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Research article

An exploration of circular water management accountability: A case from Indonesia

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ABSTRACT

Purpose: Palm oil is the leading commodity of the plantation sub-sector in Indonesia, providing a tremendous economic impact for the people and the government. However, the development of oil palm plantations raises the issue of environmental damage because oil palms use large quantities of water. The purpose of this study is to explore circular water management accountability practices through disclosures issued by each company and the effectiveness of water management voluntary disclosure under the Global Reporting Initiative (GRI) standards on increasing stakeholder trust and reducing information asymmetry.

Design/methodology/approach: This study used secondary data collected from reports published by plantation sub-sector companies listed on the Indonesia Stock Exchange (IDX) and accessible online. Analysis was performed using the method of Miles and Huberman (1992): data reduction, data presentation, conclusion drawing, and verification. Data reduction was conducted by identifying plantation sub-sector companies that reported water management practices consecutively from 2018 to 2020 and seeking all disclosures related to water management and circular water management practices with 3R indicators. Data presentation was carried out by presenting findings from circular water management disclosures and comparing inter-year circular water management accountability practices to examine reporting routines. Finally, conclusions were drawn and verified.

Findings: The results of this study show that only six of the 20 plantation sub-sector companies reported circular water management with 3R indicators for three consecutive years (2018–2020). Two of these six companies attached GRI index references to their reports consisting of GRI 303 (Water and Effluents) and GRI 306 (Waste), while the other four did not. In addition, water management voluntary disclosure under the GRI standards was shown to increase stakeholder trust and reduce information asymmetry.

Originality/value: This study raises the concepts of water accounting and circular water management accountability practices in plantation sub-sector companies listed on Indonesia Stock Exchange (IDX).

1. Introduction

Indonesia is an agricultural country (Syahza et al., 2021). In 2017, the plantation sub-sector proved to have a significant role in Indonesia's development and economy, earning it the title of the largest foreign exchange earner at USD 23 billion (Rinaldo and Endri, 2020). The agricultural sector, including the plantation sub-sector, is claimed to be the largest user of fresh water in the world because it requires more than 85% of human water consumption (Falkenmark and Rockström, 2004; D'Odoricoa et al., 2020; Grafton and Hussey, 2011). This mean more than 85% of total human water consumption consumed in the agricultural sector. Water is an essential resource on earth because of its irreplaceable role in maintaining the function of the environment and society (D'Odoricoa et al., 2020). Lack of water can affect the growth and production of plants and a company's business activities (Amanah et al., 2019; Veranica, 2014; Sukmawan et al., 2019).

As the leading commodity of the plantation sub-sector in Indonesia, palm oil has an incredible economic impact on the people and the

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government (Syahza et al., 2021). The land used for oil palm plantations in Indonesia is 14, 858, 300 ha as of 2020 (Badan Pusat Statistik, 2020). However, the development of oil palm plantations raises the issue of environmental damage because oil palms use large quantities of water, threatening the availability of water in the surrounding areas (Sukmawan et al., 2019; Idris, 2017). Nevertheless, many studies break the stigma that oil palm is a water-hungry plant (Harahap and Darmosarkoro, 1999; Pasaribu et al., 2012; Taufir et al., 2013). Baskoro (2017) argued that the decrease in water availability around plantations does not occur because of their development but because of inadequate water management by companies in the plantation sub-sector, considering that oil palm is a water-efficient plant compared to other crops.

Oil palms require constant rainfall throughout the year due to their shallow roots, which do not store water properly. This implies that oil palms store water but not in a way necessary for plant survival. Generally, harvest roads have low infiltration capacity (Baskoro, 2017; Hashim et al., 2014). This mean the soil on the bushland is not exposed to the direct impact of rainwater because it is blocked grass or leaves of wild plants that exist on the surface of the soil so that the soil structure is not easily destroyed and the soil absorbs water more easily. Low organic matter can affect the stability of the aggregate consequently soil is easily destroyed when exposed to rain or when inundated so that the soil pores clogged with soil particles dispersed and reduce the infiltration rate on the ground. Unfortunately, this rainfall is not evenly distributed throughout Indonesia, with a more extended rainy season in the western part of Indonesia (Sumatra, Java, Kalimantan, Sulawesi, and Bali) than in the eastern region (the Maluku Islands and Lesser Sunda Islands), except for Papua (Anshori, 2004; Naharuddin et al., 2021). In addition, 53%–86% of the average annual rainfall occurs from October to March, while the dry season runs from April to September (Anshori, 2004; Swarinoto et al., 2019).

Indonesia also has other plantations, such as coconut, rubber, coffee, cocoa, sugar cane, tea, and tobacco (Syahza et al., 2021; Badan Pusat Statistik, 2020; Hidayat, 2013). The total area of plantation land is 25, 470, 800 ha, 12.67% of the total land area of Indonesia (Pratama, 2020). Therefore, the quantity of water needed for these plantations is quite significant, and plantation sub-sector companies must manage water to achieve the targets of the Sustainable Development Goals (SDGs) (Molden, 2007; Rickfält, 2019).

Water is essential for human life, the environment, and economic growth (Jatnika et al., 2021; Distefano and Kelly, 2017; EC, 2012). Its availability is critical for companies to support plantations and run their businesses. Water availability is regulated in Law no. 17 of 2019 concerning Water Resources Article 3, which states that the "Regulation of Water Resources aims to: (a) provide protection and guarantee the fulfillment of the people's right to water; (b) ensure the sustainability of the availability of Water and Water Resources to provide equitable benefits to the community [and] (c) ensure the preservation of the function of Water and Water Resources to support sustainable development."

Every company must disclose matters related to its social and environmental responsibilities, including those associated with the use of natural resources such as water. The company's obligation to disclose this social responsibility report is also stated in Government Regulation no. 47 of 2012 concerning Social Responsibility of Limited Liability Companies Article 2, which says that "Every company as a legal subject has social and environmental responsibilities." Article 4 paragraph (1) PP No. 47 of 2012 states "Social and environmental responsibilities are carried out by the Board of Directors based on the Company's annual work plan after obtaining approval from the Board of Commissioners or the General Meeting of Shareholders (GMS) in accordance with the Company's articles of association, unless otherwise stipulated in the laws and regulations". The social responsibility report informs stakeholders (investors, residents, general public etc) about the company's activities related to the environment and how the company participates in preserving the environment. This research examines circular water management accountability practices in Indonesian companies operating in the plantation sub-sector industry and the effectiveness of water management voluntary disclosure under the Global Reporting Initiative (GRI) standards on increasing stakeholder trust and reducing information asymmetry.

This study begins with a literature review, followed by a section on research methodology. Next, data analysis and findings are further explained and are followed by a discussion. Lastly, conclusions are presented along with suggestions for government and plantation sub-sector companies and suggestions for future studies.

2. Literature review and hypothesis development

2.1. Legitimacy theory and agency theory

Legitimacy theory is a mechanism that encourages organizations to generate voluntary social and environmental disclosures that justify their existence through economic and social actions that are legal and do not harm society and the environment (Burlea and Popa, 2013). Legitimacy theory aims to reduce the gap between how the public wants an organization to behave and how the organization actually behaves (Gray et al., 1995). However, underperforming organizations may use sustainability disclosures as a legitimate tactic to influence the public regarding their sustainability performance (Hummel and Schlick, 2016; Deegan, 2002; O'Donovan, 2002). This tactic leads the public into believing the underperforming organizations are meeting societal expectations when they are not. Community legitimacy is a strategic factor for the company in order to develop the company in the future. This can be used as a vehicle for constructing the company's strategy, especially related to efforts to position itself in the midst of an increasingly advanced society. Organizational legitimacy can be seen as something that companies want or seek from society. Thus, the quality of these sustainability disclosures can indicate the quality of an organization's performance concerning the health of society and the environment.

