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Mobilising Islamic Funds for Climate Actions: From Transparency to Traceability

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ABSTRACT

Mobilising sufficient financial resources for low carbon development has led to countries integrating green bonds into their sovereign bond portfolios. However, questions remain over the efficacy and integrity of these financial instruments. Climate bonds impose additional accountability requirements that connect the money raised with actions to reduce atmospheric greenhouse gases. These requirements are given further prominence in financial instruments intended to fund climate change while complying with core Islamic values, such as the green sukuk, a Sharia-compliant alternative to traditional fixed-income investments to fund environmental projects. Climate-related financial instruments require tracking the flow of money through chains of decisions within and between organisations. This research explores how the Indonesian government, as the first sovereign state issuer of green sukuk, attempted to connect money raised from Islamic capital markets to actual reductions in greenhouse gas emissions. This required the creation of new accounting objects that connected financial data with GHG accounting at a granular level. Our analysis demonstrates how the existing accounting systems were repurposed by constructing green sukuk accounting objects that sought to connect equivalent disbursements of money with social and environmental benefits, primarily represented by reduced GHG emissions.

KEYWORDS

Transparency; traceability; public accounting system; climate change; sovereign green bonds and sukuk

Setting the context

At a 2020 annual climate bonds conference, a prominent expert argued in their keynote speech for greater accountability from national governments.

By the way, don't underestimate the benefits of investors pushing sovereigns to issue green bonds with the reporting and transparency requirements to allow you to see where their money's going, (Climate Bonds Expert).

The message supports academic concerns over the lack of environmental benefits derived from climate bonds issuance (Bhandary, Gallagher, and Zhang 2021; Liu and Lai 2021; Park 2018) and a recognition that issuers of climate bonds often have a contractual obligation

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to produce periodic accounts of a bond's actual and projected climate impacts (ICMA 2018, 2021).

The accountability of green financial instruments has been subject to criticism (Bridge et al. 2020; Chen, Letmathe, and Soderstrom 2021; Larcker and Watts 2020). Prior research has noted the need for enhanced transparency as to how money from green funds is spent (Bebbington et al. 2021; Bhandary, Gallagher, and Zhang 2021; Mol 2010, 2015), and for the governance of climate financial markets (Mehrpuoya and Salles-Djelic 2019). For example, studies have identified cases where green bonds have been compromised (Ng 2018), and where the application of green funds has been problematic (Zhang 2020), plus issues such as inappropriate marketing campaigns (Schäfer 2018), governance gaps (Park 2018), and a lack of focus on practices or impacts (Liu and Lai 2021).

Typically, money from these green financial instruments is not separately accounted for. In most accounting systems, this money is pooled with revenue and other sources of finance, rendering it impossible to connect them directly with climate reducing actions. There are concerns that the inability to demonstrate the achievement of climate impacts will inhibit the mobilisation of funds to tackle climate change issues, particularly in Islamic capital markets.

Accounting technologies have been applied in other contexts to connect financial flows, actions, moral foundations, non-financial measures and sustainable impacts. These include environmental regulation, local government (Thomson, Grubnic, and Georgakopoulos 2014), biodiversity (Sobkowiak, Cuckston, and Thomson 2020), businesses (Gibassier, Rodrigue, and Arjaliès 2018); (Rodríguez-Gutiérrez, Correa, and Larrinaga 2019), impact assessment (Arjaliès et al. 2022), and climate change governance (Charnock, Brander, and Scheider 2021; Charnock and Hoskin 2020; Gibassier and Schaltegger 2015). The potential of using accounting (financial and GHG) to resolve accountability failings of climate financial instruments remains underdeveloped. To address this, we present a case study that examines the changes in accounting practices due to the Indonesian government's issuance of the world's first sovereign green sukuk.¹

Sukuk are 'flexible securities which may be structured to meet a variety of issuer and investor goals whilst conveying specific asset-linked rights and obligations to create a *Sharia*-compliant alternative to traditional fixed-income investments' (Adam and Thomas 2004, 163). The distinctive feature of sukuk design is that the assets linked to it are required to promote social, environmental or economic development while maintaining the Islamic prohibition on usury/interest (*riba*), uncertainty (*gharar*), and gambling (*maysir*) (AAOIFI 2019; Adam and Thomas 2004; Hidayah, Lowe, and Woods 2019). Accounting for a green sukuk requires accountability mechanisms that connect funds with specific green purposes and ensure compliance with the fundamental tenets of the Islamic faith (Liu and Lai 2021; Moghul and Safar-Aly 2014). While conventional climate bond issuers are expected to account for the environmental benefits accruing from a single source of finance, they also have to demonstrate compliance with *Sharia* principles in the case of Islamic climate instruments.

Green sukuk promises future reduced GHG through financing specific projects but requires evidence of direct impact at a granular level. This requires accounting for how this 'promise' is delivered through different accounting objects and infrastructures of traceability (Power 2019). Green sukuk accountability requires GHG accounting technologies

that measure lifecycle impacts on greenhouse gas emissions (Brander 2016, 2017) of specific programmes, projects or individual assets funded by the green sukuk.

This paper focuses on the Indonesian government's use of climate tagging (Kornberger, Pflueger, and Mouritsen 2017; Madsen 2015; Thaler 1999; Thaler and Sunstein 2021) designed to track climate change expenditures and connect them with climate impacts. Climate tagging was seen as a solution to their enhanced accountability responsibilities to Islamic climate financial markets while complying with other political programmes and social norms. The tagging of budgets, expenditures, or non-financial indicators into connected chains (Power 2019) builds and reinforces specific priorities while undermining others (Bandelj, Wherry, and Zelizer 2017; Kornberger, Pflueger, and Mouritsen 2017). Tagging is not a neutral process; instead, it prioritises a specific purpose, such as climate change, over others and so can be disruptive, leading to potential conflicts when there are limited resources, divergent principles, aspirations and/or incentive structures (van Asselt, Rayner, and Persson 2015).

Tagging allows the possibility of re-naming and re-valuing 'existing' objects to produce other spaces of inquiry (Frandsen 2009).² Tagging is conceptualised as a form of naming that enables the creation of new accounting objects located in multiple organisations. Green sukuk accounting objects establish additional chains of traceability for transparency (Power 2019) and climate-related accountability. Climate tagging creates new possibilities for counting, connecting and governing climate-related accounting objects which were previously considered disconnected.

This study contributes to the literature by exploring whether climate tagging practices were able to meaningfully connect money from a climate financial instrument to material environmental outcomes (Mol 2015). Our analysis considers the transparency of these new accounting objects and the traceability infrastructures (Power 2019; Quattrone 2022). As such, it highlights several critical attributes of accountability related to governing the complex dynamics of climate-linked financial instruments (Bridge et al. 2020; Chen, Letmathe, and Soderstrom 2021; Larcker and Watts 2020).

The Indonesian government's approach tags equivalent quantities of money as they pass through decision chains within the government and between government agencies, rather than directly tracking money raised by the green sukuk. Climate tagging is also used to connect different accounting objects in the government's financial accounting system with accounting objects in their greenhouse gas (GHG) accounting system. The paper will argue that the enhanced financial transparency and traceability achieved through climate tagging offers some accountability and climate governance of green sukuk, albeit limited. We also analyse a similar problem with the transparency and traceability of the Indonesian government's GHG accounting system, designed to ensure compliance with Indonesia's international climate change commitments rather than project-level impact assessment. This paper argues theoretically and demonstrates empirically that climate tagging can create links between the asset, climate impacts and proceeds of green sukuk. However, when evaluated from the perspective of green sukuk accountability, some of these links were weak and problematic.

This paper is structured as follows. First, we outline our theoretical approach to understanding the shift from transparency to traceability in accounting for material climate outcomes. Second, we review the literature related to the development of green financial instruments, in particular the challenge of designing instruments that are aligned with

key tenets of the Islamic faith and any enhanced accountability requirements. Third, we describe and justify our case selection and research methods. Finally, we present our empirical findings and concluding comments.

Transparency, traceability, and tagging

Gray (1992, 145) argued that ‘the process of becoming more transparent is initially a painful process for the internal participants, but should encourage the diminution of the internal versus external tension’. Michelon, Rodrigue, and Trevisan (2020) suggest that transparency is not simply about disclosing additional information but involves reconfiguring the roles of accounting for a particular entity. However, demands for improved transparency are unlikely to trigger material changes if transparency is deemed as a ritual (Christensen and Cornelissen 2015) and assessed against procedures rather than material outcomes (Kamil, Bush, and Gupta 2021; Mol 2015). Consequently, changing the focus of transparency away from process to outcomes (Arjaliès et al. 2022; Fazey et al. 2018; Quattrone 2022) can be daunting as this requires creating new relationships and making chains of actions across different institutions visible (Power 2021). Assessing against outcomes requires a complex interaction of traceability technologies, such as tagging or earmarking³ (Bandelj, Wherry, and Zelizer 2017; Kornberger, Pflueger, and Mouritsen 2017), with existing accounting objects. Therefore, tagging offers one approach to establishing appropriate traceability systems by constructing chains of funds, actions, assets and impacts, which allow the continuous measuring, monitoring, evaluation and auditing of ‘performance’ across every step of the chain. However, given climate change is a wicked problem, making visible any complex chain of actions that seeks to reduce climate impact will be challenging.

To develop our analysis of the Indonesian green sukuk case study, we draw upon concepts of transparency (Mol 2010, 2015; Quattrone 2022) and traceability through tagging (Frandsen 2009; Madsen 2015; Power 2019, 2021). In seeking transparency, Quattrone (2022, 552) notes that what is measured and disclosed is a matter of perspective, practices, and institutional arrangement’ and any material representation is always partial and reductive (Busco and Quattrone 2018). The reductive capacity of any account is affected by agency, interests, motives and definitional practices (Quattrone 2022), often presented in standardised disclosure guidelines that emphasise procedures instead of outcomes (Arjaliès et al. 2022; Mol 2010, 2015). However, the green sukuk requires outcome-oriented accounting rather than procedural accounting. Climate tagging offers the potential to construct an appropriate green sukuk accounting object and render it traceable by tracking its material and financial performance in a continuous process of connecting it to different materialities, institutions, and technological devices (Power 2019), to enable appropriate modes of governance.

Traceability has many faces, but can be defined as a continuous process of association across multiple domains, a ‘chain-making’ process, which ideally reveals purpose, perspectives, practices, institutional arrangements and impact (Power 2019; Quattrone 2022). Traceability is an ongoing formative process with convergent and divergent dynamics, which temporarily stabilises objectives between domains both within an institution and between different institutions. Framing and constructing the traceability process entails systematic engagement with the named-numbers of accounting

technologies. Accounting technologies, such as tagging or earmarking, become critical practices through which connectivities (but also dis-connectivities) between agencies, priorities and activities are made to happen (Frandsen 2009; Madsen 2015; Power 2019, 2021). Through a chain of traceability (Frandsen 2009; Power 2019), the green sukuk becomes an accountable object that can be governed to achieve material social and environmental impacts that are then used to legitimate any returns to green sukuk holders. Therefore accounting for green sukuk needs to make visible the spatial, temporal and institutional dimensions of any attributed GHG impacts, establish what counts as green values and as financial values (Bridge et al. 2020), and how to embody elements of spirituality (Hidayah, Lowe, and Woods 2019).

In complex chains such as the green sukuk, which includes outsourced activities and a range of third-party relationships beyond the boundaries of a single organisation, there will be contested notions of what is valuable, what are important relationships, and what constitutes a legitimate externality, or indeed a problematic environmental accounting technique. In this instance, making visible the trajectory of a green-sukuk-asset will undermine other visibilities (Bebbington et al. 2019; Lohmann 2009; Power 2019; Unerman, Bebbington, and O'Dwyer 2018). Revealing the GHG performance of projects or assets funded by the green sukuk may threaten other social, environmental or economic visibilities seen as more important by the state or other powerful interests. There may be pressure not to make visible different sensitive results, such as the non-reporting of high carbon-emitting projects or attributing the benefit of carbon-reducing projects funded out of general funds to the green sukuk.

When contested values exist within a chain, the dynamics and relative power of distributed agencies (Power 2019) impact the potential for meaningful connectivity. For example, even in conventional climate bonds, conflicts could emerge over what constitutes climate reducing activities or beneficial greenhouse gas outcomes (see, for example, Bhandary, Gallagher, and Zhang (2021); Bridge et al. (2020); Chen, Letmathe, and Soderstrom (2021); Larcker and Watts (2020); Liu and Lai (2021); Ng (2018); Park (2018)). Any attempts at chain-making between programmatic ideas, institutions and technological devices (Power 2019) has the potential of constructing new accounting objects (Kornberger, Pflueger, and Mouritsen 2017), allowing possible re-naming and re-valuing relationships which produce new spaces of inquiry and the possibility of traceability into other domains (Frandsen 2009).

In many cases, there can be a disconnect between how climate outcomes were originally defined during the construction of a bond and how they are measured in practice. This produces potential uncertainties and ambiguities in accounting for the impact of a climate bond and difficulties in aligning financial accounting systems with greenhouse accounting systems (Bridge et al. 2020). These systems will have been constructed for various purposes using multiple technologies, institutional arrangements, and accounting objects that may (or may not) be compatible or connectable (Power 2019; Quattrone 2022). As such, measuring the impact of climate change activities arising from a specific source of finance and/or a specific project will require a reconfiguration of connections between diverse agencies and multiple disciplines such as finance, environment, climate science or planning, but in a setting where the named-numbers in these financial accounting systems are not easily connectable with the named-numbers in GHG accounting systems. In particular, the granularity and translatability of how different

actions or transactions are coded in these systems will be critical. Differences in granularity of data will require either splitting a named-number into various transactions or aggregating named-numbers into new categories. For example, this may require allocating a regional measure of GHG emitted in a period to individual projects or assets to determine whether that project has increased or decreased atmospheric concentrations of GHGs. How that allocation process is undertaken will significantly impact the attributed impact of a sukuk funded asset and could affect the distribution of any return to the sukuk holder(s).

Transparency and traceability for climate bonds, including the green sukuk, need to extend beyond conventional place-based transparency (Mol 2015) or conventional organisational accounting to connect markets, regulatory processes, resource and pollution flow, material systems, plus multiple institutions, economic, social and ecological systems. New accounting infrastructures will need to be constructed around the linkages within upstream and downstream value chains, applying techniques such as digital tagging (Troshani, Locke, and Rowbottom 2019), product tags (Madsen 2015), labelling, earmarking or certification (Mol 2015). Assigning additional labels to transactions recorded within accounting systems enables new forms of tracking and visibility of spending (Thaler 1999; Thaler and Sunstein 2021), which can be attached to existing or new priorities (Bandelj, Wherry, and Zelizer 2017), such as climate change. These tags are constructed around residual traces, which become embedded in other accounting devices for communication, collaboration, classifications and accountability (Kornberger, Pflueger, and Mouritsen 2017). Thus these tags offer the potential to connect and mediate (Miller and O'Leary 2007; Thomson, Grubnic, and Georgakopoulos 2014) between the different modes of governing and accounting objects: in particular, to be able to link and match funds, eligible projects, climate reductions, financial planning systems and GHG accounting systems.

Mobilising funds through green financial innovation

There has been a surge in the development of new financial instruments such as 'green bonds', 'impact investing', 'sustainable finance' (Sachs et al. 2019), that follow a longer trend of financial innovation intended to engineer targeted societal development (Miller 1986, 1992; Tufano 2003). ICMA (2018, 2021) defines green bonds as a debt instrument dedicated to financing or refinancing green projects. Green bonds are intended to drive change with an implied accountability requirement to connect money raised with environmental actions or projects (ICMA 2018, 2021) and their material impacts to ensure the attainment of the stated purpose of any debt instrument. However, meeting this enhanced transparency is problematic through conventional organisational annual financial reports, which lack sufficient information granularity to create direct chains with funded green projects (Bridge et al. 2020) and codified green bond accounting practices (Liu and Lai 2021). Lerner and Tufano (2011, 2018) caution against making assumptions about the impact of green debt instruments in creating real benefits to society, such as climate change, environmental and social justice. Despite the widespread diffusion and adoption of these instruments, studies have noted the potential failure to deliver intended benefits to societal development (Alamad, Hidayah, and Lowe 2021; Pitluck 2012).

Prior studies have challenged the compatibility between green debt instruments and Islamic principles (Ahmed et al. 2015; Azhgaliyeva, Kapoor, and Liu 2020; Hayat et al. 2019), such as green sukuk. A green sukuk (World Bank 2020) is a financial instrument that complies with the key tenets of Islamic principles, green purposes and the requirements of specific capital markets. When designing Islamic financial products, Alamad, Hidayah, and Lowe (2021) identified two critical principles. Firstly, a general ethical-faith principle, determined by Sharia, requires the consideration of honesty, justice and truthfulness while avoiding uncertainty and usury, and which avoids predetermined or fixed returns (Alamad, Hidayah, and Lowe 2021). In this context, money should not be considered as a commodity or interest-generating. Instead, it should be accounted for through material assets (Alamad, Hidayah, and Lowe 2021; Pollard and Samers 2007), plus their impact on the balance of life on earth (*mizan*) (Ahmad and Bruch 2002; Napier 2009). Secondly, Sharia rules permit transactions or activities unless proven non-compliant (Alamad, Hidayah, and Lowe 2021; Chapra 2007; Kamla 2006). This allows the possibility of developing innovative Islamic financial instruments, such as sukuk (Adam and Thomas 2004), despite moral tensions between western capitalistic hegemony and Islamic spiritual ideals (Hidayah, Lowe, and Woods 2019), as shown in Table 1.

Table 1 summarises the differences between sukuk and conventional bonds, including differential demands for transparency and traceability. The traceable outcomes of sukuk are similar to green bonds that restrict spending to specified green purposes (Adam and Thomas 2004; Hayat et al. 2019) rather than conventional sovereign bonds, which allow for more flexible spending possibilities (Alesina and Passalacqua 2016; Chapra 2007; Posner 2007). Any sukuk should also be free from usury, interest, uncertainty, and assets associated with sectors considered not to be compliant with Sharia (Alamad,

Table 1. Comparisons between green bonds and sukuk.

	Asset-backed sukuk	Asset-based sukuk	Green bonds
The basis for the issuance	Specified assets	Issuer's balance sheet	Issuer's balance sheet
Process	Mostly project financing mechanism, repayment based on the project.	Refinancing & financing mechanism, repayment could be generated outside the project, the need for underlying assets.	Refinancing & financing mechanism, repayment could be generated outside the project for green project purposes.
Principles	Sharia, e.g. prohibition against usury/interest (<i>riba</i>), uncertainty (<i>gharar</i>), gambling (<i>maysir</i>), and sectors against collective interests.	Sharia, e.g. prohibition against usury/interest (<i>riba</i>), uncertainty (<i>gharar</i>), gambling (<i>maysir</i>), and sectors against collective interests.	The green framework outlines contractual restrictions on the use of proceeds, type of project, management of proceeds, monitoring and reporting,
Accountability Requirements	Details of specific assets and impacts, compliance with Sharia and contractual terms. Transparency and traceability at the asset level.	Details of company/ issuing entity-specific assets and general impact, general assurance on compliance with Sharia and contractual terms. Transparency and traceability at issuing entity level.	Disclosure of information on the use of proceeds, project selection and ability to repay bondholders. Transparency at issuing entity level.
Returns policy	Future profit and loss sharing or investment agency agreements (based on a memorandum of the offer).	Future profit and loss sharing or investment agency agreements (based on a memorandum of the offer).	Pre-set interest level based on risk evaluation

Sources: Climate Bonds Initiative (2021), World Bank (2020), Adam and Thomas (2004), Chapra (2007), Alamad, Hidayah, and Lowe (2021).

Hidayah, and Lowe 2021). In particular asset-based sukuk requires traceability to the material outcomes from spending money raised in accordance with their memoranda of the offer.

Research methods and case selection

Case selection

As signatories of the Paris Agreement (UNFCCC 2015), numerous countries attempt to align financial systems with low carbon development. This requires the development of new ways to track climate expenditures to GHG emissions in accounting systems (UNDP and IBP 2018). Despite competing social and environmental priorities, and ongoing problems in defining climate expenditures or climate projects, the Government of Indonesia has undertaken several accounting innovations in tracking public finance flow from their sovereign green sukuk (see Appendix A for detailed transactions) throughout their financial accounting systems and their GHG accounting systems. Their climate tagging mechanism has sought to ensure the channelling of green sukuk funds to appropriate climate change action plans, comply with existing government financial protocols, and monitor performance against memoranda of the offer, as recommended by the ICMA (2018, 2021) and comply with Sharia. Achieving all of these objectives through reconfiguring accounting systems is a significant challenge.

Accordingly, this empirical site offers the potential of understanding the complexity of developing climate change traceability in complex chains of relationships, using existing sovereign-state governing and accounting tagging and tracing technologies across international, national and local levels in the private and public sectors institutions. The green sukuk constitutes an innovative form of green financial instruments that creates new social and environmental accountability challenges and opportunities, and these are explored in this paper.

Research methods

We performed a two-stage research process to develop an in-depth understanding and evaluation of the accounting innovations in this case study. The first stage involved a desk-based analysis of documents related to the life cycle of the Indonesian green sukuk to identify any traceability mechanisms, accounting objects and transparency infrastructure in place. This process included documents related to capital markets, policies, initiatives, individual projects or climate actions funded by the Indonesian government, such as international climate commitments, sukuk memoranda of the offer, green bonds principles, impact reports published by sukuk issuers and accounting reports from government ministries.⁴ The analysis aimed at identifying clusters of chain making activities and processes linked to the green sukuk (e.g. tagging and tracing, governing, verification, monitoring, and reporting) across the different institutions involved, including their characteristics, possible connecting devices and key institutions involved in these activities. Five clusters of critical activities and processes were identified and summarised as A-E, with their specifications as 1–4 in Table 2 below.

Table 2. Indonesia's Sovereign Green Sukuk: chains, relationships and connectivities.

	Chain making of [1]	Key characteristics [2]	Connecting devices [3]	Key institutions [4]
A	Planning and the use of allocated money	Exclusion criteria: e.g. new fossil fuel, large scale hydropower plants, nuclear-related assets.	Identification in 'Budget Tagging Process'.	The Ministry of Finance, technical advisors.
B	Selection process	Inclusion of mitigation and adaptation activities in the pool of eligible green projects.	Budget tagging process Screening against green framework (nine categories of projects).	Delivery ministries, the Ministry of Finance, the National Development Planning Agency (BAPPENAS) and the Ministry of Environment and Forestry, external parties for peer review.
C	Management of expenditures	Maintain an eligible green project pool larger than the expected outstanding issuance amount.	General treasury account policy. A 'register' to record the allocation of green sukuk money.	The Ministry of Finance
D	Reporting	Monitor and report progress against allocated money, expenditures to date, and estimated environmental benefits.	Monitoring Reporting Verification (MRV) through the National registry system (SRN) Resilience Index Information systems.	The Ministry of Finance, Delivery ministries, BAPPENAS and the Ministry of Environment and Forestry, external assurance
E	GHG accounting systems	Principles, rules, and processes to inform and track the progress of achieving the pledge of National Determined Contribution (NDC) to GHG reduction.	GHG Inventory, Mitigation action plans, National Registry System, IPCC methodologies, internal-governing devices, data management system within each imperative delivery ministry and entity.	Sectoral ministries are coordinated by the Ministry of Environment and Forestry.

Sources: Compiled from interview statements, CICERO (2018), Ministry of Finance (2018a), Second Biennial Update Report (BUR) Government of Indonesia (2018), UNFCCC (2020).

The document analysis generated initial insights about the process. It was used for the design of the second stage of the research process – the constructing of interview questions, undertaking interviews, and non-participant observations.⁵ A combination of targeted requests and snowballing allowed us to interview respondents from among (i) the budget and planning officers who regulate activities and control spending, (ii) officers who are in charge of monitoring climate change delivery, (iii) market development analysts, and (iv) the issuing officers of green sukuk. We performed 32 interviews across relevant levels of seniority, including state and non-state actors. These interviews were augmented by empirical evidence gathered from non-participant observations and attendance at climate-related events, including internal workshops, public consultation events and webinars. This provided an element of triangulation and robustness and enriched our understanding of the context of the study. These are summarised in Table 3.

The collected data, including interviews, were transcribed by one of the authors as the interviews were primarily done in Bahasa Indonesia. While a few interviews were done in English, the same author did the transcribing for consistency purposes. The initial analysis adopted essential elements to consider, as suggested by Saunders (2016), including familiarity with languages, the meaning of practices or narratives, and reflections. The transcription and initial analysis enabled us to familiarise ourselves with the characteristics of languages utilised by the interviewees from different professional backgrounds. We

Table 3. Fieldwork summary.

Interviewees	Mode	Primary functions	People	Duration	Dates
Development planning officers	In-person Written response	Environmental, transport development, system and procedures	4	3.5 h	August 2019, February 2020, August 2020
Delivery ministry officers (Energy and transports)	In-person, Online call	Planning budgeting, GHG inventory, mitigation, sustainable transport unit	6	8 h	February, March 2020
Environment officers	In-person, Online video call	MRV, GHG Inventory, Mitigation, Resource mobilisation, Climate Finance	5	6 h	February 2020, August 2020
Finance officers	In-person	Fiscal policy, debt management, Islamic finance	8	8.5 h	August 2019, February, March 2020
Financial industry	In-person, Online call	Underwriters, Sustainability, ESG Account Manager	4	2.5 h	November, December 2019
Financial regulator	Video call, Written response	Islamic capital market, the sustainable finance unit	2	2 h	August, September 2020
International development, think tank.	In-person	Programme manager, tracking public finance	2	4 h	September, Dec 2019
External assurance	In-person	Second opinion provider	1	0.5 h Follow-up by attending seminars	Nov 2019
Total			32	35 h	
Mode of Observations	Topics	Dates			
In-person workshops (2), public consultations (2), conferences and seminars (3). Webinars (2) and online conference (1) (34 h)	Climate bonds conferences, green equities conference, workshops on formulating methodology, public consultation for updated NDC, public meeting on green transport, webinar on financing for low carbon development and online conference on climate bonds.	March 2019, November 2019, January 2020, February 2020, March 2020, July 2020, September 2020.			

then used NVivo 12.6.0 for data management and the interviews' early coding process, facilitated building a codebook to identify empirical themes that dominated the conversations in each interview session. From the initial coding, and guided by Table 2, we engaged in an interactive process reflecting on the chain of actions associated with accounting for green sukuk and on the accounting practises used for governance, transparency, traceability and impact attribution. This then provided insights into the process, which led to the climate tagging of equivalent financial flows being temporarily accepted as an institutional solution. In other words, the interviews produced a structured narrative using the categories presented in Table 2, which will be presented in the following

section. The interviews confirmed the key chain making activities and accounting processes identified in our documentary analysis.

Findings

This study identifies a number of limitations in transparency and traceability within the Indonesian financial and GHG accounting systems in relation to tackling climate change and the accountability requirements of the green sukuk. Their solution involved repurposing existing techniques within the government accounting system that indirectly tracked equivalent financial flows from the green sukuk. However, problems emerged in how the flows of funds connected, through allocation and tagging, GHG accounting systems to sukuk funded projects. GHG accounting reforms attempted to adapt GHG accounting systems, designed to calculate nationally determined contributions under international climate conventions, to provide project-level accounts of GHG impacts. At the same time, these reforms provided enhanced transparency and traceability to the green sukuk and provided a basis for further development (Frandsen 2009).

Enhanced transparency through equivalence

The transparency requirements contained in the Green Bond Principles (ICMA 2018, 2021) were used to structure the Indonesian green sukuk. This voluntary but authoritative framework provides guidance on enhanced transparency requirements, legitimate use of the allocated money, project selection processes, managing the use of allocated money, performance monitoring and reporting. These principles were designed using the assumptions associated with the financial accounting systems of large corporations, rather than governments or public sector organisations, as evidenced by the following:

Government is not like a corporate where we already have all the systems, (Market Development Officer).

This suggests a need to adapt government accounting systems to meet expected climate bond accountabilities. Typically,

Sovereign Green, Social, and Sustainability (GSS) bonds finance expenditures rather than projects, and these expenditures are not usually newly created. Most respondents told us their GSS bond-financed expenditures from current or previous budgets, (Climate Bonds Initiative 2021, 5).

An assumption is that money from green sukuk should be connected to new projects that produce beneficial climate outcomes and tracked through chains of decisions. This connectivity should also ensure the expenditure does not involve any activities related to usury or conflict with those that are not accordance with Islamic principles.

For program-based green sukuk, I do not want the environment to be used as collateral to find money to cover the budget deficit. Now climate and environmental affairs are sexy. This is often utilised for those who sell debt, (Development Planning Expert).

This statement confirms that green sukuk must be asset-based or asset-backed and should not be used to finance general expenditures. Despite this, our research identified that money raised from the Indonesian green sukuk was pooled with other government

revenues in a general treasury account (see [Figure 1](#) below), primarily intended ‘for financing state budget deficit, general state budget, and non-earmarked’ (Directorate of Islamic Financing 2019).

Despite the requirement for enhanced transparency and traceability concerning the green sukuk, the government’s financial accounting system created an initial disconnection, which inhibited the ability to directly track green sukuk funds through the state budget system.

The general treasury account operates as a black box, limiting the possibility of tracing green sukuk proceeds. However, this observation has to reflect that the repayment of the green sukuk also comes out of this account, drawing on funds from tax payments or other income sources. In this regard, the green sukuk is accounted for no differently than other central government income. Throughout the Indonesian government’s accounting systems all transparency, tracking or tagging, operates indirectly by identifying equivalent financial flows into and out of an account. Using this approach, it was possible to conclude that the total expenditures tagged as climate-related exceeded the proceeds from the green sukuk.

From our understanding, there are two approaches for managing green bonds proceeds, tracking and earmarking methods. Here we chose to earmark, which means we only claim that we have green projects as much as the issuance amount. While for tracking, we [would] require to create separate accounts and new systems in the state budget. It is not possible, (Debt Management Officer).

This Debt Management Officer notes the weakness in using ‘earmarked’⁶ equivalent financial flows to construct the accountability of the green sukuk. This critique also

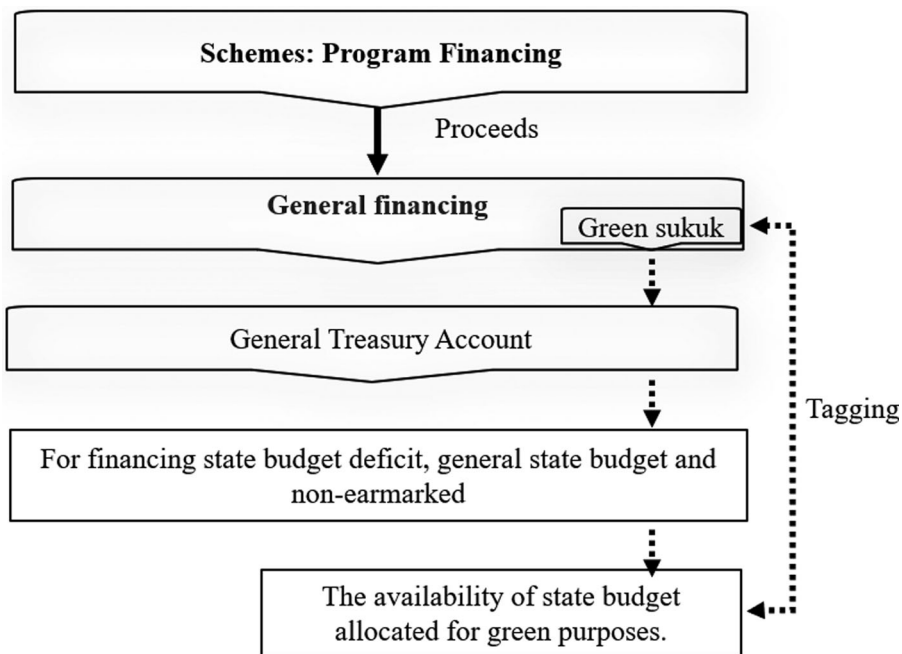


Figure 1. Programme financing mechanism. Source: adapted from Directorate of Islamic Financing (2019).

demonstrates an understanding of what would be required, which in their opinion, would require substantive changes in the government accounting system. The use of climate tagging was seen as a pragmatic solution that repurposed the existing accounting numbers available in each associated institution (see Table 2, columns 3–4).

However, the Indonesian government’s accounting for their green sukuk was subject to external assessment by an independent opinion provider (CICERO 2018). For instance, the green bonds and sukuk framework of the Government of Indonesia were awarded Medium Green Shading⁷ in recognition of its long-term commitment to eligible climate projects in pursuit of its Nationally Determined Contribution (NDC) from the Paris Agreement alongside its low carbon development programme (Alfsen et al. 2018).

Enhanced transparency and traceability in GHG accounting

Our research identified several problems with connecting the Indonesian government’s GHG accounting system with specific projects financed by money from the green sukuk. The initial purpose of their GHG accounting system was to monitor their national progress towards the NDC commitment under the institutional arrangement of the UNFCCC (2016). In this system, the main accounting object was the nation, sub-divided into five priority sectors⁸, not funding streams or individual projects that satisfy the Green Bond Principles or are contained in the sukuk memoranda of the offer. The production of GHG accounts is an ongoing practice consisting of monitoring, reporting and verification as recommended in the transparency framework by the UNFCCC (2016) and was adopted by the government of Indonesia as represented in Figure 2.

This system lacked the granularity and connectability of GHG data required by the green sukuk and as such required the creation of GHG allocation techniques to apportion sectoral or territorial GHG emissions to assets or projects. Documentation about the

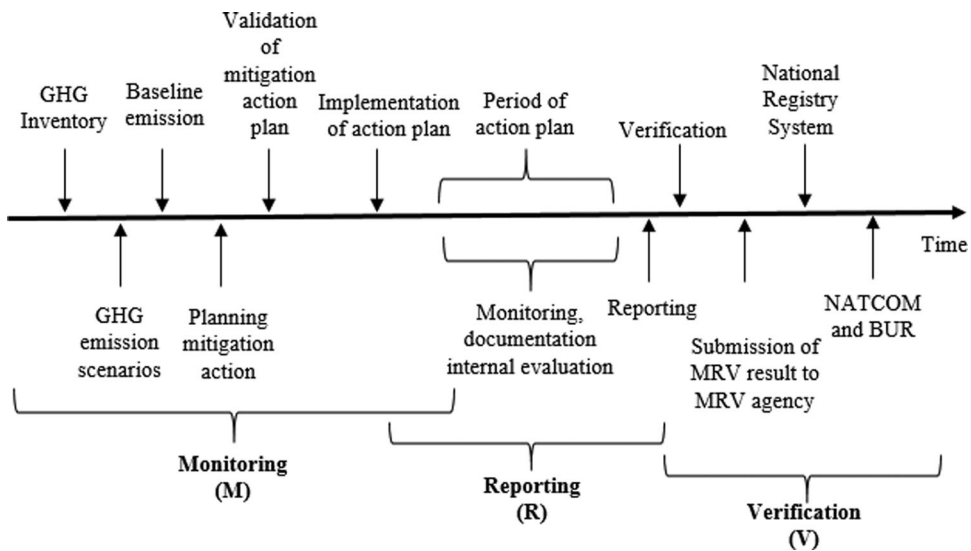


Figure 2. National GHG Accounting System. Source: adapted from the Second Biennial Update Report (BUR) Government of Indonesia (2018).

National Registry System for Climate Change (NRS-CC) noted that differentiating GHG by the source of funding was not its primary emphasis. Instead, this system focussed on accounting for the GHG emission reductions from each sector from climate mitigation actions. The Directorate-General for Climate Change (DGCC) Ministry of Environment and Forestry as the coordinator for the monitoring, reporting and verification (MRV), confirmed this sectoral accounting focus.

[...] the implementation of MRV with the main task of engaging all sectors that implement climate actions, namely government, private, and public. in Third Biennial Update Report (Government of Indonesia 2021, 4–2).

To achieve its nationally determined contribution (NDC) under the Paris Agreement (UNFCCC 2015), Indonesia selected five priority sectors: energy, forestry, agriculture, waste, and industrial production and product use (Government of Indonesia 2016). Its sectoral GHG accounts were produced through an evolving collaborative process between distributed agencies responsible for producing GHG inventories, determining baseline scenarios, the scope of mitigation actions, activities, documentation, disclosure of information and verification. However, this process was not designed for green sukuk accounting. As such, we observed difficulties in apportioning these sectoral GHG accounts with the assets financed by the green sukuk due to non-aligned financial and GHG accounting objects. Therefore, it was impossible to directly connect GHG emission reductions accounts to the assets that backed the sukuk or climate tagged equivalent expenditures on these projects.

This connectivity problem is related to a misalignment between green sukuk eligible projects and the Indonesian Government's five priority NDC sectors. According to Green Bond Principles (ICMA 2018, 2021) and the green sukuk memorandum of the offer, eligible green projects or assets were not limited to these five sectors. Green sukuk accounting objects required reliable assessments of the use of money and consequential GHG reductions broken down into categories such as 'renewable energy, energy efficiency, resilience to climate change for highly vulnerable areas, sustainable transport, waste to energy and waste to management, sustainable management of natural resources, green tourism, green building and sustainable agriculture' (CICERO 2018, 13–16). Connecting GHG impacts to green sukuk required an apportioning of recorded GHG from international convention compliance objects to green bond eligible funding categories. This re-apportioning was a complex financial and GHG accounting challenge involving the application of expert subjective judgements and apportionments.

For instance, low carbon public transportation projects require participation from ministries responsible for energy and infrastructure and transportation. However, the primary objective of the transportation ministry was not low carbon transport but rather to enable more accessible and safer public transport. Therefore, the portfolio of projects within the transportation ministries had multiple objectives and was indirectly funded from national and regional budget accounts. It was possible to attribute existing public transport projects as legitimate applications of green sukuk funds through climate tagging, even though the primary intention of the project was not climate-related.

It is possible that these projects will not achieve the level of GHG emission reduction that other options might have, given that climate change may not have featured in its initial evaluation. Our research indicated that further development is needed in the

Indonesian GHG and financial accounting system to more effectively connect and mediate (Miller and O'Leary 2007; Thomson, Grubnic, and Georgakopoulos 2014) between the different institutions and agencies with responsibilities and accountabilities associated with reducing GHG emissions. In particular, these systems need to be capable of linking and matching funds, eligible projects, climate reductions, financial planning systems and GHG MRV systems. Our analysis suggests that the climate tagging system creates the possibility that sukuk proceeds could be attributed to projects or assets with uncertain climate impacts, in line with the concerns of Arjaliès et al. (2022); Mol (2010, 2015) over the limitation of transparency practices that privilege procedural matters instead of material social or ecological outcomes.

Tagging through equivalency

As noted above, we observed that the government pooled green sukuk funds in the general treasury account instead of dedicated accounts, with subsequent loss in traceability. This was a problem that applied to all government revenue sources. This pooling requires the tagging of equivalent amounts of money as it flows in and out of different accounts within the central government, between various ministries, government levels, and external institutions. In this way, expenditures from each ministry, department, and agency are tagged and tracked to assess performance against national priorities, work plans and national action plans, including climate change.

Before the issuance of the green sukuk, the Indonesian government had used a form of climate tagging in their budgeting and planning processes to manage their climate mitigation and adaptation activities (Figure 1). They used climate tagging to create climate accounting objects that made visible and governable their climate commitment in budgeting and planning accounts. A centralised GHG emission validation process complemented climate tagging in the financial accounting system to ensure appropriate measurement and reporting of GHG emissions.

The predominant GHG accounting object was geographical in nature, further subdivided into the five sectoral GHG accounting objects. These GHG accounting objects did not wholly align with financial accounting objects, which were typically linked to ministerial structures and institutionalised financial control procedures. Climate tagging in the financial and GHG accounting systems attempted to create climate-related chains that connected financial expenditures and GHG emissions throughout governmental institutions and agencies (Ministry of Finance 2015).

Earlier to the introduction to green sukuk, climate tagging was a regularised part of the financial budgeting and planning system used to align their accounts with politically determined national action plans. However, we observed that how that tagging was undertaken varied across different parts of the government, resulting in differences in what counts as a budget for tackling climate change. For example, if the ratio between expenditures and GHG reduction was very low, in some cases, this was not tagged as climate-related or green sukuk.

From budget tagging, if it is associated with emission reductions, for example, the tagging indicated a large number of state budgets, but the emission reductions were relatively small, it could not be associated, (Officer from Delivery Ministry).

This statement shows how these tagging choices led to concerns expressed in our interviews that it was not always possible to directly assess the GHG impacts of tagged actions or expenditures. With the introduction of the green sukuk, these existing traceability problems and lack of direct connectivity were amplified.

As discussed earlier, the green sukuk requires far greater connectivity and traceability between raising money in the Islamic capital market, their expenditures, and environmental benefits than was observed. This requirement for greater connectivity and traceability was operationalised through ongoing modifications of the climate tagging system to create new accounting objects, and thereby track the mobilisation of sukuk funds to climate change activities and impacts. However, these new accountability requirements had to compete alongside other systems requirements, such as governing all political priorities, not just climate change.

One major limitation we observed in creating green sukuk accounting objects was the lack of direct connectivity with funding sources due to the use of a single treasury account from which all government activities were funded. A complete tracking system would require many treasury accounts linked with varying sources of funding, which respondents argued would overly complicate the existing financial system. Therefore, the government's solution was to track equivalent finance flows to nominated projects using climate tagging that accounted for earmarked funds as they flow in and out of accounting objects.

Here, earmarking as we understand it is just a claim that, for instance, we have a sukuk issuance of 100 million and we have a green project of that value too. So, we make sure we have, (Market Development Officer).

The government used data from tagged climate budgets to evidence the size of funds allocated to government departments and the amount spent. The climate tagging of equivalent financial flows allowed the possibility of green sukuk funds being used to refinance existing projects or to be connected with impacts that have already been delivered.

For the issuance of green sukuk in 2018, we selected data from the tagging in 2016 for refinancing and data in 2018 for financing. We chose two years before the issuance to ensure that the project is completed, (Fiscal Planning Officer).

We observed that this climate tagging was able to create a connection through the accounting systems with appropriate underlying assets that evidenced compliance with the underlying Islamic tenets of the sukuk memorandum of the offer. This is represented on side 1 of [Figure 3](#). However, there were concerns about the connections between the GHG accounting system and the MRV report for the NDC performance (side 2 of [Figure 3](#)). The connection between the GHG accounts and financial accounts that flow from the general treasury accounts was re-formulated to present named-GHG-numbers alongside named-green sukuk-expenditures in accounting objects that were deemed appropriate to judge compliance with the green sukuk memorandum of offer (side 1 [Figure 3](#)). [Figure 3](#) provides an overview of the interplay between the different accounting systems and institutions that produce these other accounting numbers and objects.

Limitations in the GHG accounting numbers that purport to represent the climate impact of the disbursement of green sukuk money were recognised by interviewees as

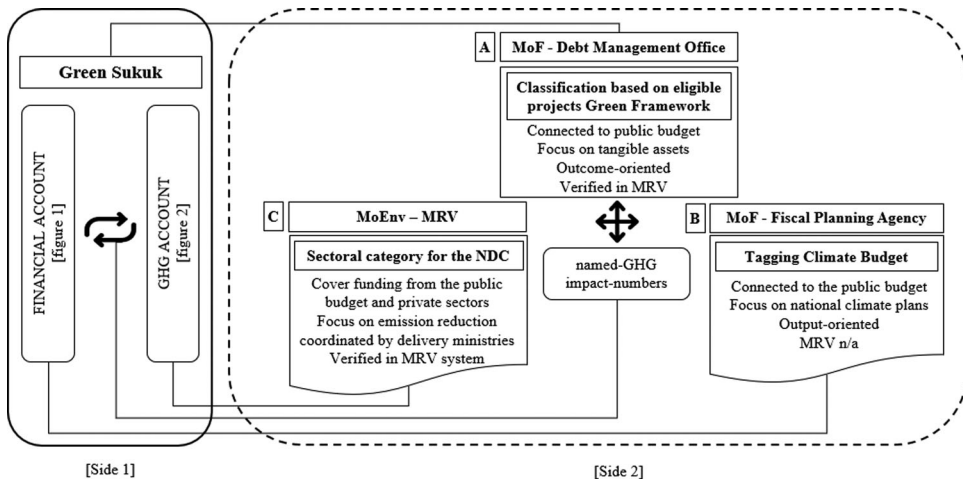


Figure 3. Constructing environmental integrity of equivalent finance flows. Source: Illustrated from obtained data.

a constraint in how ministries respond to changing service delivery imperatives. Measuring consequential climate benefits was a complex task requiring the interpretation and translation of principles, objectives, and targets in the Indonesian government's green framework. It was not seen as a purely technical or calculative task to produce named- GHG reduction-numbers, even using the existing climate tagging system. Climate tagging, combined with subjective GHG apportionment practices, connected some previously disconnected domains and performance measures which formed a partial chain of actions that created the future possibility of meaningful green sukuk accounting objects. There was a recognition that despite these limitations, climate tagging allowed new climate-related visibilities and opportunities to emerge even though it was not fully aligned with the enhanced accountability of the green sukuk.

Our analysis suggested that it was concerned over how to improve the climate effectiveness of the line ministries in their spending decisions that underpinned an ongoing programme to enhance connections between financial and GHG accounting systems. Over time, there was a sense that climate tagging could be developed to directly connect different sources of finance with specific assets and expenditures on eligible green activities and projects. However, the major challenge derived from the constraints of the national GHG accounting system remained that it had been designed to comply with international climate conventions, not for accounting for the impact of specific projects, in ways that would correspond to how they had been funded. Interviewees were aware that the GHG accounting system was not sufficiently granular for the complete traceability required by the green sukuk over its life cycle, particularly the attribution of material environmental impacts in the form of reduced GHG emissions.

Discussion and conclusion

Our analysis confirms that the accountability of sovereign green bonds, including sukuk, while pursuing material climate outcomes and Sharia compliance remains a challenge.

While modifications of the financial accounting system through climate tagging were considered appropriate for allocating funding from general revenues to climate adaptation and mitigation programmes, they only enabled limited connections between expenditures and green sukuk outcomes. Tagging did not prevent the refinancing of existing climate projects, nor did it optimise the GHG reductions from investment programmes or accurately attribute GHG reductions to individual projects.

Traceability remained limited in assessing the potential environmental, social or economic development impact of green sukuk financed assets (AAOIFI 2019; Adam and Thomas 2004; Hidayah, Lowe, and Woods 2019). Opinions were expressed that more substantive reforms of the government financial and GHG accounting were required to create direct chains that connect with material climate and social outcomes rather than monitoring compliance with procedures.

Our analysis suggests that assessing against material environmental and social outcomes needed further development of traceability technologies and relevant accounting objects situated in diverse agencies (see Table 2 columns 3–4) working with multiple disciplines such as finance, environment, climate science or planning. In particular, improving the connectivity of green sukuk-climate tagged-numbers in financial accounting systems and green sukuk-tagged-numbers in GHG accounting systems is part of 'the dialectic of connectivity and disconnectivity' (Power 2019, 127) within the governance of climate change. Resolving this green sukuk GHG connectivity problem needs to be balanced against the degree of financial flexibility required in the government's accounting systems to deal with competing economic, social and environmental priorities, particularly when governing in times of significant uncertainty. Even so, without greater financial and GHG transparency and traceability, it may be challenging to establish the political and institutional common ground Mol (2015); Power (2019); Quattrone (2022) necessary to accelerate Indonesia's climate mitigation and adaptation activities.

We have presented evidence of how climate tagging enabled the creation of new accounting objects by using the green sukuk to connect previously disconnected institutional domains, financial and GHG accounting systems. Using green sukuk accounting objects to mediate between the different interests of all those involved in reducing GHG emissions was reported by interviewees as partially successful. This supports Power (2019), who highlighted how traceability infrastructure and devices allow heterogeneous perspectives from different fields to be diffused and reconstituted to support shared social and policy values. Climate tagging, in conjunction with GHG accounting systems, was able to configure indirect chains partially connecting sukuk funds with climate outcomes and Islamic principles (Alamad, Hidayah, and Lowe 2021; Hidayah, Lowe, and Woods 2019), and so meeting some of the requirements contained in the memorandum of the offer. This traceability strategy, in our view, offers the potential for evolving into an effective accounting for the material and ethical integrity of the green sukuk.

Our study showed that climate tagging in the Indonesian government accounting system was constantly evolving: for example, in the progression from the earmarking of funds at a procedural level to project-level impact reporting suitable for the green sukuk. However, there remain several outstanding problems in tracking financial flows to GHG outcomes that do not overly constrain budget flexibility (Posner 2007) or divert

money from other policy imperatives (Zelizer 2012). The chain-making process entailed in making green sukuk accounting objects fully accountable is likely to require a long journey of incremental connections between multiple domains while navigating the many disconnectivity posed by the multifaceted and conflicting agendas, objectives, perspectives, practices, and institutional arrangements of the state, business, investor and public interests involved in and impacted by the climate change crisis (Power 2019; Quattrone 2022).

One particular concern was that, without adequate traceability mechanisms, funds from the green sukuk risked being attributed to previously funded projects (Medarova-Bergstrom et al. 2011) or diverted into funding government deficits elsewhere. However, our research indicates that green sukuk projects appear to have been selected in a way that maintains the integrity of the green sukuk but was not fully aligned with the Indonesian NDC commitments.

The study has certain limitations. Firstly, by limiting the analysis of traceability to the case of the green sukuk, its findings are not necessarily generalisable to other sovereign green bonds or Islamic financial instruments. Therefore, there is a potential for accounting research to undertake comparative investigations across multiple sovereign issuers or institutional settings. Secondly, given that the focus of this study is primarily on traceability, we do not assess the effectiveness of the overall configuration of green sukuk funded projects and other climate adaptation or mitigation projects. Even if we had set out to undertake this evaluation, limitations in the GHG accounting systems would likely make this difficult to achieve. The GHG accounting system in Indonesia adopts an attributional territorial production method, whereas evaluating climate effectiveness would require life cycle consequential GHG accounting data (Brander 2016, 2017). Further studies are also required to explore the misalignment of the timing of GHG accounts relating to climate-related financial instruments. At present, accounts of GHG impact are required over the life of the financial instrument, whereas the GHG impacts may extend beyond that period, e.g. a reforestation project could continue to remove GHG from the atmosphere for over 500 years. In addition, further research into the effectiveness of assurance concerning climate finance initiatives is required (CICERO 2018; Liu and Lai 2021; Moghul and Safar-Aly 2014).

Despite these limitations, we consider that this study makes a relevant contribution to the dialogue among social and environmental accounting scholars in their engagement with the IPCC as discussed in Charnock and Thomson (2019). Notably, this study contributes to the discourse related to demands for enhanced transparency and traceability as to how funds from green-labelled financial instruments are spent and how that expenditures contribute to reducing material climate impacts (Arjaliès et al. 2022; Bebbington et al. 2021; Bhandary, Gallagher, and Zhang 2021; Mol 2010, 2015). We also see it as contributing to policy discussions on ways of integrating traceability devices that go beyond tracking to evaluating the capability of government budgets to finance national climate action plans: for instance, encouraging the participation of private financial flows in this kind of green initiative, particularly from within Islamic capital markets. Finally, we note that this type of traceability mechanism could also apply to other financing instruments, such as impact investing, crowdfunding, other thematic funding innovations.

Notes

1. Note the word 'sukuk' is technically a plural form of the word sakk (its singular form), but sometimes in general usage sukuk is treated as a singular form. In this paper, we will use sukuk to refer to both singular and plural forms, in accordance with general usage.
2. While this study is not adopting an Actor-Network approach which has its own ontological underpinnings, the concepts of tagging and traceability have enough similarities to emphasise and illustrate key points for this study. In this case, we wish to emphasise the importance of the (re)naming side of the tagging. This particular ANT paper has a very strong emphasis on naming as part of what accounting does and argues that accounting consistently and simultaneously names and counts, hence named numbers. Using the key reference *Circulating Reference Sampling the Soil in the Amazon Forest* by Latour (in Pandora's Hope, 1999) she followed the references (as a chain of translation) across sites while the accounting actor emerged, theorised as a space/time/value machine.
3. Earmarking is another term for tagging. While the origins of the two terms are different in terms of their fungibility and tracking of their divisional spending (Bandelj, Wherry, and Zelizer 2017; Thaler 1999; Zelizer 1994; Zelizer 2012). For instance, earmarking is characterised by ring-fenced money for specific purposes or a particular social relation that influences cognitive behaviours. In this empirical setting, the two terms are used interchangeably through the essence of tracking and categorisation. The concept of earmarking in this context might be used differently from the context of earmarking the government budget for education or health sectors.
4. Examples of the documents include Green sukuk issuance, Allocation and Impact reports (2019, 2020, 2021), National Sharia Board on Sukuk No:127/DSN-MUI/VII/2019, First NDC Republic of Indonesia 2016, Report for Climate Budget FY 2017-2018, Road Map NDC, Funding for Low Carbon Development, Public Funding for Controlling Climate Change FY 2016-2018, Lists of activities included in green sukuk, and general guidance for budgeting and planning PMK No 136/PMK.02/2014.
5. The questions covered included both general questions about the organisation and specific questions on how the initiative about green sukuk has been developed and how its accountability mechanism has been formulated. The mechanism includes the process of formulating the impact allocation report that covers the way of managing the use of planned and allocated funding, tracking, measuring, and reporting the impacts.
6. Earmarking was used by some respondents to describe climate tagging.
7. The independent assurance such as CICERO assesses green shading to signal relevant parties about the potential environmental impact of projects that are included in the green framework for green bond issuance. Prospective projects are classified in three shades: dark green, medium green and light green. Dark green is awarded for projects that demonstrate a clear long-term vision for climate-resilient and low carbon development, while medium green is awarded for projects that are on the steps towards the vision yet less clear pathways. The light green shade is allocated for projects that are climate-friendly but do not contribute to a long-term vision.
8. These are energy, industrial processes and product use, forestry, agriculture and waste.

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Appendix A. Transaction Details the Government of Indonesia's Green Sukuk

Key features	144A/Reg S Trust Certificates	144A/Reg S Trust Certificates	144A/Reg S Trust Certificates	144A/Reg S Trust Certificates
Structure	Wakala	Wakala	Wakala	Wakala
Tenor	5 years	5.5 years	5 years	30 years
Issuance Date	Mar-18	Feb-19	Jun-20	Jun-21
Maturity Date	Mar-23	Aug-24	Jun-25	Jun-51
Amount issued	USD 1.25bn	USD 750 mm	USD 750mm	USD 750mm
Oversubscription	2.4 times	3.8 times	7.37 times	3.43 times
Use of proceeds basis	Green bond and sukuk framework	Green bond and sukuk framework	Green bond and sukuk framework	Green bond and sukuk framework
Listing	Singapore Stock Exchange and NASDAQ Dubai.	Singapore Stock Exchange and NASDAQ Dubai.	Singapore Stock Exchange and NASDAQ Dubai.	Singapore Stock Exchange and NASDAQ Dubai.
Rating	Baa3 (Moody's Investors Service), BBB- (S&P Global Ratings), BBB (Fitch Ratings)	Baa2 Moody's Investors Service, BBB-, S&P Global Ratings, BBB Fitch Ratings	Baa2 Moody's Investor Service, BBB S&P Global Ratings Services, BBB Fitch Ratings	Baa2 Moody's Investor Service, BBB, S&P Global Ratings Services, BBB Fitch Ratings

Sources: Ministry of Finance (2018b, 2019a, 2019b, 2020a, 2020b, 2021a, 2021b).