

Assessing Climate-Related Financial Disclosure Based on The TCFD Framework at Padjadjaran University

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Abstract

The urgency of this research is to assess climate-related financial disclosure based on the Task Force on Climate-related Financial Disclosures at Universitas Padjadjaran to ensure transparency, effective risk mitigation, and institutional readiness in addressing climate change impacts. Climate change creates various risks and opportunities that affect not only the business sector but also public institutions, including higher education institutions. Climate-related risks may influence operational sustainability, asset management, and long-term financial stability, thereby requiring a structured disclosure framework to support transparent and systematic reporting. This study aims to develop a climate-related financial disclosure framework for Padjadjaran University based on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). This study employs a qualitative approach using an exploratory and action research design, with Padjadjaran University as the unit of analysis. Data were collected through document analysis and semi-structured interviews with stakeholders involved in sustainability management, selected using purposive sampling. The instruments included document review guidelines and interview protocols, and the data were analyzed using qualitative content analysis by mapping findings into the four core pillars of the TCFD framework: governance, strategy, risk management, and metrics and targets. The results indicate that although various sustainability initiatives have been implemented, climate-related information remains fragmented and has not been integrated into a structured disclosure framework. This study proposes a TCFD-based disclosure format that integrates governance, strategy, risk management, and measurable indicators. The findings provide practical implications by offering a structured guideline to improve transparency, support risk-based decision-making, and strengthen institutional accountability, and the framework can be adapted by other higher education institutions in developing more comprehensive climate-related reporting practices.

Keywords: *TCFD, Climate Disclosure, Higher Education Institutions, Climate Risk Management*

Introduction

Climate change has become one of the most significant global challenges in recent decades due to its broad impacts on environmental, economic, and social systems. Reports from the Intergovernmental Panel on Climate Change indicate that the global average temperature has increased by approximately 1.1°C compared to the pre-industrial period, largely driven by the rise in greenhouse gas emissions resulting from human activities. This condition shows that climate change is no longer merely an environmental issue but has evolved into a multidimensional challenge affecting various sectors of development. These impacts create a range of risks for organizations across different sectors, including both the business and public sectors (Gao, 2025).

In Indonesia, the impacts of climate change have begun to appear through the increasing frequency of extreme weather events such as floods, rising sea levels, and changes in rainfall

patterns. Rising sea levels in several coastal areas of Indonesia potentially threaten residential areas and infrastructure (Rahmawan & Wishu, 2020). In addition, increasing rainfall intensity has contributed to higher flood risks in various urban areas across the country. Climate phenomena such as *El Niño* and *La Niña* also exacerbate drought and flooding conditions in several regions of Indonesia (Ramadhani & Sudirman, 2024; Jannah et al., 2024). These conditions indicate that climate change has broad implications for the sustainability of national development (Brasika, 2021).

The impacts of climate change are not limited to environmental aspects but also have significant social and economic implications. Changes in climate conditions can reduce economic productivity, increase social uncertainty, and widen economic disparities across regions (Diffenbaugh & Burke, 2022). Rising temperatures, changing rainfall patterns, and the increasing frequency of extreme weather events have the potential to disrupt various economic sectors such as agriculture, infrastructure, energy, and transportation, thereby threatening economic stability in vulnerable regions (Setiawan et al., 2025; Leal Filho et al., 2024). These climate-induced disruptions can reduce productivity, damage physical assets, and increase operational costs, particularly in climate-sensitive sectors such as agriculture and infrastructure systems (Leal Filho et al., 2024). Moreover, the impacts of climate change are not evenly distributed, as poorer and more vulnerable populations tend to experience greater economic losses and have lower adaptive capacity, which further exacerbates existing social and economic inequalities (Tol, 2022).

In the organizational context, climate change can affect both operational and financial performance through several mechanisms. Physical risks caused by extreme weather events such as floods, droughts, and rising temperatures may result in damage to physical assets and disrupt organizational operations. Meanwhile, transition risks arising from changes in environmental regulations, the development of low-carbon technologies, and shifts in stakeholder preferences may require organizations to adjust their strategies and make additional investments (Hallegatte et al., 2023). Therefore, organizations need to understand and manage the risks and opportunities arising from climate change in order to maintain operational sustainability and long-term performance.