Agency theory discusses the relationship between agents/managers and shareholders/principals (Jensen and Meckling, 1976). Agents are tasked with maximizing the value of an organization and serving the interests of shareholders (Ordóñez-Castaño et al., 2021). However, agency theory predicts a conflict of interest that gives rise to problems when agents choose to satisfy their own interests rather than work in the interests of shareholders (Jensen and Meckling, 1976). One such problem is information asymmetry between agents and shareholders (Ordóñez-Castaño et al., 2021). Agents can disclose exaggerated social and environmental activities that provide legitimacy to the company and lead stakeholders to consider the company's sustainability performance to be very good (Hummel and Schlick, 2016). If this information asymmetry continues to occur, this can reduce stakeholder confidence.

2.2. Sustainable accounting and accountability

The role of sustainable development is becoming increasingly important as the social and environmental impacts of human activities become increasingly significant (Bebbington and Larrinaga, 2014). Sustainable development includes social, economic, and ecological aspects to meet the needs of the present without compromising the ability of future generations to meet their own needs (Bebbington and Larrinaga, 2014; Beredugo and Mefor, 2012). Therefore, accounting is inseparable from sustainable development. Gray (2001) presents accounting to sustainability in three strands:

1. Social audits refer to a public analysis conducted by independent bodies on accountable entities without the entities' consent.
2. Silent social accounts refer to social and environmental reports that are organized without being published.
3. Structured social accounts refer to the systematic reporting of social and environmental performance.

Sustainable accounting includes social and environmental reports useful for fulfilling stakeholder rights, self-justification, and independent public analysis regarding an entity's accountability for the resources used (Fitriasari et al., 2021). Accountability can be used to seek stakeholders' approval (legitimacy) and adjust to meet social expectations (Deegan, 2002; Fitriasari et al., 2021). Accountability can be demonstrated through sustainability reporting, which serves to assess the economic, environmental, and social impacts of an entity's activities and its contribution to sustainable development (Kaur and Lodhia, 2019; GRI, 2004; Fitriasari et al., 2021).

2.3. Water accounting and accountability

Water accounting is an essential tool for managing water (Ansorge et al., 2016) and analyzes water use, depletion, and water production (Molden, 1997). Water accounting systems can solve various economic, social, and environmental problems (Chalmers and Godfrey, 2012). Although differences in measurement methods can lead to different results in water accounting data, water sources, availability, use, and maintenance must remain the main measurement factors (Fitriasari et al., 2021; Ansorge et al., 2016). Linking water accounting and accountability can assist entities in deciding appropriate steps toward improving water conservation and help stakeholders oversee the entity's accountability for clean water availability (Fitriasari et al., 2021). In addition, water accounting reports can be used as a reference in shaping water policies to manage water resource use better (Prasetyo, 2017). However, reporting related to water is still very rarely done by companies in Indonesia (Adhariani, 2021; Suhardjanto and Nugraheni, 2012).

2.4. Water management disclosure sustainability standards

Two sustainability standards are GRI 303 and standards issued by the Sustainability Accounting Standards Board (SASB). GRI standards are issued by the Global Sustainability Standards Board (GSSB) and are designed to report the impact of an organization's activities on the economy, environment, and society (GSSB, 2018). SASB was established in 2011 as an independent, non-profit standard setting organization that aims to establish and maintain industry-specific standards in disclosing material and financially useful sustainability information to investors (SASB, 2018).

Table 1 shows that GRI 303 can be used by organizations of various sizes, types, sectors, or geographic locations, while SASB is intended for specific sectors (in this study, agriculture) (GSSB, 2018; SASB, 2018). GRI 303 is divided into two parts: management approach disclosures (303–1 and 303–2) and topic-specific disclosures (303–3 to 303–5) (GSSB, 2018). SASB does not discuss the management approach and focuses more on water management risk and compliance (SASB, 2018). The two standards complement each other because GRI 303 supports broad and comprehensive disclosures about organizational impact, while SASB focuses on material-financial issues such as risk and compliance (GRI, 2021).

2.5. Circular water management

Without better water management in the agricultural sector, the Millennium Development Goals (MDGs) in poverty, hunger, and a sustainable environment will not be achieved (Molden, 2007). Better water management can be achieved by shifting the world's focus from linear water management to circular water management. In linear water management, the entity will only exploit water resources by taking, using, and disposing of used water (Zvimba and Musvoto, 2018). The management process only occurs in wastewater to reduce water pollution. However, in circular water management, water management becomes more efficient in helping preserve the environment and cutting costs while increasing public awareness of water management's importance (Dwianika et al., 2020).

