countries that require assurance of the legality of imported wood. According to Hasyim et al. [45], SVLK fits with global trade-governance regimes, including the Forest Law Enforcement, Governance and Trade (FLEGT) initiative of the European Union (EU). The GoI participated in the FLEGT Voluntary Partnership Agreement (VPA) and became the first country in the world to issue a FLEGT license, which provides the country's timber products with green-lane access to European markets [46]. This implementation of SVLK as one of the tools of sustainable forest management is expected to reduce emissions from logging activities.

Table 6. The private sectors' emission reduction activities in East Kalimantan based on policy instruments.

Practices	Legal Basis	The Percentage of Companies' Involvement
Timber Legality Verification System (hereafter, SVLK based on Indonesian acronym)	- The Ministry of Forestry Regulation No. P.38/Menhut-II/2009 - The Ministry of Environment and Forestry Regulation No. P.21/2020 - The Decree of the Director-General of Sustainable Production Forest Management No. SK.62/PHPL/2020	40% of the Forestry industries
Reduced-Impact Logging (RIL)	- The Directorate General of Sustainable Production Forest Management Regulation No. 274/VI-PHA/2001 - The Directorate General of Sustainable Production Forest Management Regulation No. P.9/PHPL/2018	14% of Forestry industries
High Conservation Value (HCV)	- The Ministry of Environment and Forestry Regulation No. P.12/2015 - The Directorate General of Sustainable Production Forest Management Regulation No. P.14/2016 - The Directorate General of Natural Resources and Ecosystem Conservation Regulation No. P.5/2017	3% of Palm Oil industries Data are not available for forestry industries
Indonesian Standard for Sustainable Palm Oil (ISPO)	- The Ministry of Agriculture No. 11/2015 - Presidential Regulation No. 44/2020 - The Ministry of Agriculture No. 38/2020	16% of Palm oil industries
Reclamation and Post-Mining	Law No. 3/2020 on Amendments to Law No. 4/2009 on Mineral and Coal Mining	5% of Mining industries
Program for Pollution Control Evaluation and Rating (PROPER)	- The Ministry of Environment Regulation No. 03/2014 - The Ministry of Environment and Forestry Regulation No. 1/2021	30% of all industries in East Kalimantan get Gold and Green Rating achievements

Source: Authors' compilation.

Although the implementation of SVLK is mandatory for every forest-based company in Indonesia, unfortunately, the impact of this policy has not been visible in reducing emissions. The SVLK mandatory is not significant in reducing emissions since only a few forestry companies comply with this certification obligation. As a green development initiator at the sub-national level in Indonesia, in East Kalimantan Timur, only 40% of forestry companies obtained SVLK certificates [47].

4.2.2. Reduced-Impact Logging (RIL)

Reduced-Impact Logging (RIL) refers to sets of well-established timber harvesting practices applied to an improved forest management project which is now codified internationally in many countries around the tropics [48]. In Indonesia, the basis for RIL is the Decree of the Directorate General of Sustainable Production Forest Management No. 274/VI-PHA/2001 on Reduced-Impact Logging. Reduced-Impact Logging for Carbon (RIL-C) refers to a subset of recommended RIL practices explicitly promoted to reduce carbon emissions. It also emphasises climate change and forest degradation and opportunities to benefit from reductions in carbon emissions, including NDC to the UN Paris Climate Agreement and corporate commitments [48]. RIL-C implementation is defined by its capacities to deliver measurable climate change mitigation outcomes without reductions

in timber yields. RIL-C courses cover improving felling and bucking for greater wood use, directional felling to evade additional breakage, skid trail planning, long-line winching, and narrower haul road construction.

Studies evaluating RIL performance indicate potential emission reduction and speedy biomass/carbon recovery in selectively logged forests across the tropics. Employment of RIL practices resulted in fewer damaged trees and lower carbon [48]. The RIL procedure nearly halved the number of trees destroyed, i.e., 36 trees/ha in RIL vs. 60 in conventional practices [49]. Ellis et al. [48] estimated that implementation of RIL would reduce logging emissions by 44% of the total tropical GHG emissions while maintaining timber production. The findings of the studies highlighted the potential from the implementation of RIL-C to reduce damage on residual stands by reducing the logging damage and logging infrastructure damage and, consequently, to cut half of logging emissions without reducing timber yields. Adapting the best RIL-C practices would substantially contribute to the Indonesian forest sector's efforts to mitigate climate change and meet its emission reduction target pledged in its nationally determined contribution (NDC). However, in the East Kalimantan Province, the implementation of RIL has only been carried out by 14 of 99 forest-based companies (14%) [50].

4.2.3. The High Conservation Value (HCV)

The High Conservation Value (HCV) concept was introduced in 1999 as one of the principles in the Forest Stewardship Council (FSC), the principles and criteria developed by FSC. Moreover, the HCV is a planning tool for assisting land managers in attaining a rational balance between environmental conservation, social justice, and economic development [51]. The Tropenbos International Indonesia has continuously contributed to the wide acceptance of the HCV approach in Indonesia's policies and practices related to sustainable palm oil plantations and industrial wood plantations. Currently, the HCV concept is well accepted by palm oil and industrial farms. Moreover, the HCV is a prerequisite for certification, including Roundtable Sustainable Palm Oil (RSPO) and Indonesian Sustainable Palm Oil (ISPO) certifications for oil palm companies and FSC certification for forestry companies.

Based on the regulation, the forestry industry must identify and then allocate a minimum of 10% of forests for a conservation area. The main goal of developing this area is to support biodiversity and its ecosystems in production forest areas. According to Purwanto et al. [52], HCV management helps increase the protected areas and is a necessary effort to ensure production sustainability in the long term. In addition to the regulations in the oil palm industry, international market mechanisms that require companies to protect their ecosystem and environment play a significant role in managing HCV areas in plantation concession areas. Thus, HCV management is one of the emissions reduction strategies in the East Kalimantan Province. This province commits to maintain 640 thousand ha of forest cover as HCV areas. However, the HCV area in the East Kalimantan Province has only reached about 17 thousand ha managed by ten oil palm companies or a mere 3% of the total big palm oil companies [53].

4.2.4. Indonesia Standard for Sustainable Palm Oil (ISPO)

Indonesian Standard for Sustainable Palm Oil (ISPO) is a mandatory prerequisite set by the GoI for oil palm plantation to improve more sustainability palm oil governance. Although palm oil expansion contributes positively to the Indonesian economy, this expansion is widely debated in Indonesia. The palm oil industry provides job opportunities [54] and benefits farmers' well-being [55]. According to Nurfatriani et al. [56], Indonesia is the largest palm oil producer globally, with a total production of 37.8 million tons in a total 14.03 million ha plantation area. However, the development of palm oil plantations has caused severe problems in Indonesia, including deforestation [54], the emission of GHG [57], biodiversity losses [58], and emerging social conflicts [59]. Palm oil plantations are frequently highlighted as underlying causes of deforestation [60].

The ISPO was established to escalate Indonesian palm oil competitiveness while guaranteeing the sustainability of its production, especially in the prevention of palm oil-related problems. The ISPO aims to be more economically viable for producers while remaining independent from foreign pressures [61]. The implementation of the ISPO is expected to increase the competitiveness of Indonesian palm oil in both the domestic and international markets and support Indonesia's climate commitments. The ISPO can potentially reduce deforestation in protected forest areas if the scheme can be fully implemented and enforced. However, the exclusion of plantations is evaluated as poor performance in the ISPO's procedure. Many industries imply that they cannot join the certification process and lack commitment to zero deforestation. For example, in East Kalimantan, only 23 oil palm companies were certified by the ISPO or 16% of the total oil palm plantation area in the East Kalimantan Province [53]. Without a strong emphasis on prevention in protected areas, this may lead to an insignificant contribution of the ISPO in reducing overall deforestation.

4.2.5. Reclamation and Pos-Mining policy

The East Kalimantan Province is the largest coal producer in Indonesia. The mining sector has provided the most significant proportion to East Kalimantan's total Gross Domestic Product (GDP), with 1404 mining industries [62]. These industries produce about 250 million tons annually from 5.2 million ha in the East Kalimantan area [62]. Despite the economic contribution, the mining industries cause serious environmental problems in this province during production, mine closure, and post mine closure.