In recent years, attention to climate change disclosure has increased significantly in line with the growing global sustainability agenda. Organizations are no longer only required to report financial performance but are also expected to disclose how their operational activities affect the environment and how environmental risks may influence their financial performance in the future (Cahyani et al., 2025; Kasmita et al., 2026). Climate-related disclosure is important because it helps stakeholders understand the impacts of climate change on organizational strategies and long-term sustainability (Hassani et al., 2025). Furthermore, transparency in climate-related disclosure can increase stakeholder trust and support better decision-making by investors and regulators (Shimoda, 2023).

One of the most widely used frameworks for climate-related disclosure is the recommendation of the Task Force on Climate-related Financial Disclosures developed by the Financial Stability Board. The TCFD framework was introduced in 2017 with the aim of helping organizations disclose information regarding climate-related risks and opportunities in a consistent, comparable, and relevant manner for stakeholders (Zhang et al., 2024). This framework categorizes climate-related disclosure into four main pillars: governance, strategy, risk management, and metrics and targets, which are designed to provide a comprehensive overview of how organizations integrate climate-related issues into their governance structures

and strategic decision-making (Gao, 2023). Through this structured approach, organizations can produce more systematic and comparable sustainability reporting (Shi & Majid, 2024; Abdullah & Muchran, 2026).

Along with increasing pressure from investors, regulators, and the global community regarding sustainability reporting practices, the adoption of the TCFD framework has also increased significantly in many countries. TCFD status reports show that a growing number of organizations have begun integrating TCFD recommendations into their sustainability reports and annual reports as part of efforts to improve transparency regarding climate-related risks. However, the quality and consistency of climate-related disclosures still vary across organizations and industries (Liu & Nguyen, 2025). Previous studies also indicate that there are still gaps in the structure, completeness, and integration of climate-related information within organizational reports, highlighting the need for more systematic and standardized reporting frameworks (Gao, 2025).

In addition to the corporate sector, higher education institutions also play an important role in supporting sustainable development and climate change mitigation efforts. Universities function not only as centers for education and research but also as organizations that generate environmental impacts through their operational activities, such as energy consumption, infrastructure development, campus mobility, and facility management (Hiung & Meiden, 2023). As a result, universities also face various risks related to climate change that may affect the sustainability of institutional operations and resource management (Gao, 2025). In this context, climate-related disclosure becomes important to demonstrate institutional commitment to sustainability and to enhance transparency toward stakeholders (Shimoda, 2023).

Nevertheless, climate-related disclosure practices in the higher education sector remain relatively limited compared to those in the corporate sector. Many universities have implemented sustainability initiatives such as carbon emission reduction, energy management, and green campus development, yet they often lack reporting systems that specifically integrate climate-related risks and opportunities into institutional reports (Shi & Majid, 2024). These limitations cause information regarding climate risk management in universities to be insufficiently documented and difficult to compare across institutions (Cahyani et al., 2025). Previous research also indicates that the lack of clear reporting standards is one of the main factors hindering the development of climate-related disclosure practices in non-corporate organizations (Gao, 2025).

In the Indonesian context, attention toward sustainability reporting and climate risk disclosure has also increased along with sustainable development policies and the implementation of sustainable finance initiatives by regulators. Policies such as the sustainable finance roadmap encourage organizations to begin integrating climate-related issues into their reporting systems (Iriyadi & Antonio, 2021). Previous studies indicate that climate-related disclosure can have positive long-term impacts on organizational performance by increasing transparency and strengthening stakeholder trust (Cahyani et al., 2025). Moreover, the integration of climate-related disclosure can support better strategic decision-making in organizational risk management (Liu & Nguyen, 2025).

Padjadjaran University, as one of the public universities in Indonesia, has demonstrated a commitment to developing a sustainable campus and implementing various environmental management initiatives. However, there is currently no specific disclosure framework that systematically integrates information related to climate-related risks and opportunities within institutional reports. This condition indicates the need to develop a climate-related disclosure

framework that can help the institution improve transparency and accountability regarding sustainability issues. By adopting the internationally recognized TCFD framework, higher education institutions can obtain clearer guidance for identifying, managing, and disclosing climate-related information in a more comprehensive manner.