Table 1. Comparison between GRI 303 and SASB.

	GRI 303	SASB
Scope	Water and Effluents	Water Management
Organization Type	An organization of any size, type, sector, or geographic location.	Food & Beverage Sector, Agricultural Products
Standards	• Disclosure 303–1 Interactions with water as a shared resource • Disclosure 303-2 Management of water discharge-related impacts • Disclosure 303-3 Water withdrawal • Disclosure 303-4 Water discharge • Disclosure 303-5 Water consumption	• FB-AG-140a.1. (1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress • FB-AG-140a.2. Description of water management risks and discussion of strategies and practices to mitigate those risks • FB-AG-140a.3. Number of incidents of non-compliance associated with water quantity and/or quality permits, standards, and regulations

Circular water management is not only trusted to help the world achieve SDG No. 6 (clean water and sanitation for all) (Rickfält, 2019), but also to ensure food security, reduce poverty, and preserve ecosystems (Molden, 2007). Circular water management consists of 3R (Zhijun and Nailing, 2007; WBCSD, 2017; Mbavarira and Grimm, 2021), namely:

1. **Reduce** excessive use of water resources in business processes.
2. **Reuse** wastewater that has been used in business processes as a new resource.
3. **Recycle** wastewater generated from business processes so that it can be reused.

2.6. Indonesia plantation area

Plantations in Indonesia are spread across all 33 provinces except for Jakarta (Badan Pusat Statistik, 2020) and take up 12.67% of the total land area of Indonesia (Pratama, 2020). Oil palm plantations take up an area of 14, 858, 300 ha, which is significantly larger than other plantations, as shown in Table 2 (Badan Pusat Statistik, 2020).

2.7. Prior studies

Purwanto et al. (2019) discussed the impact of oil palm plantation companies' compliance with regulations, the application of the principle of accountability, and the effect of corporate social responsibility (CSR) on company profits. The normative research was carried out using several laws and regulations, documents, and books related to case studies (Purwanto et al., 2019). The results indicate that (1) oil palm plantation companies have a responsibility in implementing CSR by applying the principle of accountability as part of good corporate governance, and (2) the implementation of CSR is not only a responsibility but is also a promotional medium to help drive profits (Purwanto et al., 2019). Therefore, this study explores the development of circular water management accountability practices (a form of CSR) in plantation sub-sector companies.

Water accounting and accountability has not been widely researched in Indonesia (Fitriasari et al., 2021). Researchers previously conducted research in mining areas to answer the question: “How are the practices of water accountability and accounting in Indonesia within mining

Table 2. Plant type and land area in Indonesia.

Plant Type	Land Area (Ha)
Palm Oil	14,858,300
Palm	3,396,800
Rubber	3,681,300
Coffee	1,242,800
Cocoa	1,528,400
Sugarcane	420,700
Tea	112,700
Tobacco	229,800
Total	**25,470,800**

intensive and declining water deposit areas?" (Fitriasari et al., 2021). The study adopted a cross-unit case study approach of a qualitative method through two stages: (1) exploring the general practice of water accountability by descriptively calculating water accounting disclosures, and (2) exploring the routines of water accounting disclosures published by companies (Fitriasari et al., 2021). The results show that most mining companies do not publish sustainability reports regularly, and very few report water accounting. In addition, most mining companies that generated water accounting disclosures successively in 2014–2016 showed varying accounting practices (Fitriasari et al., 2021). Therefore, this study explores the development of circular water management accountability practices in related companies.

2.8. Hypothesis development

Based on legitimacy theory, disclosure of information is needed to inform the public about the company's activities and behavior and justify its actions by changing the public's perception of every situation that may arise (Ordóñez-Castaño et al., 2021). Legitimacy theory assumes that public interactions strengthen stakeholders' trust based on the company's behavior towards environmental issues, including water (Chan et al., 2014; Ordóñez-Castaño et al., 2021). Voluntary disclosure can be used to seek approval (legitimacy) from stakeholders so that an entity can meet social expectations (Deegan, 2002; Fitriasari et al., 2021). According to agency theory, environmental disclosure reduces information asymmetry between agents and stakeholders and reduces conflicts of interest with stakeholders (Freeman, 2004; Shocker and Sethi, 1973).

Based on these theories, the following hypotheses were developed:

H1. Circular water management voluntary disclosure under GRI standards increases stakeholder trust.

H2. Circular water management voluntary disclosure under GRI standards reduces information asymmetry.

3. Research methodology

3.1. Data collection method

This study used secondary data obtained indirectly from other people, company archives, profiles, manuals, or libraries (Hardani et al., 2020). Data collection was carried out using archival data, original documents collected and stored by the government, organization, or family (George, 2008). Moleong (2005) in (Hardani et al., 2020) states that document studies can be conducted on official documents (formal records). Data were collected and analyzed manually from annual, or sustainability reports published by the company and accessible online for the 2018–2020 period. The sustainability report should be a report on water, but companies in Indonesia often combine environmental-related reporting in the annual report. Therefore, this study used a yearly report to obtain data.

3.2. Sample size

Data were collected from agricultural industry companies of the plantation sub-sector listed on IDX in 2020. The companies are listed in Table 3 (Kayo, 2020; Invesnesia.com, 2019).

3.3. Analytical method

The data analysis method of Miles and Huberman (1992) in (Hardani et al., 2020) was used in this study and consisted of:

1. Data reduction, namely the simplification of data by sharpening, classifying, directing, and organizing to produce a conclusion. Data reduction was conducted as follows:
   a. Identifying plantation sub-sector companies that reported water management practices consecutively from 2018 to 2020.
   b. Looking for all disclosures related to water management and exploring circular water management practices with 3R indicators.
2. Presentation of data, namely the presentation of structured information that can provide the possibility of drawing conclusions and taking action. The presentation of the data was carried out in the following stages:
   a. Presenting data related to circular water management practices, including 3R indicators disclosed by plantation sub-sector companies listed on IDX consecutively from 2018 to 2020.
   b. Comparing inter-year circular water management accountability practices to examine reporting routines.
3. Drawing conclusions and verification, namely the process to answer the problem formulated from the start. Conclusions must be relevant to the focus, objectives, and research findings.

4. Data analysis and findings

4.1. Companies characteristic

Table 4 shows the frequency and percentage of plantation sub-sector companies listed on IDX before 2018, in 2018, and after 2018. Eighteen of the 20 companies listed before and in 2018 reported the practice of circular water management three years in a row (2018–2020). The

Table 3. Sample.

Code	Companies
AALI	Astra Agro Lestari Tbk.
ANDI	Andira Agro Tbk.
ANJT	Austindo Nusantara Jaya Tbk.
BWPT	Eagle High (BW) Plantations Tbk.
CSRA	Cisadane Sawit Raya Tbk.
DSNG	Dharma Satya Nusantara Tbk.
GOLL	Golden Plantation Tbk.
GZCO	Gozco Plantation Tbk.
JAWA	Jaya Agra Wattie Tbk.
LSIP	PP Landon Sumatera Indonesia Tbk.
MAGP	Multi Agro Gemilang Plantation Tbk.
MGRO	Mahkota Group Tbk.
PALM	Provident Agro Tbk.
PSGO	Palma Serasih Tbk.
SGRO	Sampoerna Agro Tbk.
SIMP	Salim Ivomas Pratama Tbk.
SMAR	Sinar Mas Agro Resources and Technology Tbk.
SSMS	Sawit Sumbermas Sarana Tbk.
TBLA	Tunas Baru Lampung Tbk.
UNSP	Bakrie Sumatera Plantation Tbk.

Source: sahamok.com; invesnesia.com.

Table 4. Year listed on Indonesia stock exchange (IDX).

Year Listed on IDX	Frequency	Percentage
<2018	16	80%
2018	2	10%
>2018	2	10%
Total	20	100%

Source: sahamok.com; invesnesia.com.

remaining two companies registered after 2018 did not report circular water management practices for three consecutive years. However, the disclosure and approach of circular water management in those two companies were still explored.

Table 5 shows the reports published by plantation sub-sector companies listed on IDX from 2018 to 2020. Data for 2018 were obtained from 12 annual reports and six sustainability reports. The two companies that did not publish an annual or sustainability report in 2018 only recently registered with IDX in 2019 and 2020. They only published an annual report and a sustainability report in 2019. The data for 2019 were obtained from 13 annual reports and five sustainability reports, while data for 2020 were obtained from 11 annual reports and six sustainability reports.

4.2. Water management accountability

In 2018, eight out of the 20 companies reported circular water management with 3R indicators. Three companies reported water management without 3R indicators, while nine did not publish water management reports. In 2019, circular water management reporting increased to nine companies and rose again to ten companies in 2020. Details are listed in Table 6.

Six plantation sub-sector companies reported circular water management with 3R indicators for three consecutive years (2018–2020). Six different plantation sub-sector companies reported circular water management, although not for three straight years. Four of these showed an increase in data reported (from no water management reporting to water management reporting in a later year, followed by circular water management reporting in an even later year). Two shared a decrease (from reporting circular water management one year to no water management reporting in a later year) because the sustainability reports were not published or were inaccessible. In addition, three plantation sub-sector companies were found to report water management but did not have complete 3R indicators. One of the three companies reported water management for three consecutive years, another company just listed on IDX in 2019 reported water management for two straight years, and the last company did not publish an annual or sustainability report for the last two years.

4.2.1. Circular water management accountability

The six plantation sub-sector companies that reported circular water management with 3R indicators for three consecutive years (2018–2020) were:

a. Eagle High (BW) Plantations Tbk. (BWPT)

From 2018 to 2020, BWPT published sustainability reports with 3R indicators. BWPT attached total water use from a surface water source, showing Reduce indicators, full discharge of used water from the production process, and measurement results of discharged water quality for land application. Most palm oil mill effluent (POME) produced is recycled and reused as organic fertilizer or liquid fertilizer and then used for land application systems. BWPT also attached GRI 303 and GRI 306 index references to its reports.

Table 5. Reports type.

Year	Annual Report	Sustainability Report	No Reports
2018	12	6	2
2019	13	5	2
2020	11	6	3

Table 6. Water management reports.

Year	Circular Water Management	Water Management	No Water Management
2018	8	3	9
2019	9	3	8
2020	10	2	8

b. PP London Sumatra Indonesia Tbk. (LSIP)

LSIP published sustainability reports with 3R indicators from 2018 to 2020. LSIP attached water use efficiency, which consists of water consumption and shows the Reduce indicator. LSIP also linked waste and effluent management to show Recycling and Reuse indicators. POME is recycled and reused as crude palm oil (CPO) and organic fertilizer. PP London Sumatra Indonesia Tbk. (LSIP) also attached GRI index references to its reports, consisting of GRI 303 and GRI 306 in 2018 and 2019.

c. Sampoerna Agro Tbk. (SGRO)

The data used to research circular water management accountability were the annual reports published by SGRO from 2018 to 2020. SGRO attached water source identification and management. SGRO is known to have an underground water utilization permit and a surface water tapping & utilization permit. The efforts made by SGRO in reducing water use were the installation of a flowmeter, daily recording of water use, and reporting water use to show that the daily amount did not exceed limits stipulated in the permit. SGRO also measures water quality and pays taxes on water use. POME is managed according to government quality standards starting from the cooling pond, anaerobic pond, maturity pond, and to land application. POME is utilized optimally with a methane capture facility equipped with a biogas power plant, which reduces methane as a greenhouse gas (GHG) emission from POME. SGRO did not attach the GRI index references to the annual reports.

d. Sinar Mas Agro Resources and Technology Tbk. (SMAR)

SMAR published annual reports for 2018 to 2020, which included 3R indicators. SMAR attached a water footprint and power consumption management showing Reduce and Reuse through total water consumption and water reused from the condensate process. SMAR has a zero-waste policy to manage its waste. POME is recycled and reused as CPO, organic fertilizer, and fuel. SMAR did not attach the GRI index references to the annual reports.

e. Tunas Baru Lampung Tbk. (TBLA)

Table 7. Water management accountability in plantation sub-sector companies.

Accountability	Numbers of companies	Percentage
Reported Circular Water Management for three consecutive years	6	30%
Reported Circular Water Management	6	30%
Reported Water Management	3	15%
No Water Management Reporting	5	25%
Total	20	100%

TBLA published annual reports with 3R indicators from 2018 to 2020. TBLA attached water management carried out through conservation in water catchment areas and preservation of high conservation value (HCV) areas. TBLA also attached waste management and environmental sustainability that uses 3R principles. POME is recycled and reused as organic fertilizer to add soil nutrients, reduce groundwater loss, and prevent soil erosion. TBLA did not attach the GRI index references to the annual reports.

f. Bakrie Sumatera Plantation Tbk. (UNSP)

The data used to research circular water management accountability from 2018 to 2020 were the annual reports published by UNSP. UNSP attached energy and water resources consumption efficiency and water management, which show Reduce and Reuse indicators. In addition, UNSP attached waste management, which shows that POME is recycled and reused as organic fertilizer and processed with a land application system to increase the production of fresh fruit bunches. UNSP did not attach the GRI index references to the annual reports.

5. Discussion

Stakeholder theory on value creation and trade and how to manage a business effectively. Stakeholder pressure motivates companies to invest and make better policies on environmental performance (de Villiers et al., 2011). With the stakeholder theory, it can provide a foundation that a company must be able to provide benefits to its stakeholders because the company's social responsibility is not only to its owners or shareholders but also to stakeholders who are related and or affected by the company's existence. The practice of circular water management provides an excellent opportunity for the company, which can provide significant efficiency gains and cost savings and is the key to achieving the company's water targets. Company stakeholders need to consider the actual cost of water and consider this when designing projects and making decisions. Therefore, the disclosure of circular water management will increase stakeholder confidence regarding water management and use (WBCSD, 2017). Water accounting reports are an essential reference in shaping water policies to manage water resource use better (Prasetyo, 2017). However, water reporting is rarely done by companies in Indonesia (Adhariani, 2021; Suhardjanto and Nugraheni, 2012). Fifteen out of the 20 plantation sub-sector companies listed on IDX reported water management, both with and without 3R indicators. Unfortunately, these water management reports are not routinely published. Seven out of the 20 companies regularly reported water management for three years, six reported circular water management regularly for three years, and another reported water management without complete 3R indicators where the one that reported without 3R indicators make up the seven companies not discussed. Water accounting reports, including mandatory ones such as annual and sustainability reports, are not regularly published. Table 5 shows that two to three of the 20 plantation sub-sector companies did not publish an annual or sustainability report.

Risks related to water management can include lack of water for production, poor product quality due to insufficient water quality, and regulatory issues related to disposal. It will undoubtedly affect the decisions taken for the company's progress. However, implementing circular water management will reduce this risk. With the disclosure of circular water management, certain parties can know information related to water management opportunities and benefits (WBCSD, 2017). The six plantation sub-sector companies that regularly reported circular water management with 3R indicators from 2018 to 2020 are Eagle High (BW) Plantations Tbk (BWPT), PP London Sumatra Indonesia Tbk. (LSIP), Sampoerna Agro Tbk (SGRO), Sinar Mas Agro Resources and Technology Tbk. (SMAR), Tunas Baru Lampung Tbk (TBLA), and Bakrie Sumatera Plantation Tbk. (UNSP). The data used to examine two of the six companies were sustainability reports, while the data used to examine the other four companies were annual reports. Two of the six companies attached GRI 303 and GRI 306, while the other four did not.

The companies made various efforts to reduce water use, manage and recycle wastewater, and reuse recycled water. One company reported its efforts to reduce water use by installing a flowmeter, recording daily water use, and reporting the amount of water used. Other companies are using the condensate process to reuse water. Wastewater, namely POME produced in the business process, is recycled and reused by companies as CPO, organic fertilizer, and fuel. The organic fertilizer increases the production of fresh fruit bunches, increases soil nutrients, reduces soil water loss, and prevents soil erosion.

Unlike plantation companies in Indonesia, a Thai company called Chumporn Palm Oil Industry PCL publishes its sustainable development report on its website (CPI, 2022). Water and wastewater management are explained in more detail through ongoing projects and measurements to more efficiently use water (CPI, 2022). Two wastewater management projects carried out in 2020 were (1) Biogas Production Technology and Waste Water Management for the Preservation of Energy and Environment, and (2) The Waste Water Treatment Pipelines Project. The first project benefited the surrounding communities and the environment, while the second project sent water to Animal Foods and Agriculture Center Project and neighboring palm plantations.

Indonesian plantation companies currently use only GRI standards as a reference for water management. However, reporting would be improved if the companies also used SASB standards to complement GRI standards. GRI and SASB standards complement each other because GRI standards support broad and comprehensive disclosure of organizational impact, while SASB focuses on material-financial issues such as risk and compliance (GRI, 2021).

6. Conclusion

The GRI Standards create a common language for organizations and their stakeholders, so that the economic, environmental and social impacts of those organizations can be communicated and understood. This standard is designed to improve global comparability and the quality of information on these impacts, thereby enabling greater organizational transparency and accountability. Voluntary disclosure under GRI standards increased stakeholder trust and reduced information asymmetry. Voluntary disclosure in general can be an effective step to get closer to consumers and the public. Because building trust through an emotional approach is more important than just thinking about the profits. Voluntary disclosure can attract public trust more effectively than a company's product campaign. Voluntary disclosure under the GRI standards can reduce information asymmetry because with the existence of voluntary disclosure under the GRI standards, the company's social and environmental responsibility activities are disclosed to the public. This causes information about voluntary disclosure activities to be more transparent so that information asymmetry will be reduced. Circular water management accountability in Indonesia in plantation sub-sector companies is rarely done. Only six of the 20 companies reported circular water management with 3R indicators for three consecutive years (2018–2020). The community and the government cannot know about circular water management from the remaining 70% of companies, making it difficult to monitor water use and management in the plantation sub-sector. Without these reports, the government cannot shape water policies to achieve better water resource management, and environmental damage can result. SDGs will not be achieved without better water management in the agricultural sector.

Table 7 shows that five of the 20 companies did not report water management at all. This linear water management can harm the environment and society because the entities will only exploit water resources by taking, using, and disposing of water (Purwanto, P. et al., 2019). Water management only occurs in wastewater to reduce water pollution, but the clean water crisis will continue. On the other hand, circular water management makes water management more efficient,

conserves the environment, increases public awareness of the importance of water management, and cuts costs. There is a risk that water shortages caused by climate change and other trends will make water availability even more unpredictable and scarce. Therefore, circular water management provides a solution for the entire industry, so it is necessary to make significant changes to realize circular water management. In contrast, circular water management makes water management more efficient, preserves the environment, increases public awareness of the importance of water management, and cuts costs. Circular water management is believed to help ensure food security, reduce poverty, preserve ecosystems, and achieve SDG No. 6 (clean water and sanitation for all) by reducing water use, recycling water that has been used, and reusing recycled water.

The limitation of this study is that only plantation sub-sector companies listed on IDX were considered research subjects. In addition, the reporting period studied (2018–2020) was relatively short. Expanding the research to include all companies in the plantation sub-sector over a more extended period might result in a different outcome. Therefore, we hope future studies can use a larger sample and a more extended period.

Based on the results of the study, the following are suggested:

1) The companies should follow both GRI and SASB standards
2) The government should encourage reporting and take action against water policy violators. It is suggested that companies be punished for violating policies, yet some disclosures are voluntary.

Declarations

Author contribution statement

Meiryani; Shi-Ming Huang: Contributed reagents, materials, analysis tools or data; Conceived and designed the exploration; Wrote the paper.

J. Audrelia; M. Fahlevi; M. Aljuaid; S. Grabowska: Performed the experiments; Conceived and designed the exploration; Analyzed and interpreted the data; Wrote the paper.

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Data availability statement

No data was used for the research described in the article.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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