The GoI has established Law No. 3/2020 on "Amendments to Law No. 4/2009" on Mineral and Coal Mining related to the problems. This Law revision regulated the obligation of mining concession permit holders to carry out reclamation and post-mining with a 100% success rate. This Law also punishes permit holders who do not carry out reclamation and post-mining. The sanctions imposed are imprisonment for a maximum of 5 years and a fine of IDR 100 billion. These sanctions are expected to encourage the ex-mining reclamation mandate to be more effective. According to Subarudi [62], reclamation and post-mining in East Kalimantan are still minimal implementations. Only about 5% of mining companies carry out their obligations to reclamation, while others tend to ignore them. It is supported by the statement from a respondent "*Many mining corporations ignore ex-mines reclamation since there are no sanctions as a deterrent effect. If regulation enforces them, they would be able to do reclamation*" (LG-7). In addition, concession holders are also required to provide reclamation and post-mining guaranteed funds from mining activities to post-mining as reinforced by a respondent: "*The guarantee fund is used to anticipate if the business does not or fails to carry out reclamation. Then the funds will be used by the government for reclamation*" (LG-8).

4.2.6. Company Performance Rating Program in Environmental Management (PROPER)

The Company Performance Rating Program in Environmental Management, known as Proper, evaluates the performance of the business activities related to environmental management. Proper is one of the GoI efforts to encourage corporate compliance in ecological management through information instruments [63]. Proper was previously regulated based on the Ministry of Environment Regulation No. 03/2014 on the Company Performance Rating Program in Environmental Management. Later, that policy was updated by the Ministry of Environment and Forestry Regulation No. 1/2020. This program is conducted through various activities to encourage companies to comply with legislation through incentives and disincentives of reputation and enabling companies with good environmental performance to implement cleaner production. Six criteria will be assessed in the Proper; one of them is environmental management, including energy efficiency, emission reduction, waste reduction and utilisation, and biodiversity protection.

The performance achievement rating in Proper consists of five levels: Gold (total value: 91–100), Green (total value: 71–90.9), Blue (total value: 41–70.9), Red (total value: 21–40.9), and Black (total value: 0–20.9). In 2019–2020, the Proper activities were attended

by 2038 companies throughout Indonesia, where 71 of them were companies located in the East Kalimantan Province. Of the 71 firms in that region, 4 got a Gold Rating, 17 got Green, 47 got Blue, and 2 got Red. These data show that the involvement of companies in East Kalimantan to adopt Proper is still low. Of the 71 companies involved, only about 30% successfully fulfilled their commitment to the environment shown by Gold and Green Rating achievements [64]. This percentage shows that Proper policy is still not fully effective in the implementation.

Thus, this study found that several prominent companies applied ecological principles in their business operations. However, only a few businesses are already actively involved in emission reduction efforts. Even though the central and local governments developed mandatory regulations to support the land-based private sector's participation in reducing emissions, the implementation is minimal. Most of them tend to ignore those policies. The contribution of the private sector has not been widely recorded to date. According to Zeleke et al. [65], although the role of the private sector was mentioned in the NDC document, no concrete steps have been given to escalate this potential. Only a few land-based companies' production activities applied the sustainability principles compared to the entire land-based private sector operating in this province.

4.3. Participants' Perceptions of the Importance of the Land-Based Private Sectors to Contribute to the Emissions Reduction in Indonesia

In this section, we present participants' perceptions of the importance of the land-based private sectors to contribute to the emissions reduction in Indonesia. We found that the participants from the four groups agree that the land-based private sectors play crucial roles in achieving Indonesia's target to reduce emissions. Table 7 presents themes from coded data extracted from the three group participants' perspectives (central government, local government, and the climate change practitioners) regarding the importance of the land-based private sector's involvement in emission reduction.

Table 7. Participants' perspectives of the land-based private sector roles in low emissions development.

Questions	Themes from Coded Data Extracts of CG, LG, and CCP Perspectives
Do you think the land-based private sectors play a crucial role in low emissions development? If yes, why?	- The land-based private sector is both a negative and positive driver of deforestation and forest degradation (60%) - Emissions reduction measurement is directly dependent on the reduction in deforestation (40%)
What roles are expected from the land-based private sectors in achieving the low emissions development?	- They obey the regulations and national commitment regarding the NDC targets (60%) - Applying or investing in a more sustainable business by developing technology/innovations (40%)

Note: The numbers within parentheses indicate the proportion (%) of respondents who expressed a similar opinion.

Table 7 shows two main reasons why the land-based private sectors are critical in achieving Indonesia's target to reduce emissions based on the three groups of participants' coded data extracts. First, 60% of 22 respondents highlight that the land-based private sectors are important actors who can play a crucial role as both a negative and positive driver of deforestation and forest degradation in Indonesia. "*They are actors who have a decisive contribution in increasing or reducing GHG emissions based on the way they manage their businesses*" (CCP-7,9). This sector becomes a negative driver of deforestation since, according to the participants' "*most of the GHG emissions in Indonesia comes from land-based practices*" (CG-2). "*Private companies occupy enormous forests in Indonesia*" (CCP-1). "*They carry out land clearing/landscape changes in a large area resulting in significant loss of vegetation which plays a role in reducing emissions*" (LG-7; CCP-3). The extractive sector, such as coal mining, always starts with land clearing that removes many trees from the forest before extracting coal from the earth. "*This activity removes carbon stock from the trees to the atmosphere and emitting GHG emissions from the soil*" (CCP-2). "*In East Kalimantan Province,*

for example, land clearing for palm oil plantation and mill activities contributes about 21.8% to the BAU baseline emissions, forest clearing about 17%, and energy use for mining operations contributes approximately 28.7% to the BAU Indonesian emissions baseline" (LG-3).

Conversely, the private sector can also be a positive driver of Indonesia's deforestation. "Good practices in the businesses sector could make the company's economic development and environmental protection run in balance" (LG-5,6). "If this land sector company is willing to reduce emissions, the GHG emissions will be more significantly reduced" (CG-4). "Since they are potential emitters, the improvement of the company's production processes can contribute to national emission reduction targets" (CCP-4). "Planting new trees in the bare land for timber production and oil palm plantation will absorb carbon dioxide from the atmosphere" (CCP-2).

Another reason why the involvement of the land-private sector is vital in the emission reduction based on 40% of the three group participants is that emissions reduction measurement is directly dependent on the reduction in deforestation. Further, participants explained that "*since emissions' measurement is based on land forest cover changes, the changes will have implications for either reducing or increasing emissions*" (CG-6). "*This sector has a big role both to maintain and increase forest cover because it is closely related to reducing emissions*" (CG-7). "*Companies that consider the environment will seek to increase industrial productivity without relying on land expansion*" (CP-1; CG-3).

Table 7 also displays several of the participants' expected greater private sector involvement. Sixty percent of the participants said that they must obey the regulations and national commitment regarding the NDC targets. As a mandate of the Paris Agreement, the GoI positioned the private sector as a key actor involved in Indonesia's emissions reduction target. The GoI developed a Roadmap of NDC mitigation in 2019 since this international commitment needs to be implemented at the national level in 2020. In the Road Map, the private sector was positioned in the five-sector emissions reduction targets. It means that the land-based private sectors are crucial to attaining Indonesia's target to reduce emissions.

Other expected benefits from the private sectors' involvement, according to 40% of participants, are their innovations to create or use technology by which they can achieve more sustainable businesses. "*Their innovations are needed to strengthen conservation activities in their land-based area through initiatives of sustainable forest landscapes*" (CG-5). "*The entrepreneurs must have started to adopt and develop innovations/technology leading to low emission development practices*" (CG-6,7). "*Further, that kind of technology would support their business sustainability*" (CCP-5).

On the private sectors' side (as presented in Table 8), this study highlights three important aspects of the land-based private sector perspectives in low emissions development.

First, how they perceive that their company or the company they are working for plays a significant role in carbon emission reduction. It is found that half of the participants thought that low emission development is one of the strategies to reduce the impact of environmental damage and combat climate change issues. They do not deny that their contribution as a land-based corporation is essential to achieving the emission reduction target. Individually, they all are interested in being actively involved in low carbon emissions development. They said that, among others, the next generations deserve to inherit a good quality environment. As a part of the company, they also agree that land-based private sectors are needed since their contribution will determine the success of reducing the deforestation rate as the primary source of emissions in Indonesia.

Similarly, about half of the respondents mentioned that their companies were involved in development to support the government to achieve the NDC target. The underlying reasons are a sense of responsibility and the environmental concern, primarily related to climate change and their awareness that the land-based corporation has a close link with deforestation. In the mining corporation, for example, one of them claimed that: "*Emission reduction has become a commitment to environmental management in our company since that implementation is one of the assessment criteria of our business performance. To support it, we*

do energy efficiency dan 3R waste" (PS-1). In palm oil plantation: "*We do not develop oil palm cultivation in prohibited areas, such as forest areas with high carbon stock, peatland, and wetland areas*" (PS-2). In the forestry industry, they stated: "*We get SVLK and FSC certification. We also implement RIL*" (PS-3). "*Since 2013, our company has had a Forest Conservation Policy commitment by maintaining about 21% of the total concession area as protected forest. Our business also operates under the guidelines of the Integrated Sustainable Forest Management Plan*" (PS-4). "*Our company has implemented forest and biodiversity protection efforts, planted fruit trees by involving community participation, and developed low carbon businesses*" (PS-9).

Table 8. The private sector's perspective of the land-based private sector roles in low emissions development.

Questions	Themes from Coded Data Extracts of the Private Sector Perspectives
Why does the company you are working for play a significant role in carbon emission reduction?	- Low emissions development is one of the strategies to reduce the impact of environmental damage and combat climate change issues (50%) - The land-based corporation has a very close link with deforestation (50%)
What opportunities are involved in low emissions development?	- This development provides new business opportunities for the future (45%) - No opportunities yet for businesses (55%)
What obstacles/barriers does your company face to be more actively involved in low emission development?	- Limited budget, technology, human resources, and clear regulations (40%) - Incentives for the businesses that have implemented the low emissions development program (60%)

Authors' compilation.

Second, they also see that this development will support their business sustainability (45%). "Low carbon emissions development is a new opportunity for the future business" (PS-7). For the last five years, the main customers who buy and sell our final product, paper, want products produced from factories with low emission processes and make efforts to zero carbon (PS-4). However, about 55% of the participants claim: "Being involved in this development has not provided benefits yet from the business side" (PS-4; PS-2; PS-7; PS-5). "There are still no clear regulations" (PS-3). "The mechanisms have not been established and integrated yet" (PS-2). "In addition, it has not been allowed yet to voluntarily market carbon" (PS-7).

Third, the obstacles/barriers faced by the companies to be more actively involved in low emission development were considered. About half of respondents from this group stated that the firms they work for were not involved in emission reduction efforts. About 40% claim that they face technological factors, limited skilled human resources in the relevant context, and financial problems in implementing low emission development. "*To be involved in this program requires a considerable initial cost related to facilities and technology, while the government provides no incentives or rewards to encourage entrepreneurs to participate*" (PS-4). "*High investment costs are required in the transition period, while the Government provides no incentive to encourage entrepreneurs to participate*" (PS-4; PS-2; PS-7; PS-5). "*We will spend much money, while no appropriate rewards will be obtained*" (PS-1; PS-3; PS-9). On the other hand, no incentive provided is the primary reason why most land-based private sectors are not actively involved in the emission reduction program in Indonesia (60%). They mentioned that some factors are needed to increase the feasibility of the land-based business sector in the framework of low emission development. They need clear and efficient regulations, an internal management policy, resources' availability, and an incentives policy (including tax management, licencing bureaucracy facilitation, and a premium scheme for product sales).

5. Discussion

Based on the results of this study, it is clear that a single policy will not be sufficient to force the land-based private sector to be actively involved in the emissions reduction targets. Several environmental regulations are still needed to encourage their contribution. The incentive policy is one of the examples, based on this case study, that needs to be

considered by the GoI to enhance the participation of the land-based private sector in low emissions development. As Nie et al. [10] mentioned, industrial enterprises in developing countries might be unable to finance additional costs to stimulate innovation. Related to incentives, many scholars asserted that incentives could be used to generate motivation and commitment [66]. According to Karsenty and Ongolo [67], the originality of the reduction in emissions from the deforestation and degradation proposal is its incentives-based mechanism designed to reward the governments of developing countries for their performance in reducing deforestation. The incentive used in partnering and alliancing has been a strategy of strengthening collaboration and helping to build trust among parties in the long run [66].

These incentive perspectives might fit with the case of reducing emissions from the land-based private sector. Our research shows that without policy incentives, existing mandatory public policies have not motivated entrepreneurs to contribute significantly to reducing emissions. As Karsenty and Ongolo [67] revealed, the scheme declines agents' development opportunities; they are more than likely to ignore the rules. The ISPO policy is the first example of this case. The data show that although this policy is mandatory for the palm oil industry, its implementation is still not fully effective since there are no benefits in the global market. First, the international market players do not recognise the ISPO as a credible sustainability standard. They see the RSPO as the only reasonable standard for sustainable palm oil [61]. Second, the ISPO also seems to lose the competition with uncertified palm oil at a producer level. This policy does not provide a premium price for certified palm oil as the RSPO does. Even though participation in the RSPO implies additional costs for smallholders, their profits increase because of the premium prices [68]. Hence, in this case, the premium prices are the incentive given by the RSPO by which can change the behaviour of the company's performance.

To obey the rules, despite incentives (as stimulus), a disincentive policy (penalties and fines) is also necessary to punish the offenders. Monitoring and evaluation must be carried out effectively by credible independent monitoring institutions supervising the land-based private sectors' emission reduction activities. A monitoring agency without adequate capacity has a vital role in making the performance of the land-based private sector's green activities more measurable and improving the governance system's credibility. Independent monitoring of SVLK policies can be used as an example. In SVLK, independent monitoring is formally instituted and featured in several countries [45]. In addition, regarding law enforcement, it is also necessary to assess the optimal level of offences (offences permitted) and what level of punishment could be given to offenders. Applying the level of fines is one of the strategies to determine the optimal law enforcement [69]. Robinson, Kumar, and Albers [69] stated that fines should be fair considering both the social cost of the crime and the capacity to pay the fine. That point does not mean that penalties should be lower. Nevertheless, it depends on the social cost of a crime. If the social cost is high, the fine should also be increased [70].

6. Conclusions

Deforestation is the highest contributor to Indonesia's emissions, and the land-based private sector's activities are one of the underlying causes of that high deforestation. Since the land-based companies are the critical factors determining the success or failure of Indonesia's low emissions development missions, the GoI positioned this private sector to be actively involved in the five-sector targets to achieve the emission reduction target by 2030. The GoI established several policy instruments to support Indonesia's commitment to meet emission reduction targets. However, the implementation is still minimal.

The primary reason for their reluctance to be involved in this development is that no incentives are provided for the private sector businesses in implementing the low emission program. Since maximising profit is the main goal for every business, and several factors are needed to increase the feasibility of this business sector, they will tend to ignore the

program unless the role of the private sector is not mandatory, and an adequate level of incentives and disincentives are provided.

Based on the problems described above, this study offers several policies that might be applied to complement the existing policies so that the implementation of emission reduction from the land-based private sector can run effectively. They are:

1. Establish an independent monitoring agency that monitors explicitly and evaluates the private sector's performance in reducing emissions.
2. Provide incentives for ecologically sustainable companies that meet predetermined standard criteria. It could be fiscal incentives (i.e., tax reduction for the sustainable industry) or non-fiscal incentives, such as providing a licensing process with a simpler bureaucracy and an automatic extension of concession permits.
3. Provide strict and fair sanctions as disincentives for companies that ignore regulations; it could be an increase in taxes or fines, according to the assessment of an independent monitoring agency.

Capacity building of business to enable them to adopt technologies and innovations related to emission reduction context (i.e., waste management technology, energy efficiency technology, RIL/C techniques, and emission measurement methods).

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