Previous studies on climate-related disclosure have predominantly focused on the corporate sector, examining the determinants, quality, and economic consequences of climate-related reporting. For instance, the factors influencing climate-related disclosure practices, while emphasize the application of the TCFD framework in corporate reporting (Gao, 2025; Shin & Majid, 2024; Cahyani et al., 2025). Other studies, such as highlight the financial implications of TCFD adoption, link climate disclosure with green innovation outcomes. Although these studies provide valuable insights, they largely concentrate on profit-oriented organizations and offer limited discussion on the application of climate-related disclosure frameworks in non-corporate settings, particularly in higher education institutions (Liu & Nguyen, 2025; Zhang et al., 2024). Furthermore, prior research tends to assess disclosure practices rather than develop a structured disclosure framework tailored to the institutional context of universities.

This study addresses this gap by focusing on the higher education sector, which remains underexplored in the climate disclosure literature. The novelty of this research lies in the development of a climate-related financial disclosure framework specifically designed for a university context by adapting the TCFD framework. Unlike previous studies that primarily evaluate disclosure quality or determinants, this study proposes a practical and structured disclosure format that integrates governance, strategy, risk management, and measurable indicators within an institutional setting. Therefore, the objective of this study is to develop a TCFD-based climate-related financial disclosure framework for Padjadjaran University, which can enhance transparency, support sustainability governance, and serve as a reference for other higher education institutions in developing climate-related reporting practices.

Method

This study employs a qualitative approach using an action research method to analyze climate-related information disclosure at Padjadjaran University. A qualitative approach is used because the study aims to obtain an in-depth understanding of the management and disclosure of climate-related issues within the context of higher education institutions. Qualitative research enables researchers to examine phenomena in their natural settings and to interpret them based on the meanings that individuals or organizations assign to them (Sugiyono, 2022). Through this approach, the research seeks to explore how climate-related risks and sustainability initiatives are currently managed and reported within the institutional environment. The study was conducted at Padjadjaran University, Indonesia, during the period of January to February, with the institution serving as the unit of analysis.

The research adopts an action research design, which allows the researcher to analyze existing practices while simultaneously developing recommendations for improvement. Action research emphasizes collaborative problem-solving and continuous improvement within organizations. The research process follows the cyclical model introduced by Kurt Lewin, which consists of four main stages: planning, acting, observing, and reflecting. These stages are conducted iteratively in order to continuously refine the analysis and develop practical recommendations for improving climate-related disclosure practices within the institution.

In addition, the research process adapts the Information Seeking and Retrieval model developed by Ingwersen and Järvelin. This model supports the systematic collection and

analysis of relevant information from multiple sources. Within this study, the model is used to guide the identification, retrieval, and interpretation of climate-related information contained in institutional documents and organizational practices. By combining the action research cycle with the information-seeking framework, the study is able to generate a structured analysis of climate-related disclosures while also supporting the development of practical improvements.

Data collection in this study was conducted through document analysis and semi-structured interviews. Document analysis was used to examine institutional reports, strategic planning documents, sustainability initiatives, and other relevant publications related to environmental management and climate-related activities at Padjadjaran University. Meanwhile, interviews were conducted with four key informants selected using purposive sampling, namely the Vice Rector for Resources and Governance, the Director of Finance, the Head of PK3L, and the Head of the Management Office. These informants were selected due to their involvement in institutional governance, financial management, and sustainability-related activities. Interviews were conducted using interview guidelines to ensure consistency while allowing flexibility for in-depth exploration. The combination of these data sources enables the researcher to obtain both formal documentation and contextual insights regarding climate-related disclosure practices within the university.

Data analysis in this study was conducted using the Task Force on Climate-related Financial Disclosures (TCFD) framework, which consists of four main pillars: governance, strategy, risk management, and metrics and targets (TCFD Hub, 2025). Information obtained from interviews and document analysis was mapped into these four pillars in order to identify the extent to which climate-related disclosures have been implemented at Padjadjaran University. This mapping process allows the researcher to assess how climate-related issues are integrated into institutional governance structures, strategic planning, risk management systems, and performance measurement practices. Furthermore, triangulation techniques were applied by comparing and cross-validating data obtained from different sources, namely documents and interviews, to ensure the consistency and credibility of the findings.

Furthermore, this study also conducted a benchmarking analysis by comparing the climate-related disclosure practices of Padjadjaran University with those of several international universities that have implemented the TCFD framework in their sustainability reporting. The benchmarking process aims to identify best practices and potential gaps in the current disclosure practices. The results of this analysis are then used to develop recommendations for improving TCFD-based climate-related disclosures at Padjadjaran University in order to enhance transparency, accountability, and institutional sustainability reporting.

Results

Table 1. *Triangulation Results of Climate-Related Disclosure Analysis*

Observation	Interview	Documentation	Conclusion
Coordination among various institutional actors regarding environmental and climate-related issues is evident through multiple communication channels, indicating strong institutional awareness of sustainability issues.	Informants stated that responsibility for sustainability issues is led by the Rector, delegated to the Vice Rector for Resources and Governance, and further implemented by a dedicated unit, namely PK3L.	Rector regulations outline governance structures and assign responsibilities related to sustainability issues.	Climate-related governance has been well established and supported by clear institutional roles and policies, although it has not yet been explicitly structured based on the TCFD framework.

Observation	Interview	Documentation	Conclusion
The university's vision and mission reflect a strong commitment to sustainability and environmental issues.	Informants indicated that sustainability issues have been integrated into long-term institutional strategies, driven by national policies from the Ministry of Education, which are translated into rector regulations and strategic plans focusing on the green campus initiative.	Strategic planning documents (Renstra) explicitly include sustainability-related objectives.	Climate change issues have been integrated into the institution's strategic planning, particularly through green campus initiatives and long-term planning documents.
The existence of a risk management function indicates that institutional risks are being managed.	Informants explained that specific climate-related risk management has not yet been developed, although general sustainability and green campus risks are considered.	Rector regulations provide a general framework for institutional risk management.	Climate-related risk management has not yet been specifically developed, although it is generally covered within the institution's overall risk management system.
Sustainability-related information is available on the university's official website.	Informants stated that metrics are based on UI GreenMetric indicators, with targets linked to rankings and supported by a green campus roadmap extending to 2030.	The Green Campus Roadmap 2030 provides documented sustainability targets, while emission-related indicators are primarily derived from the UI GreenMetric framework.	Sustainability metrics currently rely on the UI GreenMetric indicators, while targets have been more clearly defined through the Green Campus Roadmap 2030; however, they are not yet fully aligned with the TCFD framework.

The table presents the results of a triangulation analysis based on observations, interviews, and document reviews related to climate-related disclosures. The findings indicate a strong level of institutional awareness, supported by established policies, communication channels, and strategic planning aligned with sustainability objectives.

Discussion

Governance

The findings indicate that Padjadjaran University has begun integrating climate change issues into its organizational governance through various policies and sustainability programs related to the green campus concept. This commitment is reflected in the attention given by university leadership in promoting initiatives focused on environmental management and campus sustainability. Climate change considerations have also started to be incorporated into institutional policies and programs related to environmental management, energy efficiency, and the development of more environmentally friendly infrastructure. In addition, several sustainability-related initiatives have been implemented as part of the university's efforts to improve environmental performance and support the achievement of sustainable development goals. These findings reinforce prior studies which argue that leadership commitment and institutional support are key drivers in strengthening climate-related governance practices within organizations (Gao, 2025).

Oversight of sustainability-related issues is also supported by several organizational units responsible for environmental management, namely PK3L and KMR. Within the university's risk management structure, institutional leaders such as the rector, directors, and deans act as risk owners who are responsible for ensuring that organizational risks are properly managed, including risks related to climate change. Meanwhile, the university-level risk management unit and governance managers at the faculty level serve as risk officers who assist in the processes of risk identification, monitoring, and reporting within organizational activities.

Strategy

In terms of strategy, Padjadjaran University has demonstrated efforts to integrate climate change issues into its long-term organizational planning. This is reflected in several strategic planning documents that incorporate sustainability programs and the development of the green campus concept. The university has also established a sustainability roadmap extending to 2030, which includes various targets related to environmental management and climate change mitigation. These targets include increasing the use of renewable energy, developing green building infrastructure, and implementing smart building concepts aimed at improving energy efficiency and resource management within the campus environment. These findings are consistent with prior research suggesting that integrating climate-related issues into organizational strategy is essential for enhancing long-term sustainability and institutional resilience (Shi & Majid, 2024).

These strategic initiatives are also supported by resource allocation through the university's budgeting process. In the Annual Work and Budget Plan (RKAT), the university has allocated specific funding to support programs related to green campus initiatives and climate action. In addition, the university utilizes its endowment fund management as one of the funding sources to support sustainability and environmental management activities. This indicates that climate change issues are not only considered in institutional policies but are also increasingly integrated into the university's strategic planning and financial decision-making processes. However, compared to more advanced strategic practices highlighted in previous studies, such as the use of climate scenario analysis to assess future risks and opportunities (Gao, 2023), the strategic approach at Padjadjaran University appears to focus more on program implementation rather than forward-looking analytical tools. This highlights that while strategic integration has been achieved at a policy and program level, the depth of strategic analysis in addressing climate uncertainty remains limited.

Risk Management

In terms of risk management, Padjadjaran University has established a structured institutional risk management system that is implemented across various organizational units. The risk management process within the university is carried out based on organizational performance indicators that have been defined in institutional planning and performance documents. Based on these indicators, each unit develops a risk profile that includes the identification of key risks, the causes of those risks, and mitigation strategies designed to reduce potential impacts. This approach enables the university to systematically identify organizational risks, including risks related to climate change. These findings are in line with previous studies which emphasize that structured and integrated risk management systems are essential for identifying and mitigating climate-related risks within organizations (Hallegatte et al., 2023).

In the context of climate change, several risks have been identified, including the limited use of renewable energy within the campus environment, the potential impacts of extreme

weather events on infrastructure, and external regulatory constraints that may affect the development of clean energy initiatives. In addition, the level of awareness among the academic community regarding renewable energy usage also influences the effectiveness of sustainability program implementation at Padjadjaran University. To manage these risks, each organizational unit is encouraged to develop mitigation strategies that are incorporated into their respective risk profiles and monitored periodically through the institutional risk management system. Thus, the risk management process functions not only as a control mechanism but also as a basis for strategic decision-making within the organization. However, compared to prior research which highlights the importance of explicitly categorizing climate risks into physical and transition risks (Shi & Majid, 2024), the current system at Padjadjaran University does not yet distinguish climate risks as a separate category. This indicates that while the structural foundation of risk management is well established, its alignment with climate-specific risk frameworks remains limited.

Metrics and Targets

In terms of metrics and targets, Padjadjaran University has established several indicators related to environmental management and climate change mitigation through a sustainability roadmap developed through 2030. Some of the targets include increasing the use of renewable energy to 30%, reducing the university's carbon footprint by 40%, and expanding the implementation of green building and smart building concepts within the campus environment. In addition, the university also aims to increase the proportion of green open spaces and water absorption areas as part of its efforts to strengthen the campus's environmental capacity to adapt to climate change. These targets indicate that the university has begun to establish measurable performance indicators related to environmental management, which is consistent with prior studies emphasizing the role of measurable metrics in enhancing sustainability performance and accountability (Zhang et al., 2024).

However, this study also finds that the comprehensive measurement of greenhouse gas (GHG) emissions, such as the disclosure of Scope 1, Scope 2, and Scope 3 emissions, has not yet been systematically implemented by the university. In practice, environmental performance measurement at Padjadjaran University currently relies largely on the indicators used in the UI GreenMetric ranking, which serves as one of the benchmarks for assessing campus sustainability performance. These indicators cover several aspects of environmental management, including energy use, transportation, water management, and waste management. Nevertheless, they do not specifically measure greenhouse gas emissions based on the Scope 1, Scope 2, and Scope 3 classifications as recommended by the TCFD framework. This condition is consistent with prior research indicating that many institutions still face challenges in standardizing climate-related metrics and aligning them with internationally recognized reporting frameworks (Liu & Nguyen, 2025). Therefore, while the university has made progress in establishing sustainability metrics and targets, further development is required to ensure alignment with standardized climate-related disclosure practices.

Comparative Analysis of TCFD Disclosure with UBC and UTAM

To obtain a broader understanding of climate-related disclosure practices in higher education institutions, this study also conducted a benchmarking analysis by comparing the TCFD disclosures of Padjadjaran University with several international universities that have implemented the framework in their sustainability reports. This comparison aims to assess the extent to which the disclosures made by Padjadjaran University align with practices implemented by higher education institutions at the international level.

Table 2. *Comparison of TCFD-Based Climate Disclosures at Padjadjaran University, University of British Columbia, and University of Toronto Asset Management*

TCFD Component	Padjadjaran University	University of British Columbia	University of Toronto Asset Management
Governance	The Board of Directors oversees responsible investing policies and emission reduction targets. A Responsible Investing Committee composed of senior leadership is responsible for managing climate-related risks and opportunities.	Oversight is conducted by the Board of Governors and university leadership. Climate change issues are integrated into institutional governance and supported by units such as the Sustainability Office and the Office of Enterprise Risk and Assurance.	The Board of Directors oversees responsible investing policies and emission reduction targets. A Responsible Investing Committee composed of senior leadership is responsible for managing climate-related risks and opportunities.
Strategy	Sustainability strategies are integrated into planning documents such as the Strategic Plan (Renstra) and green campus policies regulated through Rector Regulations, supported by green campus and climate action programs. Climate risks are considered across short-, medium-, and long-term impacts on campus operations and financial planning.	UBC identifies the impacts of climate change on campus operations and infrastructure and develops various initiatives such as the Climate Action Plan and energy decarbonization strategies.	Climate change is viewed as a strategic factor influencing long-term investments. Analyses include physical and transition risks as well as investment opportunities in the low-carbon economy.
Risk Management	Climate change risks are not identified using a specific climate risk methodology but are generally included under environmental risks through the institutional risk management framework guided by Rector Regulations on risk management.	Climate risks are identified and assessed through an Enterprise Risk Management (ERM) framework. Risks such as natural disasters, regulatory changes, and operational impacts are analyzed based on probability and impact levels.	Climate risks are integrated into the investment risk management process and portfolio analysis and are considered in investment manager evaluations and investment decision-making.
Metrics and Targets	Padjadjaran University uses indicators from the UI GreenMetric framework in calculating total carbon emissions and has established a target to reduce its total carbon footprint by 40% in the Padjadjaran University Green Campus Roadmap 2030.	Uses standard metrics such as Scope 1, Scope 2, and Scope 3 greenhouse gas (GHG) emissions and sustainability monitoring dashboards to track progress toward climate targets.	Uses metrics such as total carbon emissions and carbon footprint (CO ₂ e) and has set a target to reduce emissions by 50% by 2030 compared to the 2019 baseline.

Through this comparison, several areas for improvement at Padjadjaran University can be identified, particularly in carbon emission measurement, the integration of climate scenario analysis into strategic planning, and greater transparency in sustainability metrics and targets. This benchmarking analysis provides insights into best practices and serves as a reference for enhancing TCFD-based disclosure at Padjadjaran University.

Conclusion

This study aims to develop a climate-related financial disclosure framework for Padjadjaran University by referring to the recommendations of the Task Force on Climate-related Financial Disclosures. Based on document analysis and stakeholder interviews, the findings show that the university has implemented various environmental and sustainability initiatives. The results suggest that the TCFD framework can serve as a foundation for developing a more comprehensive and structured approach to climate-related disclosure in higher education institutions. The study also highlights that adopting the TCFD framework has the potential to enhance institutional transparency and accountability, particularly in managing climate-related risks and opportunities. In addition to contributing to academic literature, the findings offer practical insights for universities seeking to develop sustainability reporting systems aligned with international standards.

Several limitations should be acknowledged. First, the study focuses on a single case, which may limit the generalizability of the findings. Second, the data were collected through document analysis and a limited number of interviews. Third, the study relies on qualitative analysis, which provides in-depth insights but does not measure the quantitative impact of climate-related disclosure on institutional performance. Future research is recommended to expand the scope by including multiple universities or cross-country comparisons. Further studies may also incorporate quantitative approaches to examine the relationship between climate-related disclosure and institutional performance, financial outcomes, and stakeholder perceptions. Additionally, the use of advanced analytical tools, such as climate scenario analysis and greenhouse gas measurement frameworks, is encouraged to support more robust and standardized reporting practices.

Acknowledgment

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