

# **THE CONSTRUCTION OF ACCOUNTABILITY MECHANISMS TO MOBILISE A CLIMATE-RELATED FINANCIAL FLOW**

by

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## ABSTRACT

This research seeks to understand and explain how the global climate action agenda was translated into accounting objects connected with a specific financial instrument designed to mobilise financial flows to public sector projects that tackle climate change. This thesis examines a case study of the construction of accountability mechanisms for Indonesia's sovereign green sukuk, a Sharia-compliant alternative to fixed-income instruments purposed for environmental objectives. Drawing upon the notion of the programmatic rationalities and technology of government (Rose and Miller, 1992) alongside a framework on the constitutive role of accounting in territorialising, mediating, subjectivising and adjudicating (Miller and Power, 2013), the framework facilitates explaining how the productive force of accounting can be effectively performed to organise and economise climate change in a governable field.

This thesis contributes to advancing accounting infrastructures to formulate accounting objects that embed proposed material outcomes. This study discovers the novel application of climate tags — tagging, tracing, and earmarking — that have been discursively constructed to mediate between transparency and traceability, territorialise climate accounts in the public accounting system, and adjudicate green impact measurements. Moreover, this thesis introduces enabling and constraining attributes to accelerate or restrain financial flows through subjectivising accounting objects. Nevertheless, the productive forces of accounting are prevalent in the organisation of the climate change agenda, while limited evidence can be observed in the economisation pathway. In addition, this thesis urges the demand for traceable climate-related material outcomes in every green or labelled financial instrument with similar characteristics to achieve transformative impacts in combating climate change.

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## DECLARATION

This thesis incorporates material that was written and researched by myself and appears in:

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## LIST OF ABBREVIATIONS

|                 |                                               |
|-----------------|-----------------------------------------------|
| BAPPENAS        | The National Development Planning Agency      |
| CBDR            | Common but Differentiated Responsibilities    |
| CBI             | Climate Bonds Initiative                      |
| CDM             | Clean Development Mechanism                   |
| COP             | Conference of the Parties                     |
| CO <sub>2</sub> | Carbon dioxide                                |
| ESG             | Economic, Environment, Social, and Governance |
| ETS             | Emissions Trading System                      |
| EU              | European Union                                |
| GBP             | The Green Bonds Principles                    |
| GHG             | Greenhouse Gasses                             |
| GSS             | Green, Social, and Sustainability             |
| IMF             | International Monetary Fund                   |
| IPCC            | Intergovernmental Panel on Climate Change     |
| IPPU            | Industrial Processes and Product Use          |
| LUCF            | Land Use Change Forestry                      |
| MER             | Monitoring, Evaluation, and Reporting         |

|         |                                                                  |
|---------|------------------------------------------------------------------|
| MOEF    | Ministry of Environment and Forestry                             |
| MOE     | Ministry of the Environment                                      |
| MOF     | Ministry of Finance                                              |
| MRV     | Measurement, Reporting and Verification                          |
| NDC     | Nationally Determined Contribution                               |
| OECD    | Organisation for Economic Co-operation and Development           |
| RAN-API | Adaptation Action Plan                                           |
| RAN-GRK | Mitigation Action Plan                                           |
| SBSN    | Surat Berharga Sharia Nasional (National Sharia Securities)      |
| SDG     | Sustainable Development Goal                                     |
| UK      | United Kingdom                                                   |
| UN      | United Nations                                                   |
| UNDP    | United Nations Development Programme                             |
| UNFCCC  | United Nations Framework Convention on Climate Change            |
| UNESCO  | United Nations Educational, Scientific and Cultural Organization |
| USD     | United State Dollar                                              |



## CHAPTER 1. SETTING THE SCENE

### 1.1 Research Background

In 2022, the Intergovernmental Panel on Climate Change (IPCC) highlighted the demand for “robust ‘green’ labelling and disclosure schemes in [an] innovative financing approach” (IPCC, 2022b, p. 15-5). As over 153 countries have updated Nationally Determined Contributions (NDCs) to achieve a net-zero economy, the Glasgow Climate Pact “stresses the urgency of enhancing ambition and action in relation to mitigation, adaptation and finance” as noted in the United Nations Framework Convention on Climate Change UNFCCC (2022, p. 3). However, “the absence of clear climate governance or enforceable accountability measures would increase tensions” and exacerbate long-term threats to people and the planet (World Economic Forum, 2022, p. 39). Thus, every ambitious climate action plan needs to strengthen both the means of financing and accountability mechanisms to avoid adverse impacts of climate mismanagement.

Various financial instruments have emerged to align with climate change commitment and the UNFCCC Standing Committee on Finance (2021) highlights the merit of green bonds-related instruments as a form of mobilising financial flows. Green bonds are one of the asset classes that have been deployed to accommodate the alignment to a net-zero economy in parallel with sustainability; they are social labelled bonds, commonly referred to as green, sustainability, and social (GSS) bonds. This type of instrument has the potential to expand the market, given the proportion of GSS-labelled bonds towards the outstanding debt remains substantial. Moreover, focusing on the flows of green bonds (UNFCCC Standing Committee on

Finance, 2021) has the capacity to embed climate alignment at a wider level, such as the green bond capital market ecosystem (World Bank, 2020a).

As signatories of the Paris Agreement, the issuance of sovereign green bonds demonstrates countries' climate change leadership, while emphasis remains on the dynamics for greater accountability given the nature of government accounting systems (Climate Bonds Initiative, 2021). The need to enhance transparency over environmental integrity is stressed, albeit through the development of equivalency among the climate-related and green frameworks (International Capital Market Association, 2021b, 2022b). The inability to tackle this issue may adversely affect market confidence and slow the pace of the transition towards decarbonisation (IPCC, 2022b; OECD, 2015). However, the extent to which green financial instruments can provide financial and non-financial information to users such as creditors and investors is problematic (IFRS, 2018). Similarly, to create robust 'green' labelling (IPCC, 2022b, p. 15-5) while developing the market (CICERO Shades of Green, 2021), the classification (albeit remaining diverse) must include relevance and faithful representation of the information. Efforts have been made to standardise categorisation including the Green Bond Principles and related regional framework, the European Union (EU) taxonomy, and the assessment of green shading (International Capital Market Association, 2021b, 2022b).

Among other sovereign green bond issuers, the World Bank (2021, p. 22) reported “only Indonesia has used the climate budget tagging system as the basis for issuing a sovereign green bond (SGB) and green sukuk”.<sup>1</sup> Indonesia was named as the first world sovereign green

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<sup>1</sup> 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 thesis, sukuk is used to refer to both singular and plural forms, in accordance with general usage.

sukuk (a Sharia-compliant version of a green bond) and received more than 12 notices of international recognition as a consequent of this issuance (Ministry of Finance and UNDP, 2021). As the accountability mechanism has been a concern in the green bond issuance, the deployment of climate tagging has been emphasised as an accounting technology to incorporate climate-related agenda into accounting objects. The development of climate tagging was initially intended to identify the inclusion of climate change actions into government expenditure (UNDP and International Budget Partnership, 2018).

By extending the use of climate tagging from identification of public spending capacity for climate actions to sovereign green sukuk issuance, since 2018, the government of Indonesia continues to attract oversubscription, and this signals the demand from the global market (Ministry of Finance, 2018b, 2019c, 2020, 2021c, 2022). However, to what extent the financial flows from the issuance can be connected to the impact of direct greenhouse gas (GHG) emissions is questionable. For example, there are challenges in classifying sensitive activities that positively and negatively produce climate impact (UNDP, 2019). Furthermore, over tagging and under tagging may create the risk of “greenwashing” (OECD, 2021) without stringent assurances and changes.

## 1.2 Research Aims and Objectives

The research background demonstrates the issues of accountability in the growing demand for an innovative financial approach to tackle climate change. In the adoption of green bonds to a sovereign green bond, the nature of accountability is typically attached to the present government system. To incorporate greenness, Gray (1992) highlights the role of accounting to express accountability, constructing and influencing decisions based on environmentalism

thinking. In this sense, the notion of accountability is perceived as “an emancipatory concept helping to expose, enhance, and develop social relationships through a re-examination and expansion of established rights to information” (Gray, 1992, p. 413).

Green sukuk accountability requires GHG accounting technologies that measure lifecycle impacts on the GHG emissions (Brander, 2016, 2017) of specific programmes, projects, or individual assets funded by the green sukuk. However, little is known about the impact of environment-oriented innovations at the financial instrument level (Monk and Perkins, 2020). Furthermore, most sovereign debt legal frameworks do not permit the earmarking of proceeds, which is one of the obstacles to the issuance of green sovereign bonds (International Monetary Fund, 2022). To overcome this gap, this thesis focuses on the construction of accountability mechanisms in green funds by approaching its life cycle, from the issuance to the impact. By selecting Indonesia’s sovereign green sukuk issuance as the case study, this thesis offers a unique setting whereby accounting technologies have been positioned as a “productive force” (Miller and Power, 2013, p. 558) to mobilise a climate-related financial flow.

What is evident is that connecting financial flows with environmental benefits requires new roles for accounting along with what this research defines as new ‘accounting objects’. This construction through its naming and counting practices (Bassnett, Frandsen and Hoskin, 2018; Frandsen and Hoskin, forthcoming), creates and makes visible [new] objects that act not only to monitor, trace, and set predetermined targets, but also possibly reconnect and re-redirect, and redefine already ‘existing’ accounting objects of public finances. Despite the accounting objects presented in this thesis seeming stable, this research perceives the dynamic nature of

accounting objects as highlighted by Bebbington, Russell and Thomson (2017). The problematic nature of accounting objects or entities is emphasised as “loosely structured, multi-dimensional, multi-disciplinary, political and scientific, dynamic and characterised by complex non-linear relationships” (Bebbington, Russell and Thomson, 2017, p. 27). The contested nature of accounting objects and entities in this setting will be studied in a case study of Indonesia's sovereign green sukuk.

First, climate change outcomes are complex to pin down and measure, not least because conditions produce climate outcomes and diversity in the calculative period. Second, Indonesia as a state has its own accountability towards its citizens to provide public goods and services which have interconnections that are potentially contradictory to climate change targets. Third, as part of the international community, Indonesia has its own pledge to the global climate convention, including the NDC target, strengthening net-zero commitments. In addition, the adoption of green bonds in a sukuk form has the potential to both develop the Islamic finance market to internalise the climate change agenda, and the outcomes will comply with Sharia principles.

Conceptually, the research setting of the Indonesian government's sovereign green sukuk provides a unique empirical background to explain how the programmatic agenda of climate change was translated into technologies that govern the Indonesian's government imperative agenda, as aligned with Rose and Miller (1992). The consistency of issuing green sukuk offers the possibility of rebuilding the rethinking and acting (Miller and O'Leary, 1987) on climate change concerns that coexist with the regular practices of financial instruments. Changes in the process and practices can be observed through the regular green impact reporting

mechanisms to distinguish them from conventional financial instruments that connect with the public budgeting system. Therefore, understanding the construction process and redevelopment of accounting technologies alongside the flow of funds will offer a shred of novel empirical evidence to contribute to theorising the constitutive role of accounting (Miller and Power, 2013).

This thesis builds on prior scholarship that diversely studied climate, green, or sustainable finance and socially responsible investment (SRI). By focusing on the flow of the funds from the issuance to the impact in the public accounting system, it responds to Lapsley and Miller (2019) on the potential use of accounting technologies to tackle climate change issues. Even though prior studies are overlapping in the domain of climate-related financial instruments, this thesis identifies few streams of research about their nature and definition, financial aspects, market drivers and barriers, and governance. One stream of research focuses on defining the nature of the SRI (Dimmelmeier, 2021; Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009). Another stream emphasises the financial aspects of green bonds, e.g. Larcker and Watts (2020); Martin and Moser (2016); Nanayakkara and Colombage (2019); Wulandari *et al.* (2018). In barriers and drivers for market development the dominant catalysts include the role of key actors (state via policy support, civil actors), and self-regulatory frameworks (Azhgaliyeva, Kapoor and Liu, 2020; Monk and Perkins, 2020; Tolliver, Keeley and Managi, 2020; Zhang, 2020). The preceding stream is closely related to the stream of governance.

This thesis advances the scholarship of governing climate-oriented financial instruments, here in the green bonds sphere, by focusing on the accountability mechanism within the flow of funds. In particular it focuses on when sovereign green bonds enter co-existing public

accounting systems. 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 (Mehrpouya and Salles-Djelic, 2019), that embed in the financialisation of nature (Arjaliès and Gibassier, 2022). 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).

The previous literature on green bonds has either addressed them as separate issues or at different levels. This research setting highlights the role of accounting and its potential power in reshaping the mobilisation of green funds. As reported by the World Bank (2021), Indonesia was the only country that channelled the tracking of the climate budget expenditure to the first global sovereign green sukuk issuance and regularly issued green sukuk (Ministry of Finance and UNDP, 2021). In particular, the extent to which accountability mechanisms are constructed to mobilise a climate-related financial instrument led to the following research question (RQ).

RQ 1: How can the global climate action agenda translated into accounting objects connected with a specific financial instrument be understood and explained?

RQ 1.1: How is climate change contextualised in the flow of accounts?

RQ 1.2: How are green sukuk accounting objects mediated between transparency and traceability from issuance to impact?

RQ 1.3: How are climate accounts constructed in the public accounting system?

RQ 1.4: How are measurement provisions adjudicated to channel green sukuk funds to green projects?

RQ 2: How can the productive force of accounting be effectively performed to organise and economise<sup>2</sup> climate change in a governable field?

In empirical domains, this thesis proposes to contribute to the construction of accountable objects that incorporate climate change within the flow of financial instruments. It begins by contextualising the incorporation of climate change in the flows of accounts by unpacking current accounting and governing technologies in the present system. Moreover, by examining green accountability from the issuance to impact, this discloses the connectivity and disconnectivity in creating green sukuk accounting objects within the prevailing governing technologies. In this sense, accounting technology aims to mediate multifaceted competing interests in the demand for transparency and traceability. Simultaneously, the mediation process occurs (albeit in a very limited way) through repurposing the prevailing accounting infrastructures.

Subsequently, focusing on the constitution of climate tagging extends attention to the means of incorporating climate change actions that are discursively constructed in public budgeting

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<sup>2</sup> Note the word 'economise' does not refer to the action of saving money but, this word refers to the economic actions of entities and possible repercussions on climate change. This is used interchangeably with the term 'financialise' as part of economising.



and planning systems. The inability to appropriately trace the progress and construct climate accounts in the government accounting system will avert the progress in achieving ambitious climate change commitments. Furthermore, this thesis advances the development of measurement provisions to assess 'greenness' alongside the green sukuk flows to contribute to meaningful outcomes. Examining green accounting systems is not restricted to one specific government but is potentially relevant to govern similar types of climate-related financial initiatives (Thomson and Charnock, 2022). Altogether, effective accountable objects for climate-related financial instruments can be advocated by highlighting key attributes in enabling and constraining the flow of funds from the issuance to the impact.

Theoretically, in studying the role of accounting, this study draws on the constitutive role of accounting in linking accounting, organisation and economising (Miller and Power, 2013) with the object of analysis focusing on the programmatic reform and technology of government (Rose and Miller, 1992). In deploying the dimension of the framework (Miller and Power, 2013, p. 558) to understand the "productive force" of accounting, this thesis redesigns the framework based on the setting of the study, research questions and relevant development within accounting studies.

First, this thesis unveils the contextualisation of the programmatic agenda of climate change in governing technologies that articulate sovereign green bonds and sukuk by extending the work of Charnock and Hoskin (2020); Rose and Miller (1992) and the development of accountability and environmentalism (Bebbington, Russell and Thomson, 2017; Gray, 1992). Second, this thesis presents the notion of mediation to frame the demand for enhanced transparency to traceability of the green sukuk. This thesis drew upon the notion of mediation

(Miller and Power, 2013) between the transparency (Quattrone, 2022) and traceability (Power, 2019) in mediating multiple programmatic agendas into practices and process (Kurunmäki and Miller, 2011; Miller and O'Leary, 2007; Thomson, Grubnic and Georgakopoulos, 2014). Third, the concept of territorialising (Martinez, Pflueger and Palermo, 2022; Miller and Power, 2013) is brought together to formulate new accounts into being (Gray, Brennan and Malpas, 2014; O'Dwyer, 2005; O'Dwyer and Boomsma, 2015). Fourth, in adjudicating the measurement of the green impact, this study unfolds the adjudication (Miller and Power, 2013) into the diversity of measurement provisions (Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009) and dynamics in the operationalisation (Argento *et al.*, 2020). In addition, the notion of subjectivising (Miller and Power, 2013) dynamically presents to imply the flexibility to choose to be ethical governing subjects (Frandsen and Hoskin, forthcoming; Hidayah, Lowe and Woods, 2019).

Finally, the relevance of this thesis potentially advances scholarship in the categorisation of 'green', 'climate mitigation' or 'sustainable' initiatives when monies are designated for purely climate-oriented objectives while often the flows are blended with other funds. This relevance is not only focused on a single government but more importantly with the typical nature of the setting and the adoption of the climate change agenda into local practices. This thesis demonstrates how technically and socially challenging methods in constructing accountability mechanisms can contribute to the meaningful impact of green financial instruments. Simultaneously, this thesis offers possible ways of advancing the accounting infrastructure to create new accounting objects for green funds. Moreover, this thesis has the potential to

engage with the call from IPCC (2022b, p. 15-5) on the demand for research in developing “robust ‘green’ labelling and disclosure schemes in [an] innovative financing approach”.

### 1.3 Thesis Structure

The thesis is organised as follows:

Chapter 2 overviews the context of the study (Swedberg, 2014, 2016). This chapter presents current studies and critical analysis in relation to aligning climate change into the flow of funds in multiple governing settings and the implication of GHG emission reductions. The chapter begins with the emergence of climate change as an accounting object which is then reproduced and redistributed within the flow of funding at both domestic and financial instrument levels. Despite the proliferation of climate-aligned instruments, there has been a relative lack of attention given to studying the construction of climate change accountability to mobilise a climate-related financial flow. Furthermore, accounting for climate change between the capital market, the public accounting system and the construction of attached climate-related impacts remains deficient.

Chapter 3 outlines the context of the justification (Swedberg, 2014, 2016). This chapter elaborates on a conceptual framework to understand the phenomena of linking climate change, accounting, organisation and economisation drawing upon the technology of the government (Rose and Miller, 1992) and the constitutive role of accounting – the accounting complex (Miller and Power, 2013). This chapter reconceptualises the key elements derived from the programmatic agenda, governing technologies, and the constitutive role of accounting: territorialising, subjectivising, mediating, and adjudication. Then this chapter

reconceptualises in the context of the demand for shifting transparency to traceability as a form of accountability mechanism for a climate-related financial instrument.

Chapter 4 discusses methodological considerations for the research approach. This chapter covers the underlying assumption of the philosophical approach and research strategy on the qualitative case study, including the case selection. Moreover, this chapter outlines choices in obtaining and analysing data from the life cycle approach within the in-depth attributes of the chains and consequential decisions. Data collection methods cover document analysis, semi-structured interviews and non-participatory observation based on the ethics and risk assessment granted in embarking on the fieldwork. Additionally, the chapter discusses the data analysis, ethical implications, and limitations of this research strategy.

Chapter 5 overviews the programmatic agenda of climate change that has been guided via multiple governing technologies. As climate change has been articulated in financial instruments, financial and budgeting systems and GHG accounting systems, this chapter outlines the domain where climate change has been contextualised through accounting technologies. To gain a wider view, this study will be also situated in the Indonesian government context and a global context where the climate-related instruments emerged. This chapter also elaborates on key instruments that have been utilised to align with the climate change commitments and become accountable objects to facilitate climate change.

Chapter 6 presents a critical analysis of mediating multifaceted aspirations resulting from green sukuk issuance into forms of governing technologies. This chapter focuses on unfolding the construction of green sukuk accounting objects which then identified compatibility and its

manifestation in governing instruments. The green sukuk requires an accountability mechanism that shifts from transparency to traceability. As such, it requires traceability within the flow of funds and the chain of decisions. This study unfolds the disconnectivity of governing technologies both in the financial planning system and in the GHG accounting system in which problematisation and enhancements arise in formulating accountability mechanisms. In pursuing the demand for accountability, this study indicates the scenarios in repurposing co-existing accounting technologies to construct a newly developed accounting object to enable the flow of green sukuk funds.

Chapter 7 presents the development of accounting mechanisms to incorporate climate change issues in the budgeting and planning system to assess the capacity of the government budget. This study presents a diversity of scenarios in defining the flow of funds for climate mitigation actions in central governments. The alignment into the general treasury accounts has been selected and developed whereby the role of climate tagging is highlighted to construct climate accounts. Also, this chapter features the way changes in the process become visible to co-opt climate change accounts with other governing technologies, including financial instruments and GHG impact evaluation.

Chapter 8 demonstrates the dynamics in the adjudicating measurement provisions from climate accounts to green asset accounts to present green impact allocations that enable and constrain the flows. This chapter began by unfolding considerations in defining, classifying and measuring impacts. As the green sukuk funds flow from capital market to state budget before the generation of impact, this chapter distinguishes the key considerations from the expertise and governing technologies in raising money and in allocating money to deliver impact. In

doing so, this enables the adjudicating process to be revealed whereby the role of accounting through climate tagging, tracing and earmarking is pertinent.

Chapter 9 discusses the role of accounting to organise and economise climate change into a governable entity. This chapter will present primary findings from previous chapters and highlight key enabling and constraining attributes to mobilise the flows. It is through the subjectivising role of accounting, which is manifested in tagging, tracing and earmarking, the process of assigning, naming, and calculating 'climate', 'green', becomes visible. By an iterative process between the analytical framework and the empirical evidence, this study identifies empirical and theoretical contributions in the construction of accountability mechanisms in mobilising a climate-related financial flow. Subsequently, this chapter also situates the contribution of the study to extend the theoretical framework.

Chapter 10 concludes the thesis by highlighting research contributions, implications of this study within the research community, and the practical level in formulating public policy or constructing accountability mechanisms. Furthermore, this chapter will offer reflections in utilising research methodology. This study also provides recommendations and limitations that open potential for further research.

## CHAPTER 2. ACCOUNTING AND CLIMATE-ALIGNED INSTRUMENTS

### 2.1 Introduction

To comprehend articulation of global climate action agenda in a specific financial instrument, this thesis positions itself within a body of work which takes an evolutionary view of technologies to manage and govern climate change aspirations. A central idea of this literature is that technologies evolve alongside programmatic agendas. Earlier studies highlighted a development-based approach while dismantling environmental functions as externalities. Later work explicitly demonstrated the efforts to incorporate climate change by means of finance and further development of market-based instruments both directly and indirectly. Similarities in the studies were situated in the existence of accounting technologies. In early development, financial values are detached from carbon measurements which are primarily localised in the environmental domain. In a recent development, studies have shown accounting technologies are closely embedded in both direct and indirect relations of carbon to financial values. However, there is a lack of development of studies that focus on tracing the impact within the flow of funds. The following paragraph will outline this chapter.

Firstly, the notion of climate change will be discussed in section 2.2. Secondly, this chapter will investigate the incorporation of climate change in the means of financing within multiple settings, as presented in sections 2.3, 2.4, and 2.5. Thirdly, section 2.6 will analyse the development of accounting technologies to advocate climate change and financial mechanisms. Fourthly, section 2.7 will present the typology of accounting in multiple contexts. Then the summary of the chapter will be outlined in section 2.8.

## 2.2 The Notion of Climate Change

To study climate change and accounting, Charnock, Brander and Scheider (2021) distinguish research 'about' carbon accounting from 'doing' carbon accounting. This classification implies that carbon or interchangeably GHG emissions, have been dominantly studied in the essence of 'scientific' physical carbons, its method of calculation, quantification, and carbons as objects of 'social' research (Charnock, Brander and Scheider, 2021). This distinction conflates Ascui and Lovell (2011) framing of carbon accounting from scientifically robust, measurable, and verifiable GHG emissions (IPCC, 2006, 2019) to an imaginary societal mode of governing (Bebbington and Larrinaga, 2014), namely political, financial, market, and social-environmental frames. Contextualised from the notion to account for sustainability, Gray (2010, p. 48) emphasised that "this linguistic turn deliberately or not, drew our attention to a global scale". As climate change is situated across boundaries and territory, such as global or localised into projects, it provides an abstract space of definition and governing practices. However, to contextualise climate change, it encompasses both the physical changes of the substance and the relation with governing programmatic agenda in localised practices.

The primary objective of climate action since its initial developments has been to stabilise the greenhouse gas levels and control the adverse impacts of climate change (IPCC, 2022b; UNFCCC, 1992). Climate change is explained as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (UNFCCC, 1992, p. 7). Alongside the effort to address climate change, the UN bodies developed both scientific bodies and political forces. The IPCC was established to prepare



comprehensive scientific reports on climate change globally (United Nations, 1988). On the political side, the Conference of Parties (COP) or ratifying states of climate convention has been annually held since 1995 to measure the progress and formulate agreement among the signatories of international climate conventions (UNFCCC, 2014b). Key highlights in recent developments in the IPCC report and the COP agreement stressed the demand for robust accountability mechanisms and acceleration of financing to strengthen climate mitigation and adaptation (IPCC, 2022b; UNFCCC, 2022).

#### 2.2.1 Programmatic Agenda of Climate Change

The existence of COPs to seek consensus for climate agreement has shaped the signatories to engage, adopt or refuse to adopt, and implement actions in their governing processes and practices. The initial development of UNFCCC during the Rio Earth summit in 1992 built upon the principle of Common but Differentiated Responsibilities (CBDR). This principle underpins as a foundation in designing initiatives to tackle climate change issues. The CBDR's principle acknowledges the shared responsibility for the signatories of the UNFCCC to combat environmental devastation while each country does not have equal responsibility for environmental preservation (UNFCCC, 1992). This principle offers balance in building participation from countries globally by promoting social relations among signatories' countries while respecting different stages of development. Consequently, this principle is implicit in the formulation and operation of climate-related instruments.

The following table highlights the key milestones of the COP agreements, which offer a general context to the development of financial and accountability mechanisms for tackling climate change.<sup>3</sup>

*Table 2.1 Key Outcomes of the COPs*

| <b>Conference of Parties</b> | <b>Important Milestones</b>                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COP 1, Berlin, 1995          | Agreement to assess and run an annual meeting to preserve control over global warming and recognise the need to minimise GHG emissions.                                                                                         |
| COP 3, Kyoto, 1997           | The Kyoto Protocol was adopted by developed countries to minimise the GHG emissions and set the foundation for the carbon market.                                                                                               |
| COP 13, Bali, 2007           | Set a timeframe for the replacement of the Kyoto Protocol and the inclusion of developing countries to participate. The development was started with the measurement, reporting, and verification (MRV) of policy.              |
| COP 15, Copenhagen, 2009     | Keeping global warming below 2° Celsius is confirmed, and wealthier nations pledge to long-term financing of underdeveloped nations.                                                                                            |
| COP 16, Cancun, 2010         | Formalising the Copenhagen pledges, and the Green Climate Fund is established primarily for climate initiatives in poor nations.                                                                                                |
| COP 17, Durban, 2011         | All nations agree to begin decreasing emissions including the United States and major emerging economies (Brazil, China, India and South Africa). It was determined that a global climate agreement should take effect in 2020. |
| COP 18, Doha, 2012           | Decision on the termination of the Kyoto Protocol after 2020. Countries such as the United States, China, Russia, and Canada opposed the extension of the Protocol.                                                             |
| COP 20, Lima, 2014           | All nations agree to create and communicate their commitment to reduce GHG emissions.                                                                                                                                           |

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<sup>3</sup> The author only selected the COPs' milestones highlighting the financial mechanisms and accountability aspects in tackling climate change issues.

| Conference of Parties   | Important Milestones                                                                                                                                                                                                                                                                                                      |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COP 21, Paris, 2015     | <p>The Paris Agreement was accepted unanimously to keep global warming to 2° Celsius over preindustrial levels and to continue efforts to restrict it to 1.5° Celsius.</p> <p>The wealthier nations committed to spend USD 100 billion annually through 2020 to assist poorer nations in decarbonising their economy.</p> |
| COP 22, Marrakesh, 2016 | The event focused on participation. Acknowledges the worldwide movement on climate change and sustainable development actions by governments, corporations, investors, regional level governments, and cities.                                                                                                            |
| COP 23, Bonn, 2017      | Progress on the Paris Rulebook, that encourages the engagement and dialogue of Indigenous and local groups, promoting gender equality in climate change.                                                                                                                                                                  |
| COP 24, Katowice, 2018  | Agreement on the Paris Rulebook, launch the process for climate finance procedures in 2025, formation of the Paris Compliance Committee, article 6 unresolved.                                                                                                                                                            |
| COP 25, Madrid, 2019    | Disagreement existed on the rigour of the standards for establishing an international carbon market (article 6).                                                                                                                                                                                                          |
| COP 26, Glasgow, 2021   | <p>Finalising the Paris Rulebook:</p> <p>Enhanced transparency for reporting emissions</p> <p>Common timescales for climate mitigation targets</p> <p>Mechanisms and guidelines for carbon markets on a global scale.</p>                                                                                                 |
| COP 27, Marrakech, 2022 | <p>Agreement on the creation of “loss and damage” funding for countries that are severely affected by climate disasters.</p> <p>Key agreements on phasing out coals and associated fossil fuels, and setting peaking point of carbon emission targets remain unresolved.</p>                                              |

Sources: multiples sources of the COPs’ agreements.

The table above demonstrated the key agenda in limiting the GHG emissions alongside the development of primary instruments. Among these instruments it is clear that climate targets,

assessing the progress, transparency requirements to maintain integrity, financing, and the carbon markets were among the primary decisions during the annual meetings. What is interesting here is the programmatic agenda of climate change that is translated in finance domains remains problematic and less progress could be made. While there is a need to pursue ambitious targets in curbing carbon emissions, it is not only about speed as we race to keep pace with the climate change impact itself, but also the aim to avoid any adverse impacts of such interventions. As shown from the Table 2.1, despite the CBDR principle, mandatory and voluntary commitments, the significance between the three decades of climate conventions can be distinguished between the pre Paris Agreement and post Paris Agreement. Therefore, the following section explains the development of accounting for climate change in multiple settings alongside the agreement period.

#### 2.2.2 Pre Paris Agreement

It started prior to the establishment of the UNFCCC in 1992 when carbon accounting was utilised by scientists as a tool to attribute, measure, calculate, and disclose the dynamics of the analysis of GHG emissions as noted in Ascuí and Lovell (2011). The dynamics resulted from the requirement over the signatories of the UNFCCC to make their assessment of national GHG inventories visible despite the lack of agreed methodology, which was then produced in 1995. The guidelines for national GHG inventories were revised in 1996, and refined in 2006 and 2019 (IPCC, 2006, 2019). In the Kyoto Protocol, for instance, wealthier nations were obligated to adhere to enforceable emission limits, but middle-income and low-income countries just needed to report their emissions (Nordhaus, 2013).

The Bali Action Plan in 2007, for instance, sets out wider participation from the signatories of the UNFCCC agreements for GHG inventories and MRV requirements, extending the participation from only Annex I countries. Under the Kyoto Protocol countries were divided into Annex I and Annex II, and distinguished reporting requirements towards emission reduction despite the launch of the EU Emission Trading System (ETS), as market-based climate governance (Bäckstrand and Lövbrand, 2015). To accelerate the engagement to consider the GHG inventories and its MRV for all Parties, the Copenhagen Accord in 2009 was marked with pledges to mobilise funds from developed to developing countries in filling funding gaps for climate actions (Aglietta *et al.*, 2015).

The early accountability mechanisms extended the climate mitigation commitment for a number of non-Annex I countries during the COP Copenhagen; however, this summit was considered as falling short of consensus from the Parties (Christoff, 2010). In 2010, the Parties agreed to establish the Green Climate Fund as a designated institution in response to both climate commitment and the efforts to tackle climate actions, particularly for developing countries, (Aglietta *et al.*, 2015; Bäckstrand and Lövbrand, 2015) to channel mobilisation of funding from developed to developing countries.

Despite voluntary participation from the developing countries to report their climate progress resulting from the UNFCCC resolutions agreed in Cancun in 2010 and Durban in 2011, it was not until the beginning of 2014 that developing nations were required to submit Biennial Update Reports (BURs) (UNFCCC, 2014a). The domestic MRV arrangement was intended to assess the progress of countries' voluntary climate actions (Winkler, Mantlana and Letete, 2017), including the potential to access international climate finance flows. In the absence of

direct benefits of the demand for transparency, developing nations were offered assistance in developing governing practices (Persson, 2009; Tirpak and Adams, 2008) and funding flows such as a project-based climate mitigation support under the Clean Development Mechanism (CDM) (Bowen, Campiglio and Martinez, 2017), despite reporting bias under CDM remaining prevalent as emphasised by Chen, Letmathe and Soderstrom (2021).

### 2.2.3 Paris and Post Paris Agreement

The Paris Agreement in 2015 became a remarkable momentum for climate change policy. Mehling, Metcalf and Stavins (2018) identified that the COP 21 is characterised by “bottom-up” participation in achieving NDCs. In other words, each signatory of the agreement has flexibility to achieve their contributions where legally binding requirements do not exist. Even though the Parties are required to prepare, calculate, and communicate the progress of their NDCs target, heterogeneous approaches remain present in achieving the target. Key features include target years and reference, and sectoral and geographical coverage (Mehling, Metcalf and Stavins, 2018). The diversity will also influence possibilities of international linkages within Internationally Transferred Mitigation Outcomes under article 6 of the Paris Agreement (UNFCCC, 2015), in particular the potential of double counting in emission reductions by the signatories.

Accounting has become more important as the signatories of the Paris Agreement (UNFCCC, 2015, p. 1) require “Taking full account of the specific needs and special situations of the least developed countries with regard to funding and transfer of technology”. Accounting is not only required for measuring anthropogenic emissions and removals as each country has

pledged in their NDCs but also for the inclusion of funding and technological resources to achieve these aspirations. The UNFCCC (2015, p. 3) also states that “Parties shall promote environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting, in accordance with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement”. These elements require the assessment of GHG inventories and MRV systems.

Consequently, the demand for transparency has been proliferating in climate policy and agreements at national and international levels. For instance, the enactment of the enhanced transparency framework for the signatories of the Paris accord (UNFCCC, 2016, 2020) which was seen as a critical instrument to support countries’ ambitions (Bäckstrand, 2008; Kamil, Bush and Gupta, 2021; Winkler, Mantlana and Letete, 2017). Even so, a thorough empirical examination of this presumed relationship between the extent of transparency and climate actions is required (Quattrone, 2022; Weikmans and Gupta, 2021).

### 2.3 Accounting for Climate Change and Means of Financing

Despite the dynamics of national accounting for the progress of the climate target to the UNFCCC reporting requirements, accounting practices in climate change have also created a circuit of global agreements, including capital markets. Mobilising sufficient funding for climate actions became a pivotal element in the Paris Agreement under article 2.1c, in which the signatories “agreed to make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (UNFCCC, 2015, p. 2). This commitment ratifies the urgency to mobilise funds that are not merely restricted to treat GHG emissions become part of economic calculations as a direct cost or as an opportunity cost.

The accord has led to increased worldwide impetus for climate action and an improved understanding of the costs involved with addressing the issue. Particularly, establishing connections between the related expenses of reducing GHG emissions and adapting to the impacts of climate change (Gilmore and St.Clair, 2018). The momentum also has been accelerated by financial industries with the development of a diverse range of instruments, including green bonds markets as noted in Alfsen *et al.* (2018) that are claimed by the majority of issuers to align with a low carbon development as pledged in the Paris Agreement.

For instance, to embrace the flow of annual climate finance of approximately USD 100 billion, the Organisation for Economic Co-operation and Development (OECD) examined alternative scenarios (OECD, 2016). With the scenario of the source of public funding amounting to USD 67 billion, only 40% of the scenarios could afford to meet the goal. The primary components stem from the supply of financial flows from bilateral and multilateral public finance and the demands of available portfolios with the ratio of possibility to be funded by private funding. However, the scenario will be affected by other programmatic priorities such as the implication of political shifts, unfulfilled pledges, global financial conditions, global pandemics, fossil fuel price and the commercial viability of clean technology (OECD, 2016). In this context, the study noted the capacity to mobilise public and catalyse private finance effectively also driven by public intervention such as public finance at project-or-fund levels which are directly identifiable rather than the intangible impact of policies. However, at the financial instrument level given the potential loss of traceability within the flow of funds, research showed mixed results.



Prior studies have extensively documented the development of financial instruments to accommodate resource mobilisation. A broad range of research in accounting literature addresses its role in carbon emissions, yet further improvement remains necessary as the market developed in multiple spheres, such as the ETS, carbon tax, and green bonds market. For example, carbon markets require accounting for pricing, and cap and trade of emission rights in order to constitute a direct financial incentive to manage carbon emissions. Accounting studies that have made important contributions in this domain include Callon (2009) on carbon trading, MacKenzie (2009) on carbon market designs, Andrew and Cortese (2011) on carbon disclosure, Cuckston (2018) on result-based payments for carbon reduction, and Bebbington *et al.* (2019, 2020) on conflicting accounts for carbon in market settings. However, the critical function of these instruments such as carbon taxes, cap and trade or a combination of these instruments may promote some advantages; the challenges lie in aligning with conflicting public priorities of the respective countries. For instance, concerns over development priorities, such as employment, education, and poverty alleviation (Nordhaus, 2013, 2021).

## 2.4 Mobilising Funds through Green Financial Instruments

There has been a surge in the development of new financial instruments such as ‘green bonds’, ‘impact investing’, and ‘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). Given the climate emergency, there is an urgency to massively scale up and accelerate financial flows for transformative carbon reducing activities (Buchner *et al.*, 2019). This has led to the development of an increasing range of financial instruments to leverage

indirect relationships between carbon and financial values. The Climate Bonds Initiative (2020) reported the escalating development of types of climate bonds and markets, including green bonds, sustainability bonds and their adoption in sukuk form to accommodate Islamic capital markets (World Bank, 2020b).

The International Capital Market Association (2018, 2021a) 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 (International Capital Market Association, 2018, 2021a) and their material impacts to ensure the attainment of the stated purpose of any debt instrument. However, meeting this enhanced transparency is problematic through the conventional annual financial reports of organisations, 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; Belal, Abdelsalam and Nizamee, 2015; Pitluck, 2012).

Green sukuk are among the green bonds adopted. Sukuk are “flexible securities which may be structured to meet a variety of issuer and investor goals while conveying specific asset-linked rights and obligations to create a *Sharia*-compliant alternative to traditional fixed-income investments” (Adam and Thomas, 2004, p. 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 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.

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, 2020b) is a financial instrument that complies with the key tenets of Islamic principles, green purposes and the requirements of specific capital markets. Green sukuk promises future reduced GHG through financing specific projects but requires evidence of a 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 the GHG emissions (Brander, 2016, 2017) of specific programmes, projects or individual assets funded by the green sukuk.

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; Belal, Abdelsalam and Nizamee, 2015). Secondly, Sharia rules permit transactions or activities unless proven non-compliant (Alamad, Hidayah and Lowe, 2021; Chapra, 2007; Kamla, 2006). To understand the implications in combining green bonds into sukuk form, this study presented primary characteristics as shown in Table 2.2.

Table 2.2 Comparisons between Green Bonds and Sukuk

| Characteristics             | 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, for 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.<br><br>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.<br><br>Transparency and traceability at issuing entity level. | Disclosure of information on the use of proceeds, project selection and ability to repay bondholders.<br><br>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: Raeni, Thomson and Frandsen (2022, p. 44) adapted from Climate Bonds Initiative (2021), World Bank (2020b), Adam and Thomas (2004), Chapra (2007), Alamad, Hidayah and Lowe (2021).

Table 2.2 summarises the differences between sukuk and conventional bonds, including differential demands for transparency and traceability. 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; Belal, Abdelsalam and Nizamee, 2015; Pollard and Samers, 2007), plus its impact on the balance of life on earth (*mizan*) (Ahmad and Bruch, 2002; Napier, 2009). 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).

Furthermore, the level where these requirements can be fulfilled could invite problematisation as issuing at entity level may offer more of a general form of accountability than the asset level whereby granularity is emphasised. 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, 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.

## 2.5 Accounting for Climate Change in Public Accounting Systems

A substantial body of literature has demonstrated the vital role of accounting for climate change in multiple spheres to govern economic life. These studies cover the area of carbon markets (Bebbington and Larrinaga-Gonzalez, 2008; Chen, Letmathe and Soderstrom, 2021; de Aguiar and Bebbington, 2014; MacKenzie, 2009; Schneider and La Hoz Theuer, 2019), corporations (Andrew and Cortese, 2013; Bebbington *et al.*, 2020; Unerman, Bebbington and O'Dwyer, 2018), and public sectors (Ball, 2005; Ball and Craig, 2010; Ball *et al.*, 2009; Ball and Seal, 2005; Larrinaga, Luque-Vilchez and Fernández, 2018; Milne and Grubnic, 2011; Seal and Ball, 2011; Thomson, Grubnic and Georgakopoulos, 2014). Even though studying a radical agenda to mitigate the intensity of GHG emissions is well situated in public and private sectors, market and non-market, Lapsley and Miller (2019); Thomasson and Kristoferson (2020); Thomasson, Lapsley and Steccolini (2020) emphasised the demand for research in the construction of calculative practices to address the urgent agenda of climate change. Notably, this thesis desires to add insights into how climate accounts are constructed to make abstract ideas of climate change manageable in public accounting systems.

In articulating the programmatic agenda of climate change, studies highlight the demands to examine the translation of the aspiration to mitigate climate change in accounting practices (Busco *et al.*, 2018; Fraser, 2012; Larrinaga, Luque-Vilchez and Fernández, 2018; Milne and Grubnic, 2011; Thomson, Grubnic and Georgakopoulos, 2014). This enables the research to observe the operationalisation of reformed aspirations in regular practices and processes of a governing entity (Lapsley and Miller, 2019; Lapsley, Miller and Steccolini, 2020). For example, Larrinaga, Luque-Vilchez and Fernández (2018) investigate the causes behind public sector

organisations' inaction in sustainability accounting. In integrating sustainability issues, the study highlighted the focus of a consistent trajectory and shared beliefs. Larrinaga, Luque-Vilchez and Fernández (2018) argue that consistency in political commitment and regulatory enforcement has become a critical characteristic of public sector sustainability reporting. However, due to incompatibility between the newly formed sustainability accounting system and the sustainability agenda, it was not possible for a transformation to include sustainability aspects (Larrinaga, Luque-Vilchez and Fernández, 2018). In this sense, alignment towards a consistent trajectory between distinctive government administrations influences the cause of actions and inactions towards reformed programmatic agenda.

Furthermore, this thesis notes the compatibilities to incorporate climate change within various stages of development among the Paris signatories' countries. Okitasari and Katramiz (2022) emphasise that a global development norm should be adopted into a domestic context to enable impact. Even so, economic objectives remain the primary vision among industrialised and developing countries (Okitasari and Katramiz, 2022). Scholars advocate for the need to recognise the unique characteristics of entities in their development and areas for empirical application in climate change priorities (Rietig, 2021; Thomson, Grubnic and Georgakopoulos, 2014). For instance, at a programme level, Rietig (2019), identified the need to extend the EU budget allocated for tackling climate change.

The EU adopted an overall number to be achieved, such as 20% of its budget to mitigate climate change, that was earmarked through a number of key policies, sectors, and funds between 2014 and 2020 (Rietig, 2019). The implication of the target figure affects the composition and flexibility of the budget for other priorities. To facilitate the inclusion of



climate policy, Rietig (2019) indicated the importance of key elements, such as a lower conflict between departments, shared beliefs, and priorities. It, however, has a side effect for instance, when the lower conflicts resulted from a lack of political debates or the timing where other priorities dominated the discussion, the decision remains marginalised from priorities (Rietig, 2019). The conflict occurred with the expansion of the mitigation fiscal framework to 25% of the EU budget between 2021 and 2027.

Given distinctive levels of political commitments to climate change within Western and Eastern Europe and the nature of economic dependency towards fossil fuels, for instance, achieving the target requires a mediating stabilisation through mid-point climate coverages (Rietig, 2021). It is through transition pathways, multiple orientations and processes that low carbon development can be connected across technical, social, scientific aspects and a trajectory of decisions (Rosenbloom, Meadowcroft and Cashore, 2019). Without appropriate measures and integrity in the budgeting process, the expansion of the coverage may drive a potential mistranslation (Medarova-Bergstrom *et al.*, 2011) such as by tagging to exaggerate the proportion of climate-related expenditures (World Bank, 2021).

The process to account for climate change in a budget is dominantly performed in the post-budgeting process where the processes of labelling and relabelling occur. Bäckstrand and Lövbrand (2015) internalisation of climate change into mainstream sectoral policy-making is likely to be seen as excessively demanding when implemented without expanding mandates or funding. However, increased funding or even new budget lines for climate policy integration may lead to perverse incentives to 'relabel' current operations as climate related (Bäckstrand and Lövbrand, 2015). For instance, Gilmore and St.Clair (2018) studied climate-related

expenditures that were allocated in four areas of climate actions within the US state level budget. By linking the budget to climate action plans, Gilmore and St.Clair (2018) highlight the lack of budgetary and accounting mechanisms in place that enable the assessment of the cost-effectiveness of climate-related expenditures.

Furthermore, Gilmore and St.Clair (2018) study noted the challenges in tracking climate-related spending continuously due to variations in defining the scope and processes. A similar finding was previously identified by Leggett, Lattanzio and Bruner (2013) who examined the climate change funding from the financial year 2008-2014 in 18 federal agencies. Leggett, Lattanzio and Bruner (2013) also noted the obstacles in aggregating the budget resulting from the use of a variety of accounting methods, definitions, interpretation of the methods, and budget documentation over the period of observations. The variations have led to uncertainty which was also noted by the Ministry of Finance and Climate Policy Initiative (2014) in the case of the Indonesian domestic public finance flow, and the UNFCCC Standing Committee on Finance (2014, 2016, 2018, 2021) in tracking climate budget expenditure in both domestic or global levels.

The difficulty in identification of climate-related expenditure post-budgeting process could obscure the effectiveness in operationalising the programmatic agenda of climate change. The World Bank (2021) identified how climate labelling informs and influences programme design. Typically, programmes and projects are assigned tags after they have been approved and this stage is too late to impact their design, rationalisation, and resource allocation (World Bank, 2021). This method of 'ex-post' accounting and monitoring climate expenditures has a variety of pros and downsides. One critical point was that although it was feasible to establish the

extent of climate mainstreaming via the production of monitoring indicators, this could be improved further in order to achieve "ex-ante" programming (Rietig, 2021).

In sustainability disclosure for instance, Michelin, Rodrigue and Trevisan (2020) argue that use of the ex-ante level enables the capture of the process of changes in responding to the demands for a programmatic agenda of reforms. However, in the context of the actual market for environments, it remains an unresolved subject to forego financial gains from ex-ante risk and return (Larcker and Watts, 2020). Brorström (2021, p. 11) emphasises “the practices involved in establishing these control instruments made the managers work better together than they had in a long time; for example, it was easier to collaborate on formulating the road map than to collaborate on deciding where to build a school”. This implies dynamics can be observed when planning has been operationalised into practices from the initial translation of an international programme that has been positioned and reshaped.

## 2.6 Accounting and Impact Measurements

To measure the impact of climate change by the means of finance and public budgeting, this thesis distinguishes the impact in financing and the impact in budgeting and imperative delivery. Here, accounting technologies have been studied by prior academic literature to facilitate the assessment of the impacts. 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, 2015a). The potential of using accounting (financial and GHG) to resolve the accountability failings of climate financial instruments remains underdeveloped.

Transforming qualities into quantities that are observable requires a construction of uniform proxies for ambiguous and elusive traits to enable key actors to comprehend, depict, and compare disparities (Espeland and Stevens, 1998). Similarly, accounting for GHG emissions was observed as complex and ambiguous practices and processes together with vested interests from carbon-intensive entities (Bebbington, Russell and Thomson, 2017; Milne and Grubnic, 2011). Instead of being objectively reproduced as a neutral economic fact, numbers interfere considerably with the co-production of social order (Mennicken and Espeland, 2019; Samiolo, 2012). Consequently, to be considered as an objective reality, intersubjective understanding is required for a widespread agreement based upon appropriate judgements from knowledge and comprehension (Unerman, Bebbington and O'Dwyer, 2018). In this spectrum, Milne and Grubnic (2011, p. 962) suggest the potential use of "shadow carbon accounting" to examine the credibility of promises for carbon emission reductions and relevant measures at multiple levels of analysis.

Numerous research studies have examined the relative benefits of several impact assessment approaches. Scholars have considered how effectively or precisely devices measure impact (Dey, 2018), capturing impacts from the concurrent measurements (Hall and Millo, 2018; Hall, Millo and Barman, 2015) or creation of new accounts from the prevailing accounts (Gray, Brennan and Malpas, 2014). The selection of one device over others may be based on functional considerations (Gibbon and Dey, 2011), the narrative of accounts (Russell, Milne

and Dey, 2017), or a particular decision-making environment (Costa and Pesci, 2016). These studies emphasise that instruments are wired differently and convey particular impacts. However, there is a lack of studies to incorporate the implication of incorporating programmatic agenda such as climate change alongside ethical values, cultural, or religious principles alongside the flows of funds.

Incorporating moral values in measurement provisions has resulted in diverse findings. Espeland and Stevens (1998); Lohmann (2009) suggest that embedding heterogeneous moral values does not necessarily create resistance. In secular markets, for instance, moral values such as Islamic principles are becoming silent, but social responsibility values are dominant in judgement processes (Arjaliès and Durand, 2019; Granqvist and Ritvala, 2016). Problems arise primarily when attempting to aggregate, compare, and contrast (Miller and Power, 2013) multiple shades of green to prevent asymmetrical information which may lead to moral hazards (Amiraslani *et al.*, 2022). The typical classification is seen as relating to normative values which is contradictory from market preferences to have a standardised commensuration (Chiapello, 2018). To accommodate Sharia principles, for instance, Belal, Abdelsalam and Nizamee (2015) indicated that asset-based attributes are closely connected with real societal and economic development. Here, Thomson (2021) suggests that the central focus for research should be directed to the consequential impacts in constructing environmental impact assessments for the issues interrelated to environmental governance, accounting, and accountability.

In designing environmental impact assessments, Brander (2016, 2017) emphasised the importance of the attributional and consequential choices. The attributional technique is

preferable because it improves the comparability and consistency of impact evaluations even though the choice does not account for all relevant consequence of activities in the wider context of climate change (Brander, 2016, 2017). Furthermore, to construct meaningful impact assessments, it is also vital to assess the potential of unsustainable consequences within the governing ecosystem of economic, ecological, and social spheres (Bebbington and Thomson, 2007; Gray, 2010). Therefore, to contribute to the accounting studies in impact measurement provisions, this study draws upon Miller and Power (2013) perspective on how measurement provisions have been clustered together to accommodate multiple traits to produce accounting objects.

## 2.7 Typology of Accounting Practices

To demonstrate multiple measurement provisions to contextualise climate change in accounting practices and entities, the following Table 2.3 provides a typology of entities and accounting mechanisms or practices within a set of contexts that has been studied.

Table 2.3 indicates that research has intensively focused on contextualising accounting practices in corporations and carbon markets. Measurement and reporting challenges have dominated the discussions within corporations. However, in capital markets, the emphasis is situated in the practices of measurement, accounting mechanisms, and equivalency of economic valuations. The practices align with the discussion in corporations. Certifications, carbon trading, carbon pricing, allowances and permits, and carbon management systems are among practices studied in accounting and climate change research. However, there is little evidence to support that a particular financial instrument has been utilised in influencing existing governing practices to articulate climate change. Recent study highlights

financialisation projects and practices. However, it does not address the enabling and constraining mechanisms to mobilise the flows of the financial instrument itself in producing the impacts.

In other settings, public sectors and organisations, research has situated climate change in a policy, fiscal and financial framework, and the influence in articulating programmatic rationalities within government actors. This area emphasises the use of accounting tools, and practices as modes to articulate in day-to-day practices. The tools range from index, proofing, assessment models, hybrid frameworks and practices, climate 'labelled' and procedures. Despite a wide range of practices, this does not forge connections between the attributes of the chain of decisions within the cycle, while the life cycle assessment itself is primarily situated at a project level. Further detail of the governing instruments and accounting practices in multiple entities are presented below.

Table 2.3 Typology of Accounting Practices for Climate Change Research

| Entity                        | (Accounting) Practices Observed                  | Purposes                                                                            | Papers                                                                                                              |
|-------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Corporations (Carbon Markets) | Accounting for carbon emissions                  | Analysing GHG emissions, economic valuation, environmental integrity                | MacKenzie (2009); Schneider and La Hoz Theuer (2019)                                                                |
|                               | Reporting of emission rights                     | Examined issues on the withdrawal of the IASB <sup>4</sup> framework for the EU ETS | Cook (2009)                                                                                                         |
|                               | Carbon emission permits, reporting               | Examining interests and pressures of the design (incomplete) and implementations    | Hopwood (2009); Lohmann (2009)                                                                                      |
|                               | Carbon market instruments                        | Understanding the constitution of carbon markets                                    | Callon (2009); Braun (2009)                                                                                         |
|                               | Emission trading and arbitrage of financial risk | Examining the enhancement of expertise                                              | Engels (2009)                                                                                                       |
| Corporation                   | Carbon reporting, disclosures                    | Exploring accounting, reporting practices and implications                          | Busco <i>et al.</i> (2018); Comyns (2018); Cooper, Raman and Yin (2018); Eliwa, Aboud and Saleh (2019)              |
|                               | Carbon management accounting                     | Examining carbon management accounting systems                                      | Gibassier and Schaltegger (2015b); Tang and Luo (2014); Bui and de Villiers (2017); Mahmoudian <i>et al.</i> (2021) |
|                               | Disclosure and corporate reporting               | Investigating fossil fuel reserves and disclosing unburnable carbon                 | Bebbington <i>et al.</i> (2020)                                                                                     |
| Public sector                 | Climate budget                                   | Understanding climate-related spending in the multi-annual financial framework      | Medarova-Bergstrom <i>et al.</i> (2011); Russel and Benson (2014); Gilmore and St.Clair (2018)                      |
|                               | Framing, formulating and presenting budgets      | Examining funding regulations for the environment and government strategies         | Rietig (2019); Xu, Wang and Xiao (2020)                                                                             |

<sup>4</sup> International Accounting Standards Board (IASB).



| Entity        | (Accounting) Practices Observed                                  | Purposes                                                                                        | Papers                                                                                    |
|---------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|               | Sustainability assessment model (SAM)                            | Examining accounting technologies and programmatic thinking of sustainability                   | Fraser (2012)                                                                             |
|               | Accounting sustainability hybrids                                | Exploring the role of accounting in shaping and reshaping sustainability practices              | Larrinaga, Luque-Vilchez and Fernández (2018); Thomson, Grubnic and Georgakopoulos (2014) |
|               | Carbon accounting principles                                     | Examining carbon emission allocation principles                                                 | Steininger <i>et al.</i> (2016)                                                           |
|               | GHG emissions reporting, accounting practices                    | Analysing strategies in accounting and communicating GHG footprints and emissions behaviour     | Ball <i>et al.</i> (2009); Milne and Grubnic (2011)                                       |
|               | Approaches to account for carbon                                 | Comparing production-based with consumption-based accounting                                    | Afionis <i>et al.</i> (2017)                                                              |
| Ecosystem     | Carbon disclosure                                                | Exploring architecture of capitalism in climate policy to global problems                       | Andrew and Cortese (2011, 2013)                                                           |
| Global        | Measurement and reporting challenges                             | Highlighting meta-governance to operationalise two-degree targets                               | Charnock and Hoskin (2020)                                                                |
| Organisations | Climate change disclosures                                       | Exploring the nature and changes in climate change disclosure                                   | de Aguiar and Bebbington (2014)                                                           |
| Project       | Life cycle assessment                                            | Extending attributional and consequential methods                                               | Brander (2016, 2017)                                                                      |
|               | "Index" to measure the effectiveness of conservation initiatives | Demonstrating the process of financialisation and the implication in financialisation practices | Arjaliès and Gibassier (2022)                                                             |

Table 2.3 shows only limited research emphasising climate change accountability in financial instruments that channel into public accounting systems and impacts on projects. It has been studied in different settings of entities while connectivity within the flow of climate-related

financial instruments continues to be unexplored within prior research as presented in Table 2.3. Therefore, this study focuses on how the accountability mechanism of a climate-related financial flow can be understood and explained by studying the flows of the sovereign green sukuk.

## 2.8 Summary

This chapter provides a critical analysis of the existing literature pertaining to the study of accounting for climate change. From the notion of climate change articulated in international conventions, this chapter has highlighted that multiple climate-aligned instruments have emerged to articulate the climate change programmatic agenda. Mainstreaming climate change has been incorporated by means of finance mechanisms from capital markets including Islamic capital markets to central and local governments.

Despite the growing prominence of greenwashing and failing accountability in climate-related instruments, in particular green bond markets, there is still a shortage of research on accounting in relation to green bonds, in particular the green sukuk form. The majority of accounting research focuses on disclosures, practices of carbon accounting in international conventions, carbon markets, or at a project level, and public and private organisations. As shown in Table 2.3, the body of literature is silent on examining accounting at the level of the financial instrument that explores the flow of funds and its GHG impacts within the cycle. Consequently, this study will contribute to the deficit of research in the contextualisation of climate change within the flow of accounts to mobilise a climate-related financial flow.

Shifting demands from the transparency to the traceability of green fund instruments, such as the green sukuk, have been notably missing from climate change accounting literature. Even

though the market of green bonds, including green sukuk, has been guided by the green bond principles under the International Capital Market Association, discourse remains on sovereign green bonds issuers incorporated into the existing governance system. In particular, for the green sukuk, the accountability mechanism needs to serve multiple domains including international climate conventions, Islamic finance principles, green bond principles and government budgeting, planning, and financing arrangements. Moreover, the existing literature on climate change accounting lacks an emphasis on how green sukuk accounting objects are mediated between transparency and traceability from issuance to impact.

As countries pledge to achieve international climate change commitments, this chapter distinguished the dynamics in constructing accountability mechanisms in public accounting systems within the design and the construction to operation. The need for consistency in the trajectory between multiple government administrations has been highlighted given the implications to localising current practices to incorporate programmatic agenda. The inability to maintain a consistent pathway could derail the prevailing ambitious efforts. In the case of expanding climate change targets within a fiscal framework, there is resistance in mainstreaming climate change in public accounting systems. This area of interest is underdeveloped within prior studies, for instance Lapsley and Miller (2019); Thomasson and Kristoferson (2020); Thomasson, Lapsley and Steccolini (2020).

In particular, the extent of the implications of imparting climate change into public accounting systems are debatable. Studies emphasise that attempts to classify climate change in a financial management system after a budget has been approved (ex-post) do not influence planning, performance evaluation or resource allocation. Therefore, research suggests the

selection of ex-ante processes to influence climate change impacts. However, in assessing the material outcomes of climate change reduction or relevant impacts, verified results shall be considered which relate to the ex-post process. The dynamics lead to the question on how climate accounts are constructed in public accounting systems.

Moreover, measuring the impact of budgets towards climate change and financial instruments in relation to climate change targets has invited uncertainties. Despite studies as highlighted in the section 2.6, examining the role of accounting technologies to channel financial and non-financial information, the construction of impact measurements within a heterogeneity of measurement provisions continues to be underdeveloped. Accounting research indicated disparities, intersubjective understanding, and a widespread agreement to formulate relevant judgements. Furthermore, prior research has studied the selection of measurement devices that influence the local implications of impacts. However, studies in measuring impacts within the flows of accounts that impart ethical, cultural, religious principles remain lacking. Therefore, this study seeks to understand and explain how measurement provisions are adjudicated to channel green sukuk funds to green projects.

To summarise, this chapter has presented the development of research in four spheres. Firstly, the contextualisation of climate change within the flow of accounts. Secondly, the shifting demand from green sukuk issuance in transparency to traceability from the issuance to the impacts. Thirdly, the construction of climate change accountability in public accounting systems. Fourthly, the dynamics in assessing measurement provisions to channel green and Islamic funds to green projects.

## CHAPTER 3. ACCOUNTING, ORGANISING, AND ECONOMISING CLIMATE CHANGE

### 3.1 Introduction

The preceding chapter evaluated important literature on accounting, climate change aspirations, climate-related instruments and the demand for accountability mechanisms within the flows. This chapter emphasises the constitutive role of accounting to construct governable entities in pursuing the accountability of climate change ambitions. By building on the concept of the programmatic rationalities and technology of government (Rose and Miller, 1992), this chapter highlights a set of governing technologies to articulate accountable climate targets. However, the concept does not offer an operable guide on the ways accounting performs its constitutive roles.

This study utilises Miler and Power's (2013) concept of productive forces to link accounting, organisation and economisation. The notion of the productive forces of accounting is referred to interchangeably in this thesis as the constitutive role of accounting that encompasses the dimensions of territorialising, mediating, adjudicating and subjectivising. This research acknowledges the entanglement between each dimension to enable the productive forces. However, this study argues that instead of being taken for granted and directly rooted in accounting technologies, there are enabling and constraining attributes that allow accounting roles to be performed effectively. As such, it is essential to analyse the attributes and dynamics of each dominant dimension to articulate the programmatic agenda of climate change in the flow of financial instruments within public accounting systems. In doing so, the following paragraph outlines sections for the development of the analytical framework.

The notion of accountability and accounting will be introduced in section 3.2. Then, section 3.3 will discuss the concept of programmatic rationalities and government technology. Section 3.4 will elaborate on the constitutive role of accounting followed by implications to the analytical framework in section 3.5. Subsequently, section 3.6 will give a chapter summary.

### 3.2 The Concept of Accounting and Accountability

As discussed in Chapter 1, accountability requirements facilitate the formation of a governable field to mobilise financing to tackle climate change. Prior research has shown that it is through accounting and accountability technologies that a governable field can be constructed (Frandsen and Hoskin, forthcoming; Hoskin and Macve, 1986; Martinez and Cooper, 2019; Miller and O'Leary, 1987; Rose and Miller, 1992), and actions and outcomes can be directed (Bebbington and Unerman, 2018). To understand the terms of accountability and accounting, Dillard and Vinnari (2019, p.16) highlight that “accountability is limited by what is disclosed, and what is disclosed is limited by the extant accounting system (accounting-based accountability)”. Similarly, as presented in section 1.2, Gray (1992, p. 413) underpins accountability as “an emancipatory concept helping to expose, enhance, and develop social relationships through a re-examination and expansion of established rights to information”. In this sense, the purpose of accountability is not only to enhance the transparency of subjected entities but also a way to foster social relations in imparting environmental visions (Bebbington, Russell and Thomson, 2017; Gray, 1992).

Accounting in public eyes has been portrayed as a neutral organisational truth and technical device to produce information for decision-making. Mainstream studies are dominantly interested in behavioural implications resulting from accounting (Miller and Power, 2013).

However, in meeting the demand to incorporate economic, environment, social and governance (ESG) dimensions alongside the Sustainable Development Goals (SDGs) agenda for decision-making, accounting studies need to focus on the attributes to construct both financial and non-financial information (Bebbington and Larrinaga, 2014; Bebbington, Russell and Thomson, 2017; Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009). Although integrating climate change is not a new term, the production of a newly developed account could potentially extend into a new materiality context, e.g. the materiality of climate change impact is incorporated into risk management (Frandsen, 2009; O'Dwyer and Unerman, 2020; Power, 2015).

To analyse the role of accounting, recent studies highlight the demand to focus on the construction of accounts. For instance, Power (2021, p. 8) emphasised that the construction of an account does “not just represent the pre-given fact of organisational performance but [it] is agentic in its own right”, and potentially reconstitutes current accounting practices and social relationships (Gray, 1992; Unerman, Bebbington and O'Dwyer, 2018). This implies that the accounting number is not perceived as a neutral object to represent the performance of an entity, instead, the influence of agencies also plays pivotal roles. Thus, to discover the constitutive roles of accounting in embedding non-financial elements into financial measures, it is essential to unfold the construction, distribution, and facticity of accounting objects (Mennicken and Espeland, 2019; Miller and Power, 2013; Power, 2021).

The constitution of accounting objects is closely associated with the context in which they are situated. This thesis positions itself in the context of linking accounting, organising, and economising climate change (Miller and Power, 2013). This is derived from the need to

broaden the scope of what counts as material in economic activities to limit the GHG concentrations in the atmosphere. As climate change has a intersectional relation with SDGs, Bebbington and Unerman (2018) suggest that accounting researchers need to extend the basis of inquiries beyond the organisational level (e.g. SDGs related disclosure) to the adoption of new accounting technologies and practices in embracing the issues. In accounting for SDGs, Bebbington, Russell and Thomson (2017, p. 27) argue that a formulation of space to pursue a radical transformative programme should not be located in “a discrete object or entity”. Consequently, as a form of accountability, the focus of accounting seeks to offer potential transformative or emancipatory forces rather than control or maintain self-interests among respected entities (Bebbington, Russell and Thomson, 2017).

With the demand of the global climate change commitments to internalise externalities, the construction of accounting objects is perceived to shift beyond the end points, such as cost and benefits. Instead, Miller and Power’s (2013, p. 560) definition of ‘economising’ concerns the study of “the processes and practices through which *individuals, activities, and organizations* are constituted as economic actors and entities” (emphasis added). In this study, these three constructs – individuals, activities, and organisations – play a central role in explaining and understanding the focus of the research. Specifically, how these three constructs interact and are influenced by various processes and practices, which shape the formation and operation of economic actors and entities in different settings. However, Miller and Power’s (2013) study do not discuss whether there is a parallel ‘economising of objects’, in particular in the form of those new financial instruments developed to enable the pursuit of green objectives, such as green sukuk. This study, therefore, extends the use of the term



‘economising’ ‘to designate the ‘green’ transformation in the scope and specification of those objects we call financial instruments. In this respect, the form that the ‘economising’ of green objectives takes through delivering them via financial instruments is understood as a form of ‘financialisation’.

To accommodate the economising objectives (Miller and Power, 2013), accounting objects need to imply a “quantifying” spirit (Robson, 1992, p. 688) and the incorporation of qualitative forms to construct quantification (Power, 2015) that can be traceable (Power, 2019). In doing so, accounting objects need to embed the primary features of naming and counting (Bassnett, Frandsen and Hoskin, 2018; Frandsen and Hoskin, 2018) alongside the chain of actions (Power, 2019). As such, accounting, by its naming, counting, and tracing elements facilitates the creation of new objects or reconnects, and redefines existing accounting objects that can serve the demand of the accounting infrastructure to act upon the incorporation into economic actors and entities.

By linking financial and non-financial attributes, including climate change, accounting entities embrace not only a single form of motivation but also multiple forms of motivation (Miller and Power, 2013). The objectives are manifested in the measurement provisions as underpinning characteristics for financialisation (Miller and Power, 2013). As such, climate change issues are incorporated as objects to be organised which are developed further as for financialisation; the attention needs to be situated in the process and practices to generate material outcomes. For instance, in an early study to incorporate environmental objectives, Gray (1992) highlighted transparency and accountability were manifested in accounting technologies, such as disclosing carbon emission progress. However, in later development in the domain of

green accounting, studies need to focus on shifting the debate from the marginal social-environmental accountability issues to the centre of accounting dialogues (Gray and Laughlin, 2012). The shifting demand is also emphasised given the escalating tensions in mobilising the flow of green finance (IPCC, 2022a).

However, seeking more transparency to account for nature beyond the procedural basis to outcome-oriented can be problematic (Mol, 2010, 2015; Quattrone, 2022). Transparency as a form of accountability acts to build a relation with multiple purposes often demonstrating what counts to be transparent, or material objects become visible or invisible (Quattrone, 2022). The shifting target of management towards outcome-oriented objectives involves tracing connectivity and disconnectivity where the objects have been mediated, reconstituted, and distributed (Kornberger, Pflueger and Mouritsen, 2017; Power, 2019).

Furthermore, an outcome-oriented approach is seemingly a precise abstraction of intentions, yet Hopwood (1987); Power (2015) consider constructing outcomes as an accounting object rather than an effortful elaborated technology of government. The apparatus involves shaping “organisational perception, governance, and strategic mobilisation” (Power, 2015, p. 50). Reforming perception is neither unproblematic nor detached from materials to govern (Quattrone, 2022). Rather quantifying impacts as an outcome requires the construction of numbers as accounting objects (Mennicken and Espeland, 2019; Mennicken and Miller, 2012) in the flow and the intensity of the flow (Martinez, Pflueger and Palermo, 2022; Power, 2019). Consequently, the outcome of the internalisation of climate change issues goes within and beyond the idea of the carbon emission reduction itself, but also to which economic activities are affected (Nordhaus, 2013, 2021).

In summary, the examination of accountability through accounting in performing a transformative force has been prevalent in this study. To research accounting, this thesis departs from the constitution of what to count, as accounts and accounting objects are rooted in purposes which are traced, articulated and distributed in the context of economic activities. To frame the theoretical perspective, this study draws upon two primary concepts. Firstly, the notion of managing government via programmatic rationalities and the technology of government (Rose and Miller, 1992). Secondly, the constitutive role of accounting encompasses territorialising, mediating, subjectivising and adjudicating (Miller and Power, 2013).

### 3.3 Theoretical Framework and Lessons Learned from Prior Studies

Governing climate changes from international convention to national agenda is an abstract aspiration which should be exhibited in technologies of the government that can be articulated and operationalised at local levels. Bäckstrand and Lövbrand (2015); Strippel and Bulkeley (2015) recommend that in examining climate governance in day-to-day practices, it is not merely an abstract design, rules, or regulations, but also, a mode of governing as a central departure. In this study, the mode of governing is framed beyond command and control and is seen as an ideal concept that is positioned in programmatic rationalities and the technology of the government (Rose and Miller, 1992). However, these concepts do not offer ways of accounting for performing constitutive roles to facilitate a reformed agenda of incorporating climate change to become thinkable, governable (Miller and O'Leary, 1987) and make sayable (Charnock and Hoskin, 2020). Thus, section 3.4 will analyse the potential use of

the constitutive role of accounting in territorialising, mediating, adjudicating and subjectivising the objects of inquiries (Miller and Power, 2013).

### 3.3.1 Managing Government

Departing from the idea of managing government, this study is aware that the existence of various interpretations of the concepts of governmentality or governmental management can lead to confusion and debate in governance as Kurunmäki and Miller (2011) noted. To maintain clarity, this study draws on Foucault's statement on the form of accountability, as clarified by Hoskin (2017, p. 38), whereby in the development of managing a state:

discipline was never more important or more valued than when the attempt was made to manage the population: managing the population does not mean just managing the collective mass of phenomena or managing them simply at the level of their overall results; managing the population means managing it in its depth, [managing it] in all its fine points and [managing its] details (Foucault, 2007, p. 107).<sup>5</sup>

A governing domain as a central part of managing the population enables us to apply Foucault's vision to constitute a new disposition (or apparatus) of security for the state and the population.

In this context, the population is understood to consist of human subjects that possess a set of individual desires, which will be varied and potentially contradictory, but governing

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<sup>5</sup> The phrases in brackets are only available in the French original as noted in Hoskin (2017).

successfully involves managing and accommodating these sets of desires for both majorities and minorities. As such, looking at the population as a whole as desiring self-fulfilment for each individual within it, conceptually, this can be used to make sense of the aspirations to tackle climate change, situated in the mobilisation of financial resources. These agendas are translated to green financial instruments, including sovereign green sukuk as a localised form of governing technology. Specifically, this study focuses on the constitution of green fund instruments, with a specific case study of green sukuk initiatives and accountability infrastructures to develop accounting objects that facilitate funding flows can be mobilised, traced and measured.

The localised aspirations for mobilising resources could not be detached from the interest to pursue an accountable society in which it can be seen as an abstract concept without the contextualisation. Consequently, the emergence of accounting objects is attached to a contextualised space such as green, climate, or ESG: sustainability embedded in governing instruments as a mode to be operationalised in the day-to-day practices of the governing subjects. To elaborate how aspirations and technological devices are entangled, the concept of managing government leads us to understand the notion of programmatic rationalities and the technology of governments as offered by Rose and Miller (1992).

### 3.3.2 Programmatic Rationalities and Technology of Government

The term “programmatic”, “programmes of government” and “programmatic rationalities” are interchangeable in this research. Rose and Miller (1992, p. 181) define the notion of programmatic as:

[the] realm of designs put forward by philosophers, political economists, physiocrats, and philanthropists, government reports, committees of inquiry, white papers, proposals, and counterproposals by organisations of business, labour, finance, charities, and professionals, that seek to configure specific locales and relations in desirable ways.

To render this idea in the context of accounting and sustainability, Thomson, Grubnic and Georgakopoulos (2014, p. 454) decode the definition by emphasising “the localisation of a ‘high-level agenda’” that can be articulated into policies, projects, political aspirations, or reformed programmes. The definition implies a localised form of political, abstract rationalities (Free *et al.*, 2020) that can be addressed in an object which consciously articulate ‘political calculation or interventions’ and the possibilities to create or redesign interrelations in its delivery (Kurunmäki and Miller, 2011).

Programmes operate through practices and processes that encompass government technologies. Research in this area primarily focuses on understanding accounting technology as part of societal programmes and modes of governing (Mennicken and Miller, 2012) that influence transformation in day-to-day practices (Miller and O'Leary, 1987). For instance, the use of risk maps to mediate interorganisational conflicts (Jordan, Jørgensen and Mitterhofer, 2013), the transformative potential of accounting-sustainability hybrids (Thomson, Grubnic and Georgakopoulos, 2014), interdiscursive characters of risk matrices (Jordan, Mitterhofer and Jørgensen, 2018), and micro production of accountability to extend to untapped sectors (Alawattage, Graham and Wickramasinghe, 2019). These studies demonstrated that

accounting has been instrumental in contextualising ideals in regular practices and processes to govern subjects.

In constituting such economic actors, Frandsen and Hoskin (forthcoming); Hoskin (2017) elaborates that governing forms include naming and counting to provide the 'substance and effectiveness'. Giving a name to the process of making carbon by labelling becomes thinkable, and has been proliferating, such as through net zero, low carbon development pathways, positive or negative carbon to render climate governance (Charnock and Hoskin, 2020). This form of naming, such as a climate account encompasses a form of numbering to reveal the target (Heller and Seiger, 2021). Yet, such ideas can be a trivial in a general sense without any appropriate measure at the level of details.

The notion of programmes and technologies facilitate the attributes of different agendas; concerns, interests, and ideas become visible and governable. These programmatic rationalities are connected and manifested to something that is real in technologies of governing. However, these concepts do not offer a guide to analyse the productive forces of accounting to embed climate change aspirations in regular practices. Therefore, the following section will provide a potential way in which the productive forces of accounting can be effectively performed to organise and economise climate change in a governable field. In this sense, the framework will initially draw upon fundamental dimensions, namely territorialising, mediating, adjudicating, and subjectivising (Miller and Power, 2013, p. 557).

### 3.4 Performing the Constitutive Role of Accounting

To understand the constitutive role of accounting, Miller and Power (2013) identified fundamental dimensions, namely territorialising, mediating, adjudicating, and subjectivising.

This study acknowledges the entanglement between each of these roles. However, recent studies show a contested result. Miller and Power (2013, p. 558) explain their philosophy saying: “the entanglement of these four roles, we suggest, is what gives the accounting complex its productive force, such that it is perhaps the most powerful system of representation for social and economic life today in many national settings”. As an example, in explaining this concept in the case of accounting practices for unburnable carbons and resource reserves, Bebbington *et al.* (2020) indicated that accounting can only perform a partial territory while other dimensions were absent. Furthermore, Free *et al.* (2020, p. 489) argued that the framework “offers rich new insights into the mechanics of how accounting technologies come to life, but that the framework is underspecified along at least two major dimensions”. The dimension of territorialisation on the national level (Kurunmäki and Miller, 2011; Mennicken and Miller, 2012) and the undervalued role of agency were emphasised when observing the transnational dimension (Free *et al.*, 2020). It can be observed that the primary assumption is that accounting inherently holds these productive forces’ dimensions. However, prior studies have discovered diverse results in operating in multiple settings that invite debate within the construction of accountability mechanisms. Therefore, the following section will elaborate on each dimension, including the implications to the demand for accountability within a climate-related financial flow.

#### 3.4.1 Territorialising

The territorialising role of accounting have been studied in understanding the construction of calculative spaces. Accounting enables ‘territorialising’ because it recursively produces the calculative spaces in which there is an interaction between calculative agencies (Miller and



Power, 2013). This concept emerges alongside the domination of space, representation and power in conceptualising the link between heterogeneous elements (Kornberger, Pflueger and Mouritsen, 2017). In this context of constructing the linkage, the body of research has sought to focus on accounting as an 'assemble', 'assemblage', 'complex', 'hybrid', between a variety of spaces and boundaries of entities (Miller and Power, 2013) or facilitating the construction of "double territories" (Frandsen and Hoskin, forthcoming). By linking multiple domains, debates in accounting research concern the 'centre of calculation', and 'obligatory passage points' that have been situated in distinctive centres and on the periphery in the concept of territorialisation (Kornberger, Pflueger and Mouritsen, 2017).

Territorialising emphasises attention to recursively constructing calculable spaces to carry programmatic ideas where entities can be evaluated through seemingly neutral technologies and generate a facticity (Miller and Power, 2013). For instance, the effort to connect accounting to sustainability has been incorporated in the domain of business risk. In that sense, there is a potential in which accounting needs to create a new accountable space that may either expand or diminish its organisational territory (O'Dwyer, Owen and Unerman, 2011). Climate change is an issue 'beyond borders' given the impact of global warming is not necessarily situated in a single governing practice or process. The arrangement of territory becomes a key concern in representing climate problems. Lovbrand and Stripple (2006) suggest that territoriality has to be perpetually recreated and reshaped via social behaviours.

However, redrawing the territory, including the reorientation of social relationships between calculative agencies, does not directly construct new meaning. Lovbrand and Stripple (2006) argue that territory is constructed through human beliefs and actions which reproduce the

meaning of spaces, while the space itself is static. From another perspective, territory is dynamically constituted and reconstituted to enable financial calculations to be defined and measured (Mennicken and Miller, 2012; Miller and Power, 2013). In this sense, calculative technologies that embed aspirations become the point of attention in constructing territory, rather than merely continuous practices to drive de-territorialisation and re-territorialisation. For instance, comprehending global climate commitments in a local context demands a discourse between vested authority and government capacity for managing and codifying, including measuring time span and location in practices (Lovbrand and Stripple, 2006).

As organising at a granular level is emphasised, studies highlight the demands to consider proposed uses during the construction and the distribution. As an illustration, Gond *et al.* (2012) suggest the space of sustainability accounts functioned for interactions and diagnosis. This implies the calculative spaces are operated not only to indicate the progress of the accounts but also the interrelation of calculative agencies in developing the accounts. Furthermore, the distribution of the accounts to sustain and/or to open a newly developed market (Kornberger, Pflueger and Mouritsen, 2017; Martinez, Pflueger and Palermo, 2022) is critical in performing the constitutive role of accounting. Without properly functioning to influence decision-making, Bebbington *et al.* (2020) examines that in the context of conflicting accounts, the constitutive role of account could only perform partial territorialisation.

Nevertheless, the relation within the flow of the accounts and intensity does not necessarily always correspond as the responsibility for tackling climate change is not equally distributed among key institutions. Martinez, Pflueger and Palermo (2022) offer insights in expanding the flow and intensity within aspirations, technology, and material by accommodating unfounded

data to indirectly co-create into existing market data. Therefore, in the context of partial territorialisation (Bebbington *et al.*, 2020), there is a potential to extend unexplored domains (Alawattage, Graham and Wickramasinghe, 2019) by optimising interactive and diagnostic use of accounts (Gond *et al.*, 2012). For instance, the territorialisation within the flow of climate accounts. As the flow of climate-related financial instruments corresponds to multiple settings, articulating the abstract ideas of climate change into a contextual mode of governance needs to consider the directions of the flow and intensities.

#### 3.4.2 Mediating

As the flows of the climate-related funds enter multiple territories there is a demand to construct the mediating role of accounting. The concept of mediation is dominantly discussed when linking multiple domains that are inherently conceived as possessing diverse characteristics, actors, aspirations, and arenas (Miller and Power, 2013). In this role, accounting technologies were seen to have the possibility to offer mediating functions within specific domains that were initially separable (Miller and O'Leary, 2007).

Within the literature, the constitutive role of accounting in mediating has been referred to in various terminology, including mediating devices (Callon, Millo and Muniesa, 2007), instruments (Miller and O'Leary, 2007), and machines (Wise, 1988) that have shown interchangeable deployment. The differences are commonly situated in priorities, interests, underlying assumptions, technological usages, process, and practices. As a consequence of territorialising, the process of mediation commonly occurs (Miller and Power, 2013). In

performing the mediation, accounting practices facilitate the assemblage and articulation of reformed agenda into a diversity of levels and regular operations (Miller and Power, 2013).

The mediating role of accounting is not a practice that is taken for granted. To activate the roles, forces are deemed as primary considerations (Thomson, Grubnic and Georgakopoulos, 2014; Wise, 1988). Simultaneously, the forces present within the flow could create multiple forms of mediation (Habran, Matsugi and Mouritsen, 2021). As an illustration, in the domain level, the accounting literature has situated the functions of mediation in the link between science and the market (MacKenzie, 2009; Miller and O'Leary, 2007), natural philosophy and political economy (Wise, 1988), and local and non-local sustainability practices (Thomson, Grubnic and Georgakopoulos, 2014). Even though these studies observed a discrete arena, a fundamental similarity is located in the influence of a broader context in society to an imperative delivery within each entity. By constructing knowledge beyond an internal core of a material system, this production can affect the surroundings and attempt to complete a picture by investigating the penetration of non-local into the centre of regular practices (Wise, 1988).

Studies on the mediating role of accounting can also be identified in the following streams. One stream of literature emphasises spaces, for instance, mediating political and managerial interests (MacKenzie, 2009). This can be seen in a horizontal and vertical manner. MacKenzie (2009) suggests the creation of new accounting objects in carbon management exhibit the relationship between managerial and political interests that correspond to performance measurement and technological infrastructures. This form of mediation is characterised by the existence of long-term programmatic agenda to enable the direction of measurement

outcomes to be performed given the continuous process when mediation is performed. However, the inability to develop connectivity between the different core features and local purposes may imply a potential failure to mediate the norms or material beliefs (Power, 2019), such as in an inconsistent aspiration of government administration to advocate sustainability (Larrinaga, Luque-Vilchez and Fernández, 2018).

Another stream relates to the practices that enable the mediation. In making and giving relation to contextual factors, prior studies highlighted a different form of mediating instruments, from the departure point where devices emerge, shape and reformat the local practices (Thomson, Grubnic and Georgakopoulos, 2014). This device is frequently visible as an object point for applying forces (Wise, 1988). The concept of forces here is borrowed from acts to produce a motion that can create a tendency for change. Forces can be identified from regular to momentum forces in much of the literature, such as Miller and O'Leary (2007) on capital budgeting, Pollock and D'Adderio (2012) on the magic quadrant, Jordan, Jørgensen and Mitterhofer (2013) on risk maps, and accounting-sustainability hybridisations as in Thomson, Grubnic and Georgakopoulos (2014).

As a climate-related financial flow is located alongside the flow, the constitutive role of accounting is mediated beyond a single domain. The forces are also distributed unequally. However, green sukuk accounting objects become a force for further development of the infrastructure to manage the flows as connectivity and disconnectivity are being unfolded (Power, 2019; Raeni, Thomson and Frandsen, 2022). Therefore, this study highlights the creation of new accounts encompassing the origin aspirations, materials, and expertise and also unfolds connectivity and disconnectivity.

### 3.4.3 Adjudicating

The constitutive role of accounting in adjudicating departs from the idea that accounting facilitates decisive performance measurement (Miller and Power, 2013). The idea of aggregating, comparing, contrasting, or identifying specific measures of climate finance flows is closely related to the role of accounting in enabling the adjudication (Miller and Power, 2013). This includes the demand for assessing the impact of climate-related instruments, including sovereign green bonds, in government systems. It is through the existence of measurement devices that adjudicatory roles can be performed. However, embedding a new object of measurement does not necessarily allow that it can be adjudicated in an existing system given prevalent key measures that have been stabilised (Argento *et al.*, 2020).

In adjudicating non-financial materials (e.g. climate change, ethical values) in financial forms, prior studies highlight their dynamics. The problems stem from the dynamics in calculability and comparability to either translate into monetary values, aggregate or differentiate (Chiapello, 2015, 2018). The heterogeneity is primarily situated in three areas of both inconsistency and redundancy of accounting technologies. These domains cover definition, terminology, and strategic levels (Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009). The scope of financial and non-financial impacts becomes a core point in defining the integration of qualitative information while the terminological side is closely related with concepts, synonyms, and subordinate concepts to address certain terms (Höchstädter and Scheck, 2015). The strategic level here is associated with the tendency of financial and non-financial impacts being primarily directed to pursue the goal of entities (Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009). Even though scholars agree on the elements that constitute the

diversity, the major influence of heterogeneity in measurement is addressed in slightly different ways.

As an illustration, the absence of uniformity in impact measurements is primarily derived from diversity in culture and ideology within regions; the ideologies, values, and norms of the key stakeholders; and the setting of the market and segmentation (Sandberg *et al.*, 2009). By approaching impact measurements with similar elements of heterogeneity, Höchstädter and Scheck (2015) extended the elaboration by covering the spectrum of demography and geography, organisational processes, sector and impact objectives, finance and organisational structure, asset classes and financial instruments as considerations. Among these explanations, organisational processes in assessing impact measurements are highlighted as underdeveloped, which this area demands for advancement in the analysis (Höchstädter and Scheck, 2015).

Given the contested nature of conflicting issues, other forms of accounts were constructed such as counter accounts and shadow accounts that are constructed to confront the mainstream practices and offer counterbalancing powers (Brown and Tregidga, 2017; Thomson, Dey and Russell, 2015). Typically, this type of accounts is provided by external accounting entities to facilitate changes in poorly governed domains (Denedo, Thomson and Yonekura, 2018; Manetti, Bellucci and Oliva, 2021). Despite the potential of the use of shadow accounts to counterbalance uncertainty, this study perceives the potential constructions of accounts are contested internally and depend on the chains of connectivity, actions and decisions given the diversity of measurement provisions alongside the flow of accounts. For

instance, in communicating the facticity of GHG footprints of nations account, Milne and Grubnic (2011) suggests the usefulness of formulating shadow carbon accounting.

Furthermore, studies in the adjudicating process dominantly focus on the barrier in technological and selection processes, yet enabling and constraining non-financial information adjudicated alongside financial information remain absent. As an illustration, a major barrier in shifting to incorporate qualitative information, such as ESG to financial accounts, was the lack of efficient ways to integrate. This process requires a substantial amount of data from a disintegrated system that is easily exchangeable. As such, the effort in assessing some additional targets when local governments adopted smart cities could not be tracked in performance indicators for making decisions (Argento *et al.*, 2020). The challenge in the adjudicating process was not due to the absence of measurement methods that internalise ESG dimensions, instead the difficulty occurred in aggregating established systems (Argento *et al.*, 2020). This implies the need to select relevant methods and devices that can dominantly influence the results of the measurement and the concerns of a certain public policy (Barman, Hall and Millo, 2020; Hall and Millo, 2018; Hall, Millo and Barman, 2015). Failure to measure appropriately may only affect superficial changes in administrations while not necessarily driving changes in governing practices (Argento *et al.*, 2020).

#### 3.4.4 Subjectivising

Miller and Power (2013, p. 557) indicated the constitutive role of accounting in subjectivising, emphasising that “it both subjects individuals to control or regulation by other, while entailing the presumption of an individual free to choose”. This implies the practice in subjectivising



through accounting technologies for a particular purpose, such as climate change, has created a dynamic within other contested programmatic priorities. The constitutive role of accounting in subjectivising is characterised by the potential to be regulated by the mode of governing (e.g. financial techniques, methods) while the underpinning assumption remains the flexibility to choose (Miller and Power, 2013). Furthermore, by giving subjects to accounts in relation to climate change commitments, Chiapello (2018) argues that this produces the reimagining of aspirations in local realms where a new object will be reconstructed. As such, by assigning label 'climate', 'green', or 'sustainability', offers a substance to enable economic activities to be rendered calculable and governable when naming and counting are attached (Bassnett, Frandsen and Hoskin, 2018; Frandsen and Hoskin, 2018, forthcoming). However, as climate change is situated in multidimensional interests, there is also the possibility to choose to be controllable or remain flexible within subjectivising. Thus, the production of the subject that enables the reorientation of accounting objects to become substantial could be the core dynamics from which the accounting object is formed, reproduced, or redefined (Miller and Power, 2013; Power, 2015).

However, distinguishing one account to be classified as a climate or green account and faithfully representing the purpose, such as decarbonisation, can be problematic when it serves multifaceted interests and is distributed across various spaces of production (Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009). A configuration between financial accounts and non-financial accounts should not lead to the name vanishing when money does not constitute throughout the distribution of accounts (Frandsen, 2009). Given the corresponding relation between programmes as manifestations of aspirations and

technologies to execute realisation (Rose and Miller, 1992), any reform in reshaping the economic order leads to reshaping the relation, which does not necessarily have a compatible connection (Bromley and Powell, 2012). Consequently, configuring climate change into financial accounts within the distribution of the flow of funds may correspond differently.

For instance, through hypothecating accounts to adhere to tackling climate change, this practice could create unwillingness or resistance from different vital actors. Dupont and Oberthür (2015) identify that integrating climate policy in government priorities could create a struggle without alternative win-win solutions to tackling this barrier. This challenge is derived from the potential conflicts among political and competing policy portfolios (Dupont and Oberthür, 2015). Another piece of evidence is shown in the struggle to maintain adherence to spiritual ideals in secular organisations (Hidayah, Lowe and Woods, 2019). Consequently, to reproduce a new spiritual vision, the practices require fabrication of accounting devices within the “chain of selection, translation, and appropriation of spiritual legitimacy” (Hidayah, Lowe and Woods, 2019, p. 25). Within subjectivising the chain of actions, the process opens new connections, and new financial infrastructures can be enabled through methods of naming and numbering, as noted in Frandsen (2009).

Furthermore, in subjectivising a newly developed account within existing systems, the compatibility of reformed agenda with technical processes, practices and purposes also needs to be considered. Subjectivising the general treasury account in the government budget, for instance, is closely associated with the notion of earmarking,<sup>6</sup> even though the attribute in

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<sup>6</sup> Earmarking is another term for tagging. 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,

operationalisation would lead to diversity. The concept of earmarking refers to categorising amounts of money from creation and contestation to future development (Bandelj, Wherry and Zelizer, 2017). The idea was derived from shaping the differentiation of money through social relations as the centre of a relational earmarking theory (Zelizer, 2012). Earmarking has been dominantly utilised within the budgeting sphere to constrain budget flexibility, as discussed in Posner (2007). Similarly, it is important to maintain budget continuity in terms of planning, resource allocation and performance evaluation, as highlighted by Becker *et al.* (2016). However, an arrangement to earmark financial sources, including sovereign bonds, for specific purposes could erode future fiscal flexibility due to detailed appropriations over budget to control public spending at the local level (Posner, 2007). This character contrasts with the idea of flexibility for allocating public debt instead of direct relations in the disbursement of financing public goods (Alesina and Passalacqua, 2016). Giving earmarks could also create a reverse impact by encouraging the risk of relabelling specific earmarked budgets (Medarova-Bergstrom *et al.*, 2011).

The constitutive role of accounting in subjectivising implies a potential to reconstitute a social group relation yet freedom to choose how to respond to norms remains present. Attaching functionality to accounts does not directly reproduce the relation or shift prevailing systems. Moreover, performing accounting practices and processes do not directly reconstitute a governable subject (Bebbington *et al.*, 2020); instead, this could create difficulties over compatibility. In this sense, Martinez, Pflueger and Palermo (2022) suggest research to

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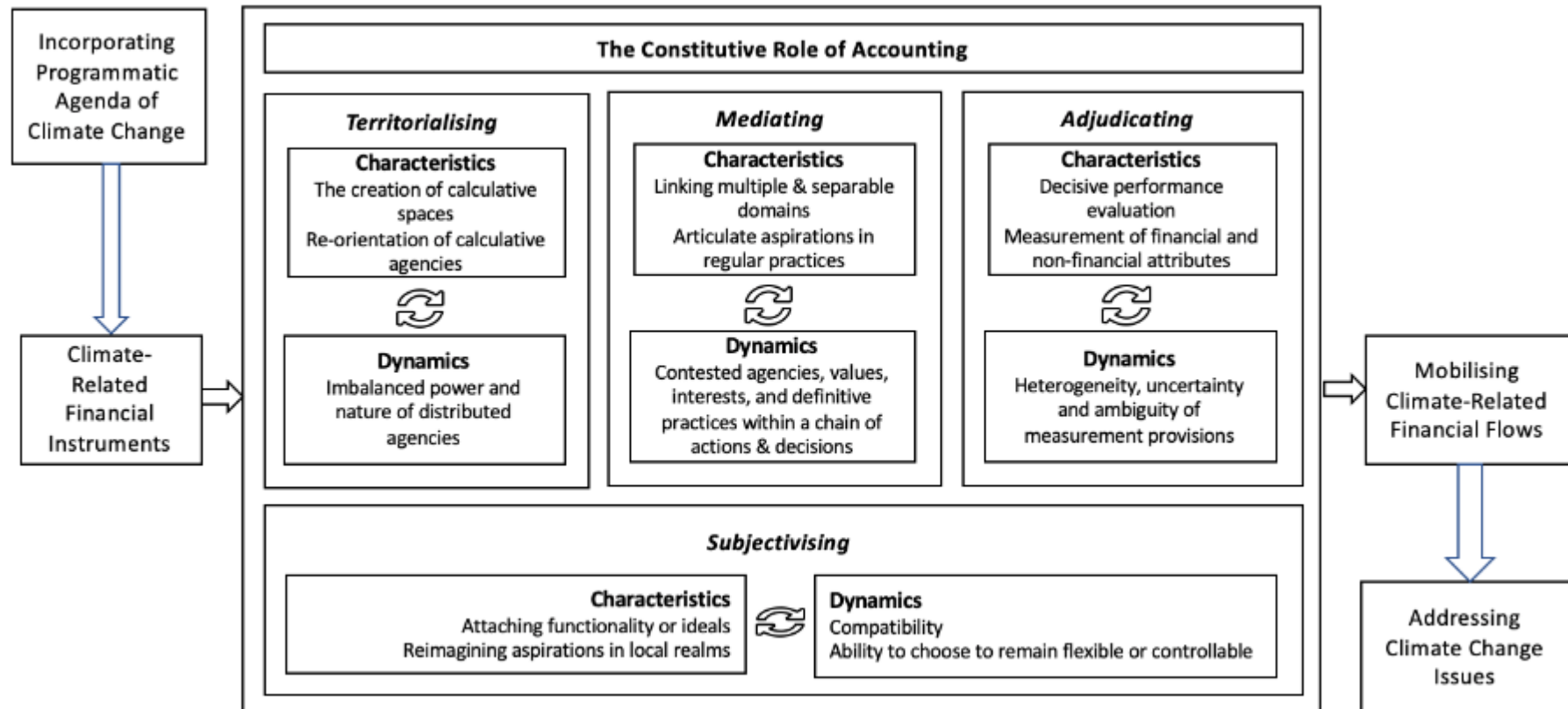
2012). For instance, earmarking is characterised by ring-fenced money for specific purposes or a particular social relation that influences cognitive behaviours. In this empirical setting, the two terms are used interchangeably through the essence of tracking and categorisation. The concept of earmarking in this context might be used differently from the context of earmarking the government budget for education or health sectors.

investigate attributes for accounting to enable and constrain its performativity. The reconstruction of the accounting infrastructure potentially facilitates the rearrangement of social relations. As such, the interactions in subjectivising could possibly reconstruct social groups where both can enhance (diminish) tensions, promote, stabilise, or resist imparting climate change as programmatic rationalities.

### 3.5 Implications of the Framework

This research sets out to explain the construction of the accountability mechanism of a climate-related financial instrument by referring to Rose and Miller's (1992) notion of the programmatic rationalities and technology of government. This notion is then detailed in Miller and Power's (2013) framework on the constitutive role of accounting to elaborate programmatic agenda to be operationalised in local governing practices. The theoretical framework will enable analysis by offering the key characteristics and dynamics within each of the dimensions in performing the constitutive role of accounting's "productive force" as illustrated in Figure 3.1.

Figure 3.1 Analytical Framework for the Construction of Accountability Mechanisms



Source: Author's analysis built upon Miller and Power (2013); Rose and Miller (1992).

Based on Figure 3.1, the subsequent paragraphs will detail the implications of the theoretical framework in offering potential explanations of the performative role of accounting in constructing accountable objects to incorporate climate change programmatic agenda in a climate-related financial instrument.

Firstly, the research considers territorialising. To incorporate climate change agenda in a financial instrument, the constitutive role of accounting facilitates the creation of calculative spaces in which it is possible to re-orient calculative agencies. Furthermore, locating climate change at the centre of calculations may face dynamics, given the nature of climate change as a wicked problem. Consequently, articulating and operationalising the rationalities in addressing climate change demand calculative spaces across sectors and priorities. As such, embedding climate change has the potential to reshape and reconstruct existing governing technologies and relations between calculative agencies.

However, mobilising the green sukuk flows not only needs to extend a single territory to double territories (Frandsen and Hoskin, forthcoming), but also channel the production of accounts, tracing the allocation and measuring the impact that can be created. Consequently, this potentially creates an imbalance in the distribution of aspirations, technologies, expertise and materials. In this sense, accounting technologies play a role in recursively producing the calculative spaces and interactions within calculative agencies (Miller and Power, 2013).

In this context, the territory of calculative spaces covers the flow of the financial instrument, the presence of climate change in financial planning systems, and the formulation of green impacts within co-existing governing technologies. However, the intensity of the flows to

pursue the programmatic agenda of climate change does not necessarily connect with the prevailing aspirations, the established governing technologies, and expertise. As such, it is necessary to identify and locate calculable spaces that facilitate effectively performing the functions. This includes potential problematisation and enhancement alongside the flow. This assumption extends the study of Martinez, Pflueger and Palermo (2022) of constructing a market by examining invalid data across the flow and the intensity within aspirations, technology, and material. Consequently, the relationships within the flow of the accounts and intensity do not necessarily always correspond as the responsibility of tackling climate change is not equally distributed among key institutions.

Secondly, mediating is considered. As the emphasis is situated on the flow of the funds, it is necessary to mediate between transparency and traceability. To develop the analysis of the Indonesian green sukuk case study, the dynamics of the accountability mechanism are situated in shifting transparency to traceability. This research will draw upon the concepts of transparency (Mol, 2010, 2015; Quattrone, 2022) and traceability through tagging (Frandsen, 2009; Madsen, 2015; Power, 2019, 2021). In seeking transparency, Quattrone (2022, p. 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.

Furthermore, in pursuing traceability the emphasis is situated in 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 connectivity (but also disconnectivity) 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 legitimatise 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 performing the mediation, accounting practices facilitate the assemblage and articulation of reformed agenda into diverse levels and locales (Miller and Power, 2013). As such, the mediating roles of accounting need 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.



Assessing accounting objects against outcomes requires a complex interaction of traceability technologies, such as tagging or earmarking (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.

Thirdly, adjudicating non-financial information with financial information within multiple measurement provisions remains problematic in prior studies. 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). Despite the ambiguity and uncertainty (Puroila and Mäkelä, 2019), the process in constructing green accounts from climate accounts has unfolded the dynamics between financial attributes and impact attributes in the concept of materiality (Cooper and Michelin, 2022).

In parallel, a potential reformed system has 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 data granularity 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).

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.*, 2020; 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 creating meaningful connectivity. For instance, even in conventional climate bonds, conflicts could emerge over what constitutes climate reducing activities or beneficial GHG 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) have the potential of constructing new accounting objects (Kornberger, Pflueger and Mouritsen, 2017), allowing possible renaming and revaluing relationships which produce new spaces of inquiry and the possibility of traceability into other domains (Frandsen, 2009).

Fourthly, subjectivising aspirations is pertinent in reconfiguring the aspirations in the prevailing accounts. By giving subjects to accounts, Miller and Power (2013) and Chiapello (2018) argue that this process produces reimagined aspirations in local realms where a new object will be reconstructed. However, demands for improved transparency are unlikely to trigger material changes if transparency is deemed a ritual (Christensen and Cornelissen, 2015) and assessed against procedures rather than material outcomes (Kamil, Bush and Gupta, 2021; Mol, 2015). Furthermore, Gray (1992, p. 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. Consequently, changing the focus of transparency away from process to outcomes (Arjaliès *et*

*al.*, 2022; Fazey *et al.*, 2018; Quattrone, 2022) by assigning objects as accounts for climate change in public accounting systems can be daunting. This requires creating new relationships and making visible chains of events across different institutions (Power, 2021).

Building a new relation in a contested interest can be daunting as the primary purpose of public accounting systems is to distribute budgets for the government's primary priorities. As climate change is situated in multiple priorities such as expanding access to energy, accessible and safe transportation, accounting the capacity of public budgets for tackling climate change does not necessarily meet with its the initial purposes. Consequently, attaching control through hypothecating accounts to adhere with tackling climate change, for instance, could create unwillingness or resistance from different vital actors. In this sense, it is crucial to find the balance between the possibility of being subjected to climate change related regulations within co-existing systems and referring to financial norms or guidance (Miller and Power, 2013). As such, understanding and explaining the production of calculative spaces subjected to climate change need to trace the core dynamics in the formulation, reproduction and redefinition from the co-existing system as suggested by Miller and Power (2013); Power (2015).

To conclude, the constitutive role of accounting potentially enables the construction of an accountability mechanism for climate-related financial flows; in particular, the demand for the transparency and traceability of the green sukuk to extend beyond conventional place-based transparency (Mol, 2015) or conventional organisational accounting. This reconstruction of the accounting technologies aims to connect markets, regulatory processes, resource and pollution flow, and 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), and 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, classification 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. Also, these tags potentially adjudicate attachment of non-financial information to financial information alongside the flow of green sukuk.

### 3.6 Summary

This chapter has provided an overview of the theoretical underpinnings of the constitutive role of accounting that are used throughout this thesis. These underpinnings include the concept of the programmatic agenda and technology of government (Rose and Miller, 1992) to facilitate the urgent need to tackle climate change in governable practices. However, this concept does not offer an analytical framework to analyse how the performativity is constituted.

To offer a detailed design and operationalisation, this study adopted the framework suggested by Miller and Power (2013), who highlight the domains in performing the constitutive role of accounting. These are territorialising, mediating, subjectivising, and adjudicating. This theoretical conceptualisation facilitates an initial departure as a theoretical lens that potentially better comprehends how climate change aspirations can become accountable objects in financial instruments and the productive forces of accounting can be performed effectively.

Beginning with the notion of accountability and accounting, these concepts are closely related. This research highlights the pivotal role of accounting to construct a governable entity, including the incorporation of climate change. The concept of accounting as a device to produce information for decision-making is positioned beyond a technical and neutral reality of an entity. Rather, in this research, accounting, by its naming, counting, and tracing approaches, creates visible (new) objects or reconnects, and redefines existing accounting objects that can serve the demand of the accounting infrastructure to act upon the incorporation into economic actors and entities. Therefore, taking into consideration aligning climate change commitments in the emergence of financial instruments, accounting has been embedded as a productive force to construct climate change aspirations as accountable objects.

Through the presentation of a climate-related financial instrument, the notion of programmatic rationalities and a set of technologies of government (Rose and Miller, 1992) can offer ways of articulating, problematising, and localising climate change aspirations in governing regular practices (Charnock and Hoskin, 2020). However, this notion does not offer

details on how to incorporate the proposed aspirations, minimise hinderances and optimise enablers in a newly developed or co-existing settings. As such, the domains of the accounting complex are interchangeable with the constitutive roles of accounting (Miller and Power, 2013) that offer ways productive forces can be performed to govern climate change in co-existing governing technologies (Gray, 1992). However, prior studies highlighted a mixture of results in utilising the framework to explain empirical evidence in multiple contexts (Bebbington *et al.*, 2020; Free *et al.*, 2020). This includes the complex nature of climate change as a wicked problem (Bebbington, Russell and Thomson, 2017; Lapsley and Miller, 2019) implies challenges and dynamics in the formulation of accounting objects and accountable entities that incorporate climate aspirations. Therefore, this study emphasises the demand to unfold each of the dimensions within the constitutive role of accounting despite the entanglements in performing productive forces being acknowledged.

Following Miller and Power's (2013) framework in explaining the production of calculative space resulting from the interaction between calculative agencies, this chapter has demonstrated the demand to develop linkages between accounting, organisation and economisation. Instead of being taken for granted when accounting devices are situated in the linkage process, this chapter has presented a recursive process in building the connectivity given distinctive aspirations within multifaceted interests. The dynamics include the role of accounting in partially territorialising the production of new space (Bebbington *et al.*, 2020) or diversity in imparting the intensity of proposed aspirations (Martinez, Pflueger and Palermo, 2022). Therefore, the concept of territorialisation potentially offers a novel analysis

in unpacking the dynamics to trace and mobilise the effort in mainstreaming climate change commitments alongside the direction and intensity of the flows.

By utilising the concept of mediation (Miller and Power, 2013), in the demand between transparency and traceability (Power, 2019), this form of analysis facilitates the comprehension of contested co-existing aspirations, technologies, practices and expertise while continuously seeking ways to mediate in permeating or diffusing aspirations. Given the imbalanced power in imperative priorities between local and non-local, selecting a relevant mediating instrument is critical (Thomson, Grubnic and Georgakopoulos, 2014). Simultaneously, the mediation process also potentially discovers disconnectivity and connectivity (Frandsen, 2009; Power, 2019; Raeni, Thomson and Frandsen, 2022) in articulating programmatic agenda in local practices (Kurunmäki and Miller, 2011). As the focus of the study is situated in the chain of action and decisions, the concept of mediation will potentially unveil connectivity and disconnectivity in pursuing accountability mechanisms alongside the flow of funds.

Similarly, the efforts to subjectivise climate change in prevailing governing systems does not necessarily impart the ideals to regular functions. Instead Miller and Power (2013) highlight the domain of freedom and control resulted from calculative devices, hypothetically located subjectivising points that indicate the extent of subjectivising can be imposed within the context of interactions. More importantly, the subjectivising nature of accounting enables ethical ideals to be imparted (Frandsen and Hoskin, forthcoming; Hidayah, Lowe and Woods, 2019) alongside the flow of accounts.



Furthermore, the notion of adjudication emphasises the decision nature of accounting as performance measurement technologies (Miller and Power, 2013). In the demand for measuring green impacts, this demands the incorporation of non-financial to financial information within prevailing measurement provisions. As such, ambiguity and uncertainty (Bridge *et al.*, 2020; Puroila and Mäkelä, 2019) within the diversity of measurement provisions (Höchstädter and Scheck, 2015; Sandberg *et al.*, 2009) continue to persist. In parallel, pursuing material outcomes (Mol, 2010, 2015) could also face challenges in operationalisation (Argento *et al.*, 2020) to enable the measurability of climate-related financial instruments.

Despite the effective potential usage of the analytical framework by building upon Rose and Miller (1992) and Miller and Power (2013) as theoretical lenses, the underpinning dimensions do not offer details in the design and implementation that travel across multiple contexts which have been recursively constituted. In parallel with the absence of the emphasis, this offers this research the opportunity to contribute to extending a theoretical lens by applying potential productive forces of accounting in constructing accountability mechanisms to enable and constrain climate-related financial flows. By selecting multiple settings alongside the flow of the funds, the research emphasises the dominant dimensions of the accounting complex within the contested settings despite acknowledging the entanglements. This assumption allows the researcher to iteratively analyse the empirical evidence through the theoretical lens. As a result, the use of this theoretical framework makes it possible for this thesis to contribute to the deficit of accounting studies that investigate the articulation of climate change as accountable objects and the productive force of accounting can be effectively performed to organise and economise climate change in a governable field.

## CHAPTER 4. RESEARCH METHODOLOGY

### 4.1 Introduction

Having introduced the analytical framework in the previous chapter, this chapter will detail the philosophical assumptions of the researcher in conducting this research project. It sets out the underlying assumptions in viewing the world, the knowledge production, and the role of the researcher in addressing the following research questions. Firstly, how the global climate action agenda is translated into accounting objects connected with a specific financial instrument can be understood and explained. Secondly, how the productive force of accounting can be effectively performed to organise and economise climate change in a governable field. This chapter will describe techniques in conducting the research from the objects of inquiries, data collection, data analysis, and maintaining research trustworthiness.

This thesis' ontological and epistemological assumptions will be discussed in section 4.2. Following that, section 4.3 will explain the research strategy, and section 4.4 will outline the data collection procedures, including case selection, choosing research participants, obtaining data from documents, interviews, and observations and ethical issues that underlie this project. Next, section 4.5 will describe the data analysis procedure, followed by section 4.6 outlining the ethical considerations of the research design. Finally, section 4.7 will provide a summary of this chapter.

## 4.2 Research Philosophy

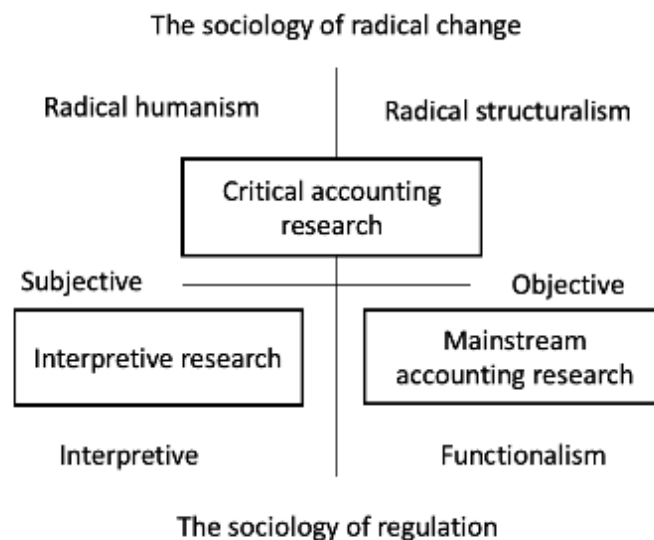
Although the underpinning philosophical assumptions are often concealed, their presence remains essential in the planning stage of the research (Creswell and Creswell, 2018). To understand a set of beliefs in shaping a worldview to conduct research, Creswell and Creswell (2018) contends there are three primary considerations: ontology, epistemology, and axiology. Ontology is concerned with the nature of reality, which shapes researchers in addressing what constitutes a reality (Lincoln and Guba, 2013). From the researcher's underlying beliefs, epistemological assumptions guide the determination of what counts as valid findings in the field of study (Saunders, Lewis and Thornhill, 2019). This implies consideration of the methodological approach to determine trustworthiness in addressing research questions.

Furthermore, to what degree the researcher's values and views, known as axiology, should be integrated into the study to influence the researcher's behaviour throughout the research process is another consideration (Denzin and Lincoln, 2000). Thus, the researcher's ontological, epistemological, and axiological stances lead to a proper mix of methodologies employed to investigate phenomena; this is known as the research methodology (Saunders, Lewis and Thornhill, 2019). However, the researcher's worldviews from ontology, epistemology, and axiology are situated in the ongoing debate between objectivity and subjectivity. Furthermore, axiology is closely embedded in the researcher's assumptions to define ontology and epistemology. As such, before selecting a study design or research method, it is crucial to reflect on these hidden underlying philosophical presuppositions (Crotty, 1998; Saunders, Lewis and Thornhill, 2019).

#### 4.2.1 Ontological Assumptions

According to Hopwood (2007, p. 1371), research is “a means of satisfying our intellectual curiosity. As such, curiosity-oriented research enlightens us about the nature, origins, modes of operation, and consequences of the multiplicity of aspects of the accounting domain”. This implies that the production of accounting knowledge is intellectually discovered by revealing the nature, attributes and consequences that construct reality. Ryan, Scapens and Theobald (2002, p. 40) suggest that interpreting and communicating observations, readings, conversations, and results to advance knowledge is crucial to the discovery process. Furthermore, in examining the object of inquiry within accounting research, Ryan, Scapens and Theobald (2002) illustrated the classification as presented in Figure 4.2.

*Figure 4.2 Taxonomy of Accounting Research*



Source: Ryan, Scapens and Theobald (2002, p. 40).

Following Rose and Miller (1992) and Miller and Power’s (2013) approach to research, and assessing it against Figure 4.2, this thesis rejects the idea of positivism and adopts critical

accounting research as the approach to produce knowledge. The object of research interests is situated in “how discourse constitutes objects and subjects [rather] than in the details of language use in social interaction” that is aligned with what Alvesson and Sköldberg (2018, p. 250) highlight in Foucault’s studies. In the taxonomy of accounting research, Ryan, Scapens and Theobald (2002) visualised three dominant categories. Mainstream accounting research, which combines objectivists with regulatory assumptions, has been dominantly utilised and referred to neoclassical economics. This stance is classified as a functionalist paradigm. The remaining three quadrants, interpretative, radical humanism (subjectivism-radical change), and radical structuralism (objectivism-radical change), have been situated to adopt critical accounting research (subjectivism-regulation) (Ryan, Scapens and Theobald, 2002). However, precisely determining the research position can be problematic given the object of inquiry, such as climate change is a complex and multi-dimensional sphere. Therefore, the research philosophy tends to offer a basis to maintain coherency in generating knowledge.

As previously mentioned, this study adopts the approach of critical accounting research as guided by Ryan, Scapens and Theobald (2002) and Chua (1986). Critical accounting research offers knowledge production as contextually dependent on social reality that can only be understood through its development and relationality (Chua, 1986; Hopwood, 2007). Although reality is a matter of subjective interpretation, this approach situates the empirical evidence as objective and has a real relation. The subjectivity is derived from the potential of alienation in human intentions and rationality towards social justice (Chua, 1986). From this perspective, empirical evidence needs to be critically analysed between theoretical

consideration and practical implications to avoid oversimplification (Ryan, Scapens and Theobald, 2002).

The following components present this philosophical viewpoint. First, applying "how" to the study questions entails comprehending the importance of the mechanism (Cooper and Morgan, 2008; Yin, 2014). The mechanism is observed through the presence of governing technologies, its real relation within other forms of technologies and experts who articulate the climate change agenda. This study also seeks to understand the historical development and changes implied within the contextual boundary. Consequently, the role of the theoretical framework evolves within the development of social phenomena yet "taken-for-granted explanations" may be presented in discursive construction of meaning, as noted in Quattrone and Hopper (2005, p.744).

By observing the development of the object of inquiry and its relation within the context, this setting brings the richness of information and in-depth meanings of contexts (Patton, 2015). Simultaneously, idiosyncratic criticism cannot be avoided, which implies the transferable quality of the research assessment (Miles, Huberman and Saldana, 2014). Therefore, maintaining consistency to contribute to analytical generalisation instead of empirical generalisation needs to be emphasised throughout, as suggested by Power and Gendron (2015). Departing from this context, this study borrows attributional and consequential concepts (Brander, 2016, 2017) in designing a life cycle approach to the sovereign green sukuk study. This approach offers an understanding of attributes in the chain of governing technologies and consequences of decisions where the accounting technologies are constructed.

Secondly, this research approach implies a way of contextualising the research field. Lukka and Kasanen (1995); Power and Gendron (2015) highlight that the socially constructive approach has been utilised by scholars such as Antony Giddens and Michel Foucault to comprehend society. As noted in Ryan, Scapens and Theobald (2002, p.88), “for Foucault, ‘truth’ is not the result of an individual's beliefs or intentions; rather, it only exists within the context of and is constituted by discursive practices”. In this perspective, Hopwood (1987) suggests that accounting research needs to be positioned in its context. Therefore, this study observes the recent development in the stream of social-environmental accounting (Lehman and Kuruppu, 2017).

*Table 4.4 Recent Developments in Social and Environmental Accounting Research*

| <b>Business Case</b>                                               | <b>Evolutionary Theory</b>                                 | <b>Critical/Radical Theory</b>                  | <b>Interpretivism/Critical Realism</b>             |
|--------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------|
| Accounting Theorists: Baker & Schaltegger; DeVilliers, Van Staden. | Accounting Theorists: Laughlin, Broadbent, Power, Thomson. | Accounting Theorists: Cooper, Tregidga, Tinker. | Accounting Theorists: Milne, Gray, Dillard, Brown. |

Source: Lehman and Kuruppu (2017, p.140).

Table 4.4 shows a number of prior studies in the approach to performing research. As this study is interested in the development of accounting technologies that interact with financial instruments, the evolutionary approach captures the construction process of social phenomena. In critically evaluating the approach to create the meaning of the observed field, the researcher admits that subjectivity cannot be clearly distinguished from the research approach and the participants of the study. In this light, the construction of the meaning itself is confined between the researcher and the research participants with regard to empirical objects. This presumption indicates that the kind of value-laden views is inevitable as

identified by Lincoln and Guba (2013). As a result, the presence of human and non-human objects are perceived in inter-subjective meanings, and there is necessity to maintain transparency and consistency to uphold the quality of this research (Miles, Huberman and Saldana, 2014).

Thirdly, drawing from a social construction approach, it creates 'new meanings' by transforming and producing an interpretation of governing technologies, expertise, interactions between actors, the situated fields, researchers, and a theoretical framework (Berry and Otley, 2004; Bryman, 2016; Chua, 1986). The interest of the researchers is located in the production of social phenomena by capturing their complexity (Hall and Messner, 2018). In doing so, this study applies an abductive approach in which it performs a continuous iterative process between the initial analytical framework and obtaining insights from the field research (Patton, 2015). For instance, in the initial stage of the research, the emphasis is situated on familiarising with actions, orientations, practices, and activities (inductive). This study narrows down particular themes in relation to theoretical interest (deductive) as suggested by Hall and Messner (2018); Saunders, Lewis and Thornhill (2019). It, however, distinguishes between domains of observations, such as events, actions, and performance measures, as 'facts' and what should be presented from interpretive perspectives that require scrutiny to reconstruct what is happening and produce objective accounts (Hall and Messner, 2018). Consequently, Power and Gendron (2015) suggest the researcher seeks to generalise within an analytical manner whereby trustworthiness in deduction and induction need to be clearly explained.



As discussed in the earlier chapter, this study proposes to inquire into how the accountability mechanism of a climate-related financial instrument can be understood and explained empirically and theoretically. Instead of looking at the objective results of accountability mechanisms, this study observes the development and evolution whereby interrelated instruments have constructed reality. Therefore, this study considers the phenomena socially constructed instead of a neutral object. In this perspective, accounting practices are produced through the interaction between actors themselves and interactions with others and programmatic technologies to pursue climate change aspirations. The dynamics may involve the process of constructing objects and expertise to pursue newly established objects. Even though governments are characterised by formal regulations, accounting practices have been modified alongside the interaction and interpretation of the key actors. Therefore, the object of the study focuses on the flow of the climate change agenda and how governing technologies are being developed and operated in capital markets, state budgets and delivery institutions; in the existence of multiple layers, macro and micro are unavoidable. This study does not see the worlds as a flat, rather the power and structures are embedded within the subjects and objects of the study.

#### 4.2.2 Epistemological Assumptions

According to Saunders, Lewis and Thornhill (2019), the focus of epistemology is on what the researcher believes to be legitimate knowledge in the field of study. In one stance, the objective perspective of reality emphasises knowledge is constructed through the generalisations or in a form of laws (Saunders, Lewis and Thornhill, 2019). From another stance, the subjective approach seeks and accepts that realities of knowledge can be

constructed from narratives, stories, perceptions and interpretations to reproduce understanding of specific contexts (Saunders, Lewis and Thornhill, 2019).

Instead of building blocks between quantitative and qualitative views, this study adopts Power and Gendron's (2015) constructive approach as a form of research that interplays between the balance of data and a theoretical perspective. Power and Gendron (2015) distinguish research in positivist and constructivist perspectives by reflecting on accounting research, as shown in Table 4.5.

*Table 4.5 Comparison between Positive and Constructive Qualitative Research*

| <b>Comparative Dimension</b>            | <b>Positivist Spirit</b>                                   | <b>Constructivist Spirit</b>                                                                        |
|-----------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Methodological focus                    | Breadth                                                    | Depth                                                                                               |
| Analytical emphasis                     | Analysing relations of cause and effect in the human world | Analysing complexity of human behaviour                                                             |
| Favoured type of explanation            | Conditional prediction                                     | In-depth understanding                                                                              |
| Viewpoint on social reality             | Reality is external to the mind                            | Reality is socially constructed                                                                     |
| Viewpoint on researcher's objectivity   | Objectivity is celebrated and actively controlled          | Subjectivity permeates research processes; research should be evaluated through its trustworthiness |
| Viewpoint on methodological flexibility | Flexibility is constrained in the name of objectivity      | Flexibility is considered as a hallmark of research                                                 |
| Viewpoint on generalisability           | Aimed at empirical generalisation                          | Either irrelevant, or aimed at analytical generalisation                                            |
| Style of writing                        | Aimed at conciseness                                       | Not bounded by conciseness; aimed at accounting for the complexity of real-world phenomena          |

Source: Power and Gendron (2015, p. 153).

By contextualising the constructive spirit of qualitative research as highlight by Power and Gendron (2015) into social and environmental accounting, Gray and Milne (2015) argue that research should emphasise engagement with the research problem based on a broader

reading and concern towards societal needs which are beyond superficial methods of understanding. Yet, the discovery of research on sustainability issues, including IPCC reports, the UN Millennium Declaration, and the World Wildlife Fund report, were dominantly grounded in the quantitative approach (Gray and Milne, 2015). This also includes research in the area of mobilising funds for climate actions, such as advocated in the Climate Policy Initiative (2021), and the Climate Bonds Initiative (2021), whereby Richardson (2015) suggests there is an urgent demand for the critical side of accounting inquiry to offer societal transformation. Although numbers enable us to see the world of observation, Rosling (2018); Stiglitz, Sen and Fitoussi (2010) suggest that to enable the capture of a complex understanding of society there is a need to examine the domain in which subject and object operate.

To conclude, this research adopts a critical accounting approach by taking into consideration aspirations, including the programmatic agenda of climate action, numbers, accounting technologies, governing technologies and expertise, and the interrelation between them as a point to trace the process of the inquiry in this study. Even so, subjective interpretation continues to exist in transforming and reproducing meaning within the co-production of accounts. The purpose of interpretation is to critically analyse the articulation of multiple programmatic ideals and agendas into a set of governing technologies in daily practices. The implication of this philosophical assumption is elaborated further in the research design.

## 4.3 Research Strategy

### 4.3.1 Research Design

“Indeed, the very role of accounting research is in part to make both accounting and our knowledge of it different – to move forward our understandings of accounting and at times the practices of accounting itself” (Hopwood, 2007, p. 1367).

In designing qualitative studies, a number of methods can be adopted, such as field study, case study, interviews, or other types of dominant approaches which may overlap. Therefore, this section offers justification for designing this study based on an interest in understanding the quality of social phenomena instead of quantifying research phenomena. The purpose of this study is to gain analytical generalisation from the theoretical framework aligned with Power and Gendron (2015) instead of generalisation of the sample to wider social phenomena. As this study is situated in the development of accounting technologies as a form of accountability for climate-related financial instruments, the field research overlaps with a case study approach as a research design.

### 4.3.2 Case Study Research Design

As this study seeks to address accountability mechanisms of a climate-related financial instrument can be understood and explained empirically and theoretically, the research adopts a case study approach. Yin (2014) defines a case study as consisting of two elements: “a case study investigates a contemporary phenomenon (the ‘case’) in its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident” (p. 2). Other features relate to the case study design and data collection. Yin (2014,

p. 2) emphasises that “a case study will have more variables of interest than the data points”. By conducting the case study research, the researcher aims to gain the richness of data to pose questions, emphasise challenges, build and test theories, and offer direction for the problem-solving (Cooper and Morgan, 2008).

There are multiple approaches to a qualitative case study, including a single case study or multiple case studies (Hall and Messner, 2018). Multiple case studies, as an example in Thomson, Grubnic and Georgakopoulos (2014) compare and contrast the way two governing entities mediate sustainability agenda in day-to-day practices, while Spence and Rinaldi (2014) focus more on a single case study in their study of the chains of technologies to govern sustainability agenda. A single case study emphasises the richness and the inductive process of initial observations, such as in an introduction to the development process of a new performance measurement system (Chenhall, Hall and Smith, 2017; Hall and Messner, 2018). In comparison, multiple case studies are typically used in assessing the effectiveness of observations both in developing and examining theory patterns (Cooper and Morgan, 2008).

As this study focuses on the development of performance measurement through accounting technologies in mobilising financial flows for addressing climate change issues, a single case study adopting a life cycle approach offers an in-depth understanding of the development process along the flows. At the same time, by iterative matching processes with theoretical framework, this design explains the analytical framework (Power and Gendron, 2015; Scapens, 2004) and brings an innovative research contribution (Alvesson and Sköldberg, 2018). By borrowing the concept of attributional and consequential elements in the life cycle assessment (Brander, 2016, 2017) into the green sukuk life cycle case study, this allows

examination of the attributes within the chain of actions and consequences of a chain of decisions.

In conducting a case study, Scapens (2004) elaborates that the activity involves more beyond collecting data in the field and then writing up the results. The process requires a careful examination of the purpose of the case study, and the research has the potential of overlapping various activities: understanding of the existing literature, well-formulated research design, and clarity of language skills (Scapens, 2004; Yin, 2014). Berry and Otley (2004) also suggest it is necessary to have a theoretical understanding in designing case study research. In this research, a theoretical framework is used to illuminate a particular case study (Scapens, 2004). Despite the potential use of an explanatory case study, there is ambiguity about a clear distinction between explanatory and exploratory in gaining the richness of empirical data (Scapens, 2004). Therefore, to gain the richness of the data and potentially contribute to theoretical development, the case study is iteratively performed to explain evidence and explore surprises that have not been analysed in prior studies.

#### 4.3.3 Selecting A Case Study

In understanding the social world, this study aims to explain the phenomena while potentially drawing an analytical generalisation from the framework as guided by Power and Gendron (2015) in Table 4.5. Lukka and Kasanen (1995); Power and Gendron (2015) argue that constructivist research strives to generalise in an analytical manner by using cases to argue for a set condition that may explain it instead of a general inference. Therefore, in selecting cases this study focuses on what Scapens (2004) highlights as a critical case to gain explanation of

an observed case such as the reasoning behind a new development of accounting methods or governing practices.

In maintaining the trustworthiness of the case, Yin (2014) and Scapens (2004) suggest the selection of a clear design. In addition to clarity, Power and Gendron (2015) highlight the trustworthiness of constructivist research is derived from the ongoing process of alignment between data and theory to discover advancement to the theoretical framework. Therefore, this section presents the way to select a case study and the ongoing process for the analysis in the following paragraph.

Firstly, this study identifies the global agenda of climate action translated in a climate-related financial instrument; here in the case study of green sukuk (a Sharia form of green bonds). The regularity of the issuance of green sukuk enables potential of reconstruction in the way of rethinking and acting (Miller and O'Leary, 1987) on climate change issues that co-exist with the origin of financial instruments. Unlike traditional bonds, GSS bonds demand the issuer to periodically report the impact of the proceeds because the issuance has the potential to reconstruct the existing public budgeting system. Furthermore, understanding the development and reconstruction of accounting technologies alongside the flow of funds enables one to contribute to theorising the constitutive role of accounting (Miller and Power, 2013). This responds to the call for studies within the flows of accounts (Martinez, Pflueger and Palermo, 2022), including the construction of accounting practices in assessing performance measurements that incorporate climate change issues in public accounting systems (Lapsley and Miller, 2019; Lapsley, Miller and Steccolini, 2020).

Secondly, this study contextualised the relation between accounting and the flow of climate-related financial instruments through green sukuk at a central government level. The settings within the construction of accounting technologies to enable mobilising the green sukuk can potentially extend the potential problems in the operationalisation of article 2.1c of the Paris Agreement (UNFCCC, 2015). This study observes the utilisation of a number of accounting mechanisms, including the adoption of tracking climate finance at the national level, such as climate tagging methodology and the Rio markers approach, CPEIRs (UNFCCC Standing Committee on Finance, 2021). This study observes that the climate tagging mechanism in regular practices has the potential to incorporate the programmatic agenda of climate change in government budgeting and planning systems. Selecting regular governing practices enables the identification of any reform, such as when internalising the programmatic agenda of sustainability into day-to-day operations (Kurunmäki and Miller, 2011; Thomson, Grubnic and Georgakopoulos, 2014).

Thirdly, as the flow of green sukuk demands the disclosure of green impact measurement and funding allocation at a granular level, the case study facilitates the unveiling of the construction process. In this process, the case study covers developments in utilising co-existing mechanisms, including tracking the climate budget and the effort to mobilise climate-related financial instruments, particularly the green sukuk. This selection of connectivity between accounting technologies and financial instruments was also reported by the World Bank (2021, p. 22) “only Indonesia has used the climate budget tagging system as the basis for a sovereign green bond (SGB) and green sukuk”.



As shown above, the boundary between contextual and social phenomena could not be distinguished clearly to examine accountability mechanisms in the flow of sovereign green sukuk; the case study provides a useful choice of research design as suggested by Ryan, Scapens and Theobald (2002); Yin (2014). Consequently, in gaining an in-depth understanding of the case, multiple sources of evidence will provide a richness of data points (Ryan, Scapens and Theobald, 2002; Yin, 2014). In doing so, negotiating access become a critical stage in this case study.

#### 4.4 Negotiating Access and Data Collection

Despite the absence of single guidance in conducting a case study, Scapens (2004, p. 265-273) suggests a number of steps, such as “preparation, collecting evidence, assessing evidence, identifying and explaining patterns and the process of writing”. In addressing the research questions, this study utilises a multi-methods approach, including document analysis, semi-structured interviews, and observation. More importantly, the quality of the data is determined by the access that the researcher can obtain. In this study, access to the case and relevant entities, including actors and other materials within the case is an essential part of the research method. Therefore, despite the pandemic Covid-19 disrupted the period of data collection, the researcher maintained to obtain valuable empirical data by performing the fieldwork processes in different periods (see Table 4.6 and Table 4.7 for the detailed timespan). In essence, a pilot study and preliminary data collection facilitated to refine the focus of the study from green finance in general to the sovereign green sukuk initiative, accounting, and governing technologies to translate the global agenda of climate action into a nation priority.

To gain relevant access, this research follows the prospective participants based on the green sukuk life cycle, from pre-issuance, issuance and post-issuance, performed alongside the data collection process. In most cases, emails were used to send proposals for fieldwork including interviews and observations, also to obtain access to internal documents that are not publicly available to maintain the richness of the data. The proposal was designed to provide the respondents with a summary of the research project, rationale, objectives, ethical considerations, the role of research participants, and key points that will be asked or obtained during the data collection process. In some cases, access was previously gained by attending conferences, seminars, and workshop to connect informally before sending emails for the formal arrangements. Furthermore, snowball approaches were performed to connect with key relevant participants. In parallel to this approach to negotiate access, the researcher also ensured to maintain the confidentiality of the research participants.

As an illustration, during preparations for this study document analysis was performed to familiarise the researcher with the research context, select research participants and narrow down the questions alongside observations. For instance, observation was performed through the involvement of the researcher in a number of conferences, seminars and workshops hosted by the research subjects to gain access for either interviews or familiarisation with research objects. The purposive sampling with specific sites allows researchers to discover a social phenomenon driven by inquiry on research questions (Creswell and Creswell, 2018; Patton, 2015). As the study adopts the life cycle approach, the research participants were selected based on their purposes within the chain of actions (pre-issuance, issuance, and post-issuance) and decisions to operationalise respected principles. This approach aligns with the

efforts in selecting research participants and its justifications (Saunders, Lewis and Thornhill, 2016). Based on this approach, the purposes within the chain of actions and relation to the consequential decisions facilitate a consideration in justifying sufficient numbers of participants (Lincoln, Lynham and Guba, 2011). Further details of the data collection approaches will be elaborated on in the following paragraphs.

#### 4.4.1 Document Analysis

Textual documents are intensively utilised to obtain empirical evidence in the field of social science (Bryman, 2016). Similarly, Laughlin (2004) emphasised that documents are essential empirical sources for conducting research in accounting. In this study, textual documents are deployed as empirical sources to familiarise the researcher with the research context in answering the research questions. However, it can be argued that a value-laden perspective may be unavoidable, as emphasised by Lincoln and Guba (2013). Therefore, it is essential for the researcher to be transparent in the utilisation of documents and address the quality and sensitivity of documents, as in Bowen (2009). To uphold the quality of research in addressing personal bias, Miles, Huberman and Saldana (2014) suggested ensuring a consistent approach and transparency at every stage be undertaken and integrity of instruments utilised. The approach used in this research proposes to demonstrate trustworthiness while balancing the extent of the confidentiality of documents to be disclosed in the findings.

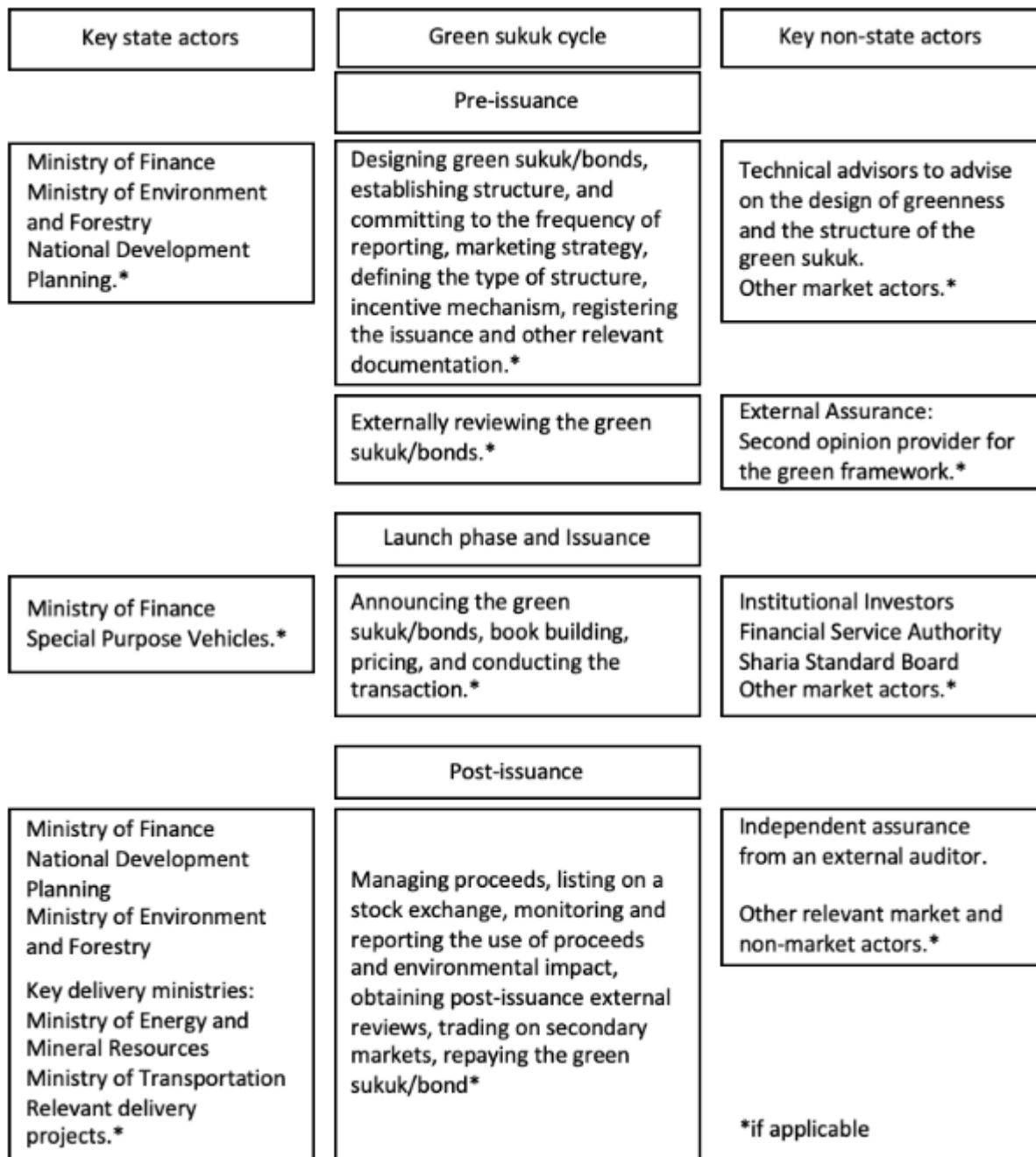
In document analysis, Bowen (2009) suggests that transparency in choosing and utilising documents become the central issue to maintain the quality of data. Therefore, the following paragraph outlines the considerations in performing document analysis.

Firstly, there are two primary purposes of document analysis. The textual reports from the key relevant instruments familiarise the researcher with the context of the study and enhance the trustworthiness of the empirical evidence from interviews and observations. As the context of the study is situated in the development and accountability of green financial instruments, the scope of document analysis covers the key relevant instruments to govern the programmatic agenda of climate change in public financing systems. The instruments are manifested in tracking public funding flows, green sukuk and bonds, public accounting systems, and climate change accountability to align with international commitments. Consequently, documents were obtained in this area to inform the context of the study.

Secondly, a substantial number of relevant documents from the domain of governing climate changes, budgeting, planning, financing, and imperative sectors were collected. The range of documents includes regulations, policy frameworks, roadmaps, public accountability reports at the national and local government level, as well as non-governmental institutions that are related to the area of study. These types of documents facilitate obtaining an understanding of government programmes on climate change and instruments used to operationalise the agenda. Furthermore, documents were obtained during interviews and observations, including annual reports, discussion papers or materials, and copies of workshops on methodology or material standards. Also, reports are published publicly by respective entities within the domain of observation. There is no obligation for research participants to provide supplementary documents. All obtained documents were analysed and are used for the academic purposes of the research only. The lists of analysed documents are included in Appendix 4.1.

Thirdly, the initial step in selecting the data started with understanding the inclusion of climate change in public accountability mechanisms. However, this study noted the absence of climate change aspirations in the relevant ministries in 2014-2019, as demonstrated in the public accountability report published by sectors that delivered the NDC target. As this study focuses on accounting technologies, climate change and public financing, the development of climate change in the fiscal space was examined. The document analysis enables the identification of the early and continuous development of climate change tracking in the Indonesian government's accounting system. Furthermore, relevant data on the green sukuk was identified, including documents from other sovereign green bonds issued by other countries to understand the key actors in the green sukuk life cycle as demonstrated in Figure 4.3.

Figure 4.3 Prospective Research Participants within the Green Sukuk Life Cycle



Source: Author's illustration based on document analysis.

The document analysis enables us to familiarise with the context and identify critical actors as shown in Figure 4.3 within the flows of green sukuk from the issuance to the construction of impacts. Among the data, the green framework, second opinion providers' reports and green

impact allocations have been prevalent in offering information on the necessary instruments and actors.

The main distinction between green bonds and other types of bonds is a green framework from the issuer that implies the demand for external assurance and a report on green impact allocation. The green framework provides the intention of the use of funds, the governing framework including the selection process, monitoring evaluation, and accounting policy to produce sufficient reports to account for the outcome for the capital (International Capital Market Association, 2018, 2021a, 2021b, 2022a, 2022b). Data on the green framework are obtained from issuers and independent reviewers. This study compares the green frameworks of different issuers and external assurances both in sovereign green bonds type and in the green sukuk scheme. It allows the analysis of different models of the framework in terms of its governance and accounting policy, including issuers, leading institutions involved, roles and instruments utilised. This also helps to decide on a specific type of bond, which is green sukuk. Alongside the green sukuk framework, this study also obtained data about the allocation of funds and its impacts. This data is available publicly as a commitment from the issuer, which indicates where the money goes to line institutions who deliver projects.

#### 4.4.2 Semi-Structured Interviews

In obtaining data, this research adopts a life cycle approach whereby the respondents are targeted based on design, development, and implementation in constructing an accountability mechanism within the flow of a climate-related financial instrument. As the objects and subjects of the inquiries are within the emerging stages, the use of a combination

between elite interviews and intensive interviews become the approach of the research. Conducting elite interviews enables the researcher to develop engagement with senior-level people and individuals (Alvesson and Skoldberg, 2018). In particular, key actors who had the most influence over important aspects of planning, development, and implementation of the accountability mechanisms of the observed green financial instrument. Simultaneously, to gain insights on the reformed agenda through the green sukuk initiative and climate tagging in regular government practices, the intensive interviews with research participants will offer insights in terms of the integration and dynamics in implementation.

The semi-structured interview was selected given that the approach of the case study is explanatory research. This method enables researchers to gain participants' opinions, expressions, and experiences within the field of study (Brinkmann and Kvale, 2015). The purpose of interview data is to reconstitute what occurred in situated fields as well as to examine the interpretive act in which interviewees participated (Hall and Messner, 2018). To determine interview techniques, Saunders, Lewis and Thornhill (2019) distinguish the techniques based on the purpose of the research. A structured type of interview is mainly used in explanatory research, while the unstructured interview is deemed to obtain data for exploratory research (Saunders, Lewis and Thornhill, 2019).

To align with the research approach, an explanatory case study which facilitates the in-depth exploration of data, this research carries out semi-structured interviews. It can be perceived that this technique allows researchers to discover and review social phenomena as perceived by participants, as in Patton (2015). Moreover, the interviews provide opportunities to interpret meanings within a specific social phenomenon that occurred while developing



accounting techniques, allowing the researcher to connect with key experts within the organisation. The flexibility to follow up the response of interviewees allows researchers to conduct an in-depth investigation (Hall and Messner, 2018) and pursue the same lines of inquiry (Bryman, 2016) when unsolved tensions occur during observations and applications of guidelines from obtained documents. The interview objective is to obtain data from the participants' experiences, knowledge, and insights.

Three steps were taken to identify the key actors in this study.

1. Identification of key actors who actively design, develop and implement the green sukuk initiative from the pre-issuance, issuance to post-issuance as presented in Figure 4.3.
2. Identification of key actors who are connected to the commitment of the government of Indonesia's NDC, ratified in the Paris Agreement. Of particular interest were those key actors who develop and implement the climate change mitigation actions and trace climate finance in domestic public spending.
3. Identification of relevant actors who indirectly relate to the green sukuk initiative or tracing climate budget but have a relation to the operationalisation at the project level to generate impacts.

This study performed 40 semi-structured interviews with research participants representing a diverse group of key actors to discover social phenomena in considerable depth. The process allowed the researcher to reflect on the conversations derived during the interviews and to examine the interaction between documents, texts, and observations. The participants of this study are presented in the following table.

Table 4.6 The Summary of Semi-Structured Interviews

| Interviewees                                      | Mode                           | Primary Functions                                                         | Number of Interviews | Duration        | Dates                                       |
|---------------------------------------------------|--------------------------------|---------------------------------------------------------------------------|----------------------|-----------------|---------------------------------------------|
| Development planning officers                     | In-person                      | Environmental, transport development, system and procedures               | 3                    | 3.5 hours       | August 2019<br>February 2020<br>August 2020 |
| Delivery ministry officers (Energy and transport) | In-person<br>Online call       | Planning budgeting, GHG inventory, mitigation, sustainable transport unit | 6                    | 8 hours         | February,<br>March 2020                     |
| Environment officers                              | In-person<br>Online video call | MRV, GHG inventory, mitigation, resource mobilisation, climate finance    | 5                    | 6 hours         | February 2020<br><br>August 2020            |
| Finance officers                                  | In-person                      | Fiscal policy, debt management, Islamic finance                           | 8                    | 8.5 hours       | August 2019<br>February,<br>March 2020      |
| Financial industry                                | In-person<br>Online call       | Underwriters, sustainability, ESG account manager                         | 4                    | 2.5 hours       | November,<br>December 2019                  |
| Financial regulator                               | Video call                     | Islamic capital market, the sustainable finance unit                      | 1                    | 2 hours         | August,<br>September 2020                   |
| International development, think tank             | In-person                      | Programme manager, tracking public finance                                | 3                    | 5 hours         | September,<br>December 2019                 |
| Local government                                  | In-person                      | Delivery projects, climate mitigation, transport                          | 7                    | 9 hours         | January,<br>February 2020                   |
| External assurance                                | In-person                      | Second opinion provider                                                   | 1                    | 0.5 hour        | November 2019                               |
| <b>Total</b>                                      |                                |                                                                           | <b>38</b>            | <b>45 hours</b> |                                             |

As shown from Table 4.6, by using the green sukuk life cycle as a lens, 38 semi-structured interviews with state and non-state actors from the pre-issuance, issuance, and post-issuance of sovereign green sukuk were conducted. In addition to these interviews, two written responses from the interview questions were obtained during the early stage of pandemic Covid-19. The background of the interviewees includes project delivery, external assurance, budgeting, finance, fiscal policy, energy, transportation, Islamic capital market unit, ESG account manager, underwriters, and green technical consultants. The positions within the organisational structures range from high-level leadership roles to officers in day-to-day operations, covering director generals, co-managing directors to project officers. The length of the interviews varied. Consequently, semi-structured interviews were intended to allow understanding of the case, follow up on key discussion during interviews or confirm critical concerns voiced by preceding interviewees.

The interview questions were developed based on the research questions proposed in this study, its relevance with the interviewees' area of responsibility, and relation with the design and implementation of green sukuk alongside governing devices. In this sphere, the questions are contextualised to the efforts in addressing climate change, financing for climate change and accounting mechanisms utilised as a form of accountability (see Appendix 4.3 for the interview guide). The interviews also clarified the main aspects while the research questions served as a foundation and the length of the interviews depended on the scheduling and time availability of the interviewees. The researcher was invited to attend internal meetings among the interviewees, which will be discussed further in the following section, and given the opportunity to receive internal meeting documents to gain the richness of discussion. Furthermore, informational redundancy, where new information does not offer added value

to the collected data, becomes a primary consideration in achieving data saturation, as suggested by Saunders *et al.* (2018).

#### 4.4.3 Non-Participatory Observations

This study employs non-participatory observations to facilitate the researcher in capturing how different actors engage with each other and other undocumented phenomena (Patton, 2015). Non-participatory observation allows new insights beyond actors' perceptions uncovered in more formal interview settings. Observing the interaction of actors within different settings intensifies understanding of the importance of these contexts and allows investigation of issues that emerge within the green sukuk life cycle. However, the attendance of the researcher has a likelihood to influence the interaction within the situated setting of observation. Therefore this study maintains the clarity of scope of observation and its transparency as suggested by Patton (2015). These non-participatory observations took place in conferences or related meetings with the full consent of participants and followed any relevant code of conduct in each institution. Moreover, this research complies with the Chatham House Rule. No audio or video recordings were made of these observations, but extensive field notes were made, and diaries kept.

The scope of observation is provided in the observation guidelines as follows:

*"When a meeting or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed"*  
(Chatham House, 2002).

Abiding by the rule provides an opportunity to make extensive fieldnotes and engage with multiple settings allowing non-participatory observations. Firstly, in gaining an understanding of the research topics and connecting with potential research participants as guided in the green sukuk life cycle, three primary conferences were attended. These were conferences on climate bonds and green equities in London, and also Islamic finance conferences in Indonesia. These connect the researcher with targeted participants and allow exposure to primary concerns discussed during the conferences. Secondly, similar conferences or public meetings were attended. This type of meeting provides an opportunity to attend as an observer, and the presence of observers is disclosed on the list of attendances. Lastly, the researcher attended workshops and internal meetings as a follow-up to interviews with the research respondents. Entering internal discussion facilitates the researcher in the observation of key concerns (see Appendix 4.4 for the observation guide). At the same time, it also could lead to directing the researcher to a certain point of view which may lead to a bias. Therefore, in each of the non-participatory observations, the researcher also obtained other supporting evidence. Table 4.7 outlines the key topics, mode of observation and the period of observation.

*Table 4.7 Summary of the Non-Participatory Observations*

| <b>Mode of Observations</b>                                                                                                                                                    | <b>Topics</b>                                                                                                                                                                                                                                                     | <b>Dates</b>                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <p>In-person workshops (2), public consultations (2), conferences and seminars (3)</p> <p>Webinars (2) and online conference (1)</p> <p>Project visits clean transport (2)</p> | <p>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</p> | <p>March 2019, November 2019, January 2020, February 2020, March 2020, July 2020, September 2020, February 2021, March 2021</p> |

Given the specific topics of the observations, all participants of these conferences/public meetings are assumed to be adult, literate people with experience in this area. Consents followed the code of conduct of each institution. Furthermore, by conducting the observations this opened up a space for investigation and provided new insights for the researcher. Also, the result of the observations was developed as material for further investigation by using interviews.

#### 4.4.4 Data Management, Transcription, Translation, and Coding Process

After entering the field, what counts as evidence and the extent of intellectual data is complex. This aligned with Yin's statement in difficulty in defining the case study due to the inability to distinguish clearly between the phenomenon and its context (Yin, 2014). Furthermore, multiple data points of interest are visible and simultaneously blurry, given the richness of the case alongside the green sukuk life cycle. As such, this section presents the management of the data before it can be analysed. In doing so, Miles, Huberman and Saldana (2014) suggest maintaining transparency and a consistent approach to handling data. These processes cover

transcriptions, assigning codes or field notes, identifying similarities and differences, identifying patterns, noting reflections, explaining issues with a broader context, and iterative processes to produce a theoretical contribution (Miles, Huberman and Saldana, 2014).

Transcription becomes an entry point for managing the obtained data from interviews. The interviews were transcribed in the native languages of the respondents: either Bahasa Indonesia or English. The resulting 40 interviews in total, 33 interviews were transcribed in Bahasa Indonesia and seven were transcribed in English. Given the diversity of the language, the researcher is aware of the potential discrepancies that may occur and influence the analysis of the study. Evans (2018) highlights the possibility that cultural hegemonies will be reproduced unwittingly via the process of translation, which is intricately intertwined with data analysis and interpretation. In order to code the data, the transcribing procedure was done in the original language that the research participants used. When the original language is Bahasa Indonesia, solely selected quotes will be translated into English and being examined to ensure the most accurate interpretation.

The initial analysis involved the consideration of essential elements, as suggested by Saunders, Lewis and Thornhill (2016), including familiarity with languages, the meaning of practices or narratives, and reflections. The transcription and initial analysis enabled familiarisation with the characteristics of languages utilised by the interviewees from different professional backgrounds. The researcher 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, this study engaged in an interactive process reflecting on the chain of actions associated with the

contextualisation of climate change, accounting for green sukuk, accounting practices used for climate governance, transparency, traceability and impact attribution. This then provided a structured narrative in relation to research questions and the analytical framework.

#### 4.5 Data Analysis

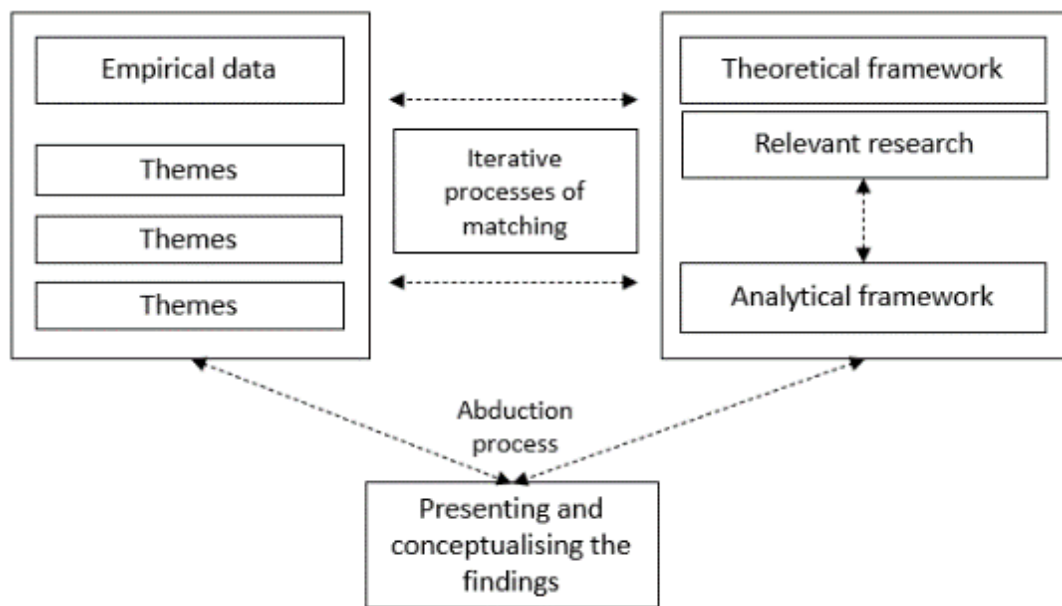
In analysing and interpreting data, Alvesson and Sköldberg (2018, p. 332) suggest the merit of using abductive approach to gain a novelty by combining “a less naïve attitude vis-à-vis the role of preconceptions”. In doing so, the innovative potential can be obtained from the data to contribute to the observed field of study empirically, theoretically and methodologically, and “reinventing the wheel” potential can be avoided (Alvesson and Sköldberg, 2018, p. 336). To offer a guide in analysing empirical, this thesis draw upon the “importance of considering three distinct and interrelated layers or levels of analysis; the programmatic or discursive, the practices and processes to which such discourses are intrinsically linked” as highlighted by Kurunmäki and Miller (2011, p. 220). This level of analysis offers a guidance that is closely aligned with the analytical framework (see Figure 3.1) that was built upon Miller and Power (2013); Rose and Miller (1992). However, to maintain the richness of the data, the analysing process and interpretation also consider the nature of accounting research in climate change area and the variation of the breadth in empirical evidence to explain the theoretical framework in line with Alvesson and Sköldberg (2018).

As emphasised by Bebbington, Russell and Thomson (2017) the nature of accounting objects and entities in relation to climate change is contested as a wicked problem. Therefore, in analysing data, this process involves refining the obtained data from multiple sources by identifying and categorising distinct patterns which emerged as well as those linked with



theoretical interests as illustrated in Figure 4.4. Even so, this process, can be perceived as reductionist as multiple data points were gathered through multiple methods.

*Figure 4.4 Data Analysis Process*



Source: Author's analysis based on Alvesson and Sköldberg (2018); Hall and Messner (2018); Patton (2015).

In the initial stage of the data analysis, which is closely associated with methods in collecting the data, it is intended to gain familiarity with programmatic agenda, actions, orientations, practices, and activities (inductive) (Alvesson and Sköldberg, 2018; Hall and Messner, 2018). Then, the researcher narrows down particular themes in relation to theoretical interest (deductive) (Alvesson and Sköldberg, 2018; Hall and Messner, 2018). Given the nature of this research utilised by the researcher as the key instrument, this study will adopt the views of Miles, Huberman and Saldana (2014) and Patton (2015) in maintaining transparency, clarity and a consistent approach during data analysis and theorisation. Therefore, an audit trail will be utilised to ensure records at every research stage as in Bryman (2016). Obtained data is

analysed in the thematic analysis aligned with Braun and Clarke (2006, p. 87), including “familiarising with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report”. These phases, however, can be perceived as a non-linear stage and performed through iterative processes of matching between empirical data and analytical framework to produce a novel contribution.

As an illustration, data familiarisation was also performed during the transcription processes. By listening through the data and articulating in a form of writing, this process offered a sense of key dynamics and dominant themes within the interviews. This transcription and familiarisation also facilitated the generation of initial codes and the search for patterns within the themes. The resulting 133 initial codes enabled the review of the dominant themes and dynamics to gain deeper focus during the interviews (see Appendix 4.5 for the detailed coding). For instance, from the obtained data, key themes emerged in the construction of climate tagging, a funding model which has a connection with the management of proceeds, dynamics in aligning with programme priorities, and impact measurement.

By reviewing the primary themes that were articulated among the respondents, the researcher used this stage to gain further information on the dynamics and how the following respondents address the dynamics to gain the richness of the data. Furthermore, the process of reviewing the themes and reflecting on the recent relevant research enabled the refinement of the initial theoretical framework that began with the concept of mediating instruments in the analytical framework of the constitutive role of accounting in territorialising, mediating, adjudicating and subjectivising (Figure 3.1 in Chapter 3).

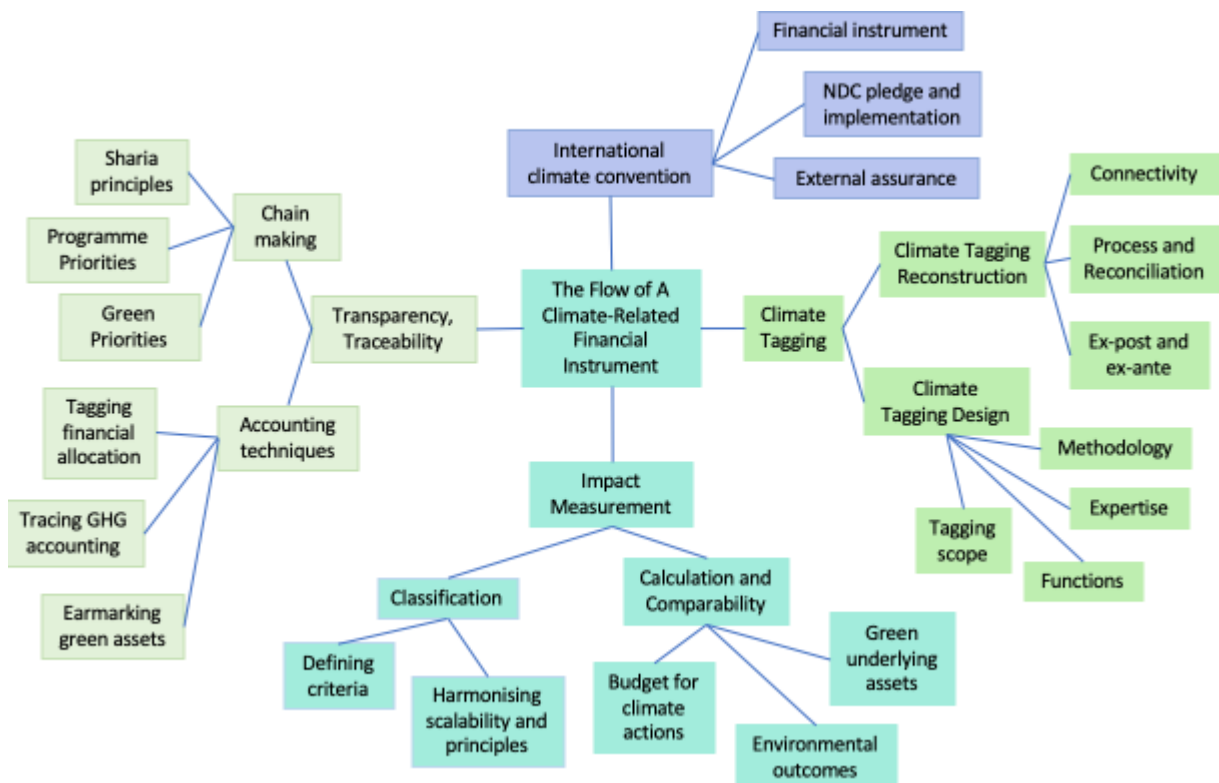
In performing the abductive process between data and analytical framework, the researcher also analysed supporting evidence within documents, field notes during observation and interviews. This enabled the researcher to frame a relation between sub-themes and main themes to define and name the themes. Developing the relation between the main and sub-themes in matching with analytical framework and extending the analytical framework creates the conceptualisation in contributing to the prior studies. For instance, in initial analysis, the analytical framework only focuses on the key characteristics and dynamics in accounting technologies to perform their productive forces. In this thesis, the emerging themes extended to the enabling and constraining attributes for accounting technologies to perform their constitutive roles.

Furthermore, the initial research question on how the flow of funds from the capital market to the state budget was traced and the impact was measured offered a valuable departing point to unpack key actions and actors within the flow of funds (see Figure 4.3). Also, multiple methods were deployed to gain the trustworthiness of the data. By situating the programmatic agenda of climate change, this study also deployed data collection from market data (see Figure 5.8 for further details) to assess the regularity of the green sukuk issuance within other sovereign green bonds. The data was retrieved from the Thomson Reuters — Eikon database— and was accessed on July 13<sup>th</sup>, 2022, with a code “green bond” for the period of 2016 to 2022. Then the screening was performed to select sovereign green bond issuers, including green sukuk and the characteristics covering the amount of the issuance, the use of proceeds, type of issuing entities and the extent of green certifications. These attributes were

selected to demonstrate the regularity of the issuance and the greenness alignment chosen by the sovereign green bond issuers.

This form of conceptualising links to verify the use of programmatic agenda and the technology of government (Rose and Miller, 1992). Based on the iterative process between empirical data, the researcher classified four key themes, comprising 1) contextualisation of climate change in governing technology to situate green financial flows, 2) transparency and traceability, 3) construction of climate change accounts in general budgeting and planning, and 4) green impact measurement. Based on these primary themes, the following figure illustrates the sub-themes.

Figure 4.5 Themes Emerged from Data Analysis

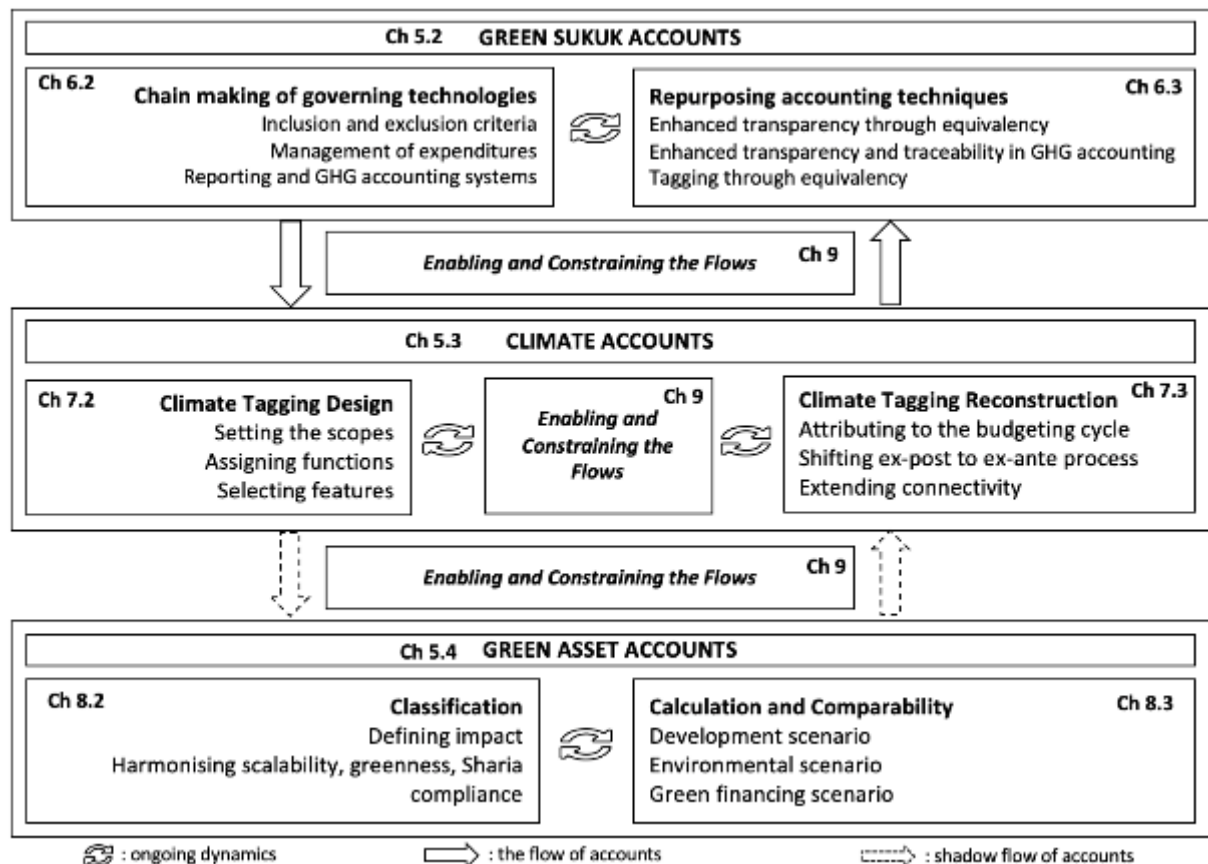


Source: Author's mapping based on empirical data.

In this sense, the research outlines essential attributes of accountability mechanisms to embed climate change issues and channel climate-related financial flows, in particular the green sukuk initiative in the public accounting system.

As the researcher is required to preserve clarity and provide justification for each stage of reporting findings (Patton, 2015), this step of research strives to assure quality, transferability to comparable settings, and applicability to real-world phenomena (Miles, Huberman and Saldana, 2014). The result of the abductive process is visualised in the following figure and will be analysed in Chapters 5, 6, 7, 8, and 9.<sup>7</sup>

*Figure 4.6 The Construction of Accountability Mechanisms to Mobilise a Climate-Related Financial Flow*



<sup>7</sup> Ch refers to Chapter.

Source: Author's analysis.

As illustrated in Figure 4.6, the analysed themes seem to be neatly distinguished. However, in analysing and presenting the data, overflows are inevitable between each theme and attribute to construct concepts. Nonetheless, the figure facilitates to organise key dominant themes to address the research questions and contribute to extend the analytical framework.

#### 4.6 Ethical Considerations and Limitations of the Research Methodology

Despite having a careful research methodology, this study admits its limitations. A single case study limits the generalisability to the setting; instead, the contribution is focused on analytical generalisation with comparable features. Second, despite the fact that subjectivity has been minimised via the use of several data collecting techniques, it is possible that individual biases have been picked up during the data collection or analysis process, leading to an imperfectly objective portrayal of reality. As noted earlier, researchers may become challenged in maintaining neutrality within a case and relationships with actors, and ethical clearances are required. Therefore, it is essential for researchers to maintain empathic neutrality and build understanding, trust, and honesty (Patton, 2015). Additionally, since the data was gathered during the COVID-19 outbreak, there was difficulty in arranging interviews to obtain the consequences of a chain of decisions in a number of areas, for instance, in a government department for financing a long-term project and a body that regulates Sharia law. However, the representation of each primary actor within the green sukuk life cycle has been fully obtained.

Furthermore, this study had already obtained ethical approval reviewed by the Humanities and Social Sciences Ethical Review Committee (see Appendix 4.3), including the risk

assessment review to anticipate any potential disruptions. Therefore, this research ensures it adheres fully to the University of Birmingham's ethical code to eliminate any unintended consequences, relating to consent, data protection and confidentiality issues, which may affect researchers or respondents of participants, as suggested by Saunders, Lewis and Thornhill (2016).

#### 4.7 Summary

This chapter has outlined the details of philosophical assumptions and methodological considerations deployed to address the research questions in this thesis.

Departing from a critical accounting research stance in line with Miller and Power (2013); Rose and Miller (1992); Ryan, Scapens and Theobald (2002), this study perceives reality and knowledge production as not value-free, including the emphasis on reflexive epistemological assumptions. As such, this research adopts a qualitative case study approach in attempting to enhance our understanding of social phenomena in accounting and offers alternative views drawing from empirical evidence as advocated by de Villiers, Dumay and Maroun (2019). This research observed materiality in the form of technologies to govern and the interaction between key experts. The governing technologies comprise a set of devices, methods, and techniques to embed the programmatic agenda of climate change within imperative priorities within the green sukuk life cycle. The existence of key actors who act upon the governing technologies is defined through the primary expertise that is incorporated in performing routine practices.

As this study aims to understand and explain the accountability mechanism of a climate-related financial instrument empirically and theoretically, this research draws upon an

explanatory case study in alignment with Cooper and Morgan (2008); Scapens (2004). This case study is selected through its compatibility to answer the research questions and the potential richness of the data in constructing an accountability mechanism within the flows. It demonstrated the ability to bridge between regular accounting technology in the public accounting system – climate tagging – as a basis for channelling the mobilisation of finance from capital markets, via the green sukuk instrument. It is through the green sukuk life cycle approach that this research reveals attributes of connectivity and disconnectivity between the object of inquiries covering technologies, practices, and expertise. Moreover, expertise is a socially constructed reality bounded by an organisation in this thesis. Consequently, this thesis perceived accounting as a process that is socially constructed rather than a taken for granted phenomenon that is value-free. Furthermore, the concept of anti-positivism is considered to underpin the epistemological assumption to understand the phenomena. In particular, by investigating a single case study, this thesis does not aim to produce a generalisation but rather to contribute to an analytical generalisation within a particular framework and area of interest (Power and Gendron, 2015).

To gain data for analytical generalisation, this object of research inquiry is located within the flow of the green sukuk. By borrowing the concept of attribution and consequential methods in a life cycle assessment (Brander, 2016, 2017), this research then adopted the approaches to the attributes of the chains and consequential decisions of governing technology within the flows. In doing so, data are obtained via document analysis, semi-structured interviews and non-participatory observations. To align with the purpose of the study, data collection techniques aim to understand the case by becoming familiar with the context. This then



facilitated narrowing the focus of research inquiries in explaining the analytical framework through the iterative process between the theoretical concept and empirical evidence. As such, the purpose influences the data collection techniques as follows.

This chapter has outlined the utilisation of document analysis to obtain data. This began with the examination of climate change agenda in the Indonesian government public accountability reports from financial year of 2014 to 2019. Despite initial exclusion of climate change agenda the public accountability reports, the Ministry of Finance's green impact allocation report and green framework as a result of the green sukuk issuance enabled to trace further documents to be analysed. The documents facilitated to map key governing technologies, associated expertise, critical issues and leads to the identification of research participants. Furthermore, document analysis also confirms the research participants' arguments when there is a discrepancy.

By approaching the green sukuk life cycle, 40 semi-structured interviews were performed with state and non-state actors from the pre-issuance, issuance, and post-issuance of sovereign green sukuk. The expertise of the interviewees covers budgeting, financing, fiscal policy, development planning, energy, transport, the Islamic capital market unit, ESG account manager, underwriters, project delivery, external assurance, and green technical advisers. The key actors ranged from a high level of position to key officers in day-to-day practices, including the director general to the project officers. As such, the duration of the interviews varied. Therefore, the research interview questions served as a basis for the overall interview plan while the specific questions depended on the availability of interviewees in terms of timing

and essential points that emerged during the discussion. This included the interview to confirm critical concern discussed by other respondents.

In addition to document analysis and semi-structured interviews, 12 non-participatory observations were conducted. The observations purposed to understand the context discussed by a wide range of participants, accessing research participants, and following up the invitation from research participants to gain a deeper understanding through internal meetings. The observations were performed through conferences, in-person workshops, public consultations, project visits, and seminars with topics related to climate bonds, green equities, NDC and methodological formulation, green transport, and financing for low carbon development.

This chapter has shown the post fieldwork process, including data transcriptions, translation, and management, to maintain the clarity and trustworthiness of the research. The data obtained were stored, interviews were transcribed, and key relevant observation notes were documented to perform thematic analysis guided by Braun and Clarke (2006). The initial codes were generated and documented in NVivo. These themes were iteratively used as a basis to perform theorising and to situate the empirical evidence to contribute to the analytical framework formulated in Chapter 3.

Despite the thoughtful research design, this research acknowledges the limitations of this research. Firstly, a single case study restricts the generalisability to the context; instead, the contribution is specific to analytical generalisation with similar characteristics. Secondly, although subjectivity has been minimised via multi-methods of data collection, personal

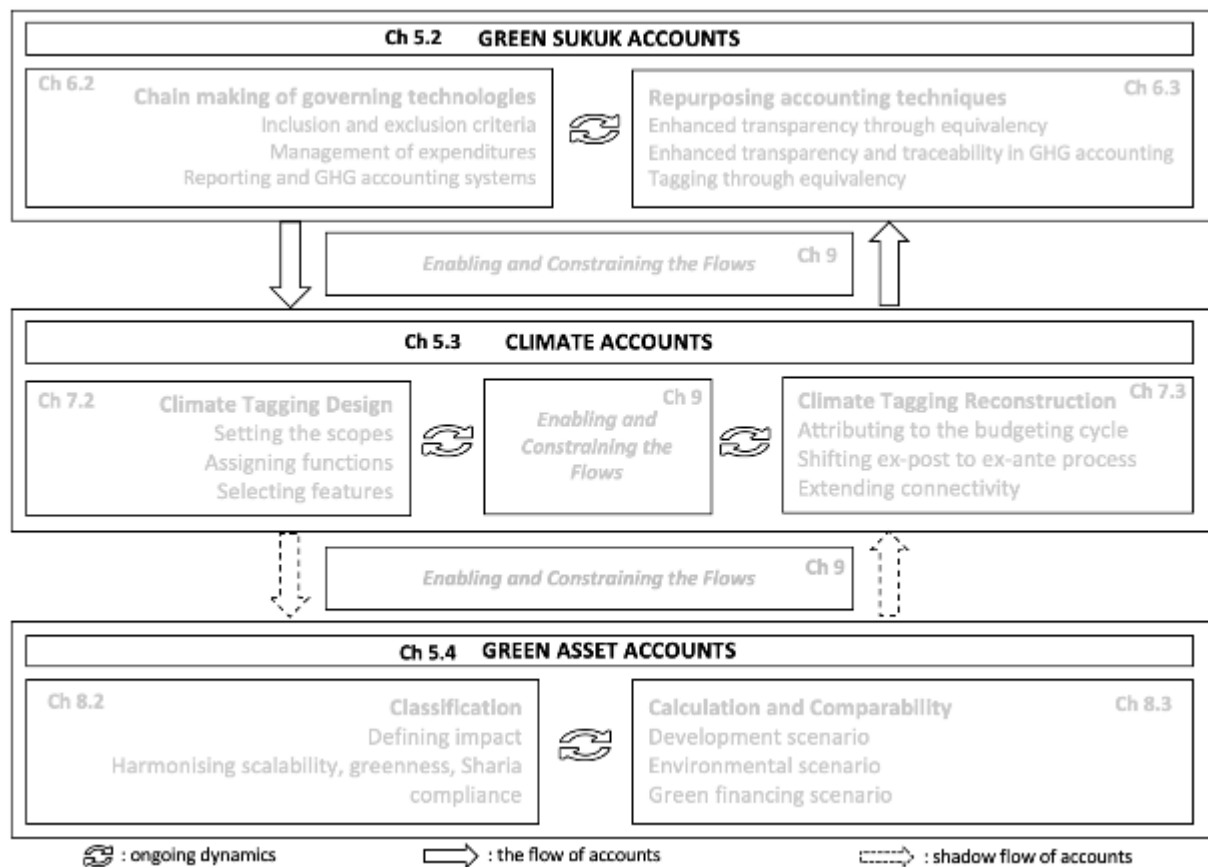
biases may have been reflected in the data gathering or analysis process influenced by the contextualisation. Therefore, the result was bounded to the similarity of characters in the observed phenomena. Lastly, as the period of data collection was prior to and during the COVID-19 pandemic, there were a slight delay in obtaining data to minimise bias and maintain the state of wellbeing from participants and researcher during the transition periods.

## CHAPTER 5. CONTEXTUALISING CLIMATE CHANGE IN THE FLOW OF ACCOUNTS

### 5.1 Introduction

The purpose of this chapter is to offer an essential context for understanding accounting and the flow of green funds when incorporating Sharia-based principles in a government financial instrument. These include articulating climate change in multiple settings, from international climate change conventions to a project to reduce GHG emissions in Indonesia. This chapter also highlights the deployment of accounting technologies to localise the global agenda to regular practices.

Figure 5.7 The Flow of Climate-Related Financial Accounts



Source: Author's analysis.

Figure 5.7 illustrates the flow of accounts to situate the global agenda of climate action in the flow of green sukuk from the issuance, state budget to the generation of green impacts. To enable the analysis and make a visible contextualisation, this study will elaborate on the accounts as a space where climate change is dominantly articulated: green sukuk accounts, climate accounts and green asset accounts. However, it is essential to note that despite the sense of stability in the name of the accounts, the discursive development of the calculative spaces will be further discussed in the following Chapters 6, 7, and 8, respectively.

To organise this chapter, section 5.2 will describe the context of green sukuk accounts among other sovereign green bonds. Next, section 5.3 will describe the attributes of climate accounts in multiple settings, including climate conventions, sectors, delivery projects, public planning, budgeting and financing. Section 5.4 will then outline the green asset accounts. Then 5.5 will provide a summary of this chapter's contents.

## 5.2 Green Sukuk Accounts: Sovereign Green Bonds and Sukuk

To contextualise the green sukuk accounts as a representation of the flow of green sukuk funds from the capital market to the Indonesian state budget, this thesis provides a descriptive global and local context. This overview indicates the incorporation of climate change programmatic agenda into day-to-day practices by observing the regularity of the sovereign green bonds, including sovereign green sukuk. The following sections describe the development of the initial issuance and the recent progress.

### 5.2.1 Sovereign Green Bonds and Sukuk

The formulation of sovereign green bonds has been perceived as a governing technology to advocate climate change and environment-related purposes in financial instruments. The programmatic agenda of climate change has urged nations to incorporate climate change by means of financing. Since the development of green bonds in early 2008, sovereign green bond issuance has gained momentum after the Paris Agreement. It began with the Climate Awareness Bonds issued by the European Investment Bank in 2007, which were then reformulated by the World Bank into green bonds in 2008. The development was adopted by development finance institutions, corporations, and governments amidst criticisms to mobilise financing for climate change. However, unlike other market mechanisms whereby the emission reduction target is set into the target, the role of green bonds is primarily to mainstream climate change into a financial mechanism. As such, this market has outpaced other types of climate-related funding instruments, as reported by the UNFCCC Standing Committee on Finance (2021) and emphasised the point of accounting within the flows, which can be illustrated in the following table.

Table 5.8 Tracking Financing Instruments align with Article 2.1c of the Paris Agreement

| Datasource               | Asset Class  | Actor Class                                                                                                       | Description                                                            | Datapoints                                                      |              |              | Flows, Integration, Targets |
|--------------------------|--------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------|--------------|--------------|-----------------------------|
| BloombergNEF             | Bonds, Loans | Banks, Corporations, Governments and its agencies (Municipalities, Sovereigns, Supranational), Project developers | Provides estimates of volumes of green or sustainability-linked loans. | USD billion                                                     | 2017         | 2018         | Flows                       |
|                          |              |                                                                                                                   |                                                                        | Green bonds                                                     | 168.6        | 175.6        |                             |
|                          |              |                                                                                                                   |                                                                        | Sustainability bonds                                            | 9.9          | 14.7         |                             |
|                          |              |                                                                                                                   |                                                                        | Social bonds                                                    | 9.1          | 11.9         |                             |
|                          |              |                                                                                                                   |                                                                        | Sustainability-linked loans                                     | 4.3          | 46.2         |                             |
|                          |              |                                                                                                                   |                                                                        | Green loans                                                     | 45.9         | 60           |                             |
|                          |              |                                                                                                                   |                                                                        | <b>Sustainable Debt Issued</b>                                  | <b>237.8</b> | <b>308.4</b> |                             |
| Climate Bonds Initiative | Bonds        | Banks, Corporations, Governments, Municipalities                                                                  | Tracks issuances of green bonds.                                       | USD billion                                                     | 2017         | 2018         | Flows                       |
|                          |              |                                                                                                                   |                                                                        | Green bonds (at least 95% proceeds dedicated to green projects) | 162.1        | 171.2        |                             |
|                          |              |                                                                                                                   |                                                                        | Labelled green bonds (incl. SDG, Social bonds etc.)             | 37.2         | 58.9         |                             |
|                          |              |                                                                                                                   |                                                                        | <b>Total</b>                                                    | <b>199.3</b> | <b>226.2</b> |                             |

Source: UNFCCC Standing Committee on Finance (2021, p. 81).

Table 5.8 indicates the dominant of climate-related financial instruments in a form of bonds as asset classes that emphasise flows as the datapoint. As over 153 countries are strengthening their pledges through the updated NDCs for combating climate change (UNFCCC, 2022), but less than 20% issue sovereign green bonds. Among more than USD 1.67 trillion of labelled climate and green bonds as of June 2022, Thomson Reuters (2022) documented that sovereign climate-related green bonds accounted for around 12%. This figure opened the potential for further development for countries to issue green bonds.

As noted earlier, the Paris Agreement became a pivotal momentum for countries in aligning their financial instruments with the strategic goal of climate commitments. In 2016, for instance, Poland was the first country to issue sovereign green bonds, followed by a number

of countries that then became both regular and non-regular sovereign green bond issuances. This form of financial instrument has a strategic place to finance the national efforts in meeting the climate commitment from the Paris pledge.

The net proceeds of each green bond will be used to refinance or finance, in whole or in part, existing (re-financing) and future projects that have environmental benefits that promote Poland's progress in meeting its greenhouse gas (GHG) emission reduction commitments, and that promote the country's transition to a low-emission economy (Sustainalytics, 2016, p. 3).

The report highlighted that the strategic commitment to limit carbon emissions and decarbonisation has been a driving force in issuing sovereign green bonds. To operationalise the strategic commitments, the intended use of proceeds for environmental purposes is emphasised as a distinctive element. However, the mechanism for allocating the proceeds for refinancing existing projects and new projects could invite questions on realigning previously funded projects for environmental purposes. The gradual progress to date despite the ambitious pledges to tackle climate change can be indicated from the potential critics of the accountability mechanisms for sovereign green bonds.

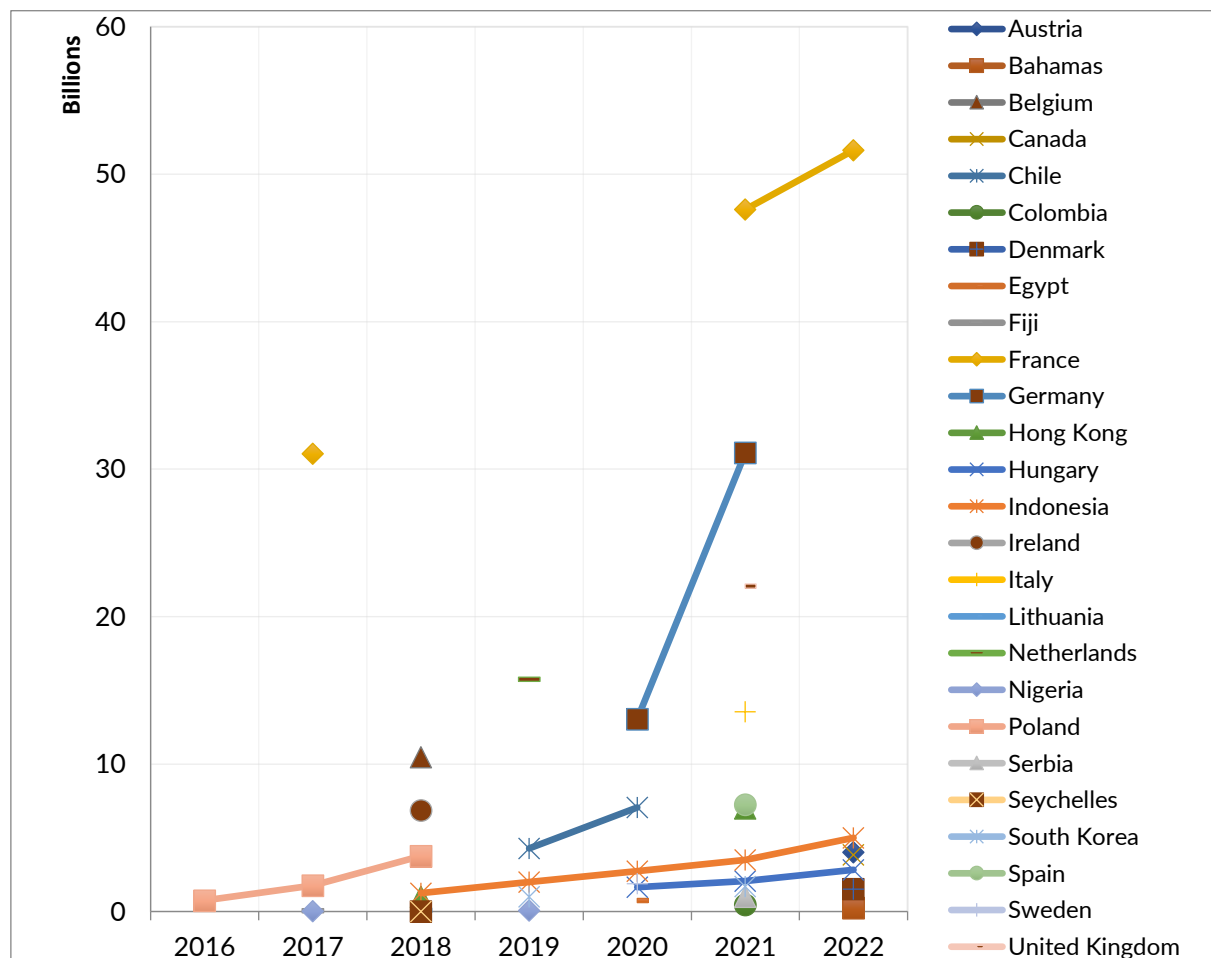
By the way, don't underestimate the benefits of investors pushing sovereigns to issue green bonds with the reporting and transparency requirements to allow you to see where their money's going (Observation 1, Climate Bonds Expert).



I think over the years, there's been a lot of obfuscation. So, there's much focus on policies that actually when you scratch the surface a little bit, you may find that the implementation is just not there (Observation 11, Institutional Investor).

The statements express the urgency to unpack governing technologies in alignment with climate ambitions beyond its surface. However, it is essential to consider the progress in countries' efforts to issue green bonds by considering the flow of funds given the nature of government allocation systems. The gradual progress can be detailed through the following Figure 5.8.

*Figure 5.8 The Cumulative Issuance of Sovereign Green Bonds and Sukuk Country by Country*



Source: Author's analysis, accessed from Thomson Reuters (2022).

Figure 5.8 illustrates that countries are including sovereign green bonds in their debt portfolios. The figure shows that the French government has the largest issuance, followed by the UK government. These countries were both the host of the international climate conventions, COP 21 and COP 26. However, among 27<sup>8</sup> issuing countries as of June 2022, the Indonesian government has shown a regular commitment to issue sovereign green bonds in the form of sukuk. The regularity of the issuance indicated the potential incorporation of climate change goals in formulating financial instruments within day-to-day government operations. Further analysis will be presented in the following paragraphs.

#### 5.2.2 Sovereign Green Sukuk

In the first green sukuk issuance impact and allocation report, the Minister of Finance for Indonesia highlighted: “This Green Sukuk initiative is a strategic way to address climate change nationally and it is also Indonesia’s contribution to the global community” (Ministry of Finance, 2019a, p. iii). This study indicates that the sovereign green sukuk initiative demonstrates national efforts towards the defining issue of climate change and reveals the potential use of accounting technologies in identifying the demand for green financing between multifaceted sectors. In positioning Indonesia to contribute to the global climate commitment, this form of financial instrument was formulated as a result of accounting technology, namely, budget tagging. This tagging is later discussed and observed in this research alongside tracing and earmarking which are analysed further in section 5.3.

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<sup>8</sup> The IMF staff note in 2022 included Latvia as one of the sovereign green bond issuances in a form of the GSS bond transaction. Given the entanglement with other thematic objectives the data cannot be fully obtained and distinguished, so this issuance is excluded from the figure.

Despite the similarity of intention of low carbon development resulting from the issuance, the Indonesian government constructed the sovereign green bonds in sukuk form, green sukuk. The adoption of sukuk as a Sharia-based instrument was perceived as compatible with sovereign green bonds and sukuk. After a decade of the enactment of state Sharia bonds or widely known as SBSN (Law number 19, 2008), the issuance of sovereign green sukuk in 2018 was an innovative financial instrument. In 2021's report, for instance, the Minister of Finance noted "Leveraging untapped financial resources and innovative financing therefore becomes necessary to close the financing gap for climate actions, and to accelerate progress towards Sustainable Development Goals (SDGs)" (Ministry of Finance, 2021a, p. 4).

The statement expresses the hope that the green sukuk initiative offers an innovative way to fill the gap of financing for climate actions (see section 5.3 for further analysis) for which the government estimated the demand of USD 247.2 billion annually as noted by the Ministry of Finance (2021a, p. 4). Moreover, the effort to create an innovative instrument was also triggered by local regulations such as when the Indonesia Financial Service Authority (OJK) (2017) launched the national Green Bond Principles in December 2017 as an attempt to expand the capital market for green projects. Also, similar attempts were made in a neighbouring country, such as Malaysia's issuance of corporate green sukuk by Tadau Energy, in which the issuance was directly dedicated to a certain project (Liu and Lai, 2021).

Despite the oversubscription in every issuance (see Appendix 5.6 for the details of the transactions), indicating the demand for this financial instrument, the availability of projects that is aligned with the Green Bond Principles (GBP) becomes a primary consideration for the optimum issuance. Consequently, the proportion to accommodate the green sukuk and the

financing gap to be allocated for climate actions continue to persist. This study observed that the incorporation of climate change to localise context, such as by green financial instruments, is meaningless without operationalisation in regular practice. However, what enables and constrains the flow from the capital market and mobilises it through the sovereign green sukuk is analysed further in the following section before it is specifically discussed in Chapters 6, 7, 8, and 9. To unpack the context, the following paragraphs unravel the nature of sukuk and the nature of government financial instruments.

Sukuk aims at two primary objectives. As stipulated in Law number 19 (2008, article 4) on state Sharia bonds, the purpose is to “finance the budget of the state including finance for development projects”. In contrast to other kinds of government bonds to finance general forms of programmes, this typical of instrument needs to be connected to a specific purpose. The laws also stated that infrastructure projects primarily related to the energy, telecommunications, transportation, agriculture, manufacturing, and public housing sectors were within the purview of projects. Without a rigorous method to govern the relationship between the original objective of climate action and the adoption in either general finance or designated project financing, these two purposes, however, may be ambiguous (see section 6.3 for further analysis).

Furthermore, by adopting Sharia principles, any projects should comply with the underpinning ideals, to exclude what should be excluded in line with pursuing welfare (Ministry of Finance, 2015b). The exclusion principles are explicitly guided as follows.

Financial transactions in accordance with Sharia restriction should be free of the following elements: (1) *Riba*, i.e. is the element of interest or return obtained from

using money to make money (money for money), (2) *Maysir*, i.e. is an element of speculation, [...] and (3) *Gharar*, which is an element of uncertainty which include those relating to delivery, quality, quantity, and so on (Law number 19, 2008).

In this sense, ambiguity should be averted in excluding projects that potentially fall into *gharar*. As such, this study observed that the structure of sovereign green sukuk transactions plays a pivotal role in determining acceptable projects as it implies the demand for transparency and accountability for sovereign green bond issuance. For instance, the underlying transaction, which is mainly of state-owned assets, becomes a fundamental requirement for the agreement to issue the state Sharia bonds and shifts the concept of interest to a notion of sharing benefits (further analysis is presented in sections 5.4 and 6.2).

### 5.3 Climate Accounts: Accounting for Climate Change in Public Spending

To contextualise the constitutive role of accounting in public spending, which this thesis names as climate accounts, this section outlines attributes articulating the climate change agenda and incorporated in the government budget. From financial dimensions within the government, the Minister of Finance states the use of accounting through tagging that is also set as the potential source of financing to accommodate different needs for climate actions:

Since 2015, the Ministry of Finance has been supporting national efforts to integrate climate change into planning and budgeting systems and developed a budget tagging mechanism to track the national budget that correlates with climate change impacts. The result of this budget tagging exercise has enabled the government to better map the green financing needs across sectors (Ministry of Finance, 2019a, p. iii).

The statement implies the effort to incorporate the climate target pledged by the Indonesian government into planning and budgeting systems and to potentially distinguish sources of financing to accommodate the demand from each sector in delivering the climate target. However, challenges initially occurred with the nature in which climate change is articulated and the prevailing governing technologies, authorities, and expertise. In outlining the attributes to construct climate accounts, the following table highlights the relationality expressed by the respondents.

*Table 5.9 Climate Change Accounts*

| <b>Dimension</b>  | <b>Articulation</b>                            | <b>Dynamics</b>                       | <b>Basis of Accounting Productions</b>         | <b>Units</b>                                              | <b>Subject</b>               |
|-------------------|------------------------------------------------|---------------------------------------|------------------------------------------------|-----------------------------------------------------------|------------------------------|
| Global commitment | Number of temperature limited (well below 2°C) | Implication for actions and inactions | GHG emissions contained; temperature increased | GHG emissions (CO2 equivalents)                           | Human activities             |
| Government        | Number of NDC target                           | Implication of economic development   | Sectoral emissions                             | Target CO2                                                | Selected sectors             |
| Delivery ministry | Number of sectoral emissions to contain        | Coverage within the sectors           | Methodological assumptions                     | Estimate CO2 from sectoral production and climate actions | Delivery projects            |
| Finance           | Number of financings to be mobilised           | Past, current, and future capacity    | Procedures in government expenditures          | Output of government budget                               | Budget and planning officers |

Source: compiled by the Author.

Table 5.9 outlines the articulation of climate change in multiple entities to construct climate accounts. It can be noted that the demand to achieve global commitments as is adapted by

the Indonesian government is closely related to other domains, such as delivery ministries to government finance. The primary challenge is clearly outlined in the basis of accounting production, which is also related to the unit and subject within the financial domain of the government. As such, to incorporate the origin of climate commitment into climate accounts, the following paragraphs will unpack each of the dimensions.

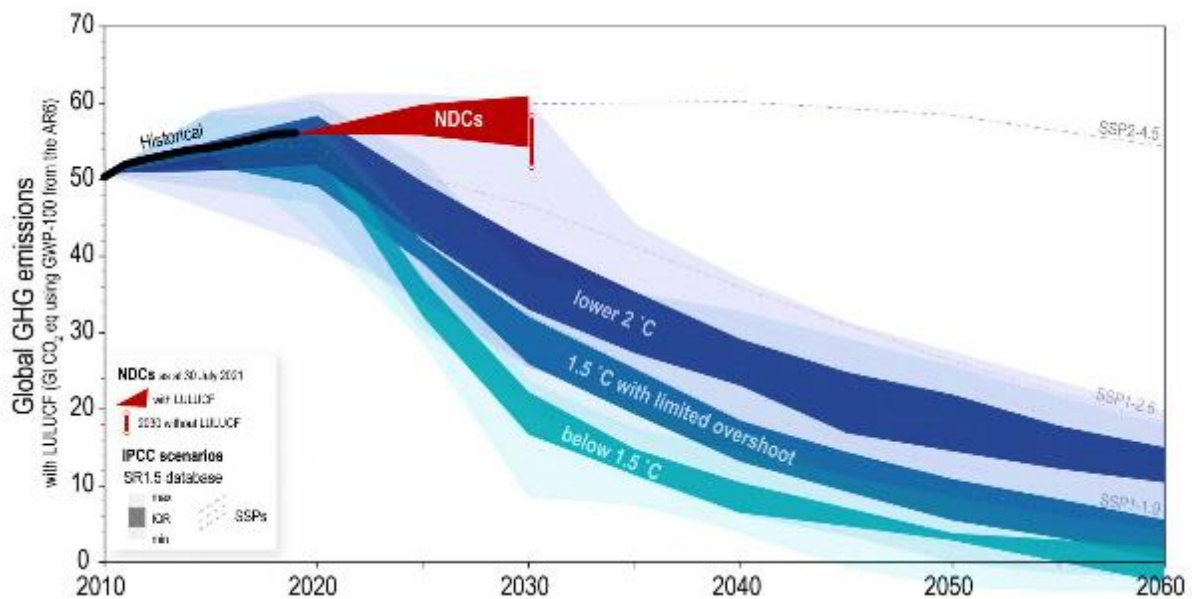
#### 5.3.1 Global Climate Commitment

At the global level, over three decades since the first establishment of the international convention on climate change in 1992, NDCs have provided major guidance in the construction of climate accounts. Not only has the NDC target been adopted by the signatories of the Paris Agreement (UNFCCC, 2015), but this climate commitment also encompasses financial commitments. As such, this implies the demand for transparency on both the progress in achieving climate mitigation alongside climate adaptation and alignment of financial flows to mainstream the NDC target. This target is commonly reflected in the reduction of GHG emissions (CO<sub>2</sub> equivalents) to set the territory of governing the climate mitigation account. Despite the heterogeneity of climate targets, the primary feature in accounting for carbon includes target years, reference points, and sectoral and geographical coverage (Mehling, Metcalf and Stavins, 2018).

As a stringent mechanism to account for carbon has been developed, the recent report from the UNFCCC (2021) stressed that the demand for immediate actions remains critical. This aims to compensate for a sluggish start on the route to net-zero emissions. If the current carbon

emissions are not decreased by 2030 the implications of the NDC synthesis are as shown in Figure 5.9 (UNFCCC, 2021).

*Figure 5.9 Comparison of Global Emissions under Scenarios Assessed in the IPCC Special Report on Global Warming of 1.5 °C with Total Global Emissions according to NDCs*



Source: UNFCCC (2021, p.29)

For any degree of warming to be halted, net-zero CO<sub>2</sub> emissions must be achieved (UNFCCC, 2021). Over 153 countries have pledged a net-zero target (UNFCCC, 2022). This becomes a long-term narrative and can also be seen as an abstract ambition without a clear and parallel roadmap that leads to transformative impact. Inability to mobilise, measure, and trace the impact of means of finance to curb GHG emissions, ambitious efforts to limit the temperature cannot be achieved. Therefore, it is crucial to investigate the translation of global climate action plan at a detailed level. Furthermore, it is important to note the demand for continuously enhancing relevant instruments for monitoring capacity and regulations in parallel with the updated pledges.



### 5.3.2 Indonesia's Climate Target and Roadmaps

Achieving the climate target as pledged within the global commitment has been a driving force for the government to incorporate climate change issues in budgeting and planning activities. Among a number of pledges since the ratification of the UNFCCC in 1994, the Paris Agreement (UNFCCC, 2015) serves as the basis for the existing governing technologies (see Appendix 4.1 for the details of regulations and frameworks included for documents analysis). In budgeting, planning and financing, the mobilisation of funding from developed to developing country was perceived to drive the involvement as stated in the White Paper as a basis for ratifying the agreement:

Even though Indonesia's participation in the Paris Agreement has the potential to result in a slight increase in costs that have been implemented within the UNFCCC framework [...] Indonesia has the opportunity to access financial support of USD 100 billion per year to support climate change mitigation and adaptation activities that have been prepared by developed countries for developing countries (Ministry of Environment and Forestry, 2016, p.26).

These international climate commitments have become foundations in the development of the climate policy framework, with stakeholders participating in political commitments and efforts to mainstream government operations, including financing. To elaborate further about the context, the following paragraphs detail the major climate targets, sectoral proportion, and authorities to provide background on the dynamics arising in Chapters 6, 7, and 8.

The government of Indonesia pledged to reduce carbon emissions by 29% from business as usual (BAU) by 2030 in the effort to prevent a global temperature rise of 2°C by 2100 as referred to in the global commitment. Despite the country being categorised as non-Annex I, in which curbing carbon emissions is a voluntary ambition, the country's climate target was initially formulated in 2008 after hosting COP Bali in 2007. The initial pledge for carbon emissions reduction was to curb 26% of emissions from domestic resources and up to 41% with international support by 2020 as outlined in the following Table 5.10.

*Table 5.10 Targets in Reducing the GHG Emissions under RAN-GRK by 2020*

| No | Sector of Activity    | Emission Reduction (Giga Ton CO <sub>2</sub> e) |              | Total        |
|----|-----------------------|-------------------------------------------------|--------------|--------------|
|    |                       | 26%                                             | 15%          | 41%          |
| 1  | Forestry and Peatland | 0.672                                           | 0.367        | 1.039        |
| 2  | Waste                 | 0.048                                           | 0.03         | 0.078        |
| 3  | Energy and Transport  | 0.038                                           | 0.018        | 0.056        |
| 4  | Agriculture           | 0.008                                           | 0.003        | 0.011        |
| 5  | Industry              | 0.001                                           | 0.004        | 0.005        |
|    | <b>Total</b>          | <b>0.767</b>                                    | <b>0.422</b> | <b>1.189</b> |

Source: Government of Indonesia (2011).

Table 5.10 presents the initial government targets that provided a basis for formulating other governing technologies. The climate commitment has been translated into numerous legislative and guiding frameworks. This ranges from formulating, issuing, and executing climate change mitigation policies and programmes at the national and municipal levels for all sectors that are directly or indirectly impacted by climate change. This form of regulatory framework, such as the development of a GHG Inventory and the execution of a mitigation activities plan, can be perceived as underpinning guides as a basis for climate action between 2011-2020. Even so, this study observed that the problematisations continued.

For instance, as the government's climate objective was strengthened, this altered regulatory authorities and technology, the shift prompted new dynamics, particularly in coordination and reporting. The initial lead, BAPPENAS, coordinated the establishment of the RAN-GRK and performs monitoring, evaluation, and reporting (MER) of mitigation action implementation. In this sense, the Ministry of the Environment (MoE, subsequently MOEF) oversaw the construction of the National GHG Inventory and verified mitigation actions. As such, both agencies produced implementation guidelines for the climate action that could be perceived as redundancies. The GHG Inventory will show the impact of applying mitigation strategies on GHG emissions.<sup>9</sup> Between this scope of governing, the government of Indonesia strengthened its climate commitment to reduce carbon emissions by 29% based on business as usual by 2030 as detailed in Table 5.11.

*Table 5.11 GHG Emissions Level in the BAU, CM1, and CM2 NDC Target*

| No | Sector      | GHG Emission Level 2010* | GHG Emission Level 2030 |        |        | GHG Emission Reduction |       |                |       |
|----|-------------|--------------------------|-------------------------|--------|--------|------------------------|-------|----------------|-------|
|    |             |                          | (MTon CO2e)             |        |        | (MTon CO2e)            |       | % of Total BaU |       |
|    |             | MTo CO2e                 | BaU                     | CM1    | CM2    | CM1                    | CM2   | CM1            | CM2   |
| 1  | Energy*     | 453.2                    | 1,669                   | 1,355  | 1,271  | 314                    | 398   | 11%            | 14%   |
| 2  | Waste       | 88                       | 296                     | 285    | 270    | 11                     | 26    | 0.38%          | 1%    |
| 3  | IPPU        | 36                       | 69.6                    | 66.85  | 66.35  | 2.75                   | 3.25  | 0.10%          | 0.11% |
| 4  | Agriculture | 110.5                    | 119.66                  | 110.39 | 115.86 | 9                      | 4     | 0.32%          | 0.13% |
| 5  | Forestry**  | 647                      | 714                     | 217    | 64     | 497                    | 650   | 17.20%         | 23%   |
|    | TOTAL       | 1,334                    | 2,869                   | 2,034  | 1,787  | 834                    | 1,081 | 29%            | 38%   |

\*Including fugitive \*\*Including peat fire

Notes: **CM1**= Counter Measure 1 (*unconditional mitigation scenario*)

**CM2**= Counter Measure 2 (*conditional mitigation scenario*)

**BAU**= Business as usual

Source: Government of Indonesia (2021a, p. viii).

<sup>9</sup> Despite their limited involvement in the data collection process, other organisations in charge of gathering development data, such as Statistics Indonesia (BPS) and the Centre for Data and Information (PUSDATIN) of each sector, also play a vital role (Government of Indonesia, 2021a).

The updated commitment made by the Indonesian government to meet the 2030 emission reduction target is shown in Table 5.11. Similar to the climate action plan guided in 2011, the primary strategy focuses on lowering GHG emissions in five sectors while the proportion for each sector was re-evaluated, such as between waste and energy sectors. This implies to the demand for ambitious actions, revisiting the scopes, methods, and re-evaluating the line of responsibilities. Particularly, energy and transportation as the predominant foundation for sovereign green bonds and sukuk, will be further examined in the subsequent sections.

Moreover, the fundamental impact of the government's climate goal is the incorporation of climate-related measures into government objectives, budgeting, planning and financial instruments. In assessing the alignment of government goals, during the period of observation up to 2021, the government of Indonesia adopted two roadmaps for climate action plans. The following figures illustrated the way the plans incorporate the mitigation activities.

Figure 5.10 Four Pillars in Establishing Mitigation Actions for Each Sector<sup>10</sup>

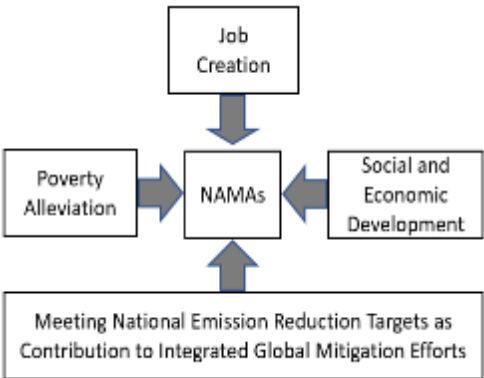
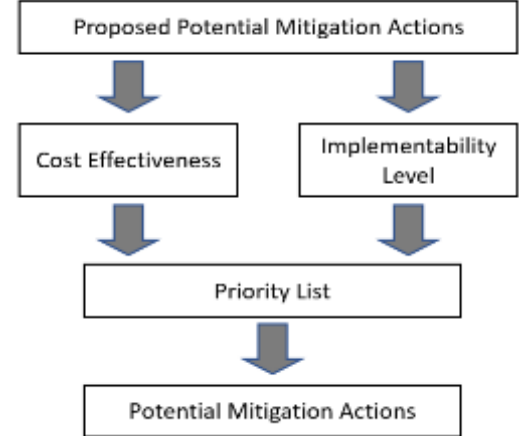


Figure 5.11 Selection Process of Proposed Potential Mitigation Actions

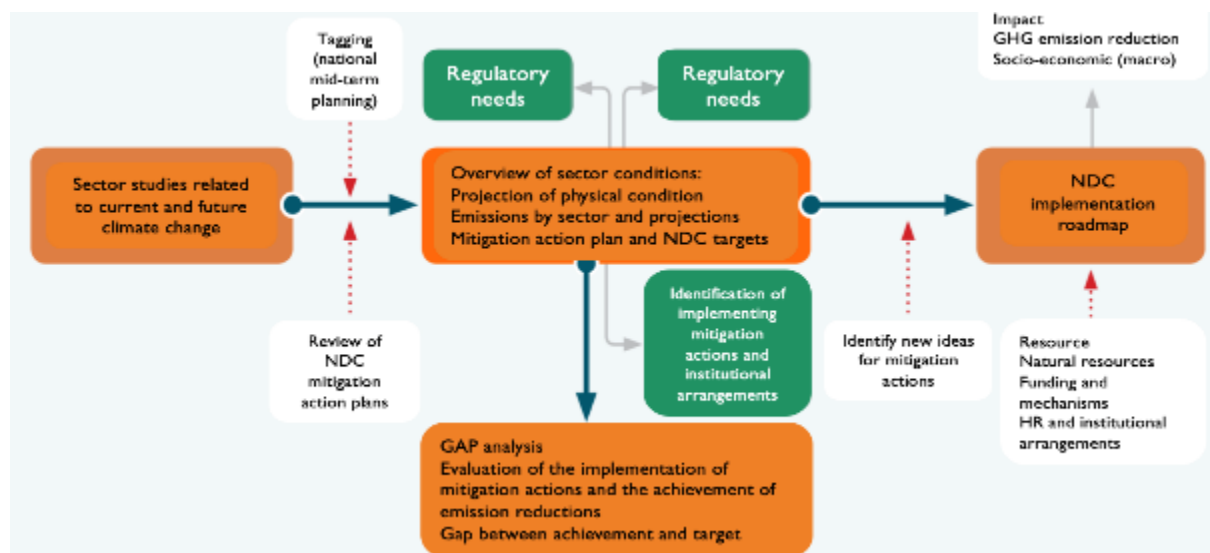


Source: National Development Planning Agency (2011).

<sup>10</sup> NAMAs (Nationally Appropriate Mitigation Actions) refer to a set of policies and actions for climate mitigation.

They were designated as national action plans for the period 2011-2020, and the NDC roadmap for the action plans 2020-2030 in attaining the NDC objective. Over the time period, the main development priorities remain consistent: “Priority financing has been determined in the 2014-2019 RPJMN. The outcome targets of the Ministries/Agencies are increasing economic growth, decreasing unemployment, and reducing poverty” (Ministry of Finance, 2018a, p. 15). Furthermore, the formulation of the roadmap can be exhibited as follows.

*Figure 5.12 The Roadmap NDC Indonesia 2020-2030*



Source: Ministry of Environment and Forestry (2019).

This roadmap was expanded from the initial framework of national climate action plans 2011-2020. Despite changing government administration, for instance after 2014, the underpinning principle persists along these development issues. This process is reflected in the budgeting and planning where development issues remain primary priorities for developing countries as shown in Figures 5.10, 5.11, and 5.12. In the mid-term priorities for instance, the government of Indonesia focused on three priorities despite other problems, which would affect which areas should be prioritised for resource allocation such as government funding.

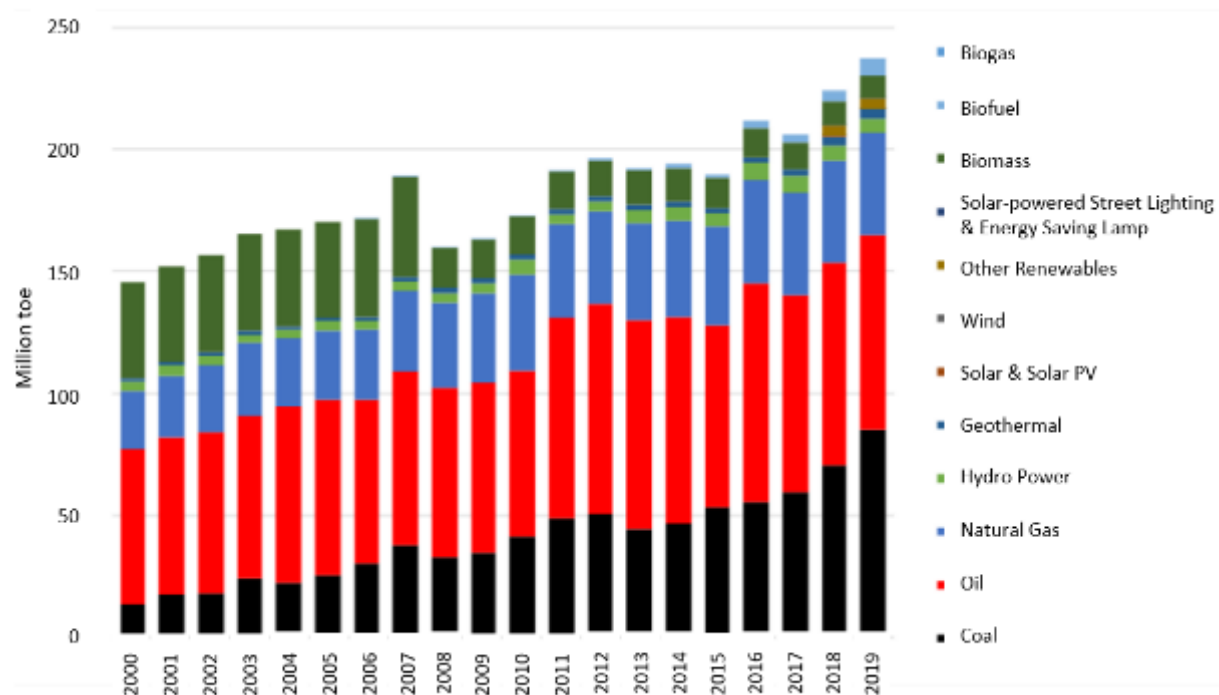
### 5.3.3 Sectoral Context: Energy and Transport

To transition to a low carbon economy and pursue ambitious goals in curbing carbon emission reductions, the energy sector including transport was accounted as the second largest emitter after the forestry sector. To articulate in governing technologies, climate actions in this area have encountered difficult dynamics given the intensity of carbon emitted from the core business operations. Furthermore, the demand for long-term funding alongside the difficulty in creating immediate impacts without connected infrastructures have been perceived as challenges by the interview respondents. In addition, measuring the accurate and continuous impact towards GHG emission reduction has raised another concern in connecting to budgeting and planning systems. To achieve the climate goal in the energy sector, including transportation, the Government of Indonesia (2021a, p. 3-14) focused on six groups of activities:

- (i) end use energy efficiency measures through energy conservation and audits,
- (ii) fuel switch to lower carbon emission fuel in residential and transport sector,
- (iii) use of renewable energy for power generation, (iv) deployment of Clean Coal Technology (CCT), (v) use of biofuel, and (vi) use of alternative fuels in industry.

However, altering the energy supply, whose composition is dominated by fossil fuels, would need considerable effort and the use of suitable financial tools. The graph below depicts the structure of the existing energy supply, which is dominated by fossil fuels.

Figure 5.13 Primary Energy Supply by Sources



Source: Government of Indonesia (2021a).

Figure 5.13 depicts Indonesia's energy supply from 2000 to 2019. Indonesia's energy source is fossil fuels (coal, oil, natural gas) and renewable energy (hydropower, geothermal, biomass and biofuels). Energy comes from domestic production and imports, primarily crude oil. As seen in Figure 5.13, fossil fuels remain the dominant energy source, 89% of the primary energy supply in 2019 while renewable energy only accounted for 11%. To meet the government's 23% renewable energy target by 2025, a transformational strategy is needed.

Indonesia has abundant renewable energy resources, but their use is hindered by a geographical mismatch between energy supplies and energy consumption centres. In some cases, renewable energy investment costs are more expensive than fossil energy. In certain circumstances, these potentials are constrained by conservation accords, for instance the United Nations Education, Scientific and Cultural Organization (UNESCO) protection

(Government of Indonesia, 2021a). These constraints hinder the government's ability to promote the development renewable energy. Additionally, investing in renewable energy, which requires a longer-term investment, may not be desirable for sovereign green bonds, since its effect may not be created within the bonds' timeline, except for long-term bonds.

Furthermore, this study observed that there were inevitable problems in constructing accounting unit for carbon emissions and preserving data consistency, even though procedures in computing carbon emissions are well established in both sectoral and reference approaches. As reported in the second and the third Biennial Update Reports (Government of Indonesia, 2018, 2021a), the 2006 IPCC Guidelines have been adopted to estimate CO<sub>2</sub> emissions by using both the Sectoral Approach (bottom-up approach) and the Reference Approach (top-down methodology). From 2000 to 2019, the discrepancy between the two estimates of emissions ranged from -5% to +8%; with a few exceptions, emissions estimated using the reference technique often exceeded those calculated using the sectoral method (Government of Indonesia, 2021a). Those biennial reports also acknowledged the adjustment were made to rectify, such as during 2010-2016, coal emissions were estimated using inaccurate activity data, and national coal consumption figures included export data (Government of Indonesia, 2018, 2021a). These examples demonstrate discrepancies in technical processes which affect progress in meeting the climate commitment.



#### 5.3.4 Climate Change in Government Budget

As noted earlier, the presence of climate tagging has been instrumental in mobilising climate-related financial flows. This section contextualises the emergence of tagging within global efforts alongside initial developments in Indonesia.

Among accounting technologies to ensure the transparency and traceability of the climate finance flows, tagging the climate budget has been promoted. Climate tagging is a government-led mechanism to identify, assess and monitor public spending for climate-related purposes. Tracking devices to scale climate finance flows into governmental budgets were initially developed in a number of developing countries, including the Philippines, Bangladesh, Indonesia, and Nepal as a country-led initiative. In Indonesia particularly, climate tagging has been developed and expanded the meaning of climate finance not only to assess the number of financial flows developed in the country but also the capacity of the state budget to finance the country's efforts to pursue the NDC.

In essence, this form of accounting has been advocated by several leading development and development finance organisations (UNDP, 2019; UNEP Finance Initiative, 2018; World Bank, 2021). The exercise of tagging is not new; it is also incorporated into other priorities including gender, poverty, education, infrastructures, and SDGs (OECD, 2021). In particular for climate change, it has invited attention to intersectional and high-level agendas to ensure the respective government budgets align to deliver climate-related outcomes (OECD, 2021). This is aligned with ongoing pressure from the UNFCCC Standing Committee on Finance (2014, 2016, 2018, 2021) to signatories of climate agreements to access regular funding flows for

mitigation and adaptation actions despite the definition itself remaining uncertain (Weikmans, Roberts and Robinson, 2020). From this tracking approach, the Indonesian government extended connectivity to financial instruments for the issuance of sovereign green sukuk.

*Table 5.12 Adoption of Climate Tagging and Sovereign Green Bonds/Sukuk*

| <b>No</b> | <b>Country</b> | <b>Fiscal Years</b> | <b>Application of Tagging</b> | <b>Sovereign Green Bonds Issuer</b> | <b>Extension to Green Bonds/Sukuk</b> |
|-----------|----------------|---------------------|-------------------------------|-------------------------------------|---------------------------------------|
| 1         | Nepal          | 2013–present        | Budget                        | n/a                                 | n/a                                   |
| 2         | Cambodia       | 2013–present        | Review                        | n/a                                 | n/a                                   |
| 3         | Indonesia      | 2014–present        | Budget                        | Yes (since 2018)                    | Yes                                   |
| 4         | Philippines    | 2015–present        | Budget                        | n/a                                 | n/a                                   |
| 5         | Ecuador        | 2016–present        | Budget                        | n/a                                 | n/a                                   |
| 6         | Ghana          | 2016–present        | Budget                        | n/a                                 | n/a                                   |
| 7         | Moldova        | preparation         | Budget                        | n/a                                 | n/a                                   |
| 8         | Colombia       | 2017                | Review                        | n/a                                 | n/a                                   |
| 9         | Ethiopia       | 2017                | Review                        | n/a                                 | n/a                                   |
| 10        | Honduras       | 2017–present        | Budget                        | n/a                                 | n/a                                   |
| 11        | Nicaragua      | 2017–present        | Budget                        | n/a                                 | n/a                                   |
| 12        | Pakistan       | 2017–present        | Budget                        | n/a                                 | n/a                                   |
| 13        | Kenya          | 2017–present        | Budget                        | n/a                                 | n/a                                   |
| 14        | Bangladesh     | 2018–present        | Budget                        | n/a                                 | n/a                                   |
| 15        | Ireland        | 2019–present        | Budget                        | Yes (since 2018)                    | n/a                                   |
| 16        | Uganda         | 2019–present        | Budget                        | n/a                                 | n/a                                   |
| 17        | Odisha (India) | 2020                | Budget                        | n/a                                 | n/a                                   |
| 18        | France         | 2021                | Budget                        | Yes (since 2017)                    | n/a                                   |
| 19        | Mexico         | 2021                | Budget                        | n/a                                 | n/a                                   |

Source: Author’s analysis based on multiple references from the respective countries’ Green Framework and World Bank (2021).

Table 5.12 indicates the use of climate tagging and potential (connectivity) to the issuance of sovereign green bonds and sukuk. Among the issuing and enacting countries, Indonesia has channelled the existing climate tagging mechanism to the issuance of green sukuk. Despite tagging as an accounting technology being unstable, this study analysed the development of this form of mechanism to formulate multiple accounts (see Chapters 6, 7, and 8 for further analysis).

The ongoing reformulation was performed alongside the demand to identify effective measures to align with the consistency of climate-related financial flows in both domestic and international contexts. The commitment was initially developed at the Copenhagen Accord where developing countries voluntarily pledged their GHG reduction commitments with a promise of funding support by developed countries (Roberts *et al.*, 2021). This Copenhagen Accord envisaged the existence of a demand to provide adequate funding for developing nations in tackling climate change, including the necessity to scale up current and potential funding flows (UNFCCC, 2009). Since then, numerous countries have adopted tracking mechanisms to identify the capacity of funding flows, gaps, or to accelerate mobilisation of funding for climate actions despite the uncertainty and incompleteness which persists in tracking the progress of mobilising funds (Bowen, Campiglio and Martinez, 2017; Clapp *et al.*, 2012). This includes the regular tracking by UNFCCC Standing Committee on Finance (2014, 2016, 2018, 2021).

However, the enactment of accounting technologies needs to consider the challenges over various scopes, intensities or locating relevant accounting objects, and implications to wider climate-aligned instruments (see Chapter 7 for further analysis). In the context of climate

tagging, this form of tracing faces limitations in being incorporated into prevailing budgeting systems, climate policy alignment, and coverage of tagging to an adverse impact on climate outcomes (World Bank, 2021). Since the initial development in 2012, climate tagging has been adopted by at least 19 countries as shown in Table 5.12. Mistranslation of tagging could hamper progress in aligning funding for climate-related actions (OECD, 2021; World Bank, 2021) and possibly have impacts on the efforts of the global stocktake on article 2.1c of the Paris Agreement (UNFCCC, 2015).

#### 5.4 Green Asset Accounts: Governing Green Framework

This section provides overviews on the demand for disclosing green assets resulting from the issuance of the sovereign green bonds and sukuk. The existence of green assets is not new in green financial instruments. However, this section allows the research to set the context as part of the flows, and in particular to contextualise the attribute to define the greenness within the interconnected spaces and the adoption of guiding principles into practices. The following section presents the essential elements to construct the accounts from the framework to impact reporting in both the global context and the Indonesian government.

By imparting a climate-related thematic label, the green bonds and sukuk framework have several commonalities with other efforts in incorporating sustainability. The distinction is situated in the extent calculable spaces and agencies become visible, in both processual and outcome levels. The green framework aims to resolve the demand for accountability of the green labelling by accommodating primary principles in governing green bonds issuance. However, the capital market could only offer a general framework as a guiding principle in green-related bonds issuance. The green framework can be seen as an authoritative

framework given the demand for assurance from external providers. The general principles cover the use of proceeds, the process in selecting green projects, management of the project, and monitoring the reporting in order that the green impact can be identified as a basis for reformulation of calculative spaces and agencies. However, without substantial reconstruction, the reformulation of the framework can be seen as a superficial rearrangement given the established nature of government financial planning systems.

#### 5.4.1 The Use of Proceeds

The use of proceeds demonstrates as an object for financing that advocates the purpose of the instrument. As analysed in section 5.2. typically, the purpose is closely associated with a wider aspiration, such as multiple narratives that articulate either NDC, low carbon economy, or net zero. Albeit the diversity of the narrative, the use of proceeds has been a primary distinctive element differing between green and traditional types of bonds. The GBP offers a typical taxonomy of projects that can be classified as green as shown in the following Table 5.13.

Table 5.13 Mapping of the GBP Project Categories to GBP Environmental Objectives

| GBP – Environmental objectives                                                                |                           |                           |              |                               |                                |
|-----------------------------------------------------------------------------------------------|---------------------------|---------------------------|--------------|-------------------------------|--------------------------------|
| GBP-project categories                                                                        | Climate change mitigation | Climate change adaptation | Biodiversity | Natural resource conservation | Pollution prevention & control |
| Renewable energy                                                                              | ● ● ●                     |                           |              | ●                             | ●                              |
| Energy efficiency                                                                             | ● ● ●                     |                           |              |                               | ●                              |
| Pollution prevention and control projects                                                     |                           |                           |              | ●                             | ● ● ●                          |
| Environmentally sustainable management of living natural resources & land use                 | ●                         | ● ●                       | ● ● ●        | ● ● ●                         |                                |
| Terrestrial and aquatic biodiversity conservation projects                                    |                           | ●                         | ● ● ●        | ● ● ●                         |                                |
| Clean transportation                                                                          | ● ● ●                     |                           |              | ●                             | ● ● ●                          |
| Sustainable water and waste water management                                                  |                           | ● ●                       | ● ●          | ● ●                           | ● ● ●                          |
| Climate change adaptation projects                                                            |                           | ● ● ●                     |              |                               |                                |
| Eco-efficient and/or circular economy adapted products, production technologies and processes | ● ●                       |                           | ●            | ● ● ●                         | ●                              |
| Green buildings                                                                               | ● ● ●                     | ●                         |              | ● ● ●                         | ●                              |

Contribution to objective:

Primary ● ● ●

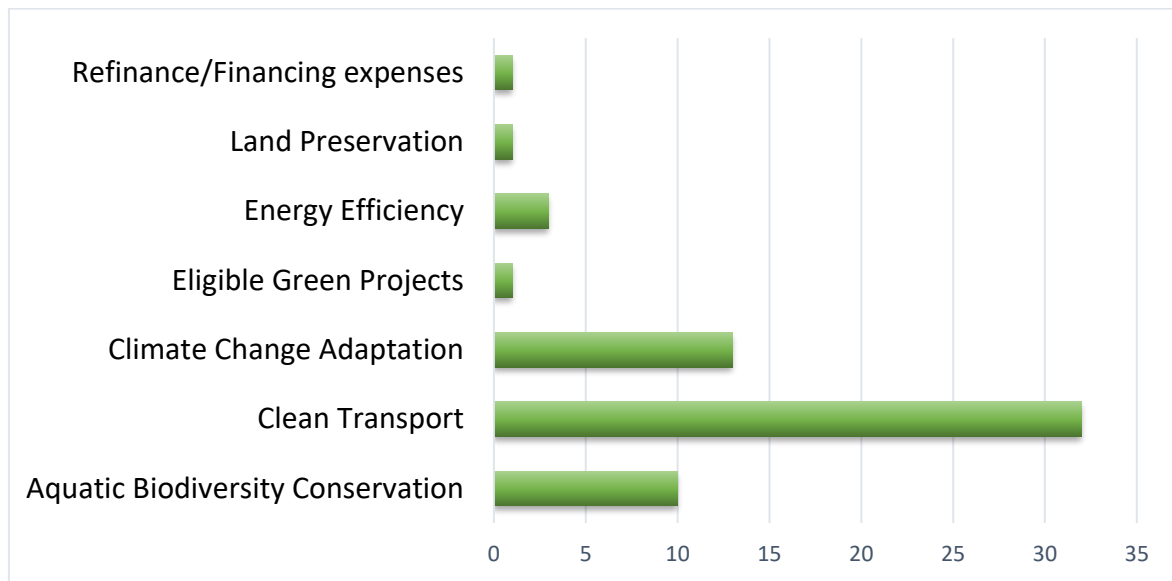
Secondary ● ●

Tertiary ●

Source: International Capital Market Association (2021b).

In the light of the GBP project categorisation, this research presents that among sovereign green bonds and sukuk issuance, clean transportation has been among the favoured projects as shown in the following figure.

*Figure 5.14 Count of Use of Proceeds for Global Sovereign Green Bond Issuances 2016-2022*



Source: Author's analysis, data accessed from Thomson Reuters (2022).

Figure 5.14 shows that the sovereign green bonds issuers dominantly allocated the use of proceeds for clean transport. Labelled green projects such as railways and other forms of public transport developments can be easily selected, and the proportion tends to dominate government expenditure. The figure also indicates that even though there is potentially a wide range of diversity in impact measurement for climate change adaptation and aquatic biodiversity conservations, these categories attract considerable attention among the issuers. However, it can be seen that renewable energy is underrepresented in the use of proceed classification.

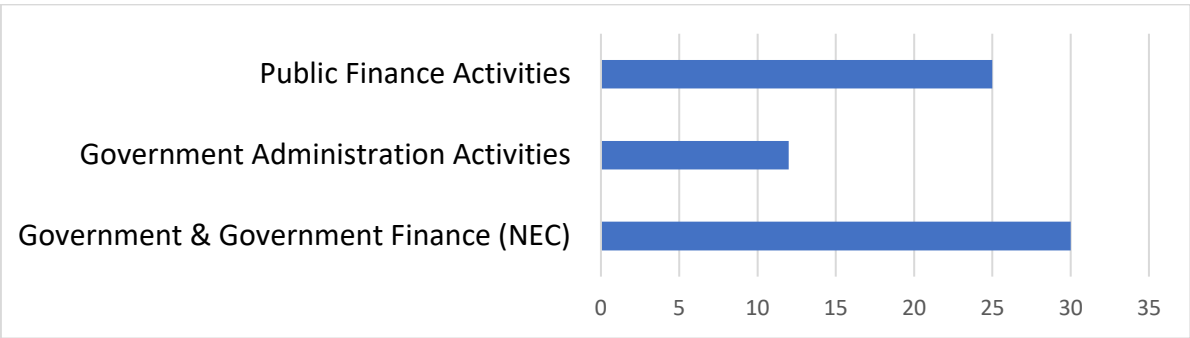
As countries need to finance the transition to a low carbon economy including the net-zero target, this form of green labelled financing has open spaces for further development to expand in financing projects in all of the green categorised aspects, yet constraint is situated in the structure of reductionist data and the nature of government expenditure. From the

variety of the GBP project classifications, it can be identified that the actual green projects might be more diverse due to technical structures in classifying and presenting data. The data to differentiate the green bonds are presented in a single column of the use of proceeds. Clean transport, for instance, can be seen as ‘a low hanging fruit’ that can easily be selected. It can be argued the supply and demand sides between green bonds investors and green projects finance need to be more ambitious to drive the market. However, the question remains in shifting operations in governing and managing the proceeds when the issuer’s main business sector is beyond the scope where green impacts can be generated. In this case the nature of the government structure is presented in the following section.

5.4.2 Managing the Proceeds

As the nature of the issuers comprise public finance activities, government administrations, government and government finance (NEC),<sup>11</sup> the issuers need to rely on other ministries to operationalise the green framework.

Figure 5.15 Business Sector Classification of Sovereign Green Bonds



Source: Author’s analysis, data accessed from Thomson Reuters (2022).

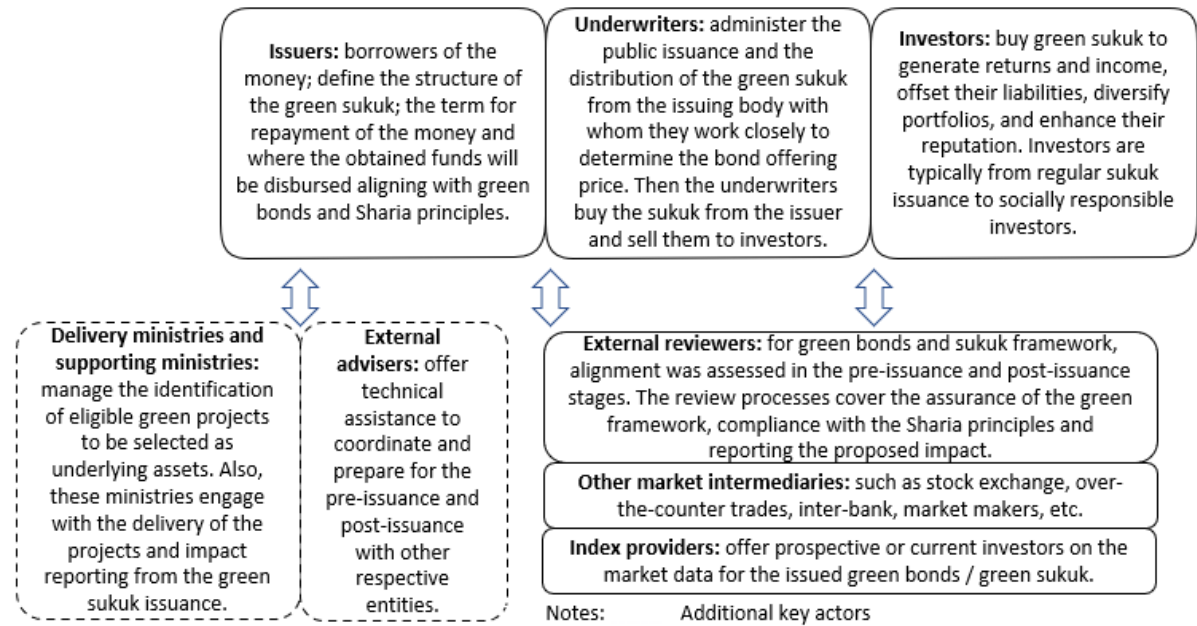
<sup>11</sup> Non-Gold Precious Metals & Minerals (NEC)



The Figure 5.15 presents the core business activities of the issuers. These sectors, however, are indirectly associated with the implementation of the use of proceeds as shown in Figure 5.14. Consequently, this form of financing issuance requires the implementing institutions to involve management from the selection of green projects to the impact reporting.

To understand the connectivity and disconnectivity of key stakeholders who are responsible for aligning with financial instruments and the implementation of climate actions, this study mapped the key actors in Indonesia’s issuance for sovereign green sukuk in Figure 5.16. Generating green asset accounts resulting from the issuance of sovereign green sukuk is beyond the authority of the debt management office. Consequently, issuing green sukuk needs to extend to key institutions based on authority, governing technologies and expertise required to deliver material outcomes. In this case, the Indonesian government collaborated with the external advisers and key delivery ministries for the NDC target.

Figure 5.16 Key Actors in Sovereign Green Sukuk



Source: Author’s illustration – based on document analysis.

Figure 5.16 presents additional key actors involved in the issuance of sovereign green sukuk. Each of the key institutions presents the governing technologies included in pre-issuance, and post-issuance. Here, the green framework encapsulates governing mechanisms to accommodate the demand for green sukuk accounting objects which will be elaborated in the following chapter.

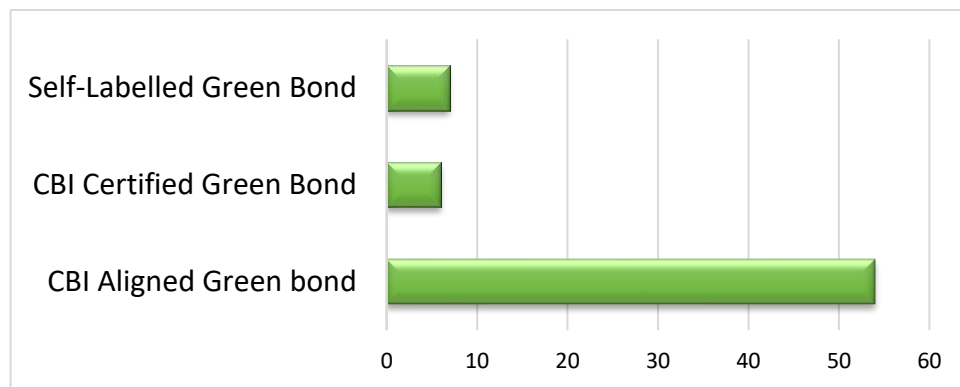
#### 5.4.3 Impact Reporting

Reporting is a major component of the GBP, and green bond issuers are obliged to report at least annually on the use of green bond revenues and the anticipated environmental implications (International Capital Market Association, 2021c). This aligns with the intention to reduce climate change being partially represented by formulating green bond markets. Consequently, the efficacy of this instrument is crucial as a manifestation of the Paris alignment resulting from the financing mechanism. However, unlike carbon prices in associated with carbon markets or taxes, this form of green impact does not associate directly with financial incentives resulting from the issuance. Despite the proceeds of the green bonds being allocated to green projects, it is crucial to understand the implication to offer added values to this green financing mechanism in the absence of a direct incentive mechanism.

The external assurance has been utilised by the issuers as part of maintaining the credibility mechanisms of sovereign green bonds. However, there have been no definitive guidelines on how to account for green impacts, and this ambiguity has enabled a variety of accounting methods to thrive. This may open space for development yet may also create inefficiency in

comparing, contrasting and evaluating. The diversity can be illustrated in the following Figure 5.17.

*Figure 5.17 Type of Sovereign Green Bonds*



Source: Author's analysis, data accessed from Thomson Reuters (2022).

The figure indicates types of guiding framework to determine the greenness of the bond. Among the issuers, the alignment to green bonds was seen as a moderate level to ensure the environmental integrity.

To understand the green label [...] we were assisted by the GLM [Green Lead Manager] on benchmarking the global green framework. For instance, the CBI [Climate Bonds Initiative] certification is more rigid. GLM did not recommend [the approach] for government because there is a lack of flexibility. Although it might be stronger. Of course, the complexity of government and corporate is different (Interview 34A, Market Development Officer).

Flexibility in the extent of greenness can be perceived as a consideration to participate in the sovereign green bond issuances. However, as noted above, determining the level of greenness

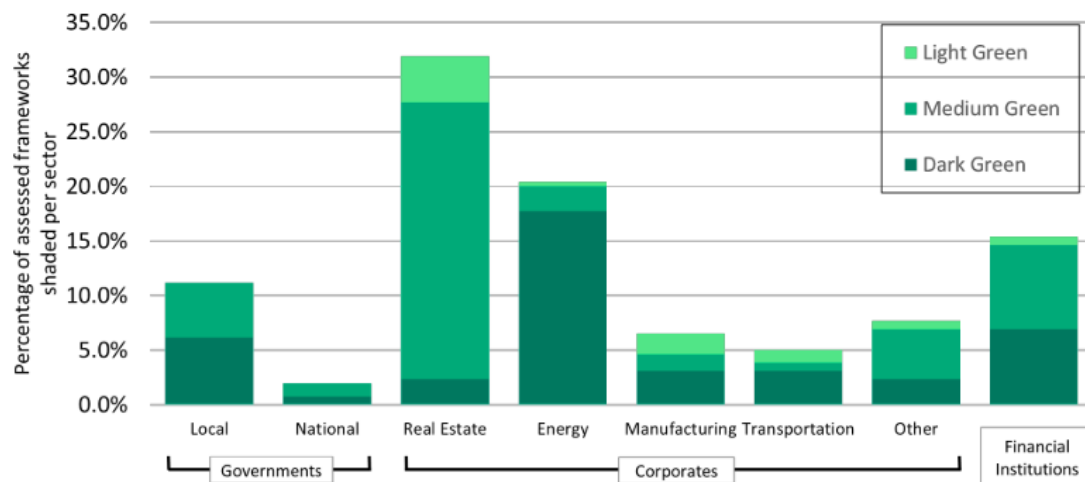
enables market participants to engage with the issue of climate change. This includes the presence of second opinion providers for the alignment approach.

The second party opinion is among the preferred external assurance in assessing the greenness of green bonds. This form of external assurance offers an analysis of the greenness of qualifying projects/assets under the issuer's green bond framework. The selection of the external assurance can also closely relate to the extent of greenness that can be classified and the underpinning rationales.

That's part of the thinking behind light, medium and dark, green that we have. At the time we develop the market in 2015, we have a lot of internal discussions about, "Should we just put our opinion on a dark green one, so those are really Paris aligned?" And we made a very conscious decision that "Yes, we still include that, but we want also include the lighter shade because we have to have every sector transitioning" (Interview 9, External Assurance).

As noted earlier that climate alignments were mainly selected by sovereign green bonds issuers. This form of alignments also emphasised as the basis in constructing multiple shades of greenness to accommodate transitions to a low carbon economy. In line with the research participant, in providing the assurance of the green framework, CICERO Shades of Green (2021), for instance, classified the potential environmental impacts of green bond issuers into dark, medium, and light green. The assignment of multiple classifications was perceived as an effort to mobilise green finance flows as demonstrated in Figure 5.18.

Figure 5.18 Percentage of Assigned Shades of Green (2015-2021) per Issuer Type



Source: CICERO Shades of Green (2021) as per August 2021.

Figure 5.18 demonstrates the composition of green classifications whereby the lighter the shades of green assigned to the projects the less consistently will project outcomes achieve a long-term plan for the net-zero target. As shown in Figure 5.18, government green bonds and sukuk issuances constituted the smallest proportion among other types of green bonds, with the medium shade of green dominating the market.

Consequently, this enables multiple projects that can be considered as green. This form of classification can positively encourage issuance from diverse backgrounds to participate. However, it is also crucial on how it affects beyond the business-as-usual given, for instance, the assurance between pre-issuance and post-issuance cannot be directly connected.

But to be honest, no issuers have signed up to assess pre-issuance and post-issuance simultaneously. I would like to do that [...] but I do not see that there are any issuers ready for that yet [...] You know, we have to balance a little bit, because

we don't want to scare any new issuers off. We still need to do our job, but we need to balance with the market, if no other market actors are doing that (Interview 9, External Assurance).

The statements demonstrate that the extent of green-labelled projects to represent the alignment with climate-related objective tend to be assessed in the pre-issuance stage, via green bonds/sukuk framework. However, articulating its greenness in ex-post assessment after the project being delivered is merely relying on the green impact reporting. Here, external assurance, an auditing firm, in a post-issuance stage is primarily focused on the allocation of the proceeds with a limited parallel assessment between environmental benefits and financial accounts to assure the greenness.

Simultaneously, the extent of constructing a stringent measure for green bonds in general is intersubjectively constructed between market participants. It is noticeable, transition approach to expand the green markets continue as a basis in which the green shades is perceived as an additional attribute to demonstrate the intention to engage with tackling climate change. However, the effort can be argued remain ambiguous without consistent pathways for further enhancements to address the global agenda of climate change. As such, despite the call for environmental integrity from a wide range of key stakeholders, shifting the extent of desirable efforts requires a balance with the market supply, demand and social groups that are involved. Furthermore, in the absence of direct monetary incentives to manifest environmental benefits in a financial instrument, green impact measurements will remain questionable to deliver its intended objective.

## 5.5 Summary

This chapter has presented the ideal programmatic agenda in practices and processes through the emergence of multiple governing technologies within the flow of green sukuk funds. This result has advanced prior studies in the articulation of climate change aspirations into meta-governance (Charnock and Hoskin, 2020) and technology of government (Rose and Miller, 1992) by offering contextualisation within the flows of accounts in responding to a call for research within the flows (Martinez, Pflueger and Palermo, 2022).

This chapter has contextualised the flows of green sukuk funds (green sukuk accounts) within a wider scope in public budgets and planning systems (climate accounts) and indirect flows to nominated projects (green asset accounts). To aggregate these accounts, this research named them climate-related financial flows. However, the Indonesian context is also closely related to the global context where the green sukuk is situated in sovereign green bond issuance. Similarly, the origin of accounting technologies to contextualise climate change conventions and principles in defining green or Sharia-based instruments are also closely related to the global situation. However, as the emancipative potential is approached by situating the accounts in the prevailing systems (Gray, 1992), these accounts were merely reflected to enable the analysis. In parallel, the stability of these accounts was contested given the nature of climate change which is in line with the development of accountability and environmentalism (Bebbington, Russell and Thomson, 2017; Gray, 1992).

Firstly, this study argues even though green sukuk is formulated as a technology to govern climate change by means of finance, it does not directly enable mobilisation of climate-related financial flows unless added values are clearly defined. This research indicated that the

creation of green sukuk as an innovative financial instrument is on a limited pathway to economise climate change objects. However, through the form of climate tagging, this accounting technology enables the reorganisation and articulation of climate change into multiple domains. The evidence shows that despite the effort of incorporating climate change agenda into financial instruments, the issuance of green sukuk does not directly reconstitute performance measurements. Instead, it is an effortful process within multiple layers, within the financial instrument level (green sukuk accounts), general treasury (climate accounts), and nominated projects (green asset accounts). Furthermore, each of the layers within the flow encompasses distinctive dynamics which are unpacked in Chapter 6 (green sukuk accounts), Chapter 7 (climate accounts), and Chapter 8 (green asset accounts).

This study highlighted that the selection of the Indonesian government's sovereign green sukuk issuance has indicated the inclusion of climate change programmatic agenda in the technology of government through its regular issuance (see in Figure 5.8). Regularity refers to the demand for a regularly produced green sukuk accountability mechanism to conclude green sukuk issuance. As such there is a potential for realigning the government financial management system to the demand for a typical green financial instrument to mobilise the flows.

However, the oversubscription in every issuance does not progressively enhance the flow of green sukuk, instead it was issued at a regular amount to maintain integrity towards the environmental pledge and Sharia principle. Given the financial instrument is issued by the government which purposely finances a wide range of imperative and political agendas,



balancing the three principles of development, Sharia, and green has invited another concern. The mediating process in fulfilling each of underpinning principles is analysed in Chapter 6.

In setting the context, it has been emphasised that climate tagging and green measurements have had a substantial role in enabling the flow to be organised instead of mobilising maximum climate-related financial flows. By presenting the context of tagging, this study demonstrated the original development of climate tagging in the government general treasury account to finance multiple government priorities (see Chapter 7 for further analysis). Also, the contextual position of the Indonesian climate tagging development among other countries was presented in Table 5.12. Furthermore, in response to the demand to allocate and disclose the progress of the green sukuk allocation, this study unpacked key governing technologies in constituting the green impacts (see Chapter 8 for further analysis).

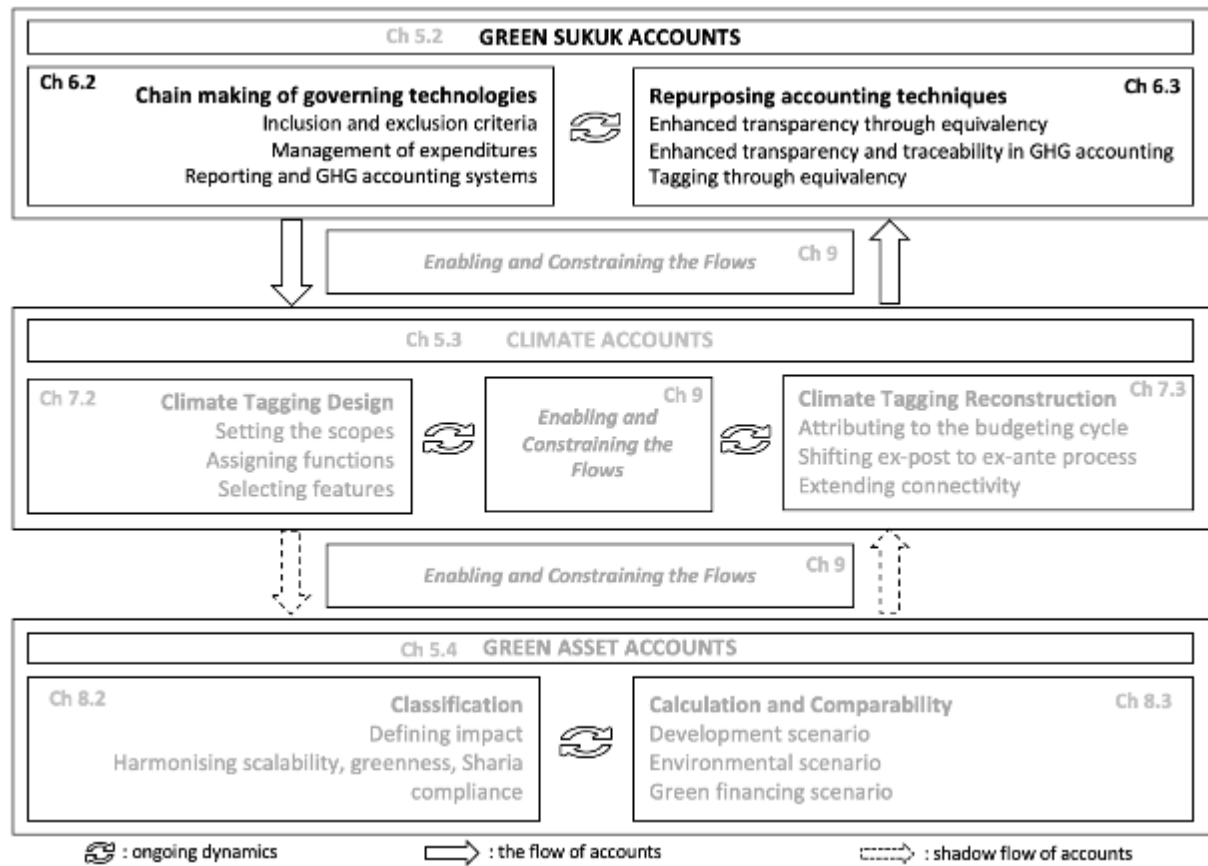
This chapter concludes by visualising the flow of green sukuk from the capital market, to the state budget to impact measurement. In light of the evidence, this chapter answered research question 1.1 on how climate change is contextualised in the flow of accounts. The flow of accounts encompasses green sukuk accounts, climate accounts and green asset accounts. In this perspective, this chapter contextualised the aspiration to articulate climate pledges into regular governing practices alongside ongoing problematisation and learning within the flows. Further details of the dynamics will be presented in Chapters 6, 7, and 8. As such, this research extends prior studies on the contextualisation of climate targets to regular practices within the flows by extending the work of Charnock and Hoskin (2020); Rose and Miller (1992) and the development of accountability and environmentalism (Bebbington, Russell and Thomson, 2017; Gray, 1992).

## CHAPTER 6. MEDIATING BETWEEN TRANSPARENCY AND TRACEABILITY

### 6.1 Introduction

This chapter will detail the constitutive role of accounting in mediating multiple programmatic agendas in governing sovereign green sukuk. It will concentrate on the context of the demand for enhanced transparency and traceability from the issuance to the generation of impact. Albeit the compatibility in the structure of the instrument, this form of financial mechanism faces a number of limitations when unfolding green sukuk accounting objects. Primarily, the challenges are situated in transparency and traceability within the Indonesian financial and GHG accounting systems. The solutions to maintain the accountability requirements of the green sukuk involved repurposing existing techniques within the government accounting system. The techniques indirectly tracked equivalent financial flows from the green sukuk. Nevertheless, problems emerged in how the flows of funds connected through the allocation and tagging of 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. Figure 6.19. will provide the area of analysis and the relation to other domains in the framework that will be elaborated further in Chapters 6, 7, 8 and 9.

Figure 6.19 Mediating between Transparency and Traceability



Source: Author's analysis.

Following the above objective, section 6.2 will explain the unfolding of green sukuk accounting objects and the limit of traceability. Next, section 6.3 will discuss how accounting techniques have been repurposed. Section 6.4 will then summarise the chapter.

## 6.2 Chain of Governing Technologies

This study indicates that the government as the sovereign green sukuk issuer reorganises existing governing technologies to construct chains, relationships and connectivity. Without changes in the existing practices and operational activities, the proposed impacts to tackle climate change issues could adversely impact the credibility of green financial instruments. To demonstrate the flow of the funds and technologies to ensure the impacts, this research

outlines the process of chain making, key characteristics, connecting devices, and key connected institutions.

*Table 6.14 Governing the Indonesia's Sovereign Green Sukuk: Chains, Characteristics and Connectivity*

|   | Chain making of<br>[1]                  | Key Characteristics<br>[2]                                                                                         | Connecting Devices<br>[3]                                                                                                                                                                         | Key Institutions<br>[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 advisers.                                                           |
| B | Selection process                       | Inclusion of mitigation and adaptation activities in the pool of eligible green projects.                          | Budget tagging process<br><br>Screening against green framework (nine categories of projects).                                                                                                    | Delivery ministries, the Ministry of Finance, BAPPENAS and the MOEF, 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).<br><br>Resilience Index Information systems.                                                                  | The Ministry of Finance, Delivery ministries, BAPPENAS and the MOEF, external assurance.               |
| E | GHG accounting systems                  | Principles, rules, and processes to inform and track the progress of achieving the pledge of NDC to GHG reduction. | GHG Inventory, Mitigation action plans, National Registry System, IPCC methodologies, internal governing devices, and data management system within each imperative delivery ministry and entity. | Sectoral ministries are coordinated by the Ministry of Environment and Forestry.                       |

Source: Raeni, Thomson and Frandsen (2022, p. 46).

By identifying key governing instruments in Table 6.10, this research examines the potential connectivity and disconnectivity to operationalise day-to-day practices. In doing so, the analysis is distinguished into three domains, inclusion and exclusion criteria, management of expenditure, and reporting alongside the impact reported in GHG accounting systems.

#### 6.2.1 Inclusion and Exclusion Criteria

This study indicates that the issuance of sovereign green sukuk holds similar characteristics in its primary consideration, inclusion, and exclusion criteria. However, implementing the criteria that can satisfy the objective of the development of financial instruments may face some challenges. In green sukuk issuance, the accounting objects need to comply with green principles and Sharia-based principles which imply what objects of financing can be included and excluded. Meanwhile, as this initiative is adopted by the Indonesian government with concurrent government priorities, this adds the basis for operationalising the green sukuk initiative.

To demonstrate the green soundness, the GBP framework operates as normative guidance. The GBP guided by International Capital Market Association (2018; 2021a, p. 2) offers authoritative and general guides for green bond issuance to align with the role of debt markets “in financing progress [for] environmental and social sustainability”. Consequently, issuers of green bonds are expected to demonstrate green credentials. This credential is reflected in what the GBP highlights as “a step-change in transparency that facilitates the tracking of funds to environmental projects, while simultaneously aiming to improve insight into their estimated impact” (International Capital Market Association, 2021a, p. 2). As the issuer of the

green sukuk, the government demands the construction of accounting objects with a more granular level of transparency and traceability.

Simultaneously, the environmental soundness to align with a net-zero emission economy demands stringent methodological practices. From the initial establishment of the GBP in 2014 to the recent GBP in 2021, the framework guides the operationalisation of traceability in the core components of the use of proceeds, project selection, management of proceeds, and impact reporting. This shifting, however, does not only apply to technical processes but also to connecting technologies, aspirations, and expertise in the construction of traceable outcomes. On the contrary, this authoritative framework which offers flexibilities also facilitates diversity in the process of governing. As such, the concern over transparency has been heightened despite the existence of external reviews to assure the framework and impact reporting. The research respondents perceived that the assurance serves as a guard to bridge between investors (bondholders) and sukuk/bond issuers' expectations in operationalising green principles. In performing the review, the 'do no significant harm criteria' facilitates as initial screening criteria to the project alongside the multiple green classifications as analysed in Chapter 5.

As an illustration, as reported by the external reviewer, CICERO (2018, p. 6):

New fossil fuel-based electric power generation capacity, large-scale hydropower plants and nuclear and nuclear-related assets will not be eligible under the framework. Fossil fuel infrastructure is also excluded from eligibility for energy efficiency projects.

However, ensuring the funding allocation does not flow in multiple directions which negate the carbon-intensive projects may contradict with development priorities. Under optimising public values of the state budget, national medium-term plans serve as the basis for budget approval and resource allocation. These criteria raised further questions when the country emphasises energy security and accessibility as national priorities of the development in Indonesia.

As noted in Chapter 5, fossil fuels, in particular coal, dominates the electricity industry since it is an affordable power source. Indonesia has substantial hydro and geothermal renewable energy resources, but their use is limited by high investment costs and a timing mismatch between resource and demand centres. Due to this exclusion criteria, the energy efficiency area becomes less attractive to be included in any green issuance despite the demand for decarbonisation across sectors.

Furthermore, the existing public accounting system allocates financial flows to the general treasury accounts. When the money flows through general financial mechanisms, it is unavoidable that the funding flows according to the exclusion criteria. To anticipate and accommodate the exclusion criteria, the Indonesian government views the existence of the national climate action plans as the basis for the allocation.

There are potential green investors who can fund climate change programmes in Indonesia, [...] Indonesia has a national climate mitigation and adaptation action plans, [...] then there is a need to finance climate change (Interview 01, Director General of Budget Financing).

As discussed in the previous chapter, in selecting climate action plans development priorities serve as the primary pillar to align with the mechanism in allocating governmental budget. For the initial development of the green bonds, this basis can be a way to allocate funding to climate-related expenditures. However, for later development, it is questionable how this type of sovereign green sukuk enables acceleration of the mobilisation or offers actual distinctive features from other traditional instruments. There is concern over the ability of green financial instruments to strengthen climate actions when business as usual continues. This implies accelerated funding or environmental objectives and flexibility should be adopted at the market development stage.

In line with green principles, Sharia principles also function as critical elements for green sukuk. Exclusion criteria also underpin the sukuk transaction. In terms of *muamalah* (relationships between mankind), the Islamic financial system is founded on Sharia law. The fundamental principle of *muamalah* is that any activities are permitted unless there is a proposition indicating impermissible factors. In the Government of Indonesia, Law number 19 (2008) guided fundamental constraints to ensure economic activities are fair and ethical and include prohibitions against engaging with *riba* (usury), *gharar* (uncertainty), and *maysir* (speculation). To avoid unlawful transactions, the Ministry of Finance (2015b, p. 8-9) suggests “the important of transparency and clarity in economic activities. [...] Thus, obligations of each contracting party must be clearly stated in any occurred transaction, as well as accountability must be maintained”. The statement implies the demand for Sharia compliance in allocating the flow of funds.

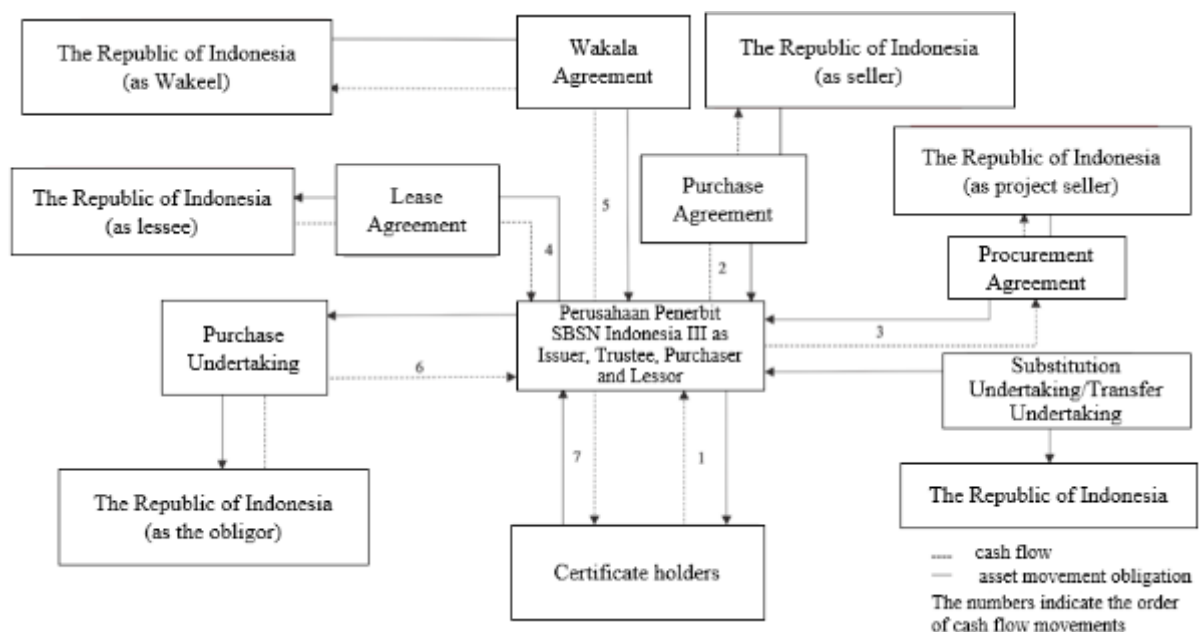


In parallel to the exclusion criteria:

Because we are in the realm of Sharia, instrument development is not limited to financial packaging, but Sharia aspects are also necessary. Consequently, our responsibility is also dealing with the contract of Sharia structure, in addition to general financial considerations (Interview 34A, Market Development Officer).

The statement stresses the demand to accommodate flexibility and compliance. Flexibility is required to enable the green sukuk issuance streams in the general financial mechanism while the structure of the transaction needs to align with a Sharia-compliant structure. As such, the sovereign green sukuk issuance adopted the *wakala*<sup>12</sup> structure whereby the flow of the fund and assets is presented in Figure 6.20.

Figure 6.20 *Wakala Series: Structure Diagram*



Source: Offering Memorandum in Ministry of Finance (2018b, p. 3)

<sup>12</sup> *Wakala*: an agreement wherein one party, gives another party the authority to act on their behalf in accordance with the terms and circumstances.

The *wakala* contract was developed to address inefficiency in other forms of sukuk transactions through the flexibility of the contract and optimises the use of underlying assets.

The Ministry of Finance (2015b, p. 127) noted that:

one [advantage] of Sukuk Negara *Wakala* is flexibility in using the underlying asset [...] shall be any combination of many types of assets both tangible and intangible assets, including goods, services, projects or other assets that are complying with the principles of Sharia.

This flexibility is restricted with at least 51% of the activities in the form of tangible assets to ensure avoiding uncertainty (*gharar*). The question arises in operationalising the flexibility under the greenness in allocated funding.

Another consideration in this instrument development as mentioned above is the general financial consideration. The Ministry of Finance (2015b, p. 30) advises that:

the sukuk issuance proceeds intended for general financing shall not be allotted/allocated to finance any particular activity or project but included in overall budget of the issuer and fused with other source of revenue or financing. Further, the proceeds will be allotted to finance any required expenditure.

The statement implies that the accountability mechanism within the transaction encompasses potential dual meanings between maintaining the flexibility and compliance.

It can be argued that transparency and traceability become a key concern in operationalising the compatibility of the principles. However, the extent of the transparency that can be

performed to encompass the principles and government mechanisms is ambiguous. However, the transparency attached to the object of financing itself can be elaborated further in the following section.

#### 6.2.2 Management of Expenditures: Underlying Assets, Financing, Refinancing

The previous section elaborates characteristics, flexibility and maintaining compliance for each of the principles. Also, this study highlights the demand for transparency to traceability in generating impacts, primarily, the existence of underlying assets that incorporate Islamic, green, and development principles. The dynamics in managing the expenditure while delivering underlying assets that can be traceable albeit flexible features are emphasised by the interview respondents:

For sukuk, there must be underlying projects that must meet Sharia compliance. This underlying project does not exist in a conventional method, but it is seen as a whole of economic fundamentals. [...] Why do we choose sukuk? because green bonds and sukuk are similar. Both require underlying assets (Interview 1, Director General of Budget Financing).

So, the underlying is yes, but we are not earmarked. That is project financing, this is called a financing programme to finance the overall state budget. There is an underlying, but it is flexible (Interview 4, Issuer).

We have already explained that the state budget mechanism is like that. It is as if that money issued a sukuk to build this. But the system will not be visible, no specific account can be made. [...] Because if that is the case, the state budget's

flexibility will decrease. State budget has priorities (Interview 34A, Market Development Officer).

These statements demonstrate the demand for what this study calls green underlying assets. Unlike other types of underlying assets, the green sukuk assets demand material values that accommodate the underpinning principles of climate mitigation. These assets are expected to align with green criteria and Sharia principles as both principles share their dimensions closely with development principles. In this sense, the traceability of the projects can be questioned given a flexible approach is adopted. It is important to note that the issuance of Sharia-based financial instruments need to avoid 'uncertainty' in their transaction, attributes, and consequence of their transaction. However, maintaining that is problematic in not only technical processes but also encompassing programmatic agendas alongside the process.

Furthermore, allocating a typical green financial flow into the general financing mechanism of the government budget has been implemented by the majority of sovereign green bonds issuance. This approach is favourable given the compatibility aspect within the existing system and efficiency through the aggregating of multiple projects into the programme mechanism as suggested by interviewees:

If we stand alone, we issue one by one, one by one new documents. But for the programme, there is one main document for a number of projects. Then we discussed with the Green Lead Manager, that if we issue green bonds, green sukuk, there was nothing in the issuance document except for a few in the offering memorandum document (Interview 34B, Debt Management Officer).

These are what we called project-financing bonds and general financing. For project financing, we issue bonds for certain projects. So, for now, [this is] why we use common bonds and sukuk instead of regular green bonds. At least both need a foundation. It is not destined to be allocated to a specific project but has been allocated to a specific project as a basis. So, it's neither purely a bond project nor completely general financing. There's a distinction (Interview 29, Issuer).

Based on the statement above, the programme financing approach has been selected for the green sukuk issuance. In this context, programme financing covers a set of projects facilitated as a basis for the issuance that potentially can be replaced if there is a failure in meeting the completion. However, unlike other programme financing, the offering memorandum also stated the use of proceeds, the external reviewer and the existence of a green structuring adviser as the primary distinction. For instance, instead of declaring the proceeds are intended for general financial requirements, the offering memorandum document (Appendix 6.7), pricing term sheet stated as follows:

The Republic will use the proceeds it receives from the issue of the Certificates exclusively to finance or refinance expenditure directly to “Eligible Green Projects” as defined in the Green Bond and Green Sukuk Framework (Ministry of Finance, 2018b, p. 53).

By purposing specifically to eligible green projects compared to other forms of the use of proceeds (see Figure 5.14), this authoritative framework offers more flexibility. Meanwhile, without accounting technologies that enable shaping and reshaping the connectivity between

the funding flows to climate actions, this mechanism could face some criticisms and raise multiple interpretations:

In terms of general financing, before we discuss green domain, it can be interpreted how the government is to finance activities that have been planned in the state budget but lack funds. It means to overcome the deficit. There are green sukuk, sukuk, etc., which are obtained by issuing bonds (Interview 30, Fiscal Policy Officer).

I think the typical green market is dominated by refinancing. But [...] it also supports the idea around reporting to look at the track records of the investing rather than saying we're going to put in green projects. In the green bonds market, it's typical to have an element of refinancing. Anyway, investors have the concern to report the project that has been already underway. That means the project already has been implemented, not just the allocation but also the impact (Interview 12, Green Lead Manager).

Earmarking and underlying assets were mainly discussed by the key institutions as the green sukuk flows to the general financial mechanism (further illustrated in Figure 6.21). In essence, the government utilised existing budgetary activities dedicated to green-related activities to serve as underlying which comply with Sharia principles and align with the use of proceeds as listed in the green framework. This underlying asset itself is flexible in a way that can be replaced with different assets when it does not meet the requirement as stated in the framework. This flexibility seems to be appealing for the nature of government budgets to

gain efficiency in managing the government budget. However, the extent it can contribute to and accelerate financing for addressing climate change continues to be problematic. These refinancing types may show immediate potential environmental impact, but this type of project or activity has been financed from other types of financial instruments which may represent business as usual.

### 6.2.3 Reporting and GHG Accounting Systems

The previous section demonstrated the alignment in ensuring compatibility between Green Bond Principles, Sharia principles and development principles. In this section, this thesis reports on the allocation of the green sukuk issuance, and the impact generated from each of the eligible green projects that facilitate as the marking point in the first impact reporting.

For the first issuance in March 2018, we have to report the progress by February 2019. We finished it at the end of January 2019. You can see on our website that it is already there. Then we launched the second issuance. It has also been audited by KPMG. So, from the report it can be seen whether it is true or not if we have delivered according to our promise (Interview 1, Director General of Budget Financing).

After the issuance of USD 1.25 bn, the homework was producing the report. At the same time the report cannot be carried out by the Ministry of Finance alone, but all the relevant ministries. However, for some cases, the initial response was 'that's not our jobs' (Interview 7, Programme Manager).

In the initial reporting process, it took quite a long time given disconnectivity. For instance, the activities financed by the green sukuk are A, B, C, D. Then those needed to be adjusted as the emission reduction for each of the projects could not be verified if we were adopting the GBP. In GHG Inventory and MRV report, we had a different naming standard (Interview 27, MRV).

The statements illustrated the dynamics in demonstrating the relationality between GHG accounts and financial accounts from the project-based level to green financial instrument level or vice versa. Unlike other types of financial instrument, the demand for counterflows resulting from the pledge to produce impact from the issuance marked the visibility of disconnected governing technologies. At the same time, the issuer pledged to report 51% of the underlying assets which were streaming to green projects. In this sense, this study found that there was widespread use of accounting technologies through tagging, tracing and earmarking under the name of climate tagged to repurpose existing accounting technologies. Further discussion is presented in the following sections.

### 6.3 Repurposing Accounting Techniques

To mediate the compatibility, this study identifies the dominant use of climate tags to mediate between transparency and traceability. As shown in Table 6.10 a number of governing technologies were compiled and aggregated the core component of the green sukuk initiative. The subsequent paragraphs will elaborate the scenarios in repurposing accounting technologies to formulate the counterflows, upstream and downstream form of accountability.



### 6.3.1 Enhanced Transparency through Equivalence

The transparency requirements contained in the Green Bond Principles (International Capital Market Association, 2018, 2021a) 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" (Interview 34A, Market Development Officer).

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

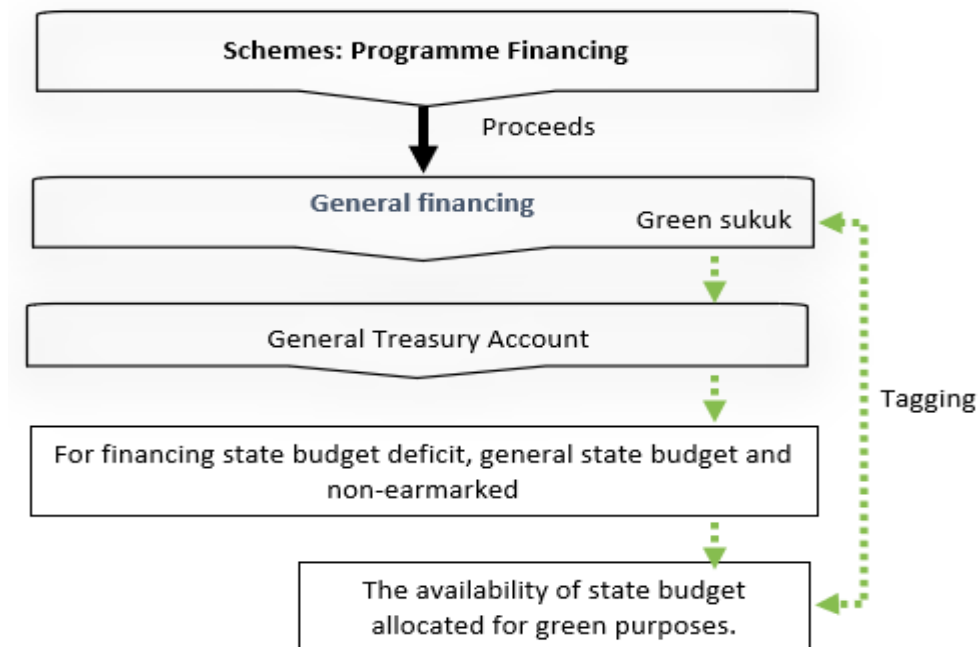
Sovereign Green, Social, and Sustainability (GSS) bonds finance expenditures rather than projects, and these expenditures are not usually newly created. Most respondents told us their GSS bond-financed expenditures from current or previous budgets (Climate Bonds Initiative, 2021, p. 5).

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 in accordance with Islamic principles.

For programme-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 (Interview 22, Development Planning Expert).

This statement illustrates the varied interpretation of the amount of attribution between programme funding and project finance. Nonetheless, the statement clearly underlines that green sukuk must be asset-based or asset-backed and should not be used to finance general expenditures. Despite this, the analysis revealed that funds from the Indonesian green sukuk were combined with other government revenues in a general treasury account (see Figure 6.21 below), and primarily intended “for financing state budget deficit, general state budget, and non-earmarked” (Directorate of Islamic Financing, 2019, p. 13).

*Figure 6.21 Programme Financing Mechanism*



Source: adapted from 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 operate 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 creating separate accounts and new systems in the state budget. It is not possible (Interview 34B, Debt Management Officer).

This Debt Management Officer notes the weakness in using 'earmarked'<sup>13</sup> equivalent financial flows to construct the accountability of the green sukuk. This critique also 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

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<sup>13</sup> Earmarking was used by some respondents to describe climate tagging.

pragmatic solution that repurposed the existing accounting numbers available in each associated institution (see Table 6.14, 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 Shading<sup>14</sup> in recognition of its long-term commitment to eligible climate projects in pursuit of its NDC from the Paris Agreement alongside its low carbon development programme (Alfsen *et al.*, 2018).

### 6.3.2 Enhanced Transparency and Traceability in GHG Accounting

This 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, subdivided into five priority sectors,<sup>15</sup> 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

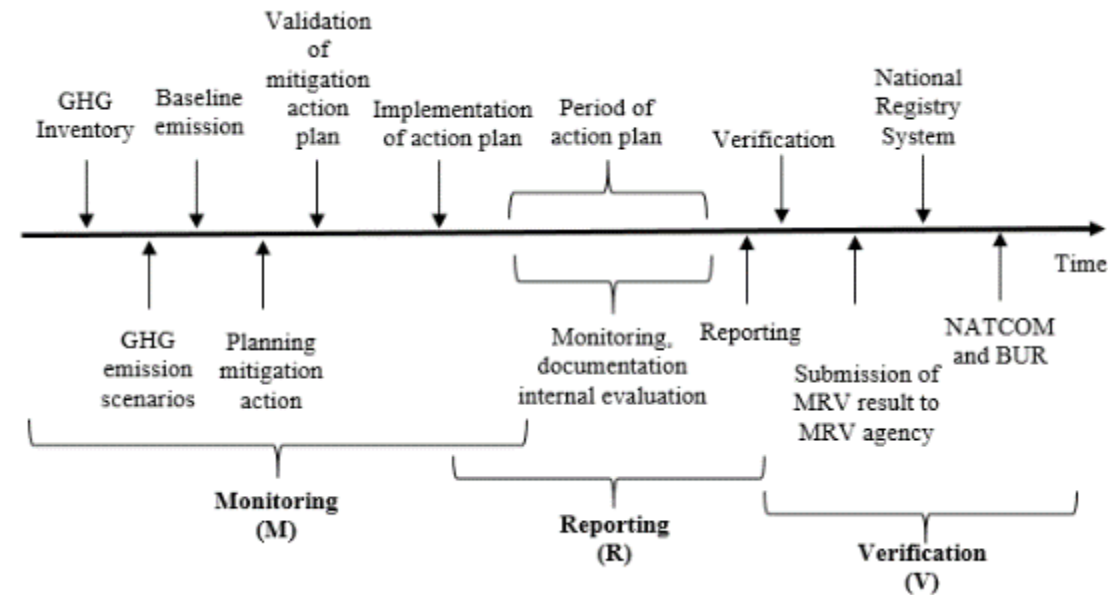
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<sup>14</sup> The independent assurance such as CICERO assesses green shading to signal relevant parties about the potential environmental impact of projects that are included in the green framework for green bond issuance. Prospective projects are classified into 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.

<sup>15</sup> These are energy, industrial processes and product use, forestry, agriculture, and waste.

framework by the UNFCCC (2016) and was adopted by the government of Indonesia as represented in Figure 6.22.

Figure 6.22 National GHG Accounting System



Source: adapted from the Second Biennial Update Report, Government of Indonesia (2018)

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 National Registry System for Climate Change noted that differentiating GHG by the source of funding was not its primary emphasis. Instead, this system focused on accounting for the GHG emission reductions from each sector from climate mitigation actions. The Directorate-General for Climate Change, Ministry of Environment and Forestry as the coordinator for the monitoring, reporting and verification (MRV), confirmed this sectoral accounting focus in the Third Biennial Update Report: “[...] the implementation of MRV with the main task of engaging all sectors that implement climate actions, namely government, private, and public” (Government of Indonesia, 2021a, p. 4-2).

To achieve its 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, this study 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 problem in connectivity is related to a misalignment between green sukuk eligible projects and the Indonesian government's five priority NDC sectors. According to Green Bond Principles (International Capital Market Association, 2018, 2021a) 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, p. 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 their initial evaluation. This 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. The 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.

### 6.3.3 Tagging through Equivalency

As noted above, this study observed that the government pooled green sukuk funds in the general treasury account instead of dedicated accounts, with a 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 6.21). 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, 2015a).

Earlier to the introduction of green sukuk, climate tagging was a regularised part of the financial budgeting and planning system used to align the Indonesian government's accounts with politically determined national action plans. However, this study 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 (Interview 26, 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 (further elaborated in Chapter 7), and thereby tracking 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 this study 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 (Interview 34A, Market Development Officer).

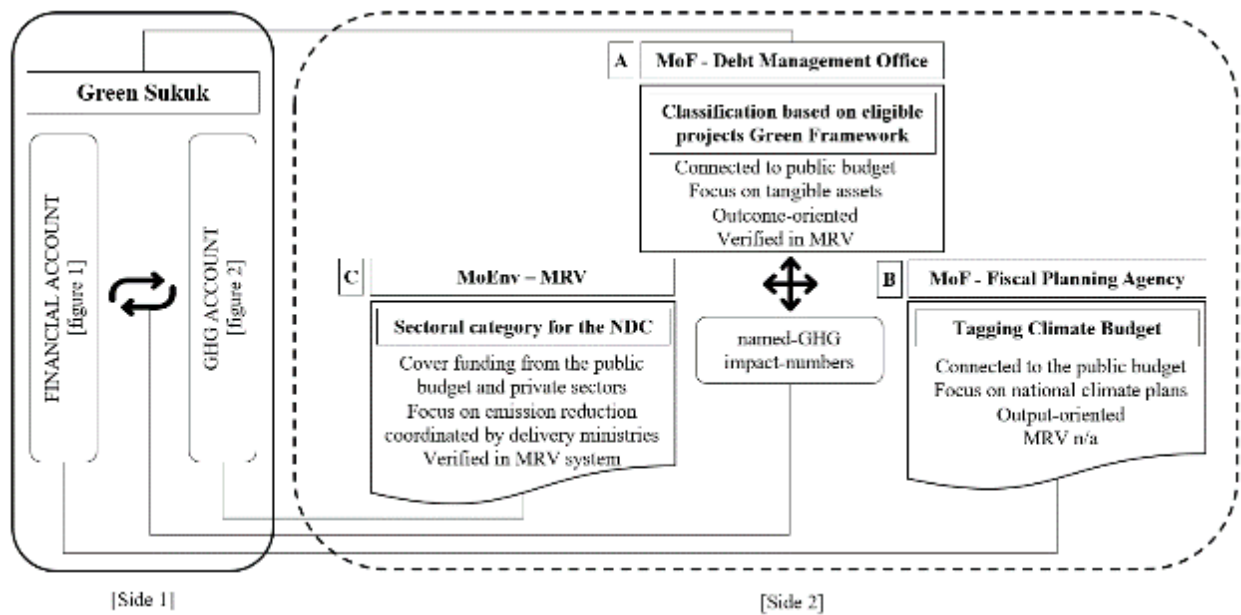
The government used data from tagged climate budgets to evidence the size of funds allocated to government departments and the amount spent. The climate tagging of equivalent financial flows allowed the possibility of green sukuk funds being used to refinance existing projects or to be connected with 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 (Interview 30, Fiscal Planning Officer).

The statement highlights the time span in selecting the period of underlying assets to meet the *wakala* structure for the sukuk issuance. Under this *wakala* structure, 51% should be presented in assets whereby that wholly owned by the issuers and can be transferrable to the sukuk holders. In maintaining the traceability of the asset, this research 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 6.23. However, there were concerns about the connections between the GHG accounting system and the MRV report for the NDC performance (side 2 of Figure 6.23). The connection between the GHG accounts and financial accounts that flow from the general treasury accounts was reformulated 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 6.23). Figure 6.23 provides an overview of the interplay between the different accounting systems and institutions that produce these other accounting numbers and objects.

Figure 6.23 Constructing Environmental Integrity of Equivalent Finance Flows



Source: Author's analysis.

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 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.

This analysis suggested that it was concern 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.

#### 6.4 Summary

This chapter highlighted the dominant constitutive roles of accounting in mediating (Miller and Power, 2013) multifaceted aspirations (Sharia, green, and development principles) that were rendered in the green sukuk accountability mechanism. It has been argued that the demand for transparency and traceability at the instrument-level accountability mechanisms requires the formulation of counterflows. The counterflows provide accountability creating a new direction for green sukuk accounting objects to enable the formulation of GHG accounts

and financial accounts in adherence with the Sharia-based principles and the authoritative framework of green bonds and sukuk.

However, this study indicated the disconnectivity of governing technologies to accommodate the demand for transparency and traceability at the financial instrument level. Therefore, this chapter offered empirical evidence to advance prior studies on transparency and traceability (Power, 2019; Quattrone, 2022) by unpacking the way aspirations, practices and processes were mediated to enable and constrain the flow of the funds through accounting technologies, covering tagging, tracing, and earmarking. By doing so, this chapter also adds to the discussion of mediating multiple programmatic agendas into practices and process (Kurunmäki and Miller, 2011; Miller and O'Leary, 2007; Thomson, Grubnic and Georgakopoulos, 2014).

Green sukuk accounting objects mediate multiple aspirations alongside the flow of accountability (the counterflows) from the instrument to projects and from projects to the instrument level. In particular, this demonstrates the greenness that is also contributing to the real economy. Therefore, material outcomes become the main focus in constructing accountable objects which embed various principles. This study identified that the green sukuk material outcomes were manifested in the configuration between financial accounts and GHG accounts that connected to real economic development. However, formulating the accountable objects in the existing system without considerable changes has invited conflicting dynamics as these accounts are neither designated for green purposes nor hold Sharia-based principles in the initial transaction. Furthermore, this chapter highlighted the

governing technologies to construct financial accounts and GHG accounts were initially disconnected given the nature of the public accounting system to facilitate multiple purposes.

In the efforts to develop connectivity between discrete domains, this chapter has revealed the role of climate tagging to mediate the green sukuk flows and constrain the misalignment of the flows. In doing so, this chapter has unpacked the chains, characteristics, and connectivity of governing devices to articulate the green sukuk initiative in prevailing governing technologies. The chain making is characterised with inclusion and exclusion criteria, management of expenditures, reporting and GHG accounting systems. By unfolding these chains, this study identified the disconnectivity and dynamics in embracing compatibility within the principles. This analysis suggests that to problematise and to seek solutions in providing transparency and traceability in green sukuk accounting objects, chains of decisions were formulated in three ways, despite limitations. Firstly, via enhanced transparency through equivalence. Secondly, by enhanced transparency and traceability in GHG accounting. Thirdly, by tagging through equivalency. From the formulation of those approaches, this research indicated the dominant role of climate tags to enable and constrain the flow.

Furthermore, this research observed that the government dominantly utilises accounting technologies (tagging, tracing, earmarking – via climate tagging) to enable and constrain the flow and the demand for the counterflows of the green sukuk initiative. Climate tagging helped maintain compatibility between principles, flexibility and compliance with the framework; it promoted connectivity from process to outcomes and ongoing problematisation for continuous enhancements. However, constraints remain in reconciling between the material and procedural in ethical, social and ecological outcomes (will be

discussed further in Chapter 8). As such, this chapter answered research question 1.2 on how green sukuk accounting objects were mediated between transparency and traceability from issuance to impact – and adds to the conclusions drawn by others that have problematised the discrete arena (Kurunmäki and Miller, 2011; Miller and O'Leary, 2007; Miller and Power, 2013; Thomson, Grubnic and Georgakopoulos, 2014) by unfolding connectivity and disconnectivity in formulating proposed material outcomes in the demands for counterflows as a form of accountability for the green sukuk initiative.

Moreover, the central use of tagging in maintaining flexibility in operationalising the authoritative framework while complying with primary principles (Sharia, development, and greenness) was shown to be the performative role of accounting in subjectivising governable entities, despite in very limited way. Consequently, to enable the flow of the green sukuk and constrain the flow streams to avoid unexpected adverse impacts, this study suggests the need to strengthen the counterflows to provide accountability and optimise the use of tagging to channel the disconnected governing technologies in mobilising climate-related financial flows.

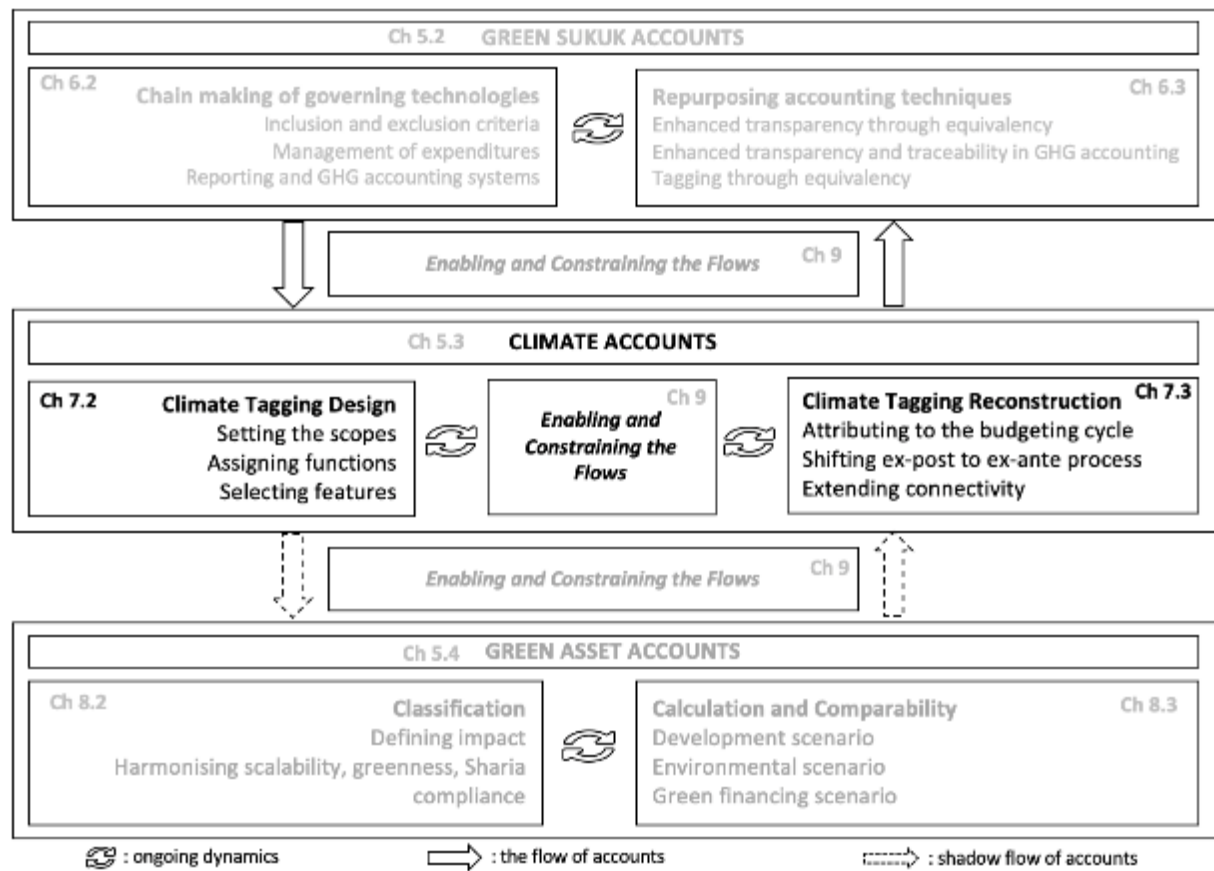


## CHAPTER 7. CLIMATE ACCOUNTS IN PUBLIC ACCOUNTING SYSTEMS

### 7.1 Introduction

The previous chapter analysed the loss of traceability when the flow of green sukuk goes into the general treasury accounts – public accounting systems. This chapter will address the research question of how climate change is constructed in the Indonesian government's public accounting system. For the purpose of the analysis, the accounts named as climate accounts are referred to as capturing a set of climate-related materials embedded in the design and reconstruction of the accounts. Instead of perceiving them as a stable set of territories that embed calculative practices, this chapter will demonstrate discursive processes in territorialising climate accounts by deploying accounting technologies. The construction of accounting technologies, namely climate tagging that encompasses tagging, tracing and earmarking, will be unpacked. This chapter will also reveal enabling and constraining attributes that mobilise the flows of a climate-related financial instrument which stream to the Indonesian government's planning and budgeting systems. In doing so, Figure 7.24 provides an overview of the key outlines in relation to other chapters and will be followed by a synopsis of this chapter.

Figure 7.24 Territorialising Climate Accounts



Source: Author's analysis.

Section 7.2 will analyse the climate tagging design as a basis for climate accounts. Then section 7.3 will elaborate on the reconstruction of climate tagging to mainstream climate change to other territories within public accounting systems. Subsequently, section 7.4 will present a conclusion of this chapter.

## 7.2 Climate Tagging Design

### 7.2.1 Setting the Territory of Climate Accounts

This research indicates that constructing a territory that embeds calculative spaces for climate accounts covers the entanglements of multiple settings. However, the design of the initial territory reorganises climate change beyond the core sectors for tackling climate change. As described in Chapter 5.3, the public budgeting and planning domains span beyond the sectors to govern Indonesia's climate target. To ensure the sufficiency of processes to perform climate actions, this research identified three approaches closely related to climate accounts. These concern environmental protection, development planning, and the economic value of carbon. Firstly, part of the functions under the Ministry of Environment and Forestry is to carry out environmental protection and management. Secondly, the government budgeting process is to assess the capacity of public spending to mainstream climate change. This approach is closely related to national development planning, where the government priorities are coordinated. Thirdly, economic-value-related instruments accelerate funding for climate change, such as financial instruments, and carbon pricing that incorporates carbon markets, and taxes.

However, as climate change is a wicked problem situated in diverse domains that encompass multifaceted interests, constructing climate change extends beyond a single space, functionality, responsibility, and authority. This implies the need to construct the demand in accounting for sufficient funding for climate change attributed to multi-dimensional territories. The following analysis will demonstrate the intersectional aspects among the territories, key characteristics, and implications.

#### 7.2.1.1 Environmental Protection and Management

Ensuring sufficient funds for government activities is closely associated with the Ministry of Finance's function. At the same time, climate change itself is under the sub-function of the Ministry of Environment and Forestry (MOEF), which is responsible for a wider remit of environmental protection and management. However, this territory is connected through the line of coordination with the international climate convention, as Indonesia is a signatory of the UNFCCC. This configuration enables the flow of progress in tackling climate change. In contrast, the distribution of the flow of funds or financing for climate change is situated in multifaceted authorities beyond the coordination of the MOEF. Consequently, the MOEF does not have authority over other ministries that are included to represent the party stakeholders, as elaborated in Chapter 5.

Nonetheless, the MOEF serves as the coordinator of national climate finance. As such, in setting the territory under environmental and protection management there is a need to consider the following attributions: "Even though there is a definition [on climate finance] and then the definition is not in line, aligning with our philosophy, with our regulations, with our needs, we will make our definition" (Interview 37, Director-General Controlling Climate Change). The statement suggests three primary considerations in defining climate accounts, including philosophy, regulations, and needs. These elements can be seen as abstract attributes given the implication of flexibilities in operationalising, while it can be problematic to set a boundary.

The attribute of flexibility is also advocated in the global climate change convention, that is, through the Common but Different Responsibility and Respected Capacity (CBDR) principles. Consequently, defining calculable spaces to account for financing climate change would create diversity. This principle also offers the flexibility to determine the scope of commitment for each nation in taking responsibility for climate change issues. To harmonise with international commitments, the CBDR principle was perceived to facilitate a key foundation to align with the existing law and government regulations, particularly in the inclusion of the government budget and financial instruments.

For instance, Law Number 32 of 2009 on environmental protection and management has been considered an initial guide to developing other governing instruments in Indonesia. It is under articles 45 (1) and (2) that budgeting and financing were highlighted. This rule mandates that the “Government and People’s House of Representatives (DPR) of the Republic of Indonesia and Local Government and the local house of representatives (DPRD) shall allocate sufficient funds for protection and management of environment” (Government of Indonesia, 2009). The rule suggests maintaining the sufficiency of funds while determining its level, which might be unclear as environmental protection and management exceed the boundary of one institution and are beyond the primary government priorities, as analysed in Chapter 5. The sufficiency can also be contrasted with the primary priorities which are open to ambiguity in interpretation and operationalisation. Furthermore, the environmental ministry covers not only the climate change domain but also other areas, from waste, biodiversity, and wildlife protection to forestry.

#### 7.2.1.2 The Economic Value of Carbons

It is stated in the previous section that one priority for the government is setting the economic value of carbon. This regulation is stipulated under Presidential Regulation No. 98 of 2021 regarding the Implementation of Carbon Economic Value for Achieving Nationally Determined Contribution Targets and Control of Greenhouse Gas Emissions in the National Development (Government of Indonesia, 2021c). By enacting the regulation, the definition of carbon encompasses multiple dimensions, which are stated as follows:

Carbon as a universal indicator in measuring the performance of climate change control efforts which are reflected in the contribution determined nationally, in addition to having important economic values and having international dimensions, mainly in the form of economic benefits for the community as well as a reflection of the principles of sustainable resource management in accordance with the mandate of Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia (Government of Indonesia, 2021c).

From the newly developed regulation, carbon is an object for economic activities alongside the global commitment to climate targets. The science behind the potential adverse impact of inaction and the urgency to tackle global warming is beyond the purpose of the regulation. Furthermore, tracking climate accounts by configuring with economic values of carbon needs a clear definition at an operable level.

As carbon is articulated in multiple spheres, problems arise when the entanglement within domains translates to carbon. This study identifies the divergence in defining climate finance

has invited the potential of mainstreaming climate change discourse in multiple settings even though limiting the boundary of accountable objects causes another complexity. For instance, during a working group meeting to formulate the scope of defining carbon at operable level, the discussion could be demonstrated in the following statement.

We first need to focus on how we start defining, including compiling the scope. So that later, we have the same frame. Whereas what is said to be low carbon development finance is defined like this. Climate change fiscal framework like this. When mapping, we know this is related to fiscal. This is related to the market, such as carbon pricing (Observation 9, Carbon Market Expert).

The argument was raised given the diversity in formulating climate accounts within the central government. Each of the representatives from the key institutions advocates similar interests.

From the start, we actually tried to identify the elasticity of government spending could reduce emissions. So, we could calculate for a certain emission reduction target, how much funding do we need? (Interview 6, Fiscal Planning Officer).

To advance the development of the economic value of carbon, the government also incorporated carbon taxes in the recent tax Law Number 7 of 2021 (Government of Indonesia, 2021b). These forms of governing technologies demonstrate that climate change has entered the territory beyond the sub-function of a primary institution in tackling climate change. This shows that climate accounts become accounting objects in multiple settings. They define the scope of finance flows for low carbon development in actual operationalisation while featuring their uncertainty within their space, alongside ongoing development of carbon

pricing and the climate change fiscal framework. However, it is important to note that the emergence of climate accounts needs to consider the sustainability of their priorities in government annual reports. Consequently, the climate accounts need not only an ad-hoc form of reporting upon any requests as they will not be included in the annual budget expenditure report (Ministry of Finance, 2014).

#### 7.2.1.3 Development Planning

Another approach to defining climate change in the territory of the public budget is the inclusion of development planning. As discussed in Chapter 5, the national action plan has been a guiding framework for implementing climate mitigation and adaptation actions before 2020, which continued with the NDC roadmaps. Even so, the implementation of the NDC requires the alignment of government priorities that are coordinated under the development planning agency. Development planning and budgeting are closely associated with other ministries' programmes. However, this relationship is constrained by the budgeting and planning officer, who is not responsible for delivering mitigation or adaptation actions. The authorities to deliver climate change are in technical delivery within sectoral ministries. Despite that, the connection between governing climate budget and plans seems to be apparent to link sectoral levels given trilateral meetings that need to be performed periodically.

In this development domain, the focus of tracking territory is identifying sufficient funding for climate change that can be supported by the public budget. The capacity of the public budget to allocate resources in climate change becomes the initial avenue.



Basically, the ultimate goal is how public financing can drive the emission reduction. When we know nominal, not projection, but based on data. How much funding is needed to achieve the NDC in 2030? Then the government can be more supportive in financing the actions in accordance with applicable regulations (Interview 30, Fiscal Policy Officer).

The statement above demonstrated the demand for assessing the progress of public budget in distributing resources aligned with the Paris Agreement. By approaching from the sectoral NDC, ministries that have a close relation to climate-related targets are incorporated. As such, an early initiative was through the climate tagging mechanism regulated through the Ministry of Finance (2014). In operationalising this regulation, in the early development manual tagging was performed and managed by a representative from the Ministry of Finance. It was considered necessary for an additional rule for line ministries to report their activities to connect with the climate delivery ministries, even though it did not change the existing public accounting system. Consequently, this challenged the continuity or sustainability of the initiative given the approach of an ad-hoc report upon any request.

Prior to incorporation into the regulatory approach, accounting for finance flows in Indonesia was initially performed ad-hoc to gain an initial assessment, yet further development has been pursued. For instance, the Ministry of Finance and Climate Policy Initiative (2014) published the landscape of public climate finance for the financial year 2011. Despite a number of challenges and uncertainty, given the lack of verified methodology to assess climate-related activities, this landscape became an initial basis for further studies before tracking the climate budget became a regular governing activity. The study was extended by the Ministry of

Finance (2012, 2014). The annual tracking in the state budget since 2016 has provided a basis for regular sovereign green sukuk issuance since 2018. Furthermore, over a couple of periods, the government formulated a climate change fiscal framework in 2019 and 2021. The details of the development will be discussed in the following section of this chapter.

#### 7.2.2 Assigning Climate Aspirations in General Treasury Accounts

The following analysis demonstrates primary consideration to incorporate climate change into the government budgeting and planning system. Unlike a control and command form of governing, the incorporation of climate change in this sphere demands collaborative efforts in the absence of initial direct authorities and responsibilities. Instead, this research indicated the development of climate tagging to construct climate accounts creates a horizontal form of accountability. This form of accountability was constituted to channel the relation between budgeting and planning, sectors that deliver NDCs, and MRV domains, in which originally disconnected. Therefore, establishing relevant lines of coordination in the absence of command and control is pertinent to seek connectivity in the form of responsibilities and authorities. However, this research argues that as climate accounts are developed, the exchange across coordinated flows between technologies and expertise are essential in designing climate accounts. The empirical evidence emphasised attention to “where to locate climate change” and “how to embed and connect beyond the tracking itself”. These elements become matters to formulate accounting technology that can generate relevant information and the production of climate accounts.

#### 7.2.2.1 Locating Climate Accounts: Dedicated or General Accounts

In assigning climate change aspirations to the public accounting system, particularly the Indonesian government's general treasury accounting, the flow of governing technologies aligned with climate change facilitates as an enabling attribute. This is manifested through the departing point to situate "where to tag". Alignment to climate change becomes a matter in the government budget for several purposes. This includes a way to identify the sum of the budget to meet the commitment for climate mitigation and adaptation, the ability of the state budget to perform its primary actions, the opportunities to expand any related financial instruments, and the efficiency and effectiveness of value for money spent to tackle the issues. By tracking the flow of the alignment to form climate accounts, the existence of earmarking and tagging have shown interchangeable deployment.

Chapter 5 has shown that tracking climate-related expenditures in national budgetary systems has been widely utilised in various developing countries. Tracking climate budgets originated to demonstrate transparency for the flow of funds mobilised from developed countries to developing nations in addressing climate change issues.<sup>16</sup> The definition of climate accounts has evolved alongside accommodating the domestic flows from the state budget to the delivery programme both directly and indirectly. Furthermore, locating where to tag is

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<sup>16</sup> Amid the increasingly international and domestic funding to tackle the pressing issues of climate change, tracking its flows has been a prominent concern. In 2010, the Bangkok Office of the UNDP called for action to "make the most of climate change finance". To follow up on this call, the governance of climate change finance (GCCF) team was established to develop climate financing and budgeting expertise for partner countries. This programme was piloted in seven countries, namely Bangladesh, Cambodia, Indonesia, Nepal, Pakistan, China, and Thailand. Climate Public Expenditure and Institutional Review (CPEIR) became the initial approach, such as by defining a country's climate mitigation fiscal framework in Indonesia published in November 2012 (UNDP, 2019).

associated closely with the scope and tracking approach. However, developing the alignment either in the form of dedicated accounts or general accounts for the representation of climate accounts faces some dynamics. The distinction is situated in the scope to represent the programmatic agenda of climate change, methodology to classify, governing technology to embed and the potential to channel to different connecting infrastructures. Even so, this research noted that the alignment approach and uncertainty relating to the associated climate change elements are dominant within the flows of the budgeting cycle.

#### 7.2.2.2 Dedicated Accounts

Some of the dedicated accounts were earmarked for education or health purposes. The Indonesian government also utilised a dedicated account as a means for the initial identification of the capacity of domestic public finance for climate change. In particular, they were used to distribute financial flows to climate-related activities. This form of account was checked through an ad-hoc team and reporting. Even though tracking climate expenditures in this form enables setting the landscape of public climate finance, this landscape did not provide regular tracking of climate accounts.

The earlier approach to account for the disbursement of actual finance flows aligning with climate-related activities in Indonesia was performed through the landscape of public climate finance. This form of tracking was initiated in collaboration between Indonesia's Ministry of Finance and the Climate Policy Initiative in 2014 by examining government expenditure, financing, and disbursement flows from central government, local government, state-owned

enterprises and international development partners for the financial year 2011. The Head of the Fiscal Policy Agency stated:

This landscape of public climate finance in Indonesia, [...] takes a further step forward, providing the most comprehensive inventory of public climate finance [...] by analysing disbursements on a comparable basis, providing preliminary insights on important local government and state-owned enterprise climate finance flows (Ministry of Finance and Climate Policy Initiative, 2014, p. iii).

The report refers to the procedure for the initial assessment of climate-related financial flows in public financing in meeting climate goals. This process was performed simultaneously with studies on the formulation of Indonesia's Mitigation Fiscal Framework in 2012 and the Low Emission Budget Tagging and Scoring System in 2014. These initial assessments deployed non-regular tagging as a key identification and classification tool. This budget tagging is not a new technology to assign multiple aspirations in the Indonesian government. Prior to tagging the climate budget, the government also tagged budgets such as gender, strategic development programmes, infrastructure, and south-south partnerships in addition to climate change mitigation actions in 2014 and climate change adaptation in 2018 (Ministry of Finance, 2021b).

However, the distinction of climate tagging situated in methodologies for verifying data has evolved alongside the dynamics between aspirations, connected technologies, expertise and material outcomes. In this ad-hoc tracking, marking was also performed by assigning colours to different types of funding sources from green (state budget), brown (local budget), blue (international development partners), and shadow grey to mark data that remained uncertain.

When it came to disbursement channels, the colours became mixed due to a combination of various sources of financial flows, which turned to solid (could be verified) and shadow (could not be verified) grey in direct and indirect climate actions (see the illustration in Appendix 7.8).

The development of the initial landscape has demonstrated a form of tracking climate-related financial flows in the Indonesian government accounts. However, assigning functions for climate actions after implementing the action plans will be meaningless as this will not change government planning and resource allocation. Without further changes in the planning and resource allocation, any efforts will not accelerate the mobilisation of climate-related financial flows. Also, uncertainty could not be avoided, given that the verification was not attached to the initial budget and resource allocation planning.

As an illustration, from the financial year of 2011, only USD 951 million could be verified to align with the climate target, while USD 1,136 million could have potential but could not be verified (Ministry of Finance and Climate Policy Initiative, 2014). This uncertainty mainly applied to the flow of funds from the state budget to the local budget (sub-national), both mitigation and adaptation, given the diverging and abstract definitions, even though the national mitigation action plan was started in 2011.

#### 7.2.2.3 General Accounts

In contrast to a flow directly into one account, assigning climate aspirations is performed through a general treasury account which serves multiple government purposes. In performing the alignment, the government deploys climate tagging that serves to enable climate accounts to act as thematic accounts. The formulation of tagging the budget in the

state budget is a process to provide marking on budgeting documents to trace and identify output covering climate mitigation activities as stated in the work plan and budget of line ministries (Ministry of Finance, 2014). The coverage was then extended to both climate mitigation and adaptation in 2018, as the scope has been developed not only for mitigation but also adaptation actions. This study, however, focuses primarily on mitigation actions in referring to climate accounts. Unlike other thematic accounts that were relatively stable, climate tagging has been constructed and reconstructed, which influences the development of calculable spaces through extended methodological frameworks. This research presents where the dynamics of formulating the methodological framework are located, the enablers, and the constrainers in the following sections.

### 7.2.3 Selecting Attributes

In assigning climate change alignment, this study identified the following attributes need to be considered in constructing climate accounts in the public accounting system. These attributes include, firstly, climate-related expertise. Secondly, costing construction: output, component, and outcome. Thirdly, equivalency towards the climate impacts, government structure, and impact generation must be assessed.

#### 7.2.3.1 Climate-Related Expertise

As climate change is a wicked problem the presence of climate tagging (including tracing and earmarking) as accounting technologies facilitate beyond deskilling key actors, instead they function as a form to connect across expertise. Even though the selection of expertise is initially performed through similarity of authority, later development has shown cross-

expertise within horizontal forms of coordination accommodates multiple branches of knowledge. The initial establishment of tagging, for instance, by the selection of budget and planning officers instead of technical officers for the imperative delivery was due to accessibility in terms of the line of coordination. It is, however, beyond the scope of the responsibility of the budget and planning department to understand relevant actions in mitigating climate changes.

They only know how to use it. The planning bureau is selected because the counterpart of the national development planning office and budgeting office in discussing the government's work plan is the planning bureau (Interview 6, Fiscal Policy Officer).

Actually, activities which are related to climate change have been stated in planning and budgeting. So, it can be inventoried by the finance office. That's why it's marked in the climate budget tagging (Interview 21, Delivery Programme Officer).

But not everyone understands climate change. Who did that, the planning bureau?

The planning bureau is not a technical person. [...] Also, it's actually potential, not reduction (Interview 25, Delivery Programme Officer).

The statements from research participants indicated the demand for not only connectivity between expertise but also connectivity across expertise to enable the flow to be reorganised and intensified. The flows are reorganised in the sense of identification and classification of climate accounts accurately. Simultaneously, this process demands knowledge exchange



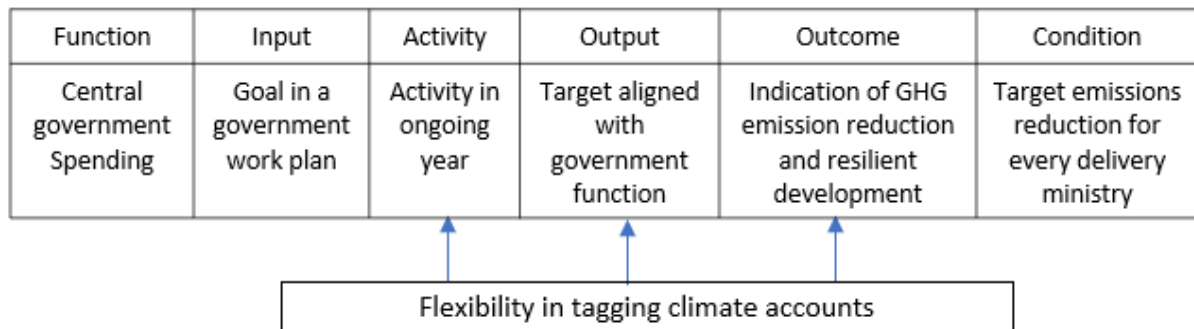
between experts to intensify the articulation of climate accounts. Nevertheless, imparting understanding might be constrained by the capacity or conflicting purposes between expertise. For instance, when the officers need to assign climate-related functions under the programme primarily for maintaining fossil fuel expansion to pursue energy security. Furthermore, the development of understanding is also incorporated through ongoing problematisation between other governing technologies and continuous interaction across expertise that will be analysed in the subsequent paragraphs.

#### 7.2.3.2 Output, Component, and Outcome

The budgeting structuring facilitates a defining point to configure climate change in budgeting and planning systems, including assessing climate performance. This study observed the prevailing dynamics in situating component, output, and outcome level in the construction of climate tagging to produce calculative spaces and assign climate aspirations. Situating climate tagging in government budgets requires unpacking the structure of performance indicators for carbon accounting and the structure of government budgeting and planning. These governing instruments connect not only technical processes but also key actors that perform the process beyond the primary functions and the implications to the budget that can be counted as climate accounts through tagging.

In the structure of climate performance, this study indicated that flexibility is performed within tagging to align with multiple purposes, as illustrated in Figure 7.25.

Figure 7.25 Climate Change Performance Information



Source: adapted from the Ministry of Finance (2019b).

The implication of locating tagging within the activity, output, and outcome, however, is in relation to the costing structure.

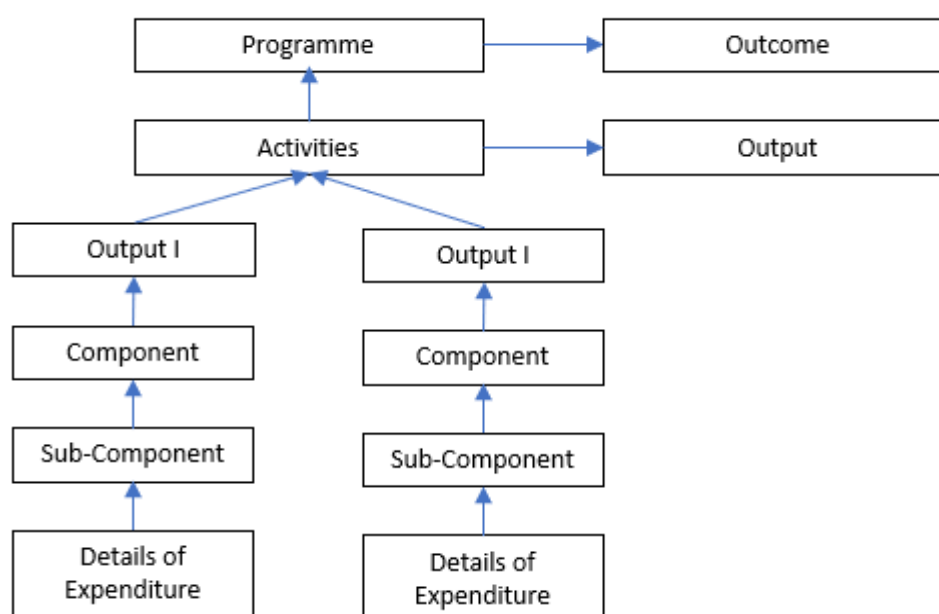
We understand that there is much concern. We call it output vs component. In this issue, the real results don't matter because we will carry out a manual identification process at the back office after gathering data up to the component level (Interview 30, Fiscal Policy Officer).

Meanwhile, if tagging the state budget in a component level, it does not reflect the impact. Because the account state budget contains meetings, team fees, and operational expenses. The impact of out spending will not directly contribute to carbon emission reductions (Observation 9, Delivery Programme Officer 6).

This study suggests the need to accommodate this distinction, and the account providers also need to consider the nature of performance measurement in the primary public accounting system.

This budgeting language<sup>17</sup> indicated in the following Figure 7.26 demonstrates the structure of formulating performance indicators and the line of authority of respective budget holders. Given the flexibility in assigning climate change into budgeting and planning accounts, the parallel reform in the general systems was a driving force to mainstream climate change.

*Figure 7.26 Structure of Budgeting Language*



Source: Ministry of Finance (2017).

The interview respondents acknowledged that by transitioning from the ADIK system to the KRISNA system<sup>18</sup> climate tagging can be incorporated on a regular basis. Even so, issues remain

<sup>17</sup> Programme: budget nomenclature owned by echelon I units for all activities carried out in one fiscal year in order to achieve the outcome. Activity: budget nomenclature owned by echelon II units for all activities carried out in one fiscal year to achieve the output. Component: resources in the form of inputs needed to do one activity. Subcomponent: a level below the component that contains an explanation of the component. Account details (6-digit account): lowest level in the budget structure (World Bank, 2018).

<sup>18</sup> ADIK (Basic Architecture on Performance Information) is controlled by the Directorate of Budgeting. The ADIK structure applied the logic model to every level of the business and was incorporated into the budgeting process and architecture based on the RKA-KL in 2016. The computation and consistency of future projections remain hard. This is owing to a lack of a clear and consistent costing approach, enough resources within line ministries to create and cost complete sector policies, and inadequate ability within MOF to examine and aggregate data from over 24,000 expenditure units. KRISNA (Collaboration Planning and Budget Performance Information) is a Bappenas application used by line ministries to construct their annual work plans and provide forward estimates that lacked congruence with the planning and medium-term budget (MTEF) information (World Bank, 2018).

in translating the programmatic agenda that is represented in political languages and budgeting and planning language.

[The name of the programme] It's a jargon language and can't be reduced to a budgeting language, it takes one more step. For example, this is a political language, building Indonesia from the periphery. This has to be taken down one more step (Interview 6, Fiscal Policy Officer).

Direct measures to verify GHG accounts require a translation between the language of the budget and the language of the project in the government system. Similarly, assessing values to represent climate change actions that demonstrate green assets raises further discussion on the appropriate measures at the budgeting level. Budgeting is closely related to planning, resource allocation, and performance evaluation, and in this research setting, it functions to channel climate accounts to other accounts.

#### 7.2.3.3 Equivalency of Tagged Budget Towards Climate Impacts

It is difficult to calculate the extent of the government budget that can exert a direct impact towards carbon emissions reduction. In the technical process, this can be simply tagged and translated to the equivalent emission factors times the performed activities. However, there is continuing uncertainty over the potential emissions reduction that can be effectively produced in actual ways, and the source where the tagging was performed and the impacts that can be generated are ambiguous.

Actually, it has been stated in the activity plan and budget. So, it can be inventoried by the Ministry of Finance by detecting which activities are related to climate

change. So, that's why it's marked in the climate budget tagging. But not everyone understands climate change. [This climate action] it's actually [creating] potential, not its reduction (Interview 32, Delivery Officer for Energy Sector).

At our place, there are eight directorates. Just to be safe, they performed tagging in each of the directorates. That's something that will later be misleading. Misleading in a sense, as if the budget is big, but the achievements were only obtained from one echelon which has two units. But the budget was from all directorates. So, it couldn't and would not provide self-explanatory information (Observation 10, Delivery Programme Officer).

The above arguments indicate that not only the technical process but also the understanding of climate impact both in ex-ante or estimated impacts, or ex-post (actual impacts) need to be considered. Understanding the resulting actual impact can be demanding when the impact needs to be connected to multiple infrastructures. Also, there is a need to consider the expertise of the account providers in connection with information on tagging.

### 7.3 Climate Tagging Reconstruction

This research observed the construction and reconstruction of climate tagging in the implementation process. Although an extended climate actions methodological framework was formulated, it is essential to monitor the level of assigning climate ideals given the potential diversity across sectors and expertise. The results would imply equivalency and aggregation of the accounts. However, finding the equivalency of structure in the impact of climate actions generated from the tagged budget can be complex. The following statement offers a glimpse of the complexity beyond the technical process:

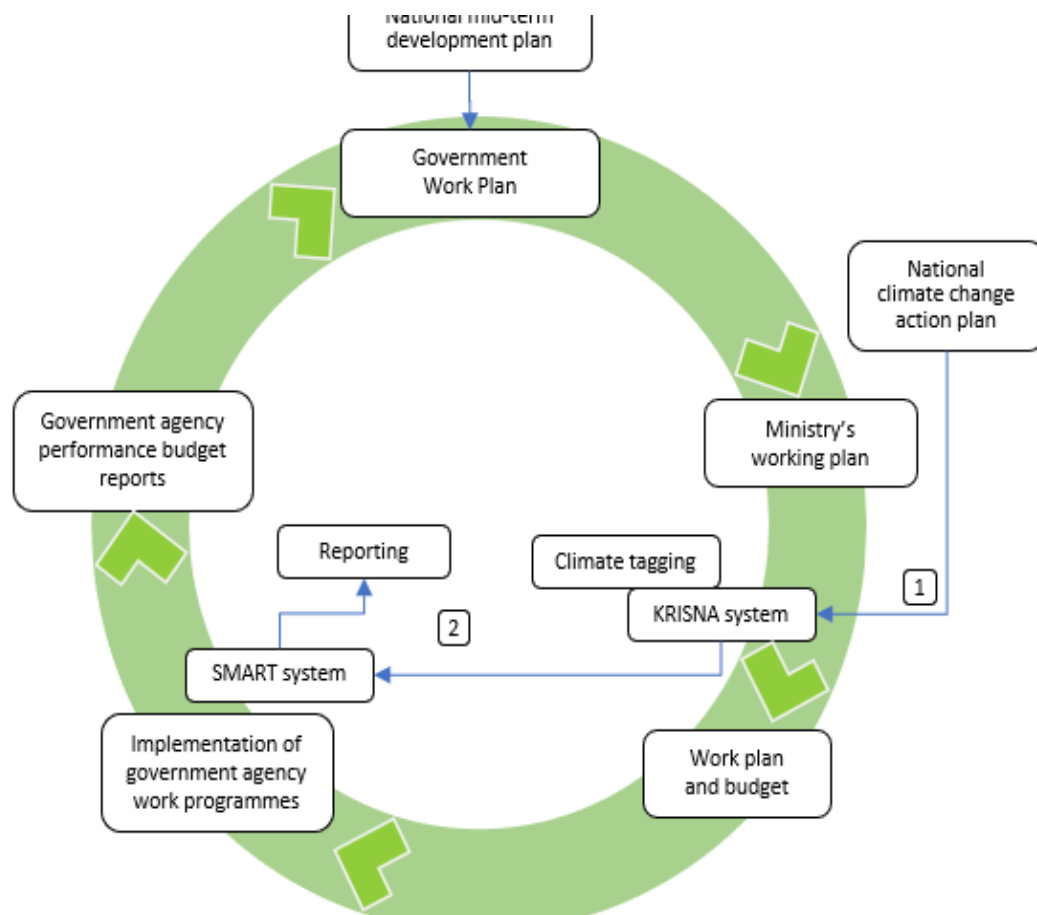
Once again, in our case, they didn't understand what this was, so all directorate generals were just tagging it like that. We had a meeting about this tagging, and the names of the activities were revealed, but I was also confused; what activities are you doing, is this also related? So, I can see things like that; just by looking at the title, I can tell that this has nothing to do with climate change. It's tagged, and it passes (Observation 10, Technical Delivery Officer).

The above statement introduces the following analysis of how the climate accounts through climate tagging have been constructed and reconstructed. The problematisation and further enhancement have been performed continuously to enable (constrain) a climate-related financial flow in public accounting systems. The following sections explain the discursive process of territorialising calculative spaces through the reconstruction of climate tagging.

#### 7.3.1 Attributing to The Budgeting Cycle

As discussed in the previous section on incorporating climate change into the system, this study analyses that assigning climate-aligned tagging into the budgeting and planning system does not necessarily include climate targets alongside the cycle. In the early development, the process encompasses the marking of climate change mitigation outputs to related ministries/agencies led by the Fiscal Planning Agency. To illustrate the incorporation within the system, the following Figure 7.27 offers connectivity with other governing technologies.

Figure 7.27 Planning and Budgeting Cycle



Source: Adapted from the Ministry of Finance (2019b, p. 49).

From the illustration in Figure 7.26 it can be seen the distinction is incorporating national action plans and climate tagging in the KRISNA system. By underpinning the national climate action plan 2011-2020 as the guide for the tagging process, this raises a question on the validity of the basis. During the data collection process in 2020, the development of the Indonesia's updated NDC roadmap was underway. Given the nature of government organisation, any government activity needs to relate to relevant enacted regulations. Here the basis of tagging was the national climate action plans which consisted of climate mitigation plans 2011-2020 and climate adaptation plans 2014-2024. Dynamics emerged in the implementation period, and the process of developing the tagging was not only about

coverage from the localisation of the tagging to represent the climate account but also about the technologies and expertise.

For instance, the relevancy of the existing rules became a point of discourse due to changes of authorities, reduction targets, and basis of the commitments.

For climate mitigation actions, we have Presidential Decree 61 of 2011, but national development itself has stated that this Presidential Decree 61 is currently no longer valid. If I'm not mistaken, there was a plan to revise. Primarily the review of the national action plan for reducing greenhouse gas emissions (Interview 23, Mitigation Officer).

The PP [Presidential Decree] is expired in the sense that the substance cannot adjust to the time horizon. In terms of regulations, it has not expired yet (Interview 30, Fiscal Policy Officer).

This is the ministerial decree, the translation of Presidential Decree 61 of 2011, the operationalisation is far from the 2011 Presidential Decree. We translated this decree into a ministerial regulation number 22/2019, even though the rule itself is currently being revised. Not really effective. However, our consideration, we are looking for the legal issue (Interview 33, Delivery Programme Officer).

From the statements, during the transition period between the previous roadmap of climate mitigation action 2011-2020 and the new roadmap of 2020-2030, as explained in Chapter 5, there was uncertainty among the key institutions. Even so, the previous effective regulation continues as a guiding framework. The evidence also shows that the inclusion in the budgeting



system was considered to enable connectivity to the technical delivery ministries, given that each party requires legitimate rules for guidance. As climate accounts have become connected to key relevant ministries, this extends to multiple governing technologies and the reform of process tagging in the public accounting system. Another point of development is explained in the next section.

### 7.3.2 Shifting Ex-Post to Ex-Ante Processes

#### 7.3.2.2 Ex-post Budgeting Process

The empirical evidence exhibits that the climate accounts were formed into post-budget and pre-budget mechanisms:

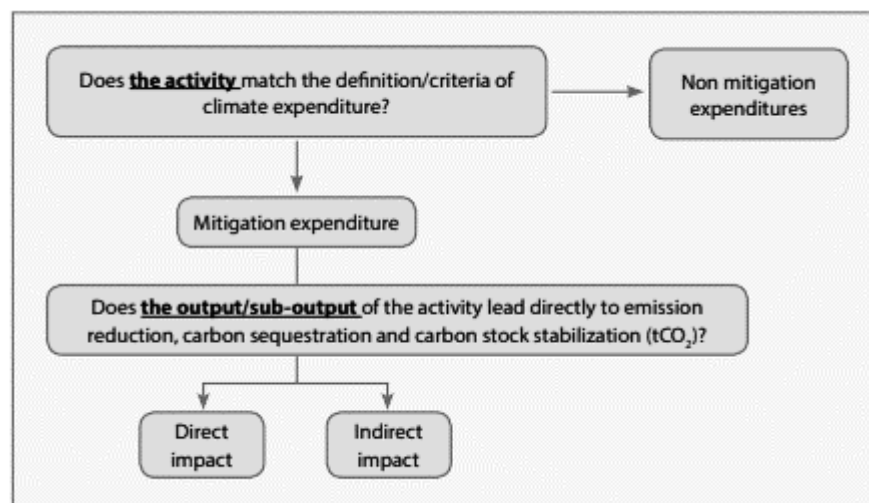
This budget marking activity has evolved from a post-tagging mechanism (marking after the budget is approved) to pre-tagging (marking when the budget is planned), and has been integrated into the national budget planning application system (KRISNA) (Ministry of Finance, 2019b).

The report indicated how climate tagging was developed alongside the dynamics that evolved. In particular, the process shifted from post-tagging to pre-tagging mechanisms. It is assumed that marking the budget during the planning process in the budget cycle enables it to inform and facilitate considerations for decision-making. However, this research demonstrates that the shifting in the process unravels ongoing problematisations in producing climate accounts that accommodate multiple purposes. Through these dynamics, however, further development of embedding climate accounts is connected to the MRV system and financial

instrument. This development, however, continues to invite uncertainty. The subsequent paragraphs explain the post-tagging mechanisms and pre-tagging mechanisms.

This study argues that assigning climate tags manually did not enable aspirations and materials to flow. This study identified that post-budget tagging mechanisms were developed into two signs of progress, a manual and a systematic form. The manual form was considered to be unsuccessful but offers key considerations in embedding the climate accounts in the budgeting system. It can be argued that the initial failure in tracking the flow of climate accounts resulted from incorporating technical dimensions without fully considering aspirational and material dimensions. The technical aspects covered merely procedural attributes such as an assessment template as illustrated in Figure 7.28.

*Figure 7.28 Assessment Template to Tag Climate Mitigation Expenditures Manually*



Source: Ministry of Finance (2014).

This form of assessment was initially performed by the finance officers who do not directly relate to the implementation of climate change issues while they are directly associated with funding for the government budget.

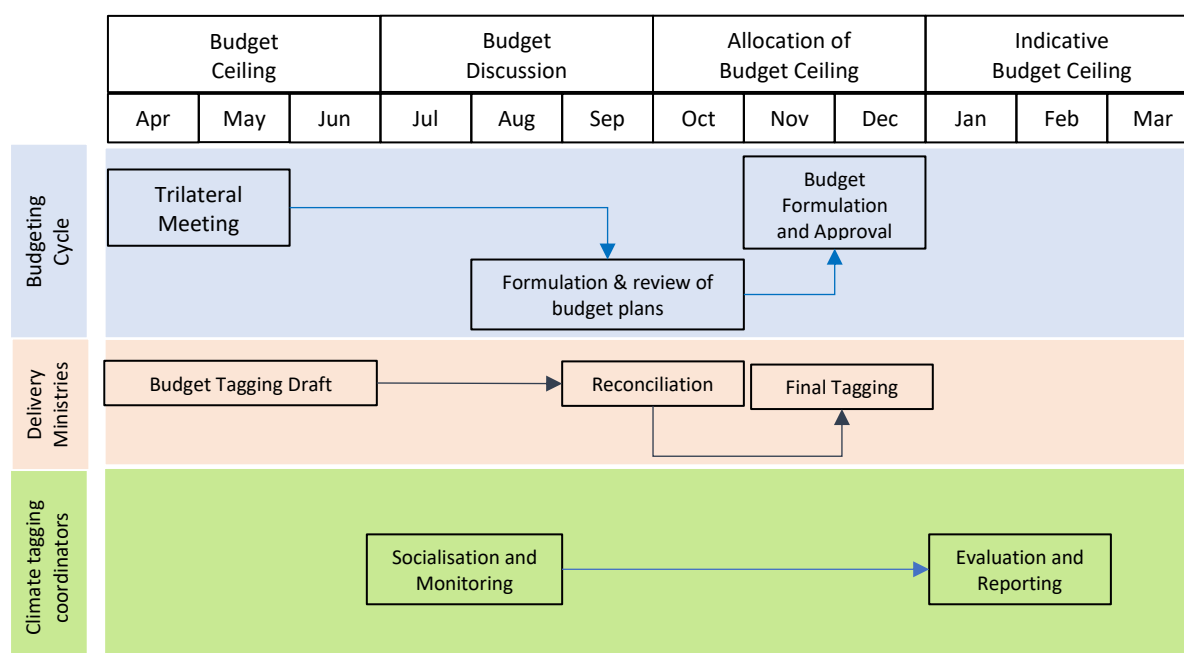
At that time, the team here was compiling the scheme, it was still manual. It's still manual because it can only request data from the Budgeting Directorate. How big is the allocation, then here it is itself? At that time, if the process was like that, it was considered less sustainable because it did not enter the system. To make it more sustainable, it needed to be entered into the system (Interview 6, Fiscal Policy Officer).

The manual mechanism was used to start building connectivity. Then the fiscal policy office, as the initiator of tagging, expands the coordination line to budgeting and planning officers within delivery ministries. The selection of budget and planning instead of technical officers who deliver the imperative delivery was due to accessibility in terms of coordination. This is the establishment of the initial social relations and technical processes.

The understanding is carried out through stages such as socialisation, reconciliation, but understanding still takes time. For example, they themselves have not established that climate change is a necessary action. So, 2015-2016 can be considered as 'unsuccessful' (Interview 30, Fiscal Policy Officer).

As previously stated by the delivery officer, building understanding towards the real climate change impacts was problematic. It was considered that irrelevant connections between budget and climate change implications were identified yet it passed the screening. To develop understanding, the account initiators conducted the process from socialisation, and reconciliation within the period of budgeting cycle as shown in the following diagram.

Figure 7.29 Climate Tagging and the Government Budgeting Cycle



Source: adapted from the Ministry of Finance (2017).

Figure 7.29 above demonstrates the disconnectivity between the budgeting cycle and the government's effort to construct climate accounts. This manual tagging was managed by a representative of the MoF. It was considered that requesting technical ministries to report required additional governing technologies such as rules. Consequently, the initial approach was performed upon a request that faced difficulties over the lack of exchange knowledge on climate change aspirations. As such, without imparting the ideals of climate aspirations, the sustainability of its practices was challenged.

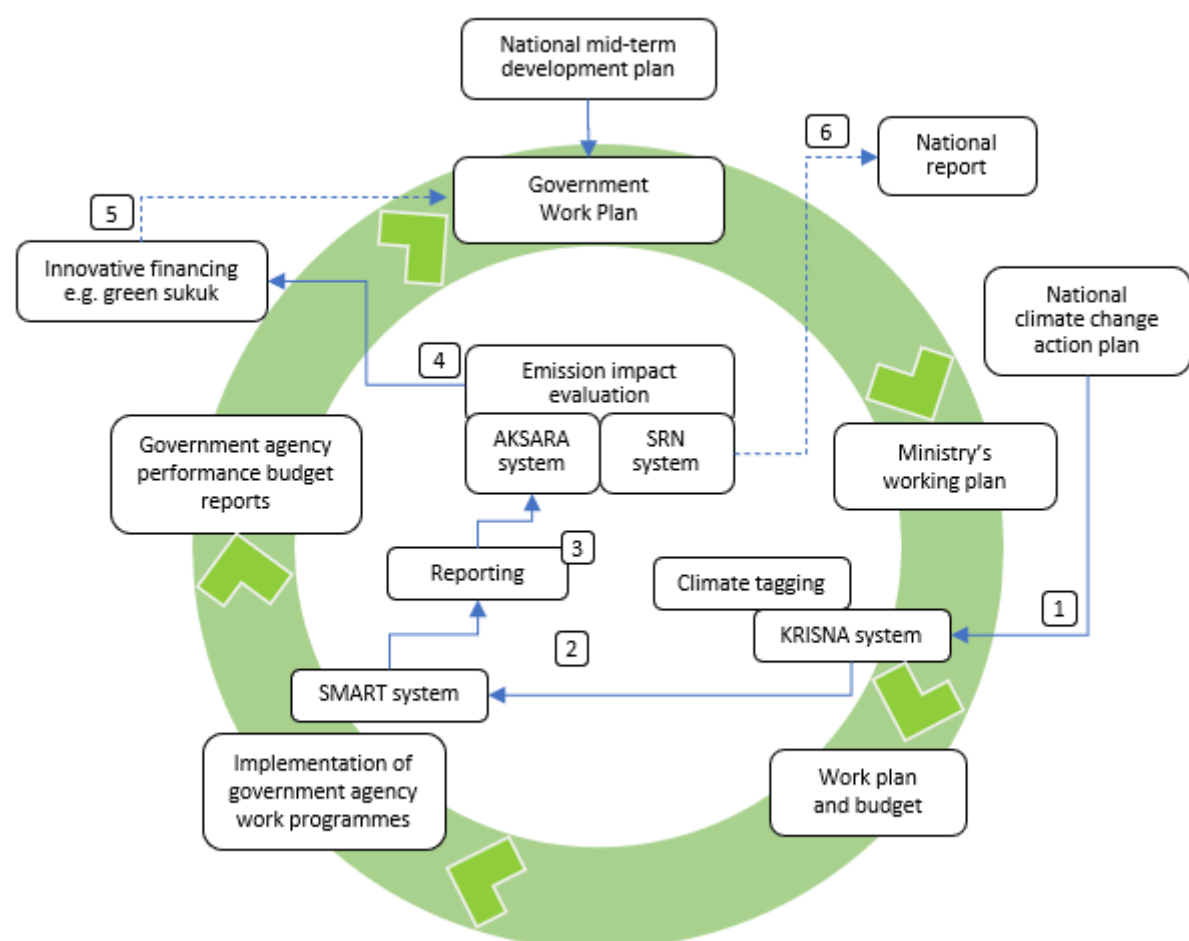
The initial manual process in the post-tagging mechanism was deemed to incorporate the technical process. Even so, this study shows dynamics emerged in the implementation period, the process of developing the tagging was not only about the coverage to represent climate accounts but also institutions which carried out the budget identification. From the

disconnectivity between the line of coordination and lack of governing technologies to build the connectivity, later developments demonstrated that the tagging was incorporated in the budgeting cycle.

#### 7.3.2.2 Ex-ante Budgeting Process

As climate accounts have been incorporated into the budgeting cycle (see section 7.3.1), the government extended the connectivity to incorporate emission impact evaluation and financial instruments as illustrated in the following Figure 7.30.

*Figure 7.30 The Flow of Climate Tagging in National Public Budgeting and Planning*



Source: adapted from Ministry of Finance (2021b, p. 13).

The figure represents the integration of impact evaluation provisions with financial instruments to open newly developed accounting objects. This study shows that connecting to measurement provisions facilitates the development of green sukuk accounting objects, which will be elaborated on in Chapter 8. By extending the connectivity, however, further dynamics arise, which will be explained further in the next sections.

### 7.3.3 Extending Connectivity

#### 7.3.3.1 Impact Evaluation Provisions

In extending the connection to emission impact evaluation, however, this study reveals the challenges to harmonise coordination among ministries. It can be seen that there are two systems, AKSARA (Monitoring Evaluation and Reporting/MER) and SRN (MRV) systems, which both perform similar functions. These governing technologies were provided by different ministries.

Each agency has its own sectoral ego; because of their interests, they often debate quite loudly regarding mitigation of all kinds. It's a kind of MRV and MER. It's the same reporting, but why report to two different platforms? (Interview 24, Data Focal Point in Delivery Ministry).

At that time, there were two versions of the data, data from BAPPENAS and data from MOEF. There used to be national action plans under BAPPENAS, but MOEF did not exist. Later it will be connected. Data in MER, validated, will be delivered in MRV, called SRN. Now still in process. That's part of the sectoral ego (Interview 30, Fiscal Policy Officer).

The sectoral egos were highlighted in the impact evaluation process given that the initial line of authorities was changed. In the initial establishment of climate action plans in 2011 it was under the national planning agency while in later development in 2015, the MOEF became the focal point of the UNFCCC. This was also due to the changes in government administration and reconstruction of climate governance technologies as previously elaborated in Chapter 5.

#### 7.3.3.2 Channelling to Financial Instrument

From Figure 7.30 it can be identified that the government has internalised the potential use of impact evaluation from the climate tagging mechanism as a basis for financial innovation.

It is confirmed by the respondents:

We see this potential for green investors who can fund climate change programmes in Indonesia. The question was how we could connect to the financing through green bonds, as it requires operationalising the proposed green framework (Interview 34A, Market Development Officer).

Before there was a green sukuk, we attempted to make a relation to our running project, sustainable development finance, in which the output was tagging climate budget (Interview 7, Programme Manager).

Connecting the existing mechanisms has been emphasised as the key entrance to trace the opening space of governing entities in making climate change governable in multiple settings. Each institution has its own governing devices to connect within a diverse range of key institutions, and deployment of a relevant device to meet the expected role of climate finance

as a means of implementation within several governing institutions. These processes offer considerable impacts to make climate change become a priority.

The necessary information for climate finance entails planning, the source of financing and type of expenditure, as well as measurable emission reduction or any related actions either for mitigation or adaptation. This process demonstrates interrelations within Ministry of Finance national development planning, environmental ministry and line ministries. Within each cycle of government period, planning and budgeting are present in all areas. Even though this sphere is within the domain of planning and finance officers it does not relate to measurable emission reductions, but allows connections within line ministries and expansion to the market development of the flow of climate finance.

#### 7.3.3.3 Climate Accounts' Ownership

Although it can be argued that climate accounts territorialise (albeit partially) multiple spheres by inviting a number of problematisations, and construction and reconstruction of accounts, the issue of account ownership was highlighted by the interview respondents:

We carry out our duty to provide access to energy for the wider community. Even so, it has something to do with climate change. That's not a co-benefit, it's not really what we want it to be. As in eastern Indonesia, we cannot talk about emissions if there is no access to electricity (Interview 24, Delivery Officer).

Our hope is that technical deliveries have more understanding. We call it ownership that there is an action that can reduce emissions. If they have



ownership, we hope it will be easier for them to submit their activity data (Interview 27, MRV Officer).

The evidence shows that building ownership to tackle climate change issues remains a challenge. A social-technical relation to build ownership becomes a key point to build common understanding. Important ministries have questioned the meaning of having ownership or other additional responsibility in parallel to the government budget. This ownership is pertinent to develop interconnected aspirations between budget, planning, and the functions of each of the key ministries. As it is beyond the core function of the delivery ministries to tackle climate change, there is concern over shared beliefs and common values and how does it differs from benefits that are widely known. Furthermore, the commitment to tackle climate change does not necessarily affect resource allocation as highlighted from the following statements:

If tagging is to inform resource allocation decisions, it will have to be embedded across the budget cycle in the medium-term expenditure framework, budget call notices and guidelines, budget documents submitted to the legislature, and budget execution and audit reports (World Bank, 2021, p. 41).

Even though [climate actions] have entered the national priority since 2019, the final decision rests with the government. But in this case, the budget is still there [...]. Our leaders are very supportive of climate issues. However, would the ministries responsible for climate prevention get more services for this commitment? (Interview 35, Budget and Planning Officer for Energy Sector).

Despite climate actions being present across sectors, it may be difficult to hold which institutions should be most responsible; the Indonesian NDC's commitment, for instance, revealed the list of institutions who engaged with this issue. The statement of the NDC will not offer any meaning if the operation of day-to-day business activities continues unchanged. For example, the activity of an institution responsible for carbon-intensive programmes may contradict with the primary function of national development priorities. Therefore, it is necessary to identify technological devices to internalise any mitigation and adaptation spectrums within various related governing bodies.

#### 7.4 Summary

This chapter has elaborated on the dominant constitutive role of accounting (Martinez, Pflueger and Palermo, 2022; Miller and Power, 2013) to territorialise climate change in public accounting systems – further named as climate accounts. As highlighted in Chapter 6, the green sukuk accounts stream to the general treasury accounts, where the flow lost its traceability. This chapter has revealed the construction of climate accounts in public accounting systems by presenting the design and reconstruction of tagging to discursively shape and reshape the calculative spaces. Instead of being specific to accommodate green sukuk purposes, climate accounts were formulated from the general financial planning accounts in which climate tagging was initially designed to account for the demand for financing climate change actions. In doing so, the alignment approach was chosen with additional measures from the existing accounts, such as a methodological framework to construct climate accounts. Despite the alignment approach being undertaken, this study

identified the discursive construction of calculative space and reorientation of calculative agencies.

The formulation of new accounts from the “old” accounts is aligned with prior studies (Gray, Brennan and Malpas, 2014; O'Dwyer, 2005; O'Dwyer and Boomsma, 2015). However, the insights from this study attests to the ongoing refinement of the existing Indonesian government financial and budgeting systems. This chapter has shown the central use of tagging to construct climate accounts and to channel GHG impact measurements in the effort to mobilise finance for climate actions. Moreover, the chapter also highlighted the core dynamics in problematisation and learning to construct further enhancements to embed climate change as a governable object in public planning, budgeting and financing entities. However, assigning climate-related functions could be transformative and problematic. The transformative potential is situated in mainstreaming climate change into a wider scope beyond the core generation of GHG emissions, while simultaneously problematic through the contested carbon-intensive elements in boosting national development that may persist in the same accounts.

Furthermore, the reorientation of calculative agencies emerged given the imbalance of expertise between the climate change domain and financial planning. This study offers insights into developing the compatibility of climate change aspirations in processes and practices. The discursive process and practices of territorialising as outlined in Figure 7.23 were presented throughout this chapter. However, this study argues that full territorialisation could not be achieved as aligned with Bebbington *et al.* (2020). This is given as the nature of climate change is diversely situated in multiple governing entities. Even so, the ongoing refinement to

territorialise climate change spaces was performed through the exchange of knowledge across key expertise within the horizontal form of coordination – planning, budgeting – and sectors responsible for governing climate change. The dynamics within practices, processes and expertise were central to designing and reconstructing the tagging in the public budgeting and planning cycle, shifting the process of assigning climate aspirations from the ex-post to ex-ante budgeting cycle and extending connectivity.

This study, however, highlighted that mainstreaming climate change in the government budget demands a parallel reform within the existing system. In this reform process, this research observed a contrasting result from prior studies highlighting the demand for similarity among the instruments or expertise. In this thesis, the similarity to governing devices for instance, in impact evaluation technologies (see Figure 7.30) has raised the concern of sectoral egos given the redundancy of the sub-functions. Simultaneously, the similarity of expertise resulted in a loss in the exchange of knowledge to advance the ongoing development of the climate accounts. As such, this chapter has answered research question 1.3 – how climate accounts were constructed in the public accounting system – and responds to Lapsley and Miller's (2019) call for research to better understand the constitutive role of accounting in addressing the critical challenges of climate change in public sectors.

The findings add to prior studies of reorganising old accounts and the distribution of accounts (Gray, Brennan and Malpas, 2014; Kornberger, Pflueger and Mouritsen, 2017) by assigning climate-related aspirations as a form of territorialising new accounts. The empirical evidence exhibits that tagging climate change in public budgeting and planning accounts involves not only incorporating climate change as a discursive process involving aspirations, people and

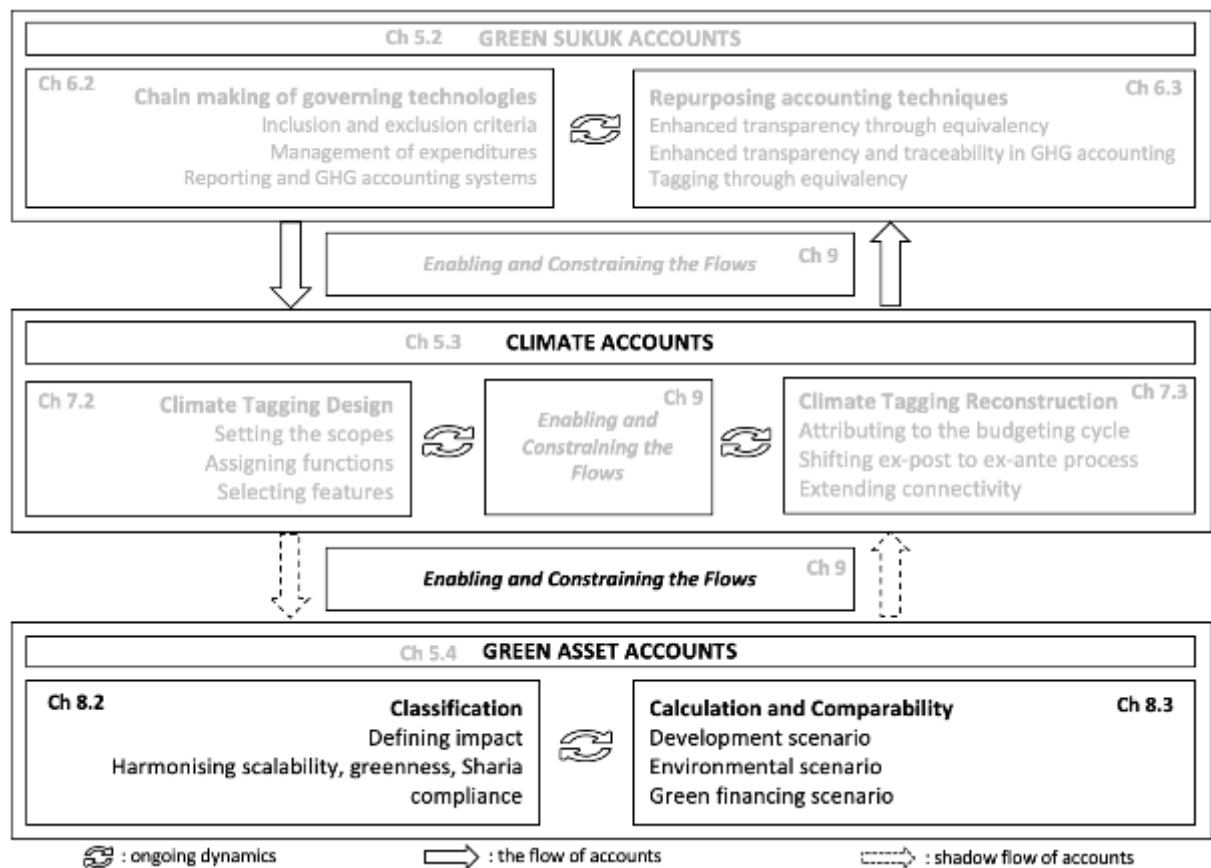
things (Martinez, Pflueger and Palermo, 2022; Miller and Power, 2013; Rose and Miller, 1992) but also stimulates a productive force to extend connectivity across expertise and governing technologies. By offering empirical evidence on the importance of budget connectivity with impact measurement, this study also provides contrasting evidence to Becker *et al.* (2016) on the equal importance of budgeting within planning, resource allocation and performance evaluation. Consequently, to enable the flow of a climate-related financial instrument in the public accounting system and constrain the flow streams to carbon-intensive development, this study suggests the need to accommodate a horizontal form of accountability that facilitates the exchange of knowledge between expertise, governing entities and technologies. In addition, this study also recommends further reconstruction of tagging spaces to optimise the stream in mobilising climate-related financial flows while maintaining the demands for environmental integrity.

## CHAPTER 8. ADJUDICATING GREEN IMPACT MEASUREMENTS

### 8.1 Introduction

This chapter will analyse the findings in adjudicating the provision of impact measurements by extending the constitutive role of accounting investigated by Miller and Power (2013). This chapter will address the question of how measurement provisions have been made calculable and comparable in channelling green sukuk to green projects. The context of the adjudicating process of green impact measurement within the climate-related financial flows is illustrated in the following Figure 8.31.

*Figure 8.31 Adjudicating Green Impact Measurement*



Source: Author's analysis

This chapter will highlight the construction of green assets accounts with climate accounts providing a basis to form shadow performativity within the government accounting system. Chapter 6 demonstrated the use of various governing technologies including climate-related measurement provisions; this chapter will present the adjudicating process to measure green assets accounts. This study highlights the processes of classification, calculation and comparability, with calculation and comparability being used mainly during the allocation of funds from the state budget to the delivery ministries.

The following section 8.2 will analyse the characteristics and dynamics involved in classification. Afterwards, section 8.3 will reveal approaches to adjudicating from climate accounts to green asset accounts in calculation and comparability. Finally, section 8.4 will summarise this chapter.

## 8.2 Classification

In adjudicating green impact measurements, this study observed that classification has been dominantly present in defining and harmonising scalability, greenness, and Sharia compliance. This is characterised by attaching non-financial attributes to financial attributes without having direct implications. In addition, the classification is manifested in multiple shades of green in what this thesis names as shadow performativity. This study argues that the self-assessed greenness offers multiple classifications that can enable the transition to climate-aligned ambitions while this classification may not be directly calculable and comparable. This could constrain further development when credibility is being questioned. Furthermore, the adoption of Sharia principles facilitates the demand to minimise uncertainties by the attachment of funded assets to real economy.

### 8.2.1 Defining Impact

In defining the impact, this study observed that the transition approach offers flexibility and emphasises progress; yet this encompasses a risk of greenwashing and can drive further ambiguity without stringent mechanisms in place. In the ambiguity of an agreed definition, the green market is developing by attributing evaluation mechanisms from the perspective of the purpose of accounts.

How do you define the impact of the underlying investment? I think a lot of the debate around whether it's in markets or in public is a defined contribution. We as an investor can have an impact in terms of our contribution on top of the investment, we are talking to our agents through reallocation of capital (Observation 3, Institutional Investor 2).

The GBP [Green Bond Principles] seek to support issuers in financing environmentally sound and sustainable projects that foster a net-zero emissions economy and protects the environment. GBP-aligned issuance should provide transparent green credentials alongside an investment opportunity (International Capital Market Association, 2021a, p. 2).

The statements indicate the lack of clarity in defining the meaning of impact for market participants between the contribution to public interests such as environmental protection or sustaining impacts to the market itself. Despite the GBP suggesting the demand for contributions to accelerate the net-zero ambition, the guidance does not impose an implication of any failure to achieve the guidance. The demand for additional effort without



direct financial relations may attract further ambiguity. As such, the effort for the reallocation of capital has a shadow performativity, albeit this account can also be considered to advocate double materiality, to achieve the Paris target well below 2° Celsius and to contribute to mobilising financial flows.

It is important to note that the distinction between green bonds and environmental impact bonds is the typical relationship between financial benefits attached to the environmental benefits pledges in the initial contracts. However, the nature of the relation depends on the nature of the entity.

There is also explicitly impact investment that had the intention to prioritise the impact over time. It's more of a mission-related investing, and there are absolutely investors explicitly taking a high risk or lowering the cost of capital; we're expecting lower returns to enable a product or service to have a greater, safer environmental impact (Observation 3, Institutional Investor 1).

It is basically for us; our mandate is to invest in smaller entities and help them to grow. So, we do actually like private equity. We don't invest in a private company or basically we cannot invest in a product where the market is already showing growth. So, we are supposed to take more risks than private investors. That's basically our core reason for our existence. It should be going to smaller companies and smaller interventions from the market (Interview 10, Institutional Investor).

The statements above highlight attention on where the impact is situated in the entities' mission, as part of performance measured, and the extent of the consequences that the

respective entities are going to tackle. Typically, key institutions have a mandate to allocate a certain amount of capital for a certain type of instrument. For instance, it is noted in the annual account of the largest green bond underwriters:

We intend to build on our market-leading position in sustainable finance, supporting our clients with \$750bn to \$1tn of sustainable financing and investment over the next 10 years (HSBC, 2021, p.10).

To operationalise this form of climate-related ambitions, data dictionaries have provided an initial guiding framework:

I work very closely within the sustainable finance team on how we include this in our products and services, how we define that, what propositions and what are dictionaries around that. So, for instance, we include green bonds as part of our advisory work with our clients. Also, we have six transitioning sectors that we need to report, and we align about 20% with our lending balances working with those sectors (Interview 11, ESG Account Manager).

The statements emphasise the articulation of climate targets into financial measures setting an earmark while it could invite dynamics given the dictionaries could assess the real impacts, instead enabling the classification of financial accounts. The typical example of a transition approach is apparent in the market development stage while this could create criticism of its robust measures as highlighted by the IPCC (2022b).

As noted earlier in defining impacts, the financial measures such as risk and return remain the primary criteria in reallocation. However, the respondents acknowledge that measurement of

risk-adjusted return in the investment process does not necessarily incorporate consideration of greenness, instead green is considered as an additional measure towards the merit of its output. In this study, the green sukuk issuer perceived that those financial attributes are compensated by considering diversification and investor-based expansion:

We wouldn't give up on return; it's more about how we make an investment decision. There is still a risk for that (Observation 3, Institutional Investor 1).

In managing a portfolio, we need to choose the lower cost of the fund with manageable risk. Even though sukuk tends to cost higher, this is part of our diversification. We also aim to develop the Islamic finance market and invite new investors (Interview 4, Issuer).

The point is that we have to innovate in financing, one of which is based on investor-based, climate change. So, from our multiple studies, we need to study financing for green earlier and we need new financing innovations. Then we think of these green bonds. We issue it (Interview 1, Director General Budget Financing).

From the statements above, green credentials could not directly compensate for financial materiality. The statement aligns with the distinction between financial materiality attached to the impact or financial materiality in parallel with environmental materiality. Consequently, for the additional commitments toward green purposes, the issuance of the sovereign green sukuk considers inviting new investors and portfolio diversification to engage with the market. However, tapping into the green sukuk market was considered to extend the primary market of sukuk investors to green investors as the basis of the transaction is sukuk. In parallel to that,

diversification through different type of portfolios was seen as another source to expand innovative capacity highlighted by the issuer. Also, as the green sukuk issuer adopted the transaction into sukuk form, as analysed in Chapter 6, the issuer demands the maintenance of the compatibility between the green and Islamic principles. This form of compatibility influences the way optimum measurements of green asset accounts are made (see section 8.3 for the analysis). Further discussion in harmonising scalability will be presented in the following section.

#### 8.2.2 Harmonising Scalability, Greenness, Sharia Compliance

Drawing on the empirical evidence, this thesis highlights that green credentials relate to scalability and the balance between green finance flows and environmental impacts. This is emphasised by the respondents who enable mobilisation of finance aligned with the pursuit of environmental benefits, as also stressed by the International Capital Market Association (2018, 2021a).

I think one of the tensions in this place in looking for solutions is often around scalability, that we just were focusing a lot on green here and there's good scalability, all of that is green (Observation 3, Institutional Investor 5).

We need to have every sector transitioning. What we need to support is the most amount of green finance flowing. The answer to that is not just thinking in a small section about what's happening. We have to do that; simultaneously, we need to protect from a greenwashing; it needs to be green (Interview 9, External Assurance).

The above statements show the emphasis on the balance in terms of scalability to mobilise funding alongside maintaining integrity against the risk of greenwashing. Instead of emphasising a definitive target towards the green finance flows, the optimal scale is advocated through classification of green measurement provisions. In this sense, enabling and constraining the flow are characterised by flexibility while this may invite further uncertainty.

However, the classification of financial materiality and green impact materiality under the transition approach demands the incorporation of the effort for transition pathways. Without a clear pathway and the substantive results, any aspirations, ideals or ethical principles could be absent. For instance, the transition pathways are also manifested in green classification. The largest second opinion providers for the green bonds framework distinguish the greenness of bonds issuance by labelling it into three shades of green. The construction of multiple shadings of green classifications assesses the way green bond principles are incorporated in green bond issuance, for instance, dark, medium, or light green while avoiding brown (CICERO Shades of Green, 2021). Another approach featured by the International Capital Market Association (2021b) in mapping green projects is by distinguishing between primary, secondary, and tertiary in attributing the GBP to the alignment of environmental objectives (see Table 5.13 in Chapter 5 for further details). These forms of classification enable the accommodation of different types of transitional projects selected by the issuers as the use of proceeds.

Underpinning the green shading, this research observed that potential flexibility and uncertainties in the classification are minimised by the demand to operationalise Sharia principles. Sharia principles direct that any transactions which fall into *gharar* exclusion

criteria should be avoided. The additional criteria can be perceived enable to minimise potential uncertainty and constrain the flow of funds that streams to carbon-intensive projects. In this sense, the issuer of green sukuk deems the optimum availability of green assets as a basis to enable flow of green sukuk and maintain credibility.

Why do we use green and sukuk instead of ordinary green bonds? At least both require an underlying. This is not an earmark for certain projects, but it has been allocated to certain projects as the underlying. So, it is not yet pure project bonds. But if this is sukuk it is not pure general financing (Interview 1, Director General Budget Financing).

In essence, no different than normal. Sukuk, Islamic funding, need to align with Islamic principles. The standard is based on sukuk, lending, normal lending but the difference lies with the use of the proceeds (Interview 11, Green Lead Manager).

Sukuk, the green sukuk that distinguishes it from conventional, is only the green factor, if the sukuk is Sharia, there is a mechanism. If you want to enter green sukuk, go to climate budget tagging first (Interview 30, Fiscal Policy Officer).

These statements demonstrate the demand for underlying assets as required from the Islamic finance principles to avoid uncertainty. This form of underlying is also seen as compatible to the demand for the use of proceeds as emphasised in green bond principles. However, the compatibility between green bonds and sukuk, in term of the use of proceeds, has been a challenge in sovereign issuers due to the structure of the government treasury account as illustrated and discussed in Chapter 6.

Despite the reformulation of governing technologies to meet multiple interests in green bonds and sukuk, there is continuing concern about the effectiveness of policy implementation. As discussed in Chapter 6, the demand for transparency and traceability was answered by allocating different green shading to each project; this thesis, however, could not identify the distinction of these projects in assessing green impact post the issuance. Indonesia's green sukuk was regularly assessed by the CICERO as the external assurance in terms of its greenness. This assessment is performed every three years and results in categorisation and verification of self-labelled green projects that are selected for bonds and sukuk issuance. Instead of the specific projects that are registered in the government planning books, this form of project is typically evaluated by assembling existing projects with interrelated green measures as shown in Table 6.14 in Chapter 6.

In Table 6.14 the Indonesian government as the issuer of sovereign green sukuk utilised the existing accounting infrastructure to facilitate the construction of greenness included in the green framework. In this type of instrument, the issuer deploys the existing governing technologies to create a new accounting object from the green sukuk issuance. The selection of measurement provisions was assessed by the alignment to Islamic principles, budgeting and planning calendar and purpose, and climate change impacts. Furthermore, this form of connectivity does not necessarily demonstrate the transition without tracing the progress and the direction of its consequence. As such, without a transformative change in the prevailing accounting mechanism, economising climate-related financial flows could not be achieved until widespread reorganisation.

From the sovereign green sukuk perspective however, the scale of financing and green label itself are also closely related to the availability of tangible green assets that can be produced from the connecting devices. The green sukuk issuers received oversubscription in every issuance (see Appendix 5.6); the balance of the issuance is maintained with the availability of green assets that could satisfy the Sharia principles. In the following sections, this study will present how climate tagging has been prevalent in constructing climate accounts to green asset accounts for the basis of the green sukuk issuance. From the tagging (including tracing and earmarking), this study indicated scenarios and dynamics that evolved since the development as presented in section 8.3.

### 8.3 Calculation and Comparability

This study reveals the construction of green impact for green sukuk issuance is formulated from the flow of funds from climate accounts to green asset accounts. Building from Chapters 5, 6, and 7, the following section elaborates on the selection of existing measurement provisions in incorporating non-financial attributes to financial attributes that underpin the green sukuk allocation. This study identifies the basis to aggregate and compare the green measurements into three forms, development based, environment based and green financing based. This thesis also highlights that Sharia principles have been instrumental in minimising uncertainties in calculating and comparing climate accounts to green asset accounts.

This study observed that the green impact measurement was constructed from the prevailing mechanisms that were reorganised. The interview respondents highlighted that in the absence of additional mechanisms, development-based measurements underpinned the green sukuk. Development principles are a fundamental guide for a country to govern its



national priorities. As such, measuring green impact from the green sukuk issuance under this basis was problematic.

There is actually a lot of confusion. But the important thing is that we have a process in the state budget. [...] To enter green, there is a national action plan on climate change mitigation and an adaptation document, which the relevant ministries will use to carry out these projects. [...] There is no new mechanism there. [...] That is the point we agree that what happened before is only assembled into one framework (Interview 34A, Market Development Officer).

It was really important that the project selection process includes components of environmental and social risk mitigation and why it's so key. [External adviser] is involved alongside the Indonesian government. So, if you look through the framework, you'll see it has quite an elaborative project selection process in order to mitigate the risk that some of the projects may have environmental or social externalities (Interview 12, Green Lead Manager).

The statements above outline the considerations involved in delivering sovereign green sukuk. This is characterised by the optimisation of co-existing governing mechanisms and outsourced external parties to construct the measurement. Unlike other types of ad-hoc project, this study identifies that the basis for sovereign green sukuk evolves given the dynamics in the implementation. These vary among the lack of clarity in the key ministries, the challenges to connect multiple governing technologies and the diversity of expertise to accommodate multiple virtues resulting from green sukuk initiative. As noted in Table 6.14

(Chapter 6), those key ministries have governing devices that are not primarily designed for green sukuk issuance. Consequently, assembling into one framework has invited problems and forced reformulations in measurement provisions. The following section explains the scenarios in detail.

#### 8.3.1 Development-based Measurement

Development-based measurement becomes the initial point of departure to measure the green impact. This is due to the use of national climate action plans as the departing point in demonstrating greenness. However, this study indicated that named climate actions do not necessarily incorporate climate aspirations. Instead, climate actions appear as a shadow performativity that is attached to other development priorities.

It is through the use of climate tagging that the government is enabled to attach climate change to the existing budgets and planning that are further developed as the basis for green sukuk issuance. However, the result of climate accounts as shown in Table 8.15 cannot be directly assessed against the green bonds and sukuk framework without further reconstruction.

*Table 8.15 Budgets Allocated for Climate Mitigation Actions FY 2016-2018*

| <b>Ministry</b>            | <b>Allocated Budget in Trillion Rupiah</b> |                              |                          | <b>Number of Outputs/Activities</b> |                    |                    |
|----------------------------|--------------------------------------------|------------------------------|--------------------------|-------------------------------------|--------------------|--------------------|
| <b>Mitigation Area</b>     | <b>State Budget Rev 2016</b>               | <b>State Budget Rev 2017</b> | <b>State Budget 2018</b> | <b>Output 2016</b>                  | <b>Output 2017</b> | <b>Output 2018</b> |
| Agriculture                | 4,3                                        | 5,4                          | 0,4                      | 21                                  | 27                 | 8                  |
| Environment & Forestry     | 1,6                                        | 1,1                          | 2,2                      | 42                                  | 19                 | 47                 |
| Energy & Mineral Resources | 2,2                                        | 2,8                          | 2,6                      | 25                                  | 29                 | 25                 |
| Industry                   | 0,1                                        | 0,0                          | 0,0                      | 13                                  | 13                 | 7                  |
| Transportation             | 21,0                                       | 34,2                         | 16,6                     | 100                                 | 39                 | 16                 |
| Public Works & Housing     | 43,2                                       | 52,0                         | 50,4                     | 62                                  | 32                 | 32                 |
| <b>Total</b>               | <b>72,4</b>                                | <b>95,6</b>                  | <b>71,8</b>              | <b>263</b>                          | <b>159</b>         | <b>135</b>         |

Source: (Ministry of Finance, 2018a; Ministry of Finance, 2019d).

Table 8.15 presents the reports from climate tagging as a basis for the green sukuk issuance. Key elements from Table 8.15 cover sectors for climate mitigation and the proportion between budget spent and the output of the climate accounts between the financial years of 2016 to 2018.

Despite tagging being directed by the MoF since 2014 as analysed in Chapters 5 and 7, the financial year of 2016 was selected as the basis for the first issuance of green sukuk. This is assuming that by 2018, the projects that were allocated in financial year of 2016 had produced any impacts to serve as underlying assets for the sukuk issuance. The climate accounts in 2016 were also named as refinancing under this issuance, while the year of issuance which was in 2018 was categorised for finance allocation. Even though the issuance of green sukuk becomes a driving force to channel tracking climate accounts to mobilisation of climate-related financial flows, the basis of the refinancing did not necessarily attribute climate aspirations or Sharia principles.

Furthermore, configuring outputs and the amount of the budget allocated can be problematic given the diversity of the measurement basis. As explained in Chapter 6, the output represents government activities that are associated with the climate action plans. However, in the initial establishment of tagging the existing government budgets were not initially intended for climate change purposes. Therefore, it is important to perceive the formulation of naming and counting to produce climate accounts. To understand the numbers shown in Table 8.15, it is important to note the initial formulation of the climate accounts.

The fundamental tagging activity is matchmaking; it was looking up to match with a definitive measure. This tagging can be used for climate change but for all matters, objectives, activities [...] However, sometimes the definition itself cannot be easily understood. Therefore, the criteria are important. For example, firstly it has to align with GHG emission reduction, then other criteria (Interview 6, Fiscal Policy Officer).

Here the matchmaking function is important. We care about the green. So, in the big picture, I always say, “you have to look at it from two sides”. There is a [green] substance side, there is a financing side. However, it [matchmaking] has limitations. That's something we are facilitating or trying to do in the future (Interview 29, Issuer).

The respondents highlight the varieties and limitations in the effort of matching as initial ways to connect between national climate action plans and budget expenditures. However, on the financing side, the issuance of green sukuk needs to align the green substance and the

financing simultaneously. It is essential that the Sharia principles are not neglected. Given the ambiguity in defining and the limit in matchmaking, the respondents considered there was a need for further development in the public accounting system to accommodate the demand for both climate accounts and green asset accounts.

I think that climate tagging will eventually help them to identify their next year's work plan. It subconsciously makes their mindset change in terms of planning. Instead of duplicating previous year's activities and rarely new activities, with this [tagging], I believe they are starting to think, to be creative, what activities can we do to both support national priorities as well as climate change. Moreover, in the national mid-term planning (2020-2024), climate change has become a national priority [...] The advantage when it becomes a national priority is that the proposed budget will be approved (Interview 30, Fiscal Policy Officer).

When we are talking about budget tagging, the main objective is efficiency of the government budget. The government budget is actually allocated to something that we prioritise or not. It is more the Article 45 that mandates, the government and local governments to develop or provide an adequate budget for environmental protection and management. From budget tagging, we can identify whether it has been allocated or not (Interview 37, Director General of Controlling Climate Change).

As the demand for further development was highlighted, the respondents deemed that the efforts to formulate and monitor climate accounts through the tagging were beyond technical

measures. The ways of thinking about the climate change expenditure in the real form can be considered not only to identify the capacity to allocate to climate-related activities but also lead to the notion of efficiency given the prioritisation.

The mindset of key officers who developed the budget and planning was deemed to play pivotal roles in formulating climate accounts. The production of climate accounts via tagging facilitates the exchange of interactions within planning, budgeting, and technical delivery in performance evaluations. As elaborated in Chapter 7, the tagging has intensified dialogues about the redevelopment of public accounting systems. However, assigning climate-related functions at an output level could not offer the relation towards the promised green impacts without a stringent attachment for methodology to verify them.

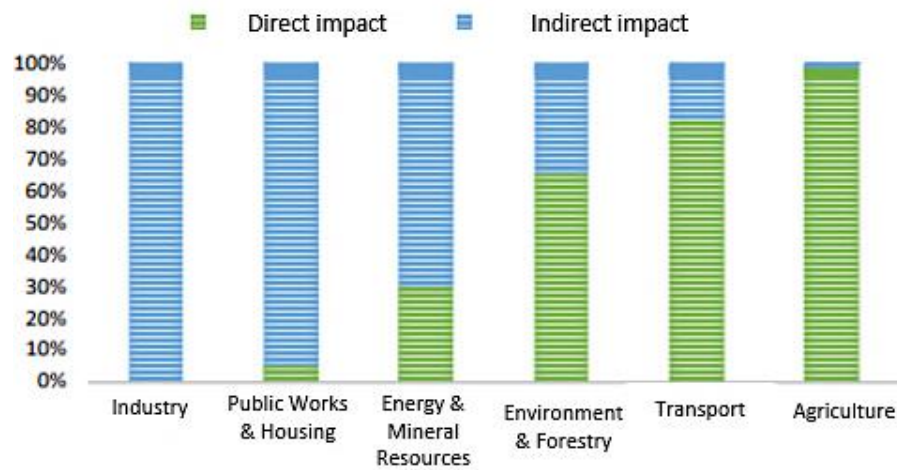
Furthermore, the allocated budget to these six ministries was selected due to the relationship with sectors included to cut carbon emissions. At the same time, these ministries are working closely with carbon-intensive sectors to ensure the primary priorities of the government are met. These priorities cover infrastructure development, access to energy, safe public transport, or closely related areas for poverty alleviation. Consequently, the activities that were tagged as climate mitigation and accounted for in the budget could potentially contribute to adverse impacts without appropriately assessing their impacts. This led to the second scenario, environment-based impact valuations.

### 8.3.2 Environment-based Impact Measurement

Climate accounts are located at output level which leads to difficulties in tracing the green impacts. The alteration in climate accounts was performed by distinguishing direct and

indirect impacts of government expenditure against GHG emission reductions as illustrated in the following Figure 8.32. However, assessing financial accounts in relation to direct and indirect impacts has led to further dynamics given the nature of the ministries as the party stakeholders (see section 5.3 in Chapter 5) and directly comparing allocated budget against carbon emission reduction is problematic. Also, the possibility of potential misclassification that will affect the judgement could not be avoided.

Figure 8.32 Composition of Direct and Indirect Impact Mitigation Budget in 2018



Source: Ministry of Finance (2019d, p. 70).

Figure 8.32 illustrates the classification of the direct and indirect impacts towards climate change in the Indonesian government budget. The classification, calculation and comparison indicate outputs that were tagged as climate accounts. This classification started in FY<sup>19</sup> 2018 after the issuance of green sukuk. It was during the preparation of green sukuk impact

<sup>19</sup> FY: financial year of.

reporting that the measurement of financial accounts against GHG accounts were problematised.

From the budget tagging, if it is related to emission reduction, for example, with a large budget, the emission reduction is only small. It can't be described, if we reported that this amount of the spending would be able to reduce that much.

This can't be comparable (Interview 28, Resource Mobilisation Officer).

From Figure 8.32 it can be seen that the output from the agricultural sector was mainly classified as a direct impact while the energy sector, for which the NDC target is far less than forestry, accounted for one third of the government spending. Then in the following report, clarification was made due to misclassification between mitigation and adaptation actions:

The Ministry of Agriculture's budget allocation for mitigation increased dramatically in 2019 to Rp1.82 trillion, however the Ministry's output decreased to 6 outputs. The Directorate General of Agricultural Infrastructure and Facilities, whose output in 2018 was the production of mitigation, switched to producing the output of adaptation in 2019, which is what led to the decline in output (Ministry of Finance (2021b, p. 24).

This demonstrates that despite the efforts to classify meaningful direct impact to the environment, misrepresentation occurs in the understanding between key actors who hold diverse expertise within climate-related activities and beyond. As a result, the mitigation and adaptation activities were misclassified between direct and indirect impacts. In this context, it is important to note the definition of direct and indirect in the report as follows:



Activities that have a direct impact (core activities) are a form of activity that will directly reduce emissions or increase absorption of greenhouse gases from emission sources or carbon sinks, while activities that do not have a direct impact (supporting activities) are activities that have an influence on the driving factors or causes of emissions or absorption (Ministry of Finance, 2019d, p. 69).

The statement above reveals the initial definition but to determine what is really direct and the implication of indirect the relation between the reduction of carbon emissions becomes the primary criteria. However, direct and indirect impacts are also considered in the key operation of the respective entities.

The solar business is the solar farm; everything that they are doing is a solar farm.

Why do I need to report every year to meet the terms and conditions in which everything that they are doing in nature is only solar farming? It is pretty obvious.

We are using it in our purposes. We still report that in our commitments. So, it is a green loan in nature not by name (Interview 11, ESG Account Manager).

To distinguish between direct and indirect impacts, the account provider needs to clearly identify the core institution activities and responsibilities in meeting the climate target. The above statement illustrates the nature of the business that directly leads to the green accounts. The nature of the operation also differentiates between the government and corporation. As such, in measuring green impact in the government budget there is a need to also consider the role of the entity, either as regulator policy formulation, policy makers or operators who deliver direct impacts to the environment.

We need to distinguish those that are really related to emission reductions, but we should not forget those that are not directly related. For example, the policy process because so far there has been a tendency in the calculations as if emission reductions are cheap. The policy process is not included in the project. The policy-making process may be a bit different, at different levels compared to project level (Observation 10, Climate Policy Expert).

The above argument highlights that the necessity to classify between direct and indirect impacts should not prevail over the importance to include the cost in formulating policy. In this sense, the role of each of the ministries to achieve the NDC target, either as a regulator or as an operator for the delivery, should to be clearly apportioned. The statements were provided after efforts to calculate between sectors, budget expenditures and the impacts towards GHG emission reductions as shown in the following table.

*Table 8.16 Total Funding Low Carbon Development FY 2018-2020*

| Sectors          | Total Budget, Excluding Subsidy<br>(in Bn Rupiah) |           |           | Emission Reduction<br>(Ton CO2 eq) |             |
|------------------|---------------------------------------------------|-----------|-----------|------------------------------------|-------------|
|                  | 2018                                              | 2019      | 2020      | 2018                               | 2019        |
| Energy           | 3,067.21                                          | 2,324.48  | 1,903.15  | 52,375,320                         | 53,963,380  |
| Industry         | 38.73                                             | 24.95     | 14.07     | 4,120,090                          | 6,129,720   |
| Forestry & Peat  | 1,381.46                                          | 3,306.84  | 2,080.94  | 829,799,090                        | 315,245,210 |
| Agriculture      | 292.74                                            | 168.22    | 264.26    | 12,670,000                         | 12,885,000  |
| Waste            | 71.88                                             | 43.88     | 147.78    | 5,009,140                          | 5,267,140   |
| Coastal & Marine | 43.50                                             | 46.22     | 440.82    | -                                  | -           |
| Transportation   | 17,059.99                                         | 16,300.62 | 11,333.08 | 3,902,250                          | 5,424,070   |
| Total            | 23,973.51                                         | 24,234.21 | 18,204.10 | 907,877,908                        | 398,916,539 |

Source: National Development Planning Agency (2020)

Table 8.16 indicates the efforts to find equivalency between the government expenditure and the estimated emission reductions generated. The challenges in finding equivalency can be

observed from the transportation sectors. As classified in Figure 8.32, transportation funding was mainly disbursed for direct impact given the initial heavy investment for connecting infrastructure within public transportation from the government budget. Yet, when it is assessed against the potential carbon emission reduction, transportation provides far less impact than other sectors, including energy sector. However, as shown in Figure 5.14 (Chapter 5), the majority of sovereign green bonds highlights clean transport in the use of proceeds, whereby transport is among the most favourable compared to other use of proceeds. For Indonesia's green sukuk, clean transport is considered as medium to dark green as classified by CICERO (2018):

Medium green is allocated to projects and solutions that represent steps towards the long-term vision but are not quite there yet while dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future (CICERO Shades of Green (2021, p. 8).

Assuming that this is related to business as usual, how the awarded green label actually demonstrated greenness can obscure credibility without respective entities producing equivalent efforts. Under business as usual the transformative impacts cannot be achieved.

From the empirical evidence above, it can be argued that measuring direct and indirect impacts remains uncertain given it is not easy to provide a clear definition of relations between financial materiality and green materiality. Also, it is necessary to consider the type of main operational business entities, the relation in achieving the programmatic climate target and the nature of activities aggregated as the output of climate accounts. Those considerations

need to trace the consequential implications in adjudicating the climate impacts to green impacts. As such, in this process of calculation and comparability, further measurements such as the economic value of carbon as the cost between sector and project levels started to be evaluated. In parallel to that the equivalence value of the policy-making process was also deemed to be included in the measurement. The inability to account appropriately for the participation of respective entities could affect the performance measurement within and beyond climate and green asset accounts.

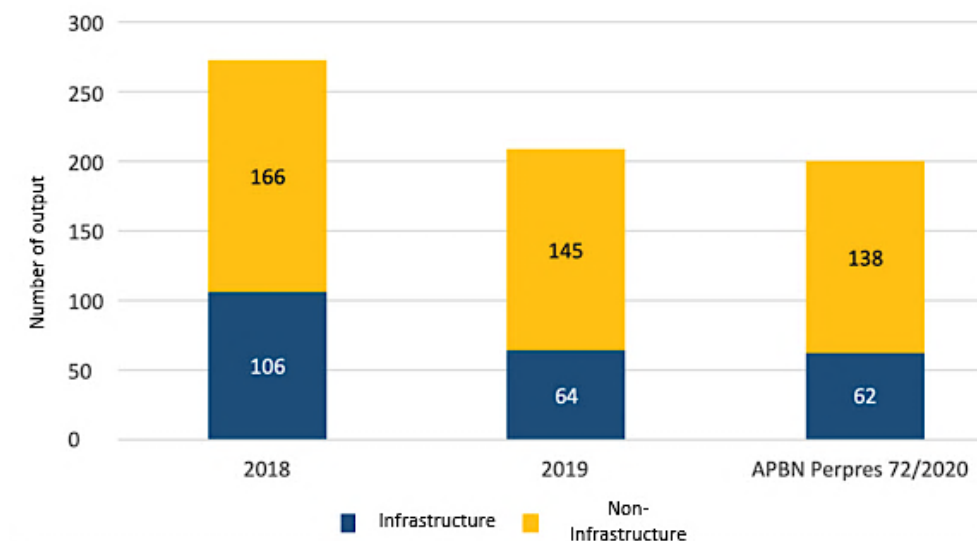
Assessing direct and indirect potentials towards the impact, however, is not necessarily sufficient when the government attempts to deploy the budget for financial purposes. For instance, in the issuance of green sukuk the impact valuation needs to adhere to both green bonds principles and Islamic finance principles, and compatibility between each of the principles shaped the criteria.

### 8.3.3 Green Finance-based Impact Measurement

This study observed the existence of 'green' assets as underlying was considered as the distinction between a conventional bond or sukuk and green sukuk. This form of asset has been perceived to minimise uncertainty and responds to the demand for traceable outcomes, aligned with Mol (2010, 2015). The issuers of green sukuk need to identify the availability of assets to satisfy the demand given the typical characteristics of general treasury accounts as analysed in Chapter 6. This research observed that in parallel with the demand for disclosing the green impact, resource allocation, and efforts to be a regular issuance of green sukuk, the

government has reconstructed the climate tags to distinguish the outputs of asset infrastructure and non-infrastructures as shown in Figure 8.33.

*Figure 8.33 Composition of the Output Related to Infrastructure and Non-Infrastructure FY 2018-2020*



Source: Ministry of Finance (2021b, p. 19).

Figure 8.33 presents the classification of the output based on connectivity to the real economy. In this sense, the government distinguished asset infrastructure and non-infrastructure to formulate green assets based on climate accounts. The representation of capital expenditure and non-capital expenditure was formulated during the year of green sukuk issuance, FY 2018, as the government needed to allocate green financing for the year of the issuance. This implies the issuance of green sukuk is closely associated with the reconstruction of public accounting systems. As noted from the report, for instance, the outputs classified as infrastructures range from various kinds of physical infrastructure such as new renewable energy power plants (solar and hydro), energy efficiency equipment and machinery, waste and wastewater management infrastructure, and irrigation networks (Ministry of Finance, 2021b). Outputs categorised in non-infrastructure cover programmes for

formulating policies and regulations, monitoring and evaluating climate change policies, and community empowerment, as well as programmes to increase the capacity of stakeholders through socialisation and training.

By classifying the assets as infrastructure and non-infrastructure, the primary basis is the physical attribute; however, it does not differentiate the impact of this to climate mitigation and climate adaptation. In this measurement, it is essential to also identify the greenness of the infrastructure itself in a way that the infrastructure can contribute to direct impacts or indirect impacts. For instance, the infrastructure for public works, housing and transportation may account for a dominant proportion of climate accounts. However, the impact of its greenness might not be significant as the GHG emissions can only be generated when both policy and implementation are connected between one or other infrastructures. This potential misinterpretation also arises from the technical process and the level of understanding of the key actors in performing the classification.

It seems that many programmes are just tagged for climate change. That's something that will be misleading later. Misleading in a sense, as if the budget is big, but the reduction at this much. For instance: the carbon reductions were only obtained from one of the echelon-two units. But budgets from other units was included (Observation 9, Technical Delivery for Mitigation Action).

Furthermore, as the Sharia principle is connected to societal development, how the programme is delivered can ensure that the typical green financing can minimise adverse impacts to other type of environments beyond climate change or the general society. For an

illustration, the respondents also highlight the need to distinguish the source of funding to avoid uncertainty when receiving allocated budgets:

As stated earlier, whether this is purely the state budget or something else, it must be separated. Don't let retirement schemes get funds from here. If that so, until our retirement, the responsibility is still there (Observation 9, Mitigation Coordinator at a Sectoral Level).

This shows a moral responsibility attached to the source of funding. This perception is aligned with ethical values in Sharia principles to avoid uncertainty. There was also uncertainty about the completion of the projects and the ability to generate actual impacts such as emission reductions when the assets are included as underlying assets.

In 2016, we were given several bus fleets but only started in 2017. Opening a new corridor in the state-owned enterprises area must be profit oriented, while we, while BRT [Bus Rapid Transit], focus on service, so there are two sides that must be taken in a middle way (Interview 18, Transport Manager at Local Government).

The above statement provides an example whereby a budget was allocated to purchase bus fleets in 2016. However, the assets could not be operated directly given the demand to align with the local government plan. Also, the respondents confirm that opening new bus corridors in a strategic area demands a strategic negotiation. As an illustration, the land was managed by a profit-oriented, state-owned enterprise for the local government who run the bus infrastructure, with the focus dedicated to public services. These dynamics resulted in delays in the production of estimated green impacts.

Even though for the first issuance the government selected sustainable transport, for instance BRT reported in the green impact allocation, it was later acknowledged there was another form of criteria for green sukuk issuance. The sukuk asset needs to be centrally owned by the central government which creates further challenges in finding the equivalency of climate accounts to green asset accounts.

Our budget's financing for green projects is still minimal because of asset ownership constraints. There are many renewable energy and conservation projects from donors. We transferred the asset ownership to local government assets, while green sukuk is expected to be from central ministries' related assets (Interview 31, Head of Planning and Budgeting in a Sectoral Ministry).

The asset ownership is the attribute for sukuk issuance as the assets that are included as underlying should be managed by the issuing entities under their balance sheets. When the assets are transferred to local governments to generate the real impact to its greenness, this shifts the ownership unless extended contracts are formulated, yet this may affect its trustworthiness.

Furthermore, in the effort to connect between public budgeting, planning classified as climate accounts which then followed to green accounts, the real impacts measured in a regularity remain obscure.

Initially, environmental indicators were excluded in the mid-term planning, but one of the national programmes started to include the environment this year. One of the strategic plans in MOEF for the next five years is emission reductions.



However, for the calculation of accountability, for example, that this activity from the state budget can reduce emissions as much, it has not gone that far (Interview 28, Resource Mobilisation Officer).

In verifying emission reductions, we have five sectors, while in the green framework there are selected use of proceeds, so we need to cross-check. At the same time, the language of budget and projects are different (Interview 27, MRV Officer).

It was acknowledged by the environmental officers from the funding department measuring reporting verification that maintaining interconnected relations between government budget, planning, and green impacts remain beyond the regularity. Even though Sharia principles have demonstrated multiple ways to minimise uncertainty, the extent it can accelerate the mobilisation of funding for decarbonisation continue to be questioned.

One study finds that only four of the G20 nations are committing more public money to clean energy than they are to fossil fuels. Overall in countries over 50% of the money that countries have pledged to the energy sector has actually gone to fossil fuels, compared to only 35% for clean energy in terms of the economic stimulus, and the remaining is for other energy purposes (Observation 11, Climate Finance Expert).

The dominant budget allocation to carbon-intensive areas in these countries also demonstrated their reliance on fossil fuel for their energy generation. Furthermore, sovereign countries' public budgets tend to be characterised with flexible spending mechanisms. Despite

the prioritisation in the Indonesian government work plan, the repayments for the bonds tend to be generated from taxes collected by the government. As an illustration, a report from the Ministry of Energy and Mineral Resources, where the country also become a regular issuance of green bonds, indicated targeted investment as follows.

*Table 8.17 Investment for Energy and Mineral Resource*

| No | Performance Indicator                       | Target (in billion US\$) |             |           |             |             |              | Percentage  |
|----|---------------------------------------------|--------------------------|-------------|-----------|-------------|-------------|--------------|-------------|
|    |                                             | 2015                     | 2016        | 2017      | 2018        | 2019        | Total        |             |
| 1  | Investment for Energy and Mineral Resources | 45.5                     | 51.4        | 57.9      | 61          | 57.3        | 273.1        | 100%        |
|    | <b>Allocation</b>                           |                          |             |           |             |             |              |             |
| a  | Oil and Gas                                 | 23.7                     | 25.2        | 26.8      | 28.4        | 29.9        | 134          | 49%         |
| b  | Electrification                             | 11.2                     | 16.4        | 20.4      | 19.6        | 15.9        | 83.5         | 31%         |
| c  | Mineral and Coal                            | 6.1                      | 6.5         | 6.9       | 7.3         | 7.8         | 34.6         | 13%         |
| d  | Renewable Energy                            | 4.5                      | 3.3         | 3.9       | 5.8         | 3.7         | 21.2         | 8%          |
|    | <b>Total</b>                                | <b>45.5</b>              | <b>51.4</b> | <b>58</b> | <b>61.1</b> | <b>57.3</b> | <b>273.3</b> | <b>100%</b> |

Source: Annual Report of the Ministry of Energy and Mineral Resources (2019, p. 26).

Table 8.17 shows that over five years since the Paris Agreement, the proportion of renewable to non-renewable does not change considerably. However, when reflecting on eligible green projects, renewable energy is one of the other eligible green projects for mitigation and adaptation actions. Looking more broadly, the Indonesian government annually accounted for public finance to climate mitigation and adaptation actions which were performed by technical ministries.

The above scenarios unveil the process of reconstructing the green asset criteria adds alternative accounting methods to account for value for money in public policy processes (Barman, Hall and Millo, 2020; Hall and Millo, 2018; Hall, Millo and Barman, 2015) and the formulation of Sharia-based assets (Belal, Abdelsalam and Nizamee, 2015).

#### 8.4 Summary

This chapter elaborated on the dominant constitutive role of accounting (Miller and Power, 2013) in adjudicating multiple measurement provisions. This chapter also has presented the diversity of measurement provisions to account for green asset accounts. This research has argued the role of accounting through climate tags (tagging, tracing and earmarking) has been performed in various ways from classification, and calculation, to comparison in configuring GHG accounts to financial accounts within the flows. It is noticeable, however, that the green impact measurements were demonstrated as shadow performativity whereby classification of greenness that is manifested in the Indonesian public accounting system cannot be directly traceable. Instead, it is through the climate tags that the creation of multiple scenarios to accommodate the principles can be visible as green asset accounts. Simultaneously, the account providers need to consider the classification of green impact among the market participants within the ambiguity and uncertainty.

The questions over ambiguity and uncertainty continue to prevail in configuring the non-financial attributes into financial attributes given the flexibility in defining impact. Without direct financial measures for the environmental impact generated from the green bonds and sukuk issuance, market participants define the impact based on alignment and transition approaches. Aligning to current governing devices that can accommodate green sukuk or green bond purposes and framing the scope to transition to a low carbon development remain dominant. These approaches enabled coordination of the demand for scalability of green finance to flows, identification of the extent of the greenness of allocated funds and Sharia compliance when green bonds are adopted in the green sukuk form.

However, when it comes to calculating and comparing the allocation of green impacts in green asset accounts, this thesis has demonstrated the dynamics in formulating scenarios and the attempts to incorporate them into regular governing practices and processes. The use of tagging remains prevalent to minimise ambiguity and uncertainty by ongoing problematisation and enhancement of green impact scenarios, covering development, environment, and green finance-based measurements. The problematisation emerged when utilising climate tagging (tracing, tagging and earmarking) given the disconnection between authorities, expertise, and time span whereby the real impacts can be produced. This problematisation stimulated spaces for learning and enhancement among governing entities and technologies.

Moreover, this chapter demonstrated the green asset accounts were primarily formulated to demonstrate the alignment of the Sharia-based principles to green bonds principles to minimise uncertainty (*gharar*). By doing so, this instrument has been perceived to contribute to the real impact of economic development, and the tangibility of the assets was perceived as adhering to the principles. By presenting the dominant role of accounting in adjudicating multiple measurement provisions through tagging, tracing and earmarking, this chapter has answered research question 1.4 on how measurement provisions were adjudicated to channel the green sukuk funds to green projects.

The findings add to prior studies by unfolding the adjudication process to enable the constitutive roles of accounting to be performed meaningfully to measure the environmental impact (Miller and Power, 2013; Thomson, 2021). The demand for adjudication aligns with prior studies on the heterogeneity of defining impact (Höchstädter and Scheck, 2015;

Sandberg *et al.*, 2009) and the challenge to operationalise the adjudication process (Argento *et al.*, 2020) in green-labelled financial instruments. The diversity led to the emergence of multifaceted measurement provisions that extend dynamics in classifying, calculating and comparing the configuration of non-financial attributes to financial attributes (Chiapello, 2015, 2018).

Despite the ambiguity and uncertainty (Puroila and Mäkelä, 2019), this study shows the process of constructing green accounts from climate accounts has unfolded and located the dynamics in materiality between financial attributes and impact attributes (Cooper and Michelin, 2022). This research reveals the process of reconstructing the criteria towards Sharia-based green impact measurement adds alternative accounting methods to account for value for money in public policy processes (Barman, Hall and Millo, 2020; Hall and Millo, 2018; Hall, Millo and Barman, 2015) and the formulation of Sharia-based assets (Belal, Abdelsalam and Nizamee, 2015). Furthermore, this study offers contrasting findings from Arjaliès and Bansal (2018); Arjaliès and Durand (2019) on the silence of Sharia principles in the secular market. Instead, the research findings show its prominence in minimising uncertainty through the construction of green asset accounts that embed equivalency to proposed impacts.

Consequently, to enable the flow of a climate-related financial instrument and climate change become a governable subject, this study suggests that shadow performativity can be formulated as a form of accountability in measuring the equivalency of green impacts. As this study shows, climate tagging offers scenarios to enable the equivalency of impact in classifying, calculating and comparing the configuration between financial accounts and GHG accounts. In further refinements of the scenarios, however, authority, expertise and time span

of impact generation need to be addressed to accelerate the stream in mobilising climate-related financial flows.

## CHAPTER 9. DISCUSSION

### 9.1 Introduction

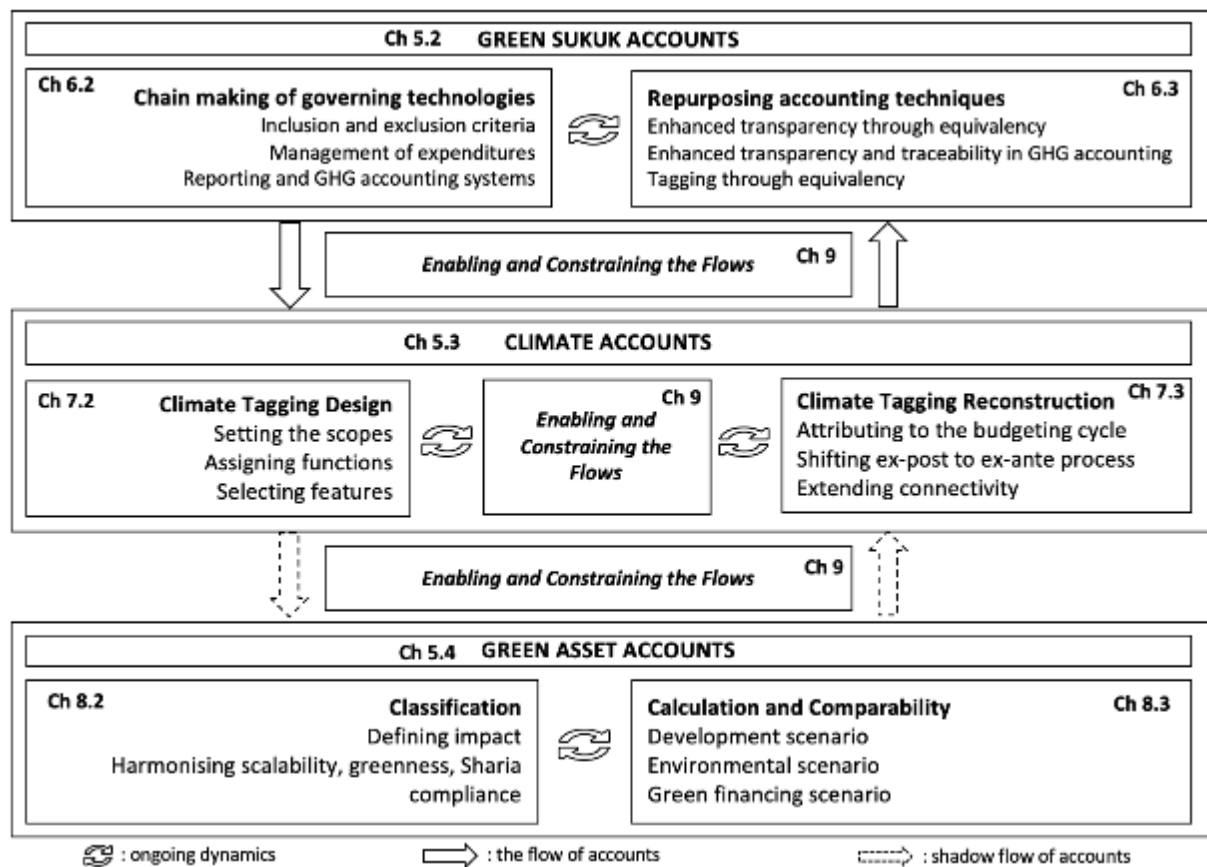
Inspired by the empirical setting in mobilising climate-related funding and the work of Miller and Power (2013) and Rose and Miller (1992), this thesis sheds light on the construction of accountability mechanisms to mobilise a climate-related financial flow. By examining the life cycle of Indonesia's sovereign green sukuk issuance, the previous Chapters 5, 6, 7, and 8 have analysed and introduced attributes in enabling and constraining flows. As this study has highlighted the prominent roles of accounting technologies to construct the demands for multi-dimensional accountability mechanisms in the flow of accounting, this chapter will unfold each dimension to perform its constitutive role.

To provide a detailed discussion, section 9.2 will analyse the empirical findings presented in Chapters 5 to 8 relevant to existing scholarship in accounting for climate change-related financial flows. This includes the mobilisation of climate-related funds, public accounting systems, and impact measurement. Section 9.3 will discuss the key themes that have emerged in formulating accountability mechanisms to enable and constrain the flow of climate-related funds. Next, section 9.4 will indicate the contribution of this research to the theoretical framework within the constitutive role of accounting. Then, the summary of this chapter will be presented in section 9.5.

## 9.2 Summary of Findings

To answer research question 1 – how global climate action agenda was translated into accounting objects connected with a specific financial instrument can be understood and explained – the findings were contextualised in four sub-research questions. These cover the contextualisation of climate change in the flow of accounts, the construction of green sukuk accounting objects mediated between transparency and traceability from issuance to impact, the construction of climate accounts constructed in the public accounting system, and adjudication of measurement provisions to channel green sukuk funds to green projects. The following figure illustrates the outline of the findings.

Figure 9.34 The Construction of Accountable Objects in a Climate-Related Financial Instrument



Source: Author's analysis.



Firstly, to analyse the flow of green sukuk, this research has shown multiple settings where accounts constructed to channel the flows from the capital market to the state budget can be traceable and measured. By analysing each calculative space – green sukuk accounts, climate accounts, and green asset accounts – this research captured the articulation of climate targets into financial instruments, budgeting and planning systems, and green alignment. The finding extends the work of Charnock and Hoskin (2020); Rose and Miller (1992) and the development of accountability and environmentalism (Bebbington, Russell and Thomson, 2017; Gray, 1992).

Even though the classification of the accounts is seemingly neutral and static, this study argues that the dynamics are recursively developed to constitute governable subjects. Furthermore, this study indicated that the classification of the accounts in the context of the Indonesia sovereign green sukuk cannot be detached from global climate commitments and discourse in the initiatives. Therefore, the flow of accounts facilitates an imaginary space where the flow of the green sukuk can be organised as a governable field. By presenting multiple governing technologies that rendered climate change agenda alongside the flow of sovereign green sukuk and underpinning the global context, this finding has addressed research sub-question 1 on how climate change was contextualised in the flow of accounts. The following paragraphs will present a summary of the findings that unveil the dynamics in each of the accounts.

Secondly, this thesis highlighted the dominant constitutive roles of accounting in mediating (Miller and Power, 2013) and rendering multifaceted aspirations (Sharia, green, and development principles) in the green sukuk accountability mechanism. This chapter has argued that the demand for transparency and traceability at the instrument-level

accountability mechanisms requires a formulation of counterflows. The counterflows as a form of accountability create the downstream and upstream direction for green sukuk accounting objects to enable the formulation of GHG accounts and financial accounts in adherence with the Sharia-based principles and the authoritative framework of green bonds and sukuk.

However, this study indicated the disconnectivity of governing technologies to accommodate the demand for transparency and traceability at the financial instrument level. Therefore, this chapter offers empirical evidence to advance prior studies on transparency and traceability (Power, 2019; Quattrone, 2022) by unpacking the way aspirations, practices and processes were mediated to enable and constrain the flow of the funds through accounting technologies, covering tagging, tracing, and earmarking. By doing so, this chapter also adds to the discussion of mediating multiple programmatic agendas into practices and process (Kurunmäki and Miller, 2011; Miller and O'Leary, 2007; Thomson, Grubnic and Georgakopoulos, 2014).

In building connectivity, this research has shown the ways accounting technologies through climate tags (tagging, tracing and earmarking) repurposed disconnected governing technologies through multiple scenarios. These comprise locating enhanced transparency through tagging financial accounts, tracing GHG accounts and earmarking the equivalence assets that connects between GHG accounts and financial accounts. As such, this chapter answered research question 1.2 on how green sukuk accounting objects were mediated between transparency and traceability from issuance to impact.

This research adds to the conclusions drawn by others that have problematised the discrete arena (Kurunmäki and Miller, 2011; Miller and O'Leary, 2007; Miller and Power, 2013; Thomson, Grubnic and Georgakopoulos, 2014) by unfolding connectivity and disconnectivity in formulating proposed material outcomes in the demands for counterflows in accountability for the green sukuk initiative. Moreover, the central use of tagging in maintaining flexibility in operationalising the authoritative framework while complying with primary principles (Sharia, development, and greenness) was shown to be the performative role of accounting in subjectivising governable entities, despite being very limited. Consequently, to enable the flow of green sukuk and constrain the flow streams to avoid unexpected adverse impacts, this study suggests the need to strengthen the counterflows form of accountability and optimise the use of tagging to channel the disconnected governing technologies in mobilising climate-related financial flows.

Thirdly, this research demonstrated that the formulation of climate accounts was performed through reconstructing discursive spaces and reorientation of calculative agency by applying multiple methodological approaches. In framing this domain, the role of accounting in territorialising (Miller and Power, 2013) can be indicated through the design and reconstruction of climate tagging to incorporate climate change in public accounting systems. This chapter has argued that in constructing climate accounts, the horizontal form of accountability creates discursive development practices and processes to set the territory of climate change. The process covered the shifting climate tagging practices from the ex-post to the ex-ante budgeting process. The ongoing refinement of that climate tagging as a technology stimulates an exchange of knowledge between key actors with their own expertise

by interacting with governing technologies across planning, budgeting, and sectors responsible for governing climate change.

However, this study indicated that the extended methodological approach to align the compatibility of their aspirations was not sufficient to mobilise a climate-related financial flow. In enabling the expansion of climate accounts while constraining the potential of over tagging or under tagging, continuous problematisations and enhancements are essential in building connectivity and bridging disconnectivity to climate-aligned instruments. In doing so, this study highlights the need for parallel reform within the existing system.

In this reform process, this research observed a contrasting result from prior studies that emphasised the attributes of similarity among the instruments or expertise to build connectivity. In this thesis, the similarity of governing devices – for instance, in impact evaluation technologies (see Figure 7.30) have raised the concern of sectoral egos given the redundancy of the sub-functions. Simultaneously, the similarity of expertise resulted in a loss in the exchange of knowledge to advance the ongoing development of the climate accounts. As such, this thesis addressed research question 1.3 – how climate accounts were constructed in the public accounting system. The finding extends prior studies who call for research in enabling and constraining attributes for territorialising (Martinez, Pflueger and Palermo, 2022) brought together to formulate new accounts (Gray, Brennan and Malpas, 2014; O'Dwyer, 2005; O'Dwyer and Boomsma, 2015).

Fourthly, departing from prior studies that emphasised the ambiguity and uncertainty in green impact measurement, this study indicated the dominant constitutive role of accounting (Miller and Power, 2013) in adjudicating multiple measurement provisions to construct green asset

accounts. This study has argued that climate tagging facilitated the construction of scenarios of green impact measurements. These scenarios consist of development-based, environment-based, and green finance-based measurements. It is notable, however, that the green impact measurements were proven as shadow performativity, given their greenness cannot be directly traced in the Indonesian public accounting system. Instead, the green asset account is formulated through classification, calculation and comparison connected to existing measurement provision within respective entities to meet the Sharia, green and development principles. Subsequently, the formulation of the green asset accounts also minimised uncertainty (*gharar*) and potentially contributed to the real impact of economic development.

This study argued that the use of tagging remains prevalent to minimise ambiguity and uncertainty by ongoing problematisation and enhancement of green impact scenarios. These scenarios include measures based on development, the environment, and green financing. The problematisation emerged when utilising climate tagging (tracing, tagging and earmarking) given the disconnection between authorities, expertise, and time span whereby the real impacts can be produced. This problematisation stimulated spaces for learning and enhancement among governing entities and technologies.

By presenting the dominant role of accounting in adjudicating multiple measurement provisions through tagging, tracing and earmarking, this chapter answered research question 1.4 on how measurement provisions were adjudicated to channel the green sukuk funds to green projects. The findings add to prior studies by unfolding adjudication processes to enable the meaningful performance of the constitutive role of accounting in environmental impact measurement (Miller and Power, 2013; Thomson, 2021). In particular, dynamics emerged to

aggregate and differentiate climate accounts (Chiapello, 2015, 2018) given diversity in financial attributes and impact attributes (Cooper and Michelon, 2022) and operationalisation in existing systems (Argento *et al.*, 2020). By discovering the reconstruction of Sharia-based green impact measurements, this study provides accounting methods to account for value for money in public policy processes (Barman, Hall and Millo, 2020; Hall and Millo, 2018; Hall, Millo and Barman, 2015) and the formulation of Sharia-based assets (Belal, Abdelsalam and Nizamee, 2015). In addition, this study offers contrasting findings from Arjaliès and Bansal (2018); Arjaliès and Durand (2019) on the silence of Sharia-based principles in the secular market. Instead, the findings demonstrated the prominence of the Sharia-based principle to construct green sukuk as a product category and to demonstrate the green impact that can enable and constrain the flows.

To conclude, it is noticeable that the notion of subjectivising (Miller and Power, 2013) attached in each of the research questions give the use of climate tagging, tracing and earmarking. Tagging was initially utilised to assign climate into prevailing financial accounts with the basis of extended methodological frameworks while offering the flexibility for multiple tagging to the same account. By tracing the relation between the tagged climate accounts and potential impact to GHG accounts, the calculation to compare was made visible. Yet, produce measurable outcomes in achieving intended Sharia, development and environmental purposes, earmarking becomes presence in the form of climate tagging to serve the designated objectives. This study revealed that these accounting technologies facilitate the extent of flexibility and compliance to adhere to ethically governable subjects (Frandsen and Hoskin, forthcoming; Hidayah, Lowe and Woods, 2019). Also, the subjectivising role enables

and constrains attributes to construct accountability mechanisms for a climate-related financial flow. This will be discussed in the following section.

### 9.3 Contribution to the Empirical Settings

The following section will discuss key highlights in the empirical findings to enable and constrain climate-related financial flows. The green sukuk flows and the climate accounts flows in public budgeting co-constructed by the Indonesian government have drawn on five themes to develop the accountability mechanism to mobilise the flows. These key themes also contribute to the development of research in accounting and climate-related financial instruments.

#### 9.3.1 Direction of the Flows of Accountability

Following the work of Martinez, Pflueger and Palermo (2022) on tracking the flows to understand the constitutive role of accounting in territorialising, this thesis highlights the findings on the key issues on accountability in enabling and constraining the flows as its purpose. By unfolding the construction of the green sukuk accounting object from the capital market, state budget and green impact allocation, the direction of the flows can be explained.

Firstly, the demand for a counterflow as a form of accountability mechanism distinguished green sukuk from other forms of traditional bonds and has been an enabling factor in constraining the flow. The counterflows (see Figure 6.23) illustrated that money raised from the green sukuk issuance demands a regular disclosure of resource allocation alongside the green impact pledged during the issuance. Consequently, this direction of the flow goes beyond a single territory, the finance domain for instance, to multiple territories where the

flow of funds was directed. This includes the involvement of participation between local and non-local elements as shown in Figure 6.23.

Secondly, in the state budget domain, this research highlights the pertinence of horizontal accountability (see section 7.3) to account for the capacity of the government budget to align with climate change commitments. As the funding from green sukuk flows to the general treasury account, the loss of traceability occurs with the flow, given the nature of the government treasury account. The treasury accounts are purposed for multiple functions and financing government priorities, which might be beyond the 'green' or 'climate' priorities. Consequently, the efforts to operationalise the flows performed by assigning functionality towards climate-related aspirations has made the disconnectivity between expertise and technologies visible. This research demonstrated the design, feature, and coverage in connecting the disconnected technologies by setting accounting territory through multiple purposes of methodological infrastructure. This methodology aimed at connecting GHG accounts and financial accounts while the process has shown an ongoing refinement. For instance, from a manual process in assigning function to more systematic processes that were incorporated through budgeting and planning systems.

Thirdly, this functionality, however, could be perceived as a shadow performativity as the shadow purpose was not connected throughout other governing technologies in the initial stage of the development. As such, assigning functionality did not also fully impart the proposed aspirations that influence the ownership of the accounts as one of the concerns. This disconnectivity, however, opens a new space for learning to enable the flows that connect the source of financing with the proposed impact. As the development has continued and the



direction of the flows pursued the accountability to multiple sources of financing, the concern over the moral responsibility, also highlighted, resulted in the contractual adherence to a range of ethical principles, including Sharia-structured instruments.

This analysis suggests as countries are strengthening the pledge to pursue net-zero targets, the direction of the flows needs to consider not only climate-related accounts but also progress in meeting such commitments. This includes tracking the flows towards carbon-intensive sectors and the alignment of the roadmaps. By doing so, the flows can be either constrained or enabled to maintain their sufficiency to address the climate change issues. As such, increased understanding responds to the demand for research in public sector accounting in tackling the critical issues of climate change as highlighted by Lapsley and Miller (2019).

#### 9.3.2 Compatibility to Intertwined Aspirations

Mobilising climate-related financial flows at a country level is undeniably intertwined with multiple aspirations. As indicated from the analysis, this research highlighted two primary approaches in enabling and constraining the flows. These are the alignment approach and transition approach. Despite the diversity in the meaning, the use of these approaches in this study was determined by the context of the respondents. For instance, within the market, the transition approach was selected to accommodate multiple classifications of 'greenness', while the government actors – the state budget domain – tend to utilise alignment to refer to 'matching' processes. As the interpretation of green impact is assessed within the adherence to the green authoritative framework, Sharia principles and the public accounting system, the

transition and alignment approaches were accommodated. These approaches were presented as the governing technologies to render climate change aspirations as examined in Miller and Power (2013); Rose and Miller (1992). However, the extent of aspirations can be intensified within the territory alongside the flows (Bebbington *et al.*, 2020; Martinez, Pflueger and Palermo, 2022) and is also influenced by the ability to mediate (Miller and O'Leary, 2007; Thomson, Grubnic and Georgakopoulos, 2014).

Mediating the aspirations into the context of climate-related financial flows is important. This finding points to aspirations in the territory of the flows in three domains, green sukuk accounts, climate accounts and green asset accounts. Despite initially flowing from a single domain of the green sukuk account, the flow into multiple levels requires the mediation of distinctive aspects. The alignment approach accommodates climate change aspirations and development priorities. These complex aspirations are primarily faced by developing countries where development agenda such as economic growth, poverty alleviation, health, and education outpaced other priorities, including a low carbon development. The transition approach performs as a narrative idea to incorporate aspirations for climate change as an enabling mechanism by offering a basis for the formulation of multiple green or climate-related classifications.

These approaches were taken given the lack of direct financial or mandatory implications resulting from the failure to embark the proposed objectives despite moral obligations. The green sukuk flows need to accommodate intangible materials – ethical, moral, greenness – as measurements of the level of goodness in which measuring in verifiable ways can be ambiguous (Milne and Grubnic, 2011; Puroila and Mäkelä, 2019). At the same time, the

demand for minimising the level of uncertainty has been clearly stated in every share-based transaction. This is through the underlying demand of green assets to enable the funds to flow into tangible assets that are purposed for real economic development as aligned with Belal, Abdelsalam and Nizamee (2015); Hidayah, Lowe and Woods (2019). The ability of accounting technologies to carry multiple purposes within the intertwined objectives could avert the funds stream to unintended directions and this enables to formulate optimum underlying assets as a basis to mobilise climate-related financial flows.

Furthermore, it is noticeable that both transition and alignment approaches can be perceived as ambiguous in assigning climate-related aspirations, while enabling the mobilisation of the flows. For instance, in the development stage to mobilise resources, this ambiguity through the approaches of alignment and transition has influenced the discourse in the extent transformative reforms can be performed via means of finance. However, as the expansions are continuously developed, the demand for having stringent and relevant methodologies needs to be pushed forwards to constrain misleading flows that may result in reverse impact to the climate commitment.

### 9.3.3 Flexibility and Compliance

In designing and implementing the construction of accounting technologies, this research indicated that flexibility and compliance become inseparable characteristics to enable and constrain the flows. Throughout Chapters 6, 7, and 8, the flexibility of assigning climate-related financial flows facilitated the mainstreaming of climate change in co-existing law and government regulations. One of the underpinning principles is the CBDR to enable signatory countries to incorporate compliance within the countries' priorities while maintaining their

contributions to international agreements on climate change. Consequently, the selection of a general programme approach for finance enables a country to incorporate the financial instruments into the existing mechanisms while facing problems in building connectivity, as institutions, expertise, governing technology all impact production (see section 6.2 for further details).

However, flexibility demands compliance with guiding provisions to constrain unexpected results in the climate-related financial flows – greenwashing. While flexibility through the CBDR has been advocated, it could also advance uncertainty in operationalising climate-related ‘labelling’ mechanisms such as green, sustainability, and ESG themes. Consequently, there is demand to balance flexibility and compliance with the proposed construction of the ‘green’ related type of financial instruments. This is not to mention the compliance with co-existing principles, including Sharia-based, green bonds, development principles and international climate commitment.

#### 9.3.4 Connectivity and Disconnectivity

The idea of connectivity and disconnectivity was proposed by Power (2019) in building the traceability infrastructure. This thesis extends the discussion by offering fresh empirical insights. Throughout the analysis, connectivity and disconnectivity have been essential elements to construct the accountability mechanisms that require a granular level of transparency. The mobilisation of climate-related financial flows required the connectivity of material outcomes, expertise, designs and features, and equivalency to impacts. Those elements enriched domains of attention in seeking transparency to account for nature (Power, 2019; Quattrone, 2022). Pursuing connectivity has dismantled the disconnectivity between

each of the elements in which problematics enable excessive climate-related financial flows without solving disconnected infrastructures.

#### 9.3.4.1 Connectivity and Disconnectivity of Material Outcomes

As assigning climate relations through accounting technologies, including frameworks, tracing, tagging, and earmarking creates procedural mechanisms in formulating outcomes, this form of technology has enabled the mobilisation of climate-related finance. However, tackling climate change requires a shift from procedural to material outcomes in which this research has shown disconnectivity as presented in Figure 6.23. This study explores whether climate tagging practices were able to meaningfully connect money from a climate financial instrument to material environmental outcomes (Mol, 2015). It is suggested the production of climate outcomes demands tracking through chains of decisions to trigger material changes if transparency is deemed as a ritual (Christensen and Cornelissen, 2015). However, the green sukuk demands outcome-oriented accounting rather than procedural accounting, as presented in the adjudicating impact measurement which highlights the outcome-green asset accounts (Chapter 8). Climate tagging has been shown to offer a continuous process of connecting material outcomes and financial outcomes that incorporated multiple principles, situated across institutions, and governed through disconnected technological devices (Power, 2019), to enable appropriate modes of governance.

#### 9.3.4.2 Connectivity and Disconnectivity of Expertise

It is important to utilise many sources of expertise throughout the development of accounting mechanisms for climate-related financial flows. The selection of corresponding key actors

becomes the basis for connecting the line of authorities and the line of coordination given the similarity scopes of the responsibility. However, unless there is an exchange of understanding across areas of expertise when developing financial instruments, attempts to develop a climate account will fail. This failure was perceived given the absence of upskilling transfer and connected technology that enable moral responsibility to be visible in governing day-to-day practices. Despite the reconciliation process, the disconnection between expertise alongside climate-related responsibility resulted in a loss of knowledge exchange.

As the learning process has been pertinent, this research identified the exchange of understanding was constructed through identifying disconnectivity between diverse climate-related expertise and beyond to allow a transfer of understanding. The process of discourse in enhancing the knowledge between financing, budgeting planning, and climate-related impacts lead to the refinement of accounting technology to enable and constrain the flows.

#### 9.3.4.3 Connectivity and Disconnectivity of Accounting Technologies

This research demonstrated that the connectivity and disconnectivity between accounting technologies to construct accountability mechanisms has been instrumental to enable and constrain the flows of climate-related instruments. The connectivity and visible disconnectivity were manifested in the capability of linking and matching funds, eligible projects, climate reductions, financial planning systems and GHG MRV systems. These instruments were presented in the design of the green framework and the ongoing refinement in the implementation based on the expansion (diminution) of the aspirations for climate change.

Departing from the framework, it is through climate tagging, including tracing and earmarking, that the connection and disconnection of climate-related instruments are visible and governable. The climate tagging device has made climate change commitment governable in budgeting and planning accounts. However, visible disconnectivity has been shown through the use of co-existing systems that were designed for other purposes which were then redesigned for climate-related purposes. Consequently, redirecting connectivity through technical systems without imparting climate change aspirations has led to unsustainable governing processes, given the absence of exchanged knowledge and devices to regularly connect with performance measurement.

Connecting accounting technologies with a wider governing device was achieved when there was parallel reform in other technologies, such as the general reform in budget and planning systems. As such, the incorporation of climate-related plans was added in redesigning the existing system. However, incorporating an additional planning instrument into the prevailing system did not create a meaningful impact without a stringent and connected measurement provisions in place. This study indicated further developments were reformulated to embed impact evaluation alongside an opportunity to channel with potential innovative financial instruments. Even so, disconnectivity remains as resulted from connecting similar GHG impact measurements that created redundancy. As such, this connection, however, requires discourse in connecting with other disconnected measurement provisions and distinguishing the source of funding. Subsequently, this research also indicated that the reform of the system and the expansion to connect multiple governing technologies enabled the production of a newly developed accounting object.

#### 9.3.4.4 Connectivity and Disconnectivity of Equivalency to Impacts

In formulating the equivalency of impacts in climate-related financial flows, this research noted the dominance of discourse in equivalency of performance between budget and impact, the level of intensity, and diversity of purpose that drive the consequential attributes.

With efforts to lower carbon in economic activities, the equivalency of carbon as a unit to measure the impact for carbon emission reductions has been widely translated. This creates what this study has named as a co-construction of climate accounts where the account for climate change has travelled from the idea to the structure of performance measurement in co-existing governing technologies. In this research the co-construction was situated in the core sector of climate change itself (energy, transport, industry, IPPU, waste, forestry) to beyond the source of carbon reductions, including financing, budgeting, planning, and interconnected instruments. As such, each of the instruments hold diverse strategic agenda, process, and technical language to translate carbon.

Assigning climate-related functions at an output level has enabled the disclosure of the heterogeneity of the outputs and the implication of the outputs for the assigned instruments. Output in a government budget can refer to the result of the activity, while output in resource allocation might not necessarily influence the decision towards input in the investment process. The interchangeable use of outputs across multiple sectors potentially enabled the mobilisation of the flows; however, without careful consideration the diversity of terminology can blur climate-related attributes.

Furthermore, the construction of the impact when the equivalency to a direct monetary unit is absent has shown a diversity in the extent a climate-related instrument has been actualised



to drive real impacts. The impact is seen to be beyond procedural by constructing a set of calculative numbers without actual progress to the environment and economy. In this sense, locating green classifications and measurements has shown different levels of intensity to implement its level of greenness.

#### 9.3.5 Problematisations and Enhancements

The process of problematisation has dominance to drive the development of accounting technologies to perform its constitutive roles. This reconstruction has been performed as continuous learning alongside the problematisation of aspiration and functions, designs and features, exchange of multiple expertise and the construction of impacts.

##### 9.3.5.1 Problematisations and Enhancements: Aspirations and Functions

Defining the boundary for climate-related financial flows within the stage of unstable developments remains daunting. This is not only due to the diversity but also the similarity of functions and aspirations. The scope of the definition has been a territory for problematisation between key relevant areas of expertise while this space also facilitates learning processes which instil, adjust, and alter the aspirations and the function of accounting technologies. However, the extent of functionality when contrasted with existing functions has constrained direct connectivity between the original function of financial government accounts, the flow of climate-related accounts, and the climate change impact accounts. Furthermore, the similarity of functions also constrains the accountability of the flow when redundancy of systems occurs in multiple authorities. In this sense, the sectoral egos have been problematised given the shifting authorities which took place while attaching or detaching

one or another authority and requires transition and negotiations as resource allocation will attach to the authority.

#### 9.3.5.2 Problematisations and Enhancements: Designs and Features

This research identified that the nature of accounting technologies to govern climate-related instruments has been continuously problematised in its categorisation. This is not only the original purpose of the governing instruments (such as financial planning systems and GHG MRV systems), but also the ambiguity in operationalising due to the mismatch. The discrepancy occurs in finding the right proportion for the time period between budgeting cycle, production of impacts, completion of the projects and compliance to Sharia-based principles. Beyond the timing, there has been a constant debate on costing proportions between outcome, output and components in locating the object of traceability. In this sense, technical process, expertise, government structure, the creation of a shadow performance indicator – when measuring economic benefits from carbon – were regarded as the key elements in operationalising at the local level. Furthermore, the legal and regulatory basis alongside the ongoing (unparallel) development of interconnected instruments has raised another concern. In addition, the difficulty in identifying climate-related expenditures and potential shifting in resource allocations either in pre- or post-budgeting processes could obscure the effectiveness in operationalising the programmatic agenda of climate change in public budgeting and planning system.

#### 9.3.5.3 Problematisations and Enhancements: Exchange of Multiple Expertise

The drive to instil climate and financial-related understanding to multiple areas of expertise as an extended shadow performativity has created tensions. Similarity of authorities and closer relations in coordination may drive accessibility to build relations and to connect with the proposed agenda. However, this study showed that tensions across expertise have generated the exchange of learning despite the necessity to be mediated with another set of expertise which has a closer relation. The problematisation and the exchange of knowledge between technical expertise in delivering the direct sectors of climate change, MRV, GHG inventories, budgeting, planning, and financing has opened a new space for learning and understanding the tensions. Through the dynamics, this research demonstrated continuous progress in making climate change governable within multifaceted expertise.

#### 9.3.5.4 Problematisations and Enhancements: Constructing Impacts

Finding a balance between financial impact materiality, development impact and GHG impact has been problematised while this has opened a learning space. This research indicated the formulation of shadow performativity to constitute green asset accounts from climate accounts in which direct relation cannot be traceable in the initial stage. The shadow performativity was accounted from multiple scenarios in connecting financial accounts that were purposed for general or multiple national development priorities to GHG accounts and the tangibility of the assets. Uncertainty was demonstrated in classifying and measuring verifiable climate change impacts – GHG accounts. Any diversion from the initial purpose of the account to impart other purposes has been made visible by attaching a methodological

approach and verification from the external assurance. These practices aimed at maintaining certainty for being accountable as the issuers and investors – bondholders – and as the signatory of climate convention to the public accountability to climate commitment.

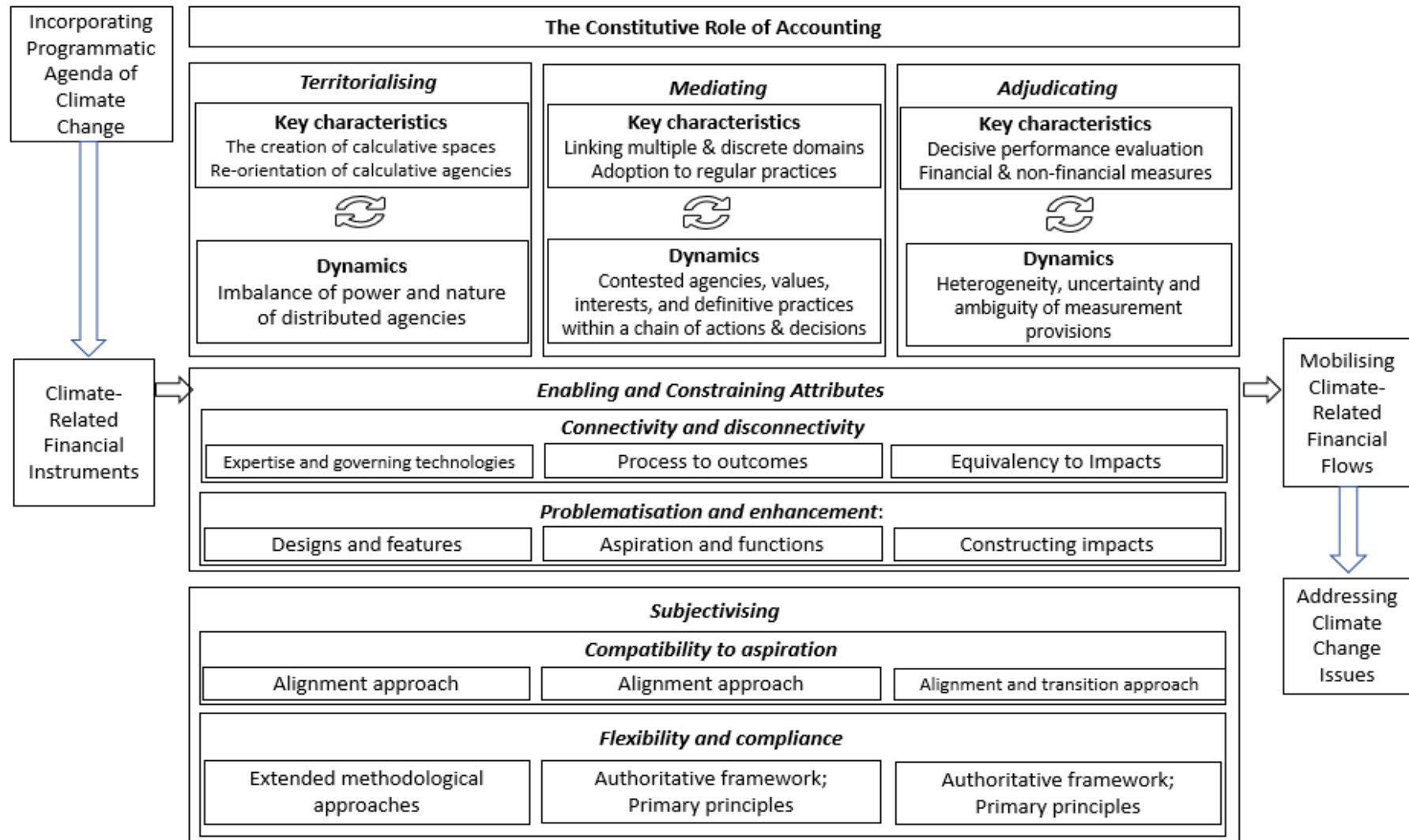
In parallel with the practices, internal problematisation to formulate the relevant measurements and comparisons has shifted beyond a single selection of measurement provision. There were increased tensions in measuring a shadow performativity such as by linking budget spent, output named and counted as climate accounts. This dynamic has enabled the detection of misclassification between adaptation and mitigations, for instance, and potentially misleading comparisons when misclassification was performed. Furthermore, as the green sukuk encompasses the demand to connect with the real economy, further developments in tracking the flow also considered the tangibility of assets claimed as climate accounts for green sukuk impact allocation. By assigning accounting objects designated for green impact measurement, this practice disclosed another concern towards the completion of projects that serves as a basis for underlying assets and the actual generation of green tagged impacts. Moving forward, however, studies need to examine the measurement and comparison of progress towards the roadmap and trace resource allocation to carbon-intensive sectors.

#### 9.4 Contribution to the Theoretical Framework

In offering the theoretical contribution, this research follows Alvesson and Sköldberg (2018); Swedberg (2014, 2016) in extending the analytical framework by iterative processes between theoretical frameworks, empirical evidence, and relevant studies. The analytical framework drew upon the notion of the programme and technology of government (Rose and Miller,

1992) where the climate change programmatic agenda is rendered through the emergence of green-labelled financial instruments, climate tagging and climate-aligned instruments. However, this form of technology could not offer productive forces to enable and constrain the mobilisation of dedicated financial instruments to tackle climate change. Therefore, to understand how the productive force of accounting can effectively organise and economise climate change in a governable field, the concept of the accounting complex (Miller and Power, 2013) offers underpinning guidance on the construction of an accountability mechanism for a climate-related financial instrument. The following figure provides the contribution of the research to extend the analytical framework.

Figure 9.35 The Extension of Analytical Framework



Source: Author's analysis.

Figure 9.35 illustrates the attributes in enabling and constraining the flows to extend the initial analytical framework concerning the constitutive role of accounting. By analysing the chain of actions and decisions within the sovereign green sukuk life cycle, the contribution to the analytical framework can be distinguished in three areas. Firstly, the empirical evidence facilitates the unfolding of the key dominