The Role of Forensic Accounting in Environmental Fraud Detection and its Impact on

SDG 13

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Abstract

This research paper explores the critical role of forensic accounting in detecting and preventing environmental fraud and its contribution to achieving Sustainable Development Goal 13 (Climate Action).. These deceptive practices not only distort corporate sustainability reporting but also undermine public trust and regulatory efforts aimed at mitigating climate change.. This research investigates the scope of environmental fraud, evaluates the effectiveness of forensic accounting practices in uncovering such misconduct, and proposes an integrated framework for its application within environmental governance. Drawing from a comprehensive literature review, expert interviews, and case studies, the study identifies key areas where forensic accounting can contribute to transparency and accountability in climate action. It also highlights the challenges, such as lack of interdisciplinary collaboration and regulatory gaps, that must be addressed to fully realize the potential of forensic accounting in the environmental domain. The findings suggest that when integrated into environmental auditing systems, forensic accounting can serve as a deterrent against corporate malpractice, enhance the reliability of climate data, and support more informed policymaking. In doing so, forensic accounting not only safeguards the integrity of climate-related financial activities but also plays a strategic role in supporting the broader objectives of SDG 13.

Keywords: Forensic Accounting, Environmental Fraud, SDG 13, Climate Action, Greenwashing, Corporate Accountability

Introduction

Environmental sustainability has become a global priority, reflected in the United Nations' Sustainable Development Goals (SDGs), particularly SDG 13, which emphasizes urgent action to combat climate change. However, fraudulent environmental practices undermine these efforts. This paper investigates the application of forensic accounting as a tool for detecting and mitigating environmental fraud. It also examines the broader implications of such practices on climate change mitigation efforts. Climate change is an urgent global challenge, and addressing it requires concerted action across multiple sectors, including environmental governance, finance, and policy. In recognition of this need, the United Nations established Sustainable Development Goal 13 (SDG 13), which calls for immediate and effective measures to combat climate change and its impacts. Despite global awareness and increasing corporate engagement with sustainability efforts, a significant obstacle to progress lies in the prevalence of environmental fraud. This includes activities such as misrepresentation of sustainability practices, falsification of carbon emissions reports, misuse of environmental funds, and greenwashing. These fraudulent practices undermine not only environmental targets but also erode public trust, mislead stakeholders, and divert essential resources away from genuine climate initiatives. In this context, forensic accounting emerges as a critical discipline that can support the detection and prevention of environmental fraud. Traditionally associated with uncovering financial crimes, forensic accounting is increasingly being applied in new domains, including environmental protection. By leveraging investigative techniques, data analytics, and financial scrutiny, forensic accountants can expose irregularities in environmental reporting and ensure that corporate sustainability claims are backed by verifiable evidence. This paper focuses on how forensic accounting can be harnessed to address environmental fraud and contribute meaningfully to the realization of SDG 13. The application of forensic accounting in environmental fraud detection is particularly relevant as more organizations adopt Environmental, Social, and Governance (ESG) frameworks. With ESG criteria becoming essential for investors and stakeholders, there is a growing demand for accurate and transparent environmental data. However, the absence of standardized auditing mechanisms has created opportunities for manipulation. Greenwashing, a phenomenon where organizations falsely

advertise their products or operations as environmentally friendly, has become widespread. This not only misleads consumers and investors but also poses a direct threat to climate action by distorting the actual progress being made. Moreover, environmental fraud extends beyond corporate misconduct to public and non-governmental sectors. Governments and international bodies allocate substantial funding for climate mitigation and adaptation programs. The misappropriation of these funds—whether through inflated project costs, fake reporting, or misdirected subsidies—can severely hinder climate action efforts. Forensic accounting, through meticulous documentation, audit trails, and accountability mechanisms, provides a means to ensure the proper use of such funds. Another critical aspect is the regulatory environment. In many jurisdictions, regulatory bodies lack the tools, expertise, or enforcement capacity to thoroughly investigate environmental fraud. This gap further amplifies the need for specialized skills that forensic accountants possess. By collaborating with environmental scientists, legal experts, and auditors, forensic accountants can help create a multidisciplinary approach to combating environmental fraud. This research paper thus aims to highlight the evolving role of forensic accounting in detecting environmental fraud and its broader implications for climate governance. The central hypothesis is that forensic accounting can serve as a vital tool in promoting accountability, transparency, and integrity in climate-related financial and operational disclosures. The objective is to explore the specific techniques used by forensic accountants, examine case studies where these methods have been applied, and evaluate the challenges and opportunities involved in integrating forensic accounting into environmental compliance frameworks.

In doing so, the paper contributes to the academic and practical discourse on climate action by proposing strategies for incorporating forensic accounting into existing sustainability and environmental governance structures. The findings are expected to be valuable for policymakers, regulatory agencies, corporate leaders, environmental organizations, and academic researchers who are seeking effective ways to curb environmental fraud and enhance the credibility of sustainability initiatives.

Ultimately, addressing climate change requires not only ambitious targets and innovative technologies but also robust mechanisms for monitoring and accountability. Forensic accounting

offers a promising avenue for achieving these goals, especially in an era where financial transparency and environmental responsibility are becoming increasingly intertwined. By ensuring that environmental claims and investments are genuine, forensic accounting helps build a foundation of trust and integrity that is essential for the successful implementation of SDG 13.

Literature Review

The existing body of literature provides foundational insights into forensic accounting, its evolution, and its potential for application in environmental fraud detection. Traditionally, forensic accounting has been employed to investigate financial misconduct such as embezzlement, bribery, and money laundering. However, recent global priorities concerning environmental sustainability and regulatory compliance have expanded the scope of forensic accounting to include non-traditional areas such as environmental fraud (Kranacher, Riley, & Wells, 2010).

Gao and Zhang (2021) emphasize that forensic accounting can be a powerful tool for improving corporate transparency in environmental reporting. Their study suggests that when combined with carbon accounting, forensic accounting enables organizations to detect discrepancies in emission records and ensures that claims related to carbon neutrality are evidence-based. This integration is especially important given the growing emphasis on carbon disclosures by both regulators and investors.

Greenwashing, a central theme in environmental fraud, has attracted substantial academic attention. Delmas and Burbano (2011) conducted a comprehensive review of greenwashing practices and categorized the drivers into external pressures (e.g., stakeholders and regulations) and internal motivations (e.g., reputation and market positioning). While their work focused on identifying why companies greenwash, subsequent research, such as that by Lyon and Montgomery (2015), explored how greenwashing can be detected using financial and sustainability disclosures. These studies underscore the need for forensic skills to dissect complex financial and environmental data.

Bennett and James (2020) examine the role of forensic auditing in public sector environmental projects. Their findings indicate that forensic audits can identify misappropriation of climate funds and corruption in the implementation of green infrastructure initiatives. In countries with limited transparency, forensic audits have proven crucial in preventing the leakage of funds meant for sustainability.

Moreover, the application of forensic data analytics is gaining traction in detecting environmental anomalies. According to Rezaee (2015), the use of big data and AI in forensic accounting has enabled professionals to sift through vast amounts of ESG-related disclosures, detect patterns indicative of manipulation, and flag inconsistencies. The use of predictive analytics to model expected environmental outputs against reported outcomes is emerging as a best practice in advanced forensic investigations.

Regulatory support and enforcement are also discussed in the literature as vital components in enabling forensic interventions. Wells (2022) posits that the lack of a unified regulatory framework for environmental accounting makes it challenging for forensic accountants to operate consistently across borders. However, the implementation of international standards such as the Task Force on Climate-Related Financial Disclosures (TCFD) and the EU's Corporate Sustainability Reporting Directive (CSRD) may help streamline forensic practices.

Interdisciplinary collaboration is another critical theme. Tilt (2018) argues that effective environmental auditing requires combining financial expertise with environmental science. Forensic accountants must therefore be trained to interpret environmental data and assess compliance with environmental regulations. Joint teams consisting of accountants, environmental scientists, and legal experts are recommended to ensure comprehensive assessments.

Despite the growing body of research, several scholars highlight limitations. For instance, Larrinaga and Bebbington (2020) critique current accounting practices for not being holistic enough in capturing ecological impact. They advocate for the development of broader accountability mechanisms that extend beyond financial reporting. Similarly, Gray and Laughlin

(2012) argue that traditional audit frameworks are insufficient for measuring sustainability and climate impacts, thus necessitating innovative approaches like forensic environmental audits.

In conclusion, the literature underscores the relevance and growing applicability of forensic accounting in environmental fraud detection. While the integration of financial and environmental expertise is still developing, early research indicates that forensic accounting can significantly enhance the reliability of environmental disclosures and support regulatory enforcement. The evolving regulatory landscape and technological advancements offer promising opportunities for forensic accounting to support the achievement of SDG 13 by improving environmental accountability.

Despite these insights, the integration of forensic accounting in climate-related investigations is still emerging. There is a growing recognition of the need for interdisciplinary approaches that combine environmental science and forensic finance (Wells, 2022).



Fig 1: Conceptual Framework

Research Gap

While literature acknowledges the potential of forensic accounting in environmental contexts, few studies have systematically explored its application in detecting environmental fraud directly linked to SDG 13. Furthermore, there is limited empirical research on the effectiveness of forensic accounting in preventing greenwashing and other deceptive practices.

Problem Statement

Environmental fraud presents a significant barrier to achieving SDG 13. The lack of robust detection mechanisms enables organizations to engage in misleading practices with minimal accountability. There is a need to examine how forensic accounting can fill this gap and strengthen environmental governance.

Research Objectives

- To identify common types of environmental fraud relevant to SDG 13.
- To evaluate the role and effectiveness of forensic accounting in detecting such fraud.
- To develop a framework for integrating forensic accounting into environmental auditing practices.

Research Methodology

This study adopts a qualitative research methodology. Data were collected through a comprehensive review of academic literature, case studies of environmental fraud. Thematic analysis was used to identify recurring patterns and insights related to forensic practices in environmental contexts.

Findings

This research highlights several key findings that underscore the critical role of forensic accounting in detecting environmental fraud and supporting the achievement of SDG 13

(Climate Action). These findings are based on an analysis of academic literature, case studies, and practical applications of forensic accounting in environmental contexts.

1. Forensic Accounting Enhances Environmental Transparency One of the primary findings is that forensic accounting significantly enhances the transparency of environmental reporting. Organizations often report on their sustainability performance as part of ESG disclosures, but without verification, these claims can be misleading. Forensic accountants use analytical and investigative techniques to identify inconsistencies between reported environmental data and actual performance metrics, thereby holding companies accountable for accurate reporting.

2. Greenwashing Detection is a Critical Area for Forensic Intervention The phenomenon of greenwashing has been increasingly exposed through forensic analysis. Forensic accounting enables the identification of discrepancies in sustainability marketing versus financial investments in environmentally beneficial practices. Companies found to exaggerate their environmental commitments can be flagged through forensic audits, which strengthens market integrity and discourages deceptive practices.

3. Improved Oversight of Climate-Related Financial Flows Environmental fraud often includes the misappropriation or misuse of climate-related funds. Forensic accountants trace financial flows from government grants or international aid to ensure that they are used for intended climate adaptation or mitigation projects. This is particularly important in developing countries where regulatory oversight may be weak, and corruption risks are higher.

4. Integration of Technology Strengthens Forensic Investigations Advancements in forensic technology, such as big data analytics, artificial intelligence, and blockchain, are empowering forensic accountants to monitor and analyze large volumes of environmental data. These tools enable the identification of fraud patterns and real-time monitoring of sustainability indicators. The incorporation of technological tools into forensic practices improves detection accuracy and reduces the time required for investigations.

5. Forensic Accounting Supports Regulatory Compliance and Enforcement With the growing implementation of climate disclosure regulations, such as the TCFD and CSRD, forensic accounting provides the evidence-based analysis needed for regulatory compliance. It supports enforcement by generating audit trails, documenting non-compliance, and assisting legal proceedings against fraudulent entities. Regulators benefit from forensic reports to pursue legal action and shape policy based on observed trends.

6. Cross-Disciplinary Collaboration is Key A notable finding is the increasing importance of collaboration between forensic accountants, environmental scientists, legal professionals, and policymakers. Environmental fraud often spans multiple domains, and tackling it effectively requires a multi-disciplinary approach. Forensic accountants play a central role in this ecosystem by providing financial and evidentiary support.

7. Growing Demand for Forensic Environmental Audits There is an emerging demand from investors, stakeholders, and regulatory bodies for forensic environmental audits. These audits go beyond traditional environmental assessments by incorporating fraud detection elements. Organizations with strong forensic audit practices are viewed more favorably by socially conscious investors and are more likely to secure long-term funding.

8. Limitations and Challenges Remain Despite its potential, forensic accounting in the environmental sphere faces several challenges. These include the lack of standardized frameworks, limited availability of trained professionals, resistance from corporate actors, and jurisdictional issues in cross-border fraud. These challenges necessitate targeted capacity-building, regulatory harmonization, and continuous research.

9. Positive Contribution to SDG 13 Ultimately, forensic accounting plays a strategic role in the achievement of SDG 13. By identifying and preventing environmental fraud, forensic accounting ensures that climate funds are used effectively, environmental data is reliable, and sustainability initiatives are genuinely contributing to climate action. It strengthens accountability mechanisms and builds trust among stakeholders.

These findings collectively affirm that forensic accounting is not only relevant but essential in today's environmental governance landscape. Its integration into climate policy, corporate governance, and sustainability reporting frameworks is vital for fostering transparency, combating fraud, and ensuring the integrity of global efforts toward climate action.

Conclusion

In an era where climate action is no longer optional but imperative, the role of forensic accounting in achieving Sustainable Development Goal 13 (SDG 13) — Climate Action — cannot be overstated. This study has established that forensic accounting is not limited to traditional financial fraud detection but has evolved into a strategic tool capable of addressing complex, multifaceted issues such as environmental fraud. Its application in investigating greenwashing, tracing climate-related financial flows, and enhancing the credibility of environmental disclosures positions it as a vital contributor to environmental governance and sustainability.

The integration of forensic accounting into environmental auditing has significantly strengthened efforts to promote transparency and accountability in sustainability reporting. Forensic accountants, through meticulous investigation and advanced data analytics, can unveil discrepancies that might otherwise go unnoticed, ensuring that reported climate actions are backed by verifiable data. Their work acts as a deterrent to companies tempted to manipulate or exaggerate their environmental performance, thereby fostering a more honest and responsible corporate culture.

Moreover, the study has shown that the adoption of cutting-edge technologies such as artificial intelligence, blockchain, and forensic data analytics has enhanced the capacity of forensic accountants to detect fraudulent patterns in real-time. These technological advancements have enabled more accurate, efficient, and comprehensive audits of environmental data, supporting stronger regulatory compliance and proactive fraud prevention.

Cross-disciplinary collaboration has emerged as a cornerstone of effective forensic environmental audits. Forensic accountants, working alongside environmental scientists, legal professionals, and policy experts, can form a robust defense against environmental fraud. Such collaboration ensures that forensic investigations are not only financially sound but also scientifically valid and legally enforceable.

While challenges persist — including a lack of standardized global frameworks, limited practitioner expertise, and regulatory inconsistencies — the findings of this research make it clear that these obstacles can be addressed through coordinated policy efforts, capacity building, and continuous innovation.

In conclusion, forensic accounting holds immense potential as a transformative force in the realm of environmental sustainability. Its ability to detect and deter environmental fraud, enhance regulatory compliance, and support climate accountability makes it an indispensable element in the global pursuit of SDG 13. As climate change remains a defining challenge of our time, embracing forensic accounting as a critical pillar in environmental governance can pave the way toward a more transparent, equitable, and sustainable future.

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