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## **BIODIVERSITY DISCLOSURE OF INDONESIAN COMPANIES AND THE ROLE OF THE BOARD OF COMMISSIONERS**

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### ***Abstract***

*The environmental damage that occurs on a large scale has an impact on reducing biodiversity. Biodiversity has an important role that is useful for human life and plays a central role in economic development. This condition makes various parties aware of their role in preventing further damage. Companies, whether directly or indirectly, owe a great deal to the environment. This study seeks to examine the role of the Board of Commissioners as proxied by the size of the Board of Commissioners, the proportion of Independent Boards, and the proportion of women on the Board of Commissioners as a corporate governance mechanism for their biodiversity disclosure. The companies used as samples are listed in the SRI-KEHATI index from 2018 to 2020. To measure the company's biodiversity variable, we use a biodiversity index which contains 53 measurement items in 5 main themes. As a result, we find that the size of the Board of Commissioners has a positive effect on the company's biodiversity disclosure. Meanwhile, the proportion of Independent Commissioners and the proportion of women on the Board of Commissioners are proven to have no effect on the company's biodiversity disclosure.*

***Keywords: Disclosure of Biodiversity, Corporate Governance, Characteristics of the Board of Commissioners***

### ***Abstrak***

Kerusakan lingkungan yang terjadi dalam skala besar-besaran berdampak kepada semakin berkurangnya keanekaragaman hayati. Keanekaragaman hayati memiliki peran penting yang berguna untuk kelangsungan hidup manusia dan memainkan peran sentral dalam pembangunan ekonomi. Kondisi ini membuat berbagai pihak menyadari pentingnya kontribusi mereka untuk mencegah kerusakan yang lebih parah lagi, tak terkecuali perusahaan yang baik secara langsung atau tidak banyak berhutang pada lingkungan. Penelitian ini berusaha untuk melihat peran dari Dewan Komisaris yang diproksikan dengan ukuran Dewan Komisaris, proporsi Dewan Independen, dan keragaman Dewan Komisaris sebagai mekanisme tata kelola perusahaan terhadap pengungkapan keanekaragaman hayati mereka. Perusahaan yang digunakan sebagai sampel adalah perusahaan yang tercatat dalam indeks SRI-KEHATI selama periode 2018 hingga 2020. Untuk mengukur variabel pengungkapan keanekaragaman hayati perusahaan, kami menggunakan indeks keanekaragaman hayati yang berisi 53 item pengukuran dalam 5 tema utama. Hasilnya, kami menemukan bahwa ukuran Dewan Komisaris berpengaruh positif terhadap pengungkapan keanekaragaman hayati perusahaan. Sedangkan proporsi dari Komisaris Independen dan keberagaman dewan terbukti tidak berpengaruh terhadap pengungkapan keanekaragaman hayati perusahaan.

**Kata kunci: Pengungkapan Keanekaragaman Hayati, Tata Kelola Perusahaan, Karakteristik Dewan Komisaris**

## INTRODUCTION

The definition of biodiversity covers the diversity of all life, both within and between species, containing everything that exists in an ecosystem (Ketola 2009). The existence of biodiversity is precious for human survival and plays a central role in economic development. Plants, animals, and ecosystems distribute essential support for human well-being (Jones et al. 2020). Data from the World Economic Forum (2015) declares that the current accelerated rate of ecosystem damage and biodiversity loss is one of the top ten global risk factors. The World Wildlife Fund (2018) persists that species extinction rates have increased between 1,000 and 10,000 times more than natural extinction rates. Ceballos et al. (2015) state evidence that the current extinction rate is arguably unprecedented in human history. This concerns the future of planet Earth.

Considering these conditions, this problem requires solutions from many parties, including the company. It is not only the responsibility of environmentalists or the government (Skouloudis et al. 2019). Stakeholders should further influence companies to contribute to maintaining the stability of biodiversity (Mahyuddin et al. 2021). Stakeholders increasingly expect companies to recognize their responsibilities to the ecosystem and comply with their operational practices, thus reducing the negative impact of the company's operations and contributing positively to biodiversity.

Research on sustainability reporting, including biodiversity, can be expressed to have started to emerge. The existing literature has contributed insight into the complex relationship between organizations globally and nature because they indirectly have a moral obligation to conserve and protect the biodiversity that sustains many people's lives (Roberts et al. 2021). However, most research on this topic is a qualitative literature study (Mahyuddin et al. 2021). This limited study

concentrates on the extent to which biodiversity reporting is practiced in a company in a country (Boiral and Heras-Saizarbitoria 2017; Rimmel and Jonäll 2013; van Liempd and Busch 2013); developing frameworks and measurements (Addison et al. 2020; Houdet et al. 2020); Meanwhile, studies on the factors driving the disclosure of corporate biodiversity, especially in terms of the characteristics of the Board of Commissioners, are still rarely found. Roberts et al. (2021) present that accounting for biodiversity is an important topic with extensive studies but still spotlights on disclosures from annual reports using qualitative analysis.

The research question that should be raised is how companies respond to these problems and how corporate governance plays a role in preventing them (Galbreath 2012; Naciti 2019). Corporate governance is associated with the mechanisms by which corporate stakeholders organize control over the company to management for their purposes. The supervisory role of the Board of Commissioners is a crucial component of this corporate governance (John and Senbet 1998). The Board of Commissioners is considered vital because it represents the stakeholders overseeing the company to suit their interests. The board is at the pinnacle of strategic decision-making (Fama and Jensen 1983). This position, in theory, leads the board to incredible power over how a company constructs strategy for good not only shareholders but also the environment, nature, and society (Elkington 2006). It is therefore important to link the role of the Board of Commissioners in corporate governance to their biodiversity disclosure.

The governance mechanism is also considered the company's system of checks and balances. Because the strategic policy on sustainability disclosure is crucial for management (Bae et al. 2018). Sustainability disclosure researchers have analyzed the effect of governance mechanisms on corporate sustainability reporting. The proxies that are widely used to measure the

role of governance include the size of the Board of Commissioners, the proportion of Independent Boards, and the proportion of women on the board (for example, Amran et al. 2021; Haniffa and Cooke 2005; Hussain et al. 2018; Naciti 2019; Tjahjadi et al. 2021). With a large size of, the Board of Commissioners can better represent minority interest groups in the decision-making process (Bae et al. 2018). The Independent Board of Commissioners actively monitors and controls the board on behalf of external parties. Therefore, increasing independent commissioners can reduce agency conflicts and send a positive signal to outsiders (Hussain et al. 2018). While the proportion of women on the Board of Commissioners is usually considered to have an altruistic nature, making it possible to influence decisions and policies on the board on sustainability issues, including biodiversity issues (Rao and Tilt 2016).

From the existing literature, the disclosure of biodiversity is considered one of the environmental categories in sustainability reports. Still, those that focus on and specifically discuss the disclosure of biodiversity are even now very limited (Mahyuddin et al. 2021). Based on the literature study by Roberts et al. (2021), accounting academics have an increasing interest in research sustainability topics. However, there are still few researchers who try to explore the responsibility of organizations such as companies to the biodiversity crisis. The initial literature in biodiversity accounting was carried out by Van Liempd and Busch (2013), which investigates the biodiversity reporting of companies in Denmark and provides several suggestions to further improve their biodiversity disclosure.

Meanwhile, Rimmel and Jonäll (2013) try to capture the motives behind the disclosure of corporate biodiversity disclosures in Sweden. In the same year, Jones and Solomon 2013 had 'provoked' researchers to participate in increasing research on how organizations engage and

contribute to preventing biodiversity loss and raising public awareness. This is important because of the seriousness of the biodiversity crisis that continues to this day (PBB, 2015; World Economic Forum, 2015; WWF, 2018). However, this 'provocation' has not received a wide response to date. Haque and Jones (2020) examine how board gender diversity is linked to the biodiversity disclosures of European companies. While Amran et al. (2021) examine the effect of market diversification and corporate governance on biodiversity reporting in the hospitality industry. Amran et al. (2021) suggested that further studies be conducted to see how far corporate governance influences the company's biodiversity disclosure because, in their findings, board characteristics such as board size are not proven to affect the company's biodiversity disclosure. This could be due to the limited sample in his research, which only focuses on the hospitality industry.

Therefore, this study tries to answer the challenges of Jones and Solomon (2013); Roberts et al. (2021); dan Amran et al. (2021). This research contributes to at least three ways of thinking. First, occupying the limitations of the literature by trying to determine whether corporate governance and the composition of the Board of Commissioners influence the company's biodiversity disclosure to prompt the implementation of the SDGs targets. Second, more detailed measurements is expected to provide a more accurate concept of the company's biodiversity disclosure. Third, research in the Indonesian context is critical given the country's status as a megadiversity hotspot, but there is a high danger of extinction and a lack of stakeholder concern, particularly about the involvement of companies (Darajati 2016; Von Rintelen et al. 2017).

The next section will present a better understanding of how, theoretically, governance and boards involve corporate sustainability reporting. We use stakeholder theory and agency theory to justify why companies report their biodiversity

disclosure. Stakeholder theory aims at the obligation of companies to report their non-financial performance due to pressure from various parties (Freeman 2015), while agency theory describes that an effective board can minimize agency costs arising from conflicts of interest between management and shareholders. This theory also specifies that agency problems will be trimmed by disclosing information related to the company (Jensen and Meckling 1976).

Meanwhile, in section 3, we will elaborate on the method used. Indonesia was chosen as a sample country because it has the highest biodiversity potential in ASEAN and its surroundings. However, it has the highest risk of losing its biodiversity (Von Rintelen et al. 2017). Practicing the SRI-KEHATI index, ten companies were adopted as samples, and panel data regression analysis was used to determine the relationship between the board and the company's biodiversity disclosure. The variables used as a representation of the composition of the board include; board size, the proportion of independent boards, and proportion of women on board. This is based on previous studies that investigated to explore the role of corporate governance, although they did not specifically discuss the disclosure of biodiversity like Amran et al. (2021); Galbreath (2012); and Naciti (2019). To formulate the biodiversity disclosure of each company, we use the indicators developed by Hassan et al. (2020). This index contains 53 indicators from five main themes. Biodiversity disclosure is a series of company actions that are examined to have a positive impact on the sustainability of biodiversity.

The last two sections, the results and conclusions, will be presented comprehensively to answer the research questions and the results of the hypotheses developed. We assume that this research is far from perfect. For example, the use of Indonesia as a sample generates the results of this article cannot be generalized. However, the results of this study are sufficient to contribute to

the development of literature related to the topic of biodiversity, have positive implications for related parties, including companies, environmentalists, and policymakers, and make the public aware of the importance of maintaining biodiversity itself.

## **LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

### **Theoretical Foundations**

The relationship between sustainability and corporate governance has been analyzed using various theories, from agency theory (Bae et al. 2018; Naciti 2019); stakeholder theory (Naciti 2019; Russo and Perrini 2010); legitimacy theory (Amran et al. 2014; Haniffa and Cooke 2005; Matuszak et al. 2019); to signaling theory (Bae et al. 2018). The number of theories used by the researchers is because the issue of sustainability can be identified from various perspectives and dimensions (Kuzey and Uyar 2017). Nevertheless, based on the investigation of Hussain et al. (2018) and (Naciti 2019). However, based on the investigation by Hussain et al. (2018) and (Naciti 2019), the dominant theories used to link the role of corporate governance and sustainability disclosure are agency theory and stakeholder theory. So, in this study, we will use both theories in building hypotheses and explaining the research findings. Therefore, in this study, we will adopt both theories to build hypotheses and explain the research findings.

Agency theory explains information asymmetry, opportunistic behavior, and conflicts of interest between agents (management) and principals or shareholders (Naciti 2019). Management typically overcomes these issues by disclosing information voluntarily to reduce agency costs (Jensen and Meckling 1976), whether it is a company's financial statements or non-financial reports (Hussain et al. 2018). Based on this theory, the corporate governance mechanism plays an important role in monitoring and supervising

management behaviour. The representation of governance that reflects the principal interests is the existence of a board (Bae et al. 2018).

On the other hand, from the point of view of stakeholder theory, companies worldwide face stakeholder pressure to increase their sustainability disclosures (Chen and Wang 2011). Stakeholders' need for information encourages companies to disclose not only their financial information but also the company's non-financial information (Haniffa and Cooke 2005). Matuszak et al. (2019) also states that the company will not be able to carry out its long-term operations if it does not get recognition and support from stakeholders. In addition, companies must consistently demonstrate their concern for the expectations of these stakeholders (Freeman 2015).

### **Biodiversity Disclosure**

One of the important points regarding corporate accountability with regard to environmental accounting in general and biodiversity accounting, in particular, is that companies have broader responsibilities. Not only fulfill the interests of shareholders and stakeholders, the company likewise keeps responsible for the survival of future generations (van Liempd and Busch 2013). Referring to the Brundtland report, Sustainable development is defined as a concerted effort to meet the needs of today by considering the needs of future generations (Imperatives 1987), so that future generations retain the right to enjoy the benefits of biodiversity as humans feel today because biodiversity holds an important role in life. Not only does it maintain the Earth's life-supporting capacity, biodiversity also serves to provide food sources and other 'ecosystem services' such as waste decomposition, water and air purification, pollination and disease control (Schneider et al. 2014).

The definition of biodiversity is still diverse. Nonetheless, most researchers refer to the definition issued by the

Convention on Biological Diversity (CBD / Convention on Biological Diversity). The CBD defines biodiversity as:

“Biodiversity means the diversity among living organisms from all sources including, inter alia, other terrestrial, marine and aquatic ecosystems and the ecological complexes of which they are part: including diversity within species, between species and ecosystems” (CBD, 1992).

In the last two decades, there has been an increase in information on the voluntary disclosure of companies as well as information about their performance and concern for biodiversity (Atkins and Maroun 2018). This is inseparable from the demands of international stakeholders as stated in the United Nations SDGs program on targets 14 and 15. The 14th SDGs target states that marine resources must be used wisely to support sustainable development. While the 15th SDGs Target states that all terrestrial ecosystems must be protected, managed and restored sustainably to prevent biodiversity loss (PBB, 2015). To clearly communicate the company's concern for the environment, a globally accepted conceptual framework, measurement, and language are needed (Potdar et al. 2016). Recently, there have been many reporting frameworks that can be operated by companies, such as reporting standards from the Global Reporting Initiative (GRI), the Task Force on Climate-Related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), and the Carbon Disclosure Project (CDP). Among these standards, GRI is the most dominant environmental reporting framework reported by many companies in the world (Potdar et al. 2016). GRI is generally considered the most reliable and detailed (Atkins and Maroun 2018; Boiral 2016; Zhao and Atkins 2021). In the latest version of the GRI standard, specific disclosure items related to biodiversity have been regulated in GRI 304. This enables companies to comprehend the scale of biodiversity better, allowing them to provide more accurate and clear

**Table 1.**  
**Indicators of Disclosure of Biodiversity According to GRI 304**

Indicator	Description
304-1	Disclosing the location of the company's operations that are either managed, leased or adjacent to areas of high biodiversity value.
304-2	Disclosing the significant impact that the company has made, whether related to their operations, products, or services.
304-3	Disclosing habitats that have been restored or protected by the company.
304-4	Disclosing which species are affected by the company's operations, especially those included in the IUCN Red List Species and each country's national conservation species list.

information (Zhao and Atkins 2021). In this standard, GRI provides guidance on how companies should disclose information about impacts or countermeasures against biodiversity loss. These guidelines are summarized in Table 1.

In the Indonesian context, in addition to using the guidelines from GRI, public companies are required to employ the standards issued by the Indonesian government, namely the Financial Services Authority Regulation (POJK) 51 of 2017 concerning the implementation of sustainable finance. This aims to increase further the company's awareness and commitment to sustainability issues (Adhariani and Du Toit 2020). Governments and companies continue to work together to increase their environmental and sustainability contribution. Evidence from the government can be seen in several regulations and strategic conservation plans, such as the Indonesian Biodiversity Strategy and Action Plan (IBSAP) 2015-2020 (Darajati 2016).

On the company side, they continue to convey their sustainability performance through sustainability reports. Even in a more specific context, several companies propose special reports on their biodiversity performance, either submitted in the annual report or on each company's website<sup>1</sup>. The existence of this special report cannot be separated from the ideas and decisions from the board. Mainly in the Board of Commissioners, which oversees the com-

pany's activities to align with the objectives of shareholders and other stakeholders (Glass et al. 2016; Hussain et al. 2018). The board of commissioners also considers sustainability issues as part of the company's strategic formulation, such as environmental and social factors, including biodiversity issues. The board will also determine what material sustainability factors need to be identified by the company. Finally, the Board ensures that these factors are monitored and managed (KPMG, 2017, p. 7).

Academic research exploring accounting for biodiversity and nature conservation is emerging (Zhao and Atkins 2021). Though, it should be noted that the practice of the term biodiversity has not yet found a consensus. Some studies apply the term 'Biodiversity Accounting' (Adler et al. 2018; Ceballos et al. 2022; Ketola 2009; Rimmel and Jonäll 2013; Skouloudis et al. 2019). Others utilize the term 'Extinction Accounting' (Hassan et al. 2020; Roberts et al. 2021; Zhao and Atkins 2021). Some even call it 'Animal Welfare Accounting' (Sun et al. 2021), but it all boils down to the same point.

## Hypothesis Development

### *Board of Commissioners Size*

From the various works of literature that try to examine the relationship between governance and sustainability disclosure, the attribute that is widely used as a proxy

<sup>1</sup> Some of the companies we found made reports on biodiversity specifically, among others; PLN, Pertamina, PT Bukit Asam, PT Semen Indonesia,

and so on. One of the reports can be accessed at <https://sig.id/wp-content/uploads/2020/09/13.-Laporan-kehati-SI-2019.pdf>

for corporate governance is board size (Bae et al. 2018; Hussain et al. 2018; Nasih et al. 2019; Sun et al. 2021). The board in the company keeps a crucial role (Sun et al. 2021). In addition to supervising the management in managing the company, the Board also provides advice and more indepth analysis of problems that are currently or may be faced by the company in the future (Bae et al. 2018). Based on agency theory, the board is performed as a representative of the shareholders to monitor the company to minimize conflicts of interest between the principal and the agent, namely management (Fama and Jensen 1983). Besides reducing agency conflicts, the more diverse board members can better represent minority interest groups in the decision-making process. A large board size also reduces disparities through the ability to share skills, experience, information, and resources (Nasih et al. 2019).

However, the results of the relationship between Board size and the company's sustainable disclosure are still fragmented (Hussain et al. 2018). Several studies agree that more board members can enhance a company's sustainability disclosure (Bae et al. 2018; Naciti 2019; Sun et al. 2021). Other studies, as Hussain et al. (2018), assume that a large number of Boards will further diminish their efficiency in matters relating to corporate decision-making.

Despite the variation in findings in previous studies, more empirical evidence concludes that board size possesses an important role in encouraging companies to improve their environmental disclosure (Bae et al. 2018; Giannarakis 2014; Naciti 2019; Sun et al. 2021), because a larger board allows for a wider exchange of ideas and innovative experiences (Giannarakis 2014). Members in it usually come from various backgrounds, expertise, experience, and competencies (Bae et al. 2018; Matuszak et al. 2019). Therefore, a large Board of Commissioners is more likely to increase sustainability disclosures to reduce stakeholder pressures and concerns about

environmental damage, such as increasing biodiversity loss. In addition, the large size of the Board of Commissioners will represent a more diverse knowledge, education, and background so that it will be more effective in making strategic decisions mainly to deal with sustainability issues such as biodiversity problems. One way to do this is by disclosing more information about these issues. The first hypothesis in this study is:

**H<sub>1</sub>: The size of the Board of Commissioners has a positive effect on the company's biodiversity disclosure.**

### *Independent Commissioner*

An Independent Commissioner can be defined as someone who does not have a direct relationship with the company and has extensive knowledge of a particular field whose role is to provide advice and consideration to other board members (Bae et al. 2018). Based on agency theory, many Independent Commissioners tend to better monitor and control management, thus making the company more transparent (Naciti 2019). Meanwhile, based on stakeholder theory, an independent board represents all the interests of the company's various stakeholders. This tolerates the board to put more pressure on companies to implement and disclose their social and sustainability responsibilities.

Sun et al. (2021) examine animal welfare disclosure practices and what factors drive such disclosure at food companies in China. His findings reveal that a high proportion of independent boards can effectively weaken agency problems through management monitoring and controlling. Thus, boards with a high proportion of Independent Commissioners are expected to urge management to provide a higher level of transparency and report more biodiversity information through corporate reports. Therefore, the second hypothesis in this study is:



**H<sub>2</sub>: The proportion of Independent Commissioners has a positive effect on the company's biodiversity disclosure.**

### *Proportion of Women Board of Commissioners*

It is believed that women members of the council will indicate greater sensitivity to social and environmental issues that are of concern to stakeholders today, including biodiversity risks (Haque and Jones 2020). This is also corroborated by Glass et al. (2016) that women on the board are more focused on long-term corporate decisions and strategies and prioritize the wider community's interests for sustainable environmental development. This is inseparable from the nature of women, who are more altruistic than men and more associated with autonomous, individualistic, and competitive characters (Liao et al. 2015). In addition, women on boards lean to encourage open discussion, share information, and provide greater participation in the company's sustainability disclosure. This will indirectly upgrade the quality of decision-making in the council, especially those related to climate and biodiversity issues (Haque and Jones 2020). Quality board decisions will decrease agency conflicts (Hussain et al. 2018).

Because the relationship between a company's sustainability disclosure and gender (women) is fiercely debated (Matuszak et al. 2019), various researchers have attempted to connect it with theories from other disciplines. As done in the research of Hussain et al. (2018), women are more socially oriented than men. Research that is more comprehensive and pays special attention to the role of gender diversity on board is Rao and Tilt (2016). They find that there is global pressure to increase the presence of women's boards in corporate governance mechanisms and from the works of literature gathered.

Evidently, women can prove a greater influence on decisions on boards. Liao et al. (2015) and Naciti (2019) have also provided empirical evidence on the relationship between women's boards and corporate sustainability disclosures. The results show that women play an important role in the company's strategic policies.

Haque and Jones (2020) mention that there are two reasons why female members on the board can increase the company's biodiversity disclosure. First, women on board members have greater sensitivity to how to build relationships and share stakeholder concerns about environmental damage, especially biodiversity risks. Therefore, they will be more involved in the company's sustainable strategies and actions and continue to try to improve the company's biodiversity disclosure. Second, women on board members tend to encourage open discussion and greater participation. Besides being able to reduce the level of conflict in the decision-making process on the board, the contribution of the women on board can also increase the high quality of council decisions, especially on climate and biodiversity issues. Therefore, we hypothesize that:

**H<sub>3</sub>: The proportion of women on the Board of Commissioners has a positive effect on the company's biodiversity disclosure.**

## RESEARCH METHOD

### Data and Samples

The samples employed in this study are companies on the Indonesia Stock Exchange incorporated in the SRI-KEHATI Index. This index is published by the Kehati Foundation containing 25 companies performing well in supporting sustainable development and have a fairly serious concern for environmental, social, and governance issues<sup>2</sup>. The SRI-KEHATI index has been widely applied by

<sup>2</sup> IDX, "Indeks Saham di BEI", <https://www.idx.co.id/produk/indeks/>, [Online], accessed on 12 March 2021

**Table 2**  
**Sample Data from SRI-KEHATI Indeks Index**

No	Kode	Nama Saham	Sektor	Criteria 1	Criteria 2
1	ASII	Astra International Tbk.	Industrials	✓	✓
2	AUTO	Astra Otoparts Tbk.	Customer Cyclical	✓	×
3	BBCA	Bank Central Asia Tbk.	Financials	✓	✓
4	BBNI	Bank Negara Indonesia (Persero) Tbk.	Financials	✓	×
5	BBRI	Bank Rakyat Indonesia (Persero) Tbk.	Financials	✓	×
6	BBTN	Bank Tabungan Negara (Persero) Tbk.	Financials	✓	×
7	BMRI	Bank Mandiri (Persero) Tbk.	Financials	✓	×
8	BSDE	Bumi Serpong Damai Tbk.	Properties-Real Estates	✓	×
9	DSNG	Dharma Satya Nusantara Tbk.	Consumer Non-Cyclical	×	×
10	INCO	Vale Indonesia Tbk.	Basic Materials	✓	✓
11	INDF	Indofood Sukses Makmur Tbk.	Consumer Non-Cyclical	×	×
12	INTP	Indocement Tunggul Prakarsa Tbk.	Basic Materials	×	×
13	JSMR	Jasa Marga (Persero) Tbk.	Infrastructures	✓	✓
14	KLBF	Kalbe Farma Tbk.	Healthcare	✓	✓
15	LSIP	PP London Sumatra Indonesia Tbk.	Consumer Non-Cyclical	×	×
16	NISP	Bank OCBC NISP Tbk.	Financials	✓	×
17	PGAS	Perusahaan Gas Negara Tbk.	Energy	✓	×
18	PJAA	Pembangunan Jaya Ancol Tbk.	Consumer Cyclical	×	×
19	PTPP	PP (Persero) Tbk.	Properties-Real Estates	✓	✓
20	SIDO	Industri Jamu dan Farmasi Sido Muncul Tbk.	Healthcare	✓	✓
21	SMGR	Semen Indonesia (Persero) Tbk.	Basic Materials	✓	✓
22	TLKM	Telekomunikasi Indonesia (Persero) Tbk.	Infrastructures	×	×
23	UNTR	United Tractors Tbk.	Industrials	✓	×
24	UNVR	Unilever Indonesia Tbk.	Consumer Non-Cyclical	✓	×
25	WIKA	Wijaya Karya (Persero) Tbk.	Properties-Real Estates	✓	×
<b><i>SRI-KEHATI Index for the period May-October 2020</i></b>					
1	ADHI	Adhi Karya (Persero) Tbk.	Properties-Real Estates	×	×
2	JPFA	Japfa Comfeed Indonesia Tbk	Consumer Non-Cyclical	✓	✓
3	PPRO	PP Properti Tbk.	Properties-Real Estates	✓	✓
4	WSKT	Waskita Karya (Persero) Tbk.	Properties-Real Estates	✓	×
5	WTON	Wijaya Karya Beton Tbk.	Industri Dasar	×	×

Note: This index is for the period December 2020 s.d. May 2021 based on Surat Edaran IDX No.: Peng-00353/BEL.POP/11-2020. Criteria 1 (Company issues financial statements from 2018 to 2020). Criteria 2 (Company discloses aspects of biodiversity).

researchers and considered to have an important role since its launch on 8 June 2009 (Akhmadi and Januarsi 2021; Williams 2010). The list of these 25 companies is shown in Table 2.

The observation period in this study is from 2018 to 2020. We based this on the last GRI 2016 conference, which revised several standards, including aspects of biodiversity. In 2017 we issued it because, based on our observations of many companies' sustainability reports, this aspect has not become a priority. Therefore, most companies have not disclosed it. Companies that do not meet two criteria, namely publishing sustainability reports

from 2018-2020 and reporting on biodiversity aspects, are excluded from the sample. Data is obtained from sustainability reports and company annual reports.

From Table 2, it can be obviously declared that several companies have been excluded from the sample because they do not comply with both criteria. The final sample of this research is ten companies with three years of observation. The data that is ready to be analyzed is 30 observation data. This meets the criteria for parametric testing in the form of regression. To see more definitely in what year the company did not publish a sustainability report and/or report on biodiversity, we present it in appendix 1.

## Variable Measurement

### *Dependent Variable*

The measurement of biodiversity still has not found common ground. Several researchers are trying to formulate how to measure biodiversity disclosure. Amran et al. (2021), for example, attempted to develop 11 measurement items based on research from Samkin et al. (2014) and GRI A more comprehensive measurement compiled by Hassan et al. (2020) by making 53 measurement items and dividing them into five main themes, namely company reports on current or previous actions (CPA/ Current-Previous Actions) recruiting 26 items, company prevention efforts against future risks (PAF/Prevent Activities happening in the Future) 8 items, a report on company activities that have an impact on natural sustainability (ELOSS/ extinction/biodiversity loss) 13 items, a report that the company has followed several standards related to biodiversity (FG/following guidelines) 4 items, and a report on fines received or may be imposed on the company (FIN/ company fines) 2 items. In this study, we used the biodiversity measurement index of Hassan et al. (2020). The measurement of each item can be seen in appendix 2.

The data was obtained by the content analysis method, which was carried out by the researcher himself. The measurement uses a scale of 0 to 3 to consider the variety and quality of information reported by companies. A score of "1" is given if the disclosure of a particular item is general, unclear, and contains little information. A score of "2" is given if the disclosure of the company's performance contains objective, current, and verifiable information. A score of "3" is given if the information displayed meets the criteria for a score of "2" plus specific information such as displaying the location, affected species, fauna/flora that have been successfully conserved, the number of funds spent, the company's structured conservation actions on certain species, displaying the latest illustration to provide evidence to readers of their performance reports. Meanwhile, companies that do not

disclose any information on the item will be given a score of 0. The total of all item scores is a form of disclosure of the company's biodiversity (Hassan et al. 2020).

To make it easier to find content pages related to biodiversity information, we run the GRI and POJK indexes which are usually attached by companies at the end of their sustainability reports. We also conduct searches based on related keywords to validate the findings so that no information is missed. These keywords include "biological diversity", "ecosystem", "species", "rare", "conservation", "fauna", "flora". and "habitat".

### *Independent Variable*

We have four independent variables in this study. We describe the measurement of the four independent variables as follows;

- Board Size (BoardSize)
- The size of the board of commissioners is defined as the total Board of Commissioners in corporate governance.
- Proportion of Independent Commissioners (BoardInd)  
The composition of Independent Commissioners is measured using the percentage of Independent Commissioners of the total board of commissioners in corporate governance.
- Proportion of Women on Board of Commissioners (Women)  
the proportion of women on the board is measured by the percentage of female members of the board of commissioners on the total board.

### *Variable Control*

We tried to control the relationship between the independent and dependent variables by adding three variables based on previous research (Haniffa and Cooke 2005; Hassan et al. 2020; Matuszak et al. 2019; Naciti 2019). First, the size of the company is measured using log natural (ln) of total assets. Amran et al. (2021) mention that larger companies have a greater impact on the environment because of their

$$BD_{it} : \alpha + \beta_1 BoardSize_{it} + \beta_2 BoardInd_{it} + \beta_3 Women_{it} + \beta_4 FirmSize_{it} + \beta_5 Profit_{it} + \beta_6 Lev_{it} + \varepsilon_{it}$$

<i>BD</i>	= Biodiversity Disclosure
$\alpha$	= Intercept
<i>BoardSize</i>	= Board of Commissioners size
<i>BoardInd</i>	= Proportion of Independent Commissioners on the board
<i>Women</i>	= Proportion of women on the Board of Commissioners
<i>FirmSize</i>	= Company size as measured using the natural log of total assets
<i>Profit</i>	= Company profitability, measured by the ratio of return on assets (ROA)
<i>Lev</i>	= Company risk, measured by the ratio of total debt/total assets
$\varepsilon_{it}$	= Error term

The hypothesis is accepted if the p value of the tested variables is lower than 5% ( $p < 0.05$ ).

visibility. In addition, larger companies will get more attention from stakeholders. One way to meet the high expectations and pressures from these stakeholders the company will try to disclose more social and environmental-related information, including information related to biodiversity. (Nasih et al. 2019). Second, profitability is measured using ROA (Return on Assets). Based on agency theory, the management of more profitable companies will tend to increase their socio-environmental disclosures and issue them in sustainability reports to maintain their position and reputation in the market. (Bae et al. 2018; Sun et al. 2021). In addition, according to Haniffa and Cooke (2005), management in companies with higher profitability has the freedom and flexibility to carry out and disclose wider environmental performance to stakeholders. Finally, the company's risk is measured using the ratio of total debt/total assets (*Leverage Ratio*). Companies that have high leverage ratios indicate poor financial conditions. The literature states that high-risk companies use socio-environmental disclosures, including biodiversity disclosures, as a means to reduce agency costs (Bae et al. 2018; Naciti 2019).

### Empirical Model and Analysis Techniques

To test the hypothesis, we employed panel data regression analysis. The model used is.

## RESULT AND DISCUSSION

The data analysis and research results will be elaborated through four stages. First, all variables will be presented in descriptive statistics to explain the general picture of the data. This indicates the mean, standard deviation, minimum value, and maximum value of all variables. Second, all samples' biodiversity disclosure measurement index will be displayed and classified based on the index theme and data year. Third, to avoid auto-correlation and multicollinearity problems, we will present the results of the Pearson correlation and VIF (Variance inflation factor) tests. Fourth, hypothesis testing will be carried out using Generalized Least Squares (GLS) regression following many other studies that examine the effect of the relationship between variables (Hassan et al. 2020; Hussain et al. 2018; Sun et al. 2021).

### Descriptive Statistics

In Table 2 above, our observations from the sustainability reports of companies included in the SRI-KEHATI index picture that the company's attention to biodiversity issues is very low. This can be generalized to all companies on the Indonesia Stock Exchange, considering that the companies registered in the SRI-KEHATI index are companies that have a higher sustainability index than other companies. However, further observations need to be made to validate this conclusion.

**Table 3**  
**Descriptive Statistics of All Variables for the Whole Year**

Variable	Min	Max	Mean	SD
<i>Dependent variable</i>				
<b>BD</b>	19	105	58,4	23,060
<b>Theme (1) CPA</b>	15	57	36,33	12,745
<b>Theme (2) PAF</b>	0	15	7,86	4,273
<b>Theme (3) ELOSS</b>	0	30	10,3	8,171
<b>Theme (4) FG</b>	0	5	2,27	1,437
<b>Theme (5) FIN</b>	0	6	1,63	2,220
<i>Independent variable</i>				
<b>Board Size</b>	3	10	6,6	1,940
<b>Board Independent</b>	0,222	0,667	0,399	0,124
<b>Women</b>	0	0,429	0,151	0,127
<i>Control Variable</i>				
<b>Firm Size (Ln)</b>	28,836	34,611	31,551	1,519
<b>ROA</b>	0,004	0,243	0,065	0,064
<b>Leverage</b>	0,012	0,828	0,379	0,286

*Data source: Data processed by researchers*

Further, in Table 3 above, we present summarized descriptive statistics for all variables (dependent, independent, and control). From the table, what is interesting is that the biodiversity disclosure of companies in Indonesia is still quite low. If 53 points in the index are disclosed, the total score that will be obtained is 159, while the average score obtained is 58.4 or 36.7% disclosure. This requires special attention from stakeholders to encourage companies to contribute to efforts to conserve biodiversity and disclose it in their sustainability reports.

### **Biodiversity Disclosure Index Analysis**

In this second stage, we declare the total sample biodiversity disclosure score while displaying the scores by theme and year (see Table 4). The results display an increase in the biodiversity disclosure of companies in Indonesia, especially those indexed in SRI-KEHATI. The average disclosure scores for each year are 52.2, 58.2, and 64.9 for 2018, 2019, and 2020. This indicates that overall, the company is starting to realize the importance of the issue of biodiversity. However, although the overall score increased in this study, the score is very low, considering the maximum score that can be achieved by the company is 53 items, with a maximum

score of 3 = 159 for each company. The percentages for achievements in 2018 are 32.83%, 36.60% in 2019, and 40.82% in 2020, below half of the ideal disclosure according to measurements from (Hassan et al. 2020).

This improvement is also visible in almost all themes. Starting from company reports on current or previous actions related to biodiversity conservation (CPA), company strategies and future plans on biodiversity conservation (PAF), company reports on their contributions directly related to biodiversity conservation (ELOSS), and company reports on engagement and compliance with several guidelines and standards from organizations related to biodiversity conservation such as the Aichi Biodiversity Target, UN SGDs, and other guidelines (FG), as well as disclosure of possible financial or legal penalties that may be received by the company if ignore this aspect and/or the lawsuit for environmental destruction that is being handled by the company (FIN).

This increasing trend strengthens the argument of previous research, which declares that there is a collective call globally for companies to be more aware and motivated to contribute to the preservation of biodiversity (Adler et al. 2018; Hassan et al. 2020).

**Table 4**  
**Biodiversity Index Results by Year**

Index	Year of Observation								
	2018			2019			2020		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
<b>Total Biodiversity Disclosure (BD)</b>	19	80	52,2	21	92	58,2	28	105	64,9
<i>Index of Each Theme</i>									
<b>Theme 1: CPA</b>	16	51	35,3	15	51	35,0	20	57	38,7
<b>Theme 2: PAF</b>	0	13	6,2	1	14	8,3	2	15	9,1
<b>Theme 3: ELOSS</b>	0	21	8,1	3	27	10,4	1	30	12,4
<b>Theme 4: FG</b>	0	4	1,7	1	5	2,5	1	5	2,6
<b>Theme 5: FIN</b>	0	6	0,9	0	6	1,9	0	6	2,1

*Data source: Data processed by researchers*

**Table 5**  
**Correlation Matrix**

	BD	BSize	BInd	Wom	FSize	Prof	Lev
<b>BD</b>	1						
<b>Bsize</b>	0.384** (0.0360)	1					
<b>BInd</b>	-0.3649** (0.047)	-0.7322*** (0.0000)	1				
<b>Wom</b>	-0.1363 (0.4728)	0.1600 (0.3982)	-0.1503 (0.4279)	1			
<b>FSize</b>	-0.0142 (0.9406)	-0.0735 (0.6996)	0.2624 (0.1613)	-0.4627*** (0.0100)	1		
<b>Prof</b>	0.1522 (0.4219)	0.5780*** (0.0008)	-0.3400 (0.0660)	0.4359*** (0.0161)	-0.5471*** (0.0018)	1	
<b>Lev</b>	-0.2049 (0.2774)	-0.2402 (0.2010)	0.1052 (0.5801)	-0.4429* (0.0142)	0.7053* (0.0000)	-0.4521*** (0.0121)	1

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

*Data source: Data processed by researchers*

**Correlation and Multicollinearity**

The two tables below, namely Tables 5 and 6, are the results of the Pearson correlation and VIF (Variance inflation factor) test results. The Pearson correlation test is used to explore the problem of autocorrelation, where variables have a strong relationship and influence each other. Taking a threshold of 0.9 from several studies, such as Hussain et al. (2018), Table 5 shows that there is no strong correlation problem between variables in this study. VIF (Variance inflation factor) is used to analyze the correlation or strong relationship between two or more independent variables in a regression model. The assumption is that if the VIF value is  $< 10$ , then there is no multicollinearity problem. Table 6 shows that the VIF value of all variables is below 10 meaning that the problem of multicollinearity is not our concern.

Further examining the correlation results in table 5, it can be found that there is a strong correlation between the size of the board (BSize) and the proportion of independent boards (BInd) on the company's biodiversity disclosure (BD). This provides preliminary evidence for our hypothesis that corporate governance is associated with corporate biodiversity disclosure. However, the univariate results do not capture other factors that influence BD. Therefore, a multivariate analysis should be carried out to find more accurate results.

Due to the lack of observational data in this study, we consider it important to test whether the data is normally distributed or not. We used two tests, namely the Shapiro Wilk test and the Kolmogorov Smirnov test. The results of these tests can be depicted in the following Table 7.

**Table 6**  
**Multicollinearity**

Variable	VIF	1/VIF
<b>Bsize</b>	7.36	0.135790
<b>BInd</b>	4.65	0.214910
<b>Wom</b>	1.41	0.706834
<b>FSize</b>	5.82	0.171758
<b>Prof</b>	3.85	0.259609
<b>Lev</b>	3.44	0.290361
<b>Mean VIF</b>	4.43	

*Data source: Data processed by researchers*

**Table 7**  
**Normality Test Results**

	Obs	Shapiro Wilk (p value)	Skewness/Kurtosis (p value)
<b>Residual</b>	30	0.52811	0.9105

Based on the results of the normality test of the data with two different tests, undoubtedly, the data in this study are normally distributed. This can be recognized from the p value of the residual data which is above 0.05, so that the test with panel data regression can be continued.

### **Multivariate Analysis and Hypothesis Testing**

Following the procedure for selecting a more appropriate regression model based on research from Matuszak et al. (2019), our research data tends to regression testing using *random effect* (RE). First, we use the Breusch and Pagan Lagrangian multiplier test to investigate if the data in this study are more inclined to the OLS (pooled) model or the random effect (RE) model. The results show that the test value is 0.003 (p value <0.05). Then it can be said that instead of using the OLS model, the research data is more directed to the RE model. Second, to clarify whether RE is better than using FE (Fixed Effect), Hausman test is used for this need. The test value resulted in the number 0.6594 (rejected FE; accepted if p value < 0.05). So, it can be concluded that the data structure is more accurate when using the random effect regression (RE) model. Table 8 proves the results of the random effect regression.

We found that our first hypotheses were accepted, and the other two were rejected. The accepted hypothesis is that the size of the company's board (H1) has a positive effect on the company's biodiversity disclosure with a p value = 0.000, below the specified significance level of 5% (0.05). Meanwhile, what has not been proven to affect the company's biodiversity disclosure is the proportion of Independent Commissioners (H2) and the proportion of women board members (H3).

This positive effect on board size is consistent with the findings of several researchers (like Bae et al. 2018; Nasih et al. 2019; Sun et al. 2021). Sun et al. (2021) mention that boards with different types of expertise, skills, and competencies are more commonly on larger boards, and thus more members on the board have greater ease in fulfilling their function of monitoring management. Thus a larger board size can better ensure management participation in long-term social and environmental projects leading to more sustainability disclosures (Bae et al. 2018).

Due to its large size, the board's management supervision will be stricter so that management will be more careful in running the company's operations. This condition can reduce agency conflicts and send a positive signal to the community and stakeholders that their interests are well

**Table 8**  
**Regression Results (RE)**

<b>Variable</b>	<b>Expected Sign</b>	<b>BD</b>	
<b>BoardSize</b>	+	6.453** (0.000)	H <sub>1</sub> Accepted
<b>BoardInd</b>	+	6.147 (0.901)	H <sub>2</sub> Rejected
<b>Women</b>	+	-34.904 (0.318)	H <sub>3</sub> Rejected
<b>FirmSize</b>	+	-30.737 (0.481)	
<b>Profit</b>	+	-104.975 (0.572)	
<b>Lev</b>	+	-19.886 (0.564)	
<b>Konstanta</b>		5.048 (0.982)	
<b>Obs</b>		30	
<b>R-square</b>		0.2055	

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$ . We deliberately do not control the year because it is based on Test linear hypotheses after estimation using the command 'testparm' on STATA 16. The results show a value of  $0.0535 > 0.05$ , which indicates that time control is not a significant problem in the model. Data source: Data processed by researchers

represented (Bae et al. 2018; Matuszak et al. 2019). Moreover, a large board also depicts a diversity of experience, competence, and background representing a wider range of stakeholders (Sun et al. 2021). Larger board sizes are also more likely to share workload and monitor companies' environmental disclosure, including their biodiversity disclosure (Rossi et al. 2021).

Contrary to our expectations, the Independent Commissioners are expected to put greater pressure on management to disclose social and environmental issues because they represent a wider range of stakeholders. According to Bae et al. (2018), independent boards play an effective and important role on behalf of external stakeholders and the public because of their skills, experience, external (political) relations, high commitment, and are not tied to the company's internal interests. A more logical explanation for this inconsistency is the country effect. This study focuses on the relationship between governance and biodiversity disclosure in companies in Indonesia. The results of a more specific study using Indonesia as a

sample have supported our findings (see Nasih et al. 2019; Purbawangsa et al. 2019; Trireksani and Djajadikerta 2016). Purbawangsa et al. (2019) examined the relationship between governance and corporate social-environmental disclosures in developing countries, including Indonesia, also found that the proportion of Independent Commissioners does not affect corporate sustainability disclosures. This could be due to the small proportion of the Independent Board, so it has been unable to exert more influence. Table 3 shows that the average proportion of Independent Boards is 39%. So that it can be said that companies in Indonesia are limited to meeting the criteria set by the government, which are required to have an Independent Commissioner of at least 30% of the total members of the Board of Commissioners.

The proportion of women on the board is also not proven to have an effect on the company's biodiversity disclosure. The first reason, it can be seen from Table 3 that the average proportion of female Board of Commissioners is 15% and a maximum of 42%. In fact, some companies do not appear to have female members of the Board of



Commissioners. The low proportion of women on the Board of Commissioners can be the cause of their less influential decisions to determine decisions and policies related to biodiversity issues. The second reason, this is also inseparable from the culture and factors of the country where the sample is taken (Naciti 2019). Women have a positive effect on sustainability reporting in developed countries (Alazzani et al. 2019) like the United States (Hussain et al. 2018); Poland (Matuszak et al. 2019); and other countries in Europe and America (Naciti 2019). So, the reason that is most important to the conclusions of this study is that Indonesia is still classified as a developing country. Unlike developed countries where gender equality is at a higher level, patriarchal culture is still deeply rooted in Indonesia (Syukur and Bagshaw 2020). It is hoped that companies in Indonesia can increase female members on the Board of Commissioners to increase diversity in the board so that, in the end, it can improve reporting on corporate sustainability, especially reporting on biodiversity.

Finally, all control variables do not significantly affect the company's biodiversity disclosure. This finding supports the statement of Amran et al. (2021) that research that discusses the drivers of non-financial reporting provides inconsistent results. Some of them found that the company's financial aspects, such as size, leverage, and profitability, had a positive relationship, while other studies proposed the opposite findings. However, many studies also found an insignificant relationship from this relationship. The size of the company and the level of profitability of the company do not affect the current level of demand from stakeholders for companies to disclose their sustainability performance, regardless of the size and financial status of the company. This finding is supported by many studies (see Bae et al. 2018; Haque and Jones 2020; Hussain et al. 2018; Nasih et al. 2019; Roberts et al. 2021; Skouloudis et al. 2019; Sun et al. 2021). Financial leverage is also not a driving factor for bio-

diversity disclosure. This may imply that creditors are not very interested in the non-financial performance information of the company. They tend to use agreements to protect their interests (according to the research of Bae et al. 2018; Naciti 2019; Sun et al. 2021).

## CONCLUSION

The loss of biodiversity, either due to human activities or nature itself, is one of the biggest threats to the environment globally (Mahyuddin et al. 2021; Skouloudis et al. 2019). Therefore, contributions from various parties are needed. No exception for companies based on data from the Indonesian Biodiversity Strategy and Action Plan (IBSAP), Indonesia ranks first in the world for its biodiversity and accounts for 15.5% of the flora and 10% of the fauna. On the other hand, Indonesia has a higher level of environmental risk than other ASEAN countries.

Concerning the company's contribution to biodiversity conservation and extinction prevention, we find that corporate governance mechanisms play an important role. The size of the Board of Commissioners has a positive effect on the company's biodiversity disclosure. The larger the board size allows for the diversity of skills, experience and expertise on the board. In addition, the larger the board permits them to divide the tasks and will be able to focus on sustainability issues. Meanwhile, independent commissioners and women's boards have not yet become a determining factor for the company's biodiversity disclosure. This is inseparable from the characteristics of the country and culture. It seems that companies in Indonesia only meet the minimum requirements of an Independent Commissioner. The patriarchal culture is also still deeply rooted in Indonesian society, so the two attributes of the board have not yet effectively played their role.

Overall, we can conclude that the company's attention to preserving eco-

systems and biodiversity is still very low and inadequate, contrary to what many have hoped for. We use a sample of companies from SRI-KEHATI to assume that companies included in the index can represent other companies in terms of sustainability performance. However, our findings yield contradictory results, particularly about the company's biodiversity disclosure. This is due to the low understanding of companies and market players on the concept of sustainability and related issues that should be of concern to companies and disclosed in their reports.

This research has practical implications for several related parties. For academics, this research can be the initial foundation to provide an overview of how to practice biodiversity accounting in Indonesia. Research on the disclosure of biodiversity is still very limited, so it can still be explored more deeply. For companies, this research proves that biodiversity reporting is only affected by the size of the Board of Commissioners. The company is expected to be more involved in the Independent Board and female members of the Board of Commissioners in dealing with sustainability issues, especially the issue of biodiversity.

This research is far from perfect. There are still many limitations attached to this simple research. For this reason, we will mention this study's limitations and provide direction for future research. These limitations include (i) the sample is still limited and requires future research to expand the sample size. Our initial assumption is that companies included in the SRIKEHATI index can represent the disclosure and sustainability performance of companies in Indonesia. However, many companies still do not publish their complete sustainability reports on their respective websites. Many of them also do not make the issue of biodiversity one of the main concerns. (ii) The measures that we use as proxies for governance include the size, the proportion of the Independent

Commissioners, and the proportion of women members of the board of commissioners. Many sustainability studies have tried to examine the influence of the background of members of the Board of Commissioners, such as their education and experience. Future biodiversity accounting research could use this as a proxy for corporate governance. (iii) To provide more in-depth results, future research can also be carried out using qualitative methods, such as conducting interviews with company management. This approach is very important to explain how the size of the Board of Commissioners can affect the disclosure of biodiversity, as found in this study. Furthermore, a study employing a descriptive-qualitative method on the content of biodiversity disclosure, as done by Adler et al. (2018) could help researchers to investigate further how the pattern of companies in Indonesia in revealing their biodiversity.

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**APPENDIX****Appendix 1;****Sustainability Reports and Biodiversity Disclosure Checklist**

No	Code	Company Name	Sustainability Report			Biodiversity Disclosure		
			18	19	20	18	19	20
1	ASII	Astra International Tbk.	✓	✓	✓	✓	✓	✓
2	AUTO	Astra Otoparts Tbk.	✓	✓	✓	×	×	✓
3	BBCA	Bank Central Asia Tbk.	✓	✓	✓	✓	✓	✓
4	BBNI	Bank Negara Indonesia (Persero) Tbk.	✓	✓	✓	×	✓	✓
5	BBRI	Bank Rakyat Indonesia (Persero) Tbk.	✓	✓	✓	×	✓	✓
6	BBTN	Bank Tabungan Negara (Persero) Tbk.	✓	✓	✓	×	×	×
7	BMRI	Bank Mandiri (Persero) Tbk.	✓	✓	✓	×	×	×
8	BSDE	Bumi Serpong Damai Tbk.	✓	✓	✓	×	×	×
9	DSNG	Dharma Satya Nusantara Tbk.	×	×	✓	×	×	✓
10	INCO	Vale Indonesia Tbk.	✓	✓	✓	✓	✓	✓
11	INDF	Indofood Sukses Makmur Tbk.	×	×	×	×	×	×
12	INTP	Indocement Tungal Prakarsa Tbk.	✓	✓	×	✓	✓	×
13	JSMR	Jasa Marga (Persero) Tbk.	✓	✓	✓	✓	✓	✓
14	KLBF	Kalbe Farma Tbk.	✓	✓	✓	✓	✓	✓
15	LSIP	PP London Sumatra Indonesia Tbk.	✓	✓	×	✓	✓	×
16	NISP	Bank OCBC NISP Tbk.	✓	✓	✓	×	×	×
17	PGAS	Perusahaan Gas Negara Tbk.	✓	✓	✓	×	×	×
18	PJAA	Pembangunan Jaya Ancol Tbk.	✓	✓	×	×	×	×
19	PTPP	PP (Persero) Tbk.	✓	✓	✓	✓	✓	✓
20	SIDO	Industri Jamu dan Farmasi Sido Muncul Tbk.	✓	✓	✓	✓	✓	✓
21	SMGR	Semen Indonesia (Persero) Tbk.	✓	✓	✓	✓	✓	✓
22	TLKM	Telekomunikasi Indonesia (Persero) Tbk.	×	×	×	×	×	×
23	UNTR	United Tractors Tbk.	✓	✓	✓	×	×	×
24	UNVR	Unilever Indonesia Tbk.	✓	✓	✓	×	×	×
25	WIKA	Wijaya Karya (Persero) Tbk.	✓	✓	✓	×	×	×
26	ADHI	Adhi Karya (Persero) Tbk.	✓	✓				
27	JPFA	Japfa Comfeed Indonesia Tbk	✓	✓	✓	✓	✓	✓
28	WSKT	Waskita Karya (Persero) Tbk.	✓	✓	✓	×	×	✓
29	WTON	Wijaya Karya Beton Tbk.	×	✓	✓	×	×	×

**Appendix 2;****Company Biodiversity Disclosure Index (Hassan et al., 2020)**

<b>Code</b>	<b>Disclosure Items</b>
	<i>Company report on current/previous actions</i>
CPA1	Company reports on corporate expressions of moral, ethical, and/or emotional motivations for preserving species and preventing extinction with a consideration of ecosystem level effects, including normative reflective self-accounts of the company's impact on threatened and endangered species.
CPA2	Company report on partnership engagement between wildlife/nature/conservation organisations and the company which aim to address corporate impacts on endangered species.
CPA3	Company report on assessment and reflection on outcome/impact of engagement/partnerships and decisions taken about necessary changes to policy/initiatives going forward.
CPA4	Company provides pictorial representation of success in conservation.
CPA5	Company report on provision of education/training delivered on extinction accounting to all employees.
CPA6	Company report on support given at managerial level, ensure understanding of extinction accounting by decision makers.
CPA7	Company report on its involvement in afforestation activities (such as seedling transplantation, forest plantation, sustainable forestry practices, or other reforestation activities).
CPA8	Company reports its involvement in protection/conservation of "Ecological corridors" in and around the manufacturing plants, mines, transport infrastructure, and/or other locations.
CPA9	Company report on "biodiversity assessment" of its activities in and around the manufacturing plants, mines, transport infrastructure, and/or other locations.
CPA10	Company report on implementation of "biodiversity offset" for reducing their biodiversity impacts.
CPA11	Company report on biodiversity partners (both local and international organisations) helping company in biodiversity conservation.
CPA12	Company report on biodiversity projects undertaken to enhance the biodiversity in and around the manufacturing plants, mines, transport infrastructure and/or other locations.
CPA13	Company report on its involvement in land management/land rehabilitation activities.
CPA14	Company reports on floral wealth in or around its operating area (production/functional/transportation).
CPA15	Company discloses the faunal wealth in or around its operating area (production/functional/transportation).
CPA16	Company reports on donation provided (or conducted philanthropic activities) which contributed to the conservation, protection, enhancement, promotion, and preservation of biodiversity.
CPA17	Company reports steps taken for creating biodiversity awareness among its employees or in the community.
CPA18	Company report on participation in biodiversity associations (external agencies, NGOs) to improve biodiversity practices in the community.
CPA19	Company reports on amount spent (R&D, technologies, innovations) for biodiversity conservation/restoration.
CPA20	Company reports on environment policy strategy (or statement) values (or concerns) biodiversity.
CPA21	Company reports biodiversity award or recognition received for biodiversity conservation/restoration.
CPA22	Company reports biodiversity in top-level management plan.
CPA23	Company reports international conventions for biodiversity conservation and restoration.
CPA24	Company reports regular assessments (audit) of species populations in areas affected by corporate operations.
CPA25	Explain how these have been integrated into the company's internal control system, business model, business strategy, and operational plans.
CPA26	Company reports biodiversity action plan or biodiversity goals/targets for coming years.

	<b><i>Prevent activities happening in the future</i></b>
PAF27	Report on potential risks/impacts on these specific species arising from the company's operations.
PAF28	Report assessment of whether or not corporate initiatives/actions are assisting in prevention of future species extinction.
PAF29	Report strategy for the future development and improvement of actions/initiatives.
PAF30	Include a discussion of ways in which the company is working to prevent future liabilities related to harming endangered species.
PAF31	Offering where possible future graduate schemes on extinction accounting.
PAF32	In the future, collaborate with key advisors across professions to conceptualise accounts and progress with ecologists, scientists, humanities scholars, and other experts
PAF33	Update shareholders/stakeholders quarterly with progress and future actions,
PAF34	Provide education on extinction initiatives to schools in future,
	<b><i>Report on activities contributing to extinction/biodiversity loss</i></b>
ELOSS35	Record a list of plant and animal species, identified as endangered by the IUCN Red List, whose habitats are affected by the company's activities
ELOSS36	Report where, geographically, the company's activities pose a threat to endangered plant and animal species, as identified by the IUCN Red List
ELOSS37	Report and assess habitat status area protected, restored, affected, and conserved.
ELOSS38	Report on potential risks/impacts on these specific species arising from the company's operations.
ELOSS39	Company reports operations (countries) with activities in IUCN category I–IV protected areas.
ELOSS40	Company reports the native/indigenous/endemic species affected/conserved/protected/restored.
ELOSS41	Company reports ecosystems affected/conserved/protected/restored.
ELOSS42	Company reports wetlands affected/conserved/protected/restored.
ELOSS43	Company reports marine biodiversity affected/conserved/protected/restored.
ELOSS44	Company reports rivers, creeks, lakes, reservoirs, or waterways affected/conserved/protected/restored.
ELOSS45	Company report by incorporate images (photos or drawings, for example) of threatened species which are affected by the company's operations and which the company need to protect.
ELOSS46	Provide pictorial representation of failure, that is, species loss.
ELOSS47	Report on company's biodiversity/species loss due to its operations.
	<b><i>Report on guidelines or adopt the following</i></b>
FG48	Ensure that the whole process of "extinction accounting" is integrated into corporate strategy and is incorporated into the company's "integrated report," not resigned to separate sustainability reports or websites, including species specific information.
FG49	Report on compliance of United Nations Sustainability Development Goal (No15) Life on Land 15.5. Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
FG50	Report on compliance of Aichi Target 12—By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.
FG51	Report using International Integrated Reporting Council (IIRC) framework.
	<b><i>Report on company fines</i></b>
FIN52	Report potential liabilities relating to future possible legal fines/claims relating to endangered species impacts
FIN53	Report full details (narrative as well as financial figures) relating to any fines or ongoing claims relating to endangered species legislation including the names of species and a summary of losses suffered with causes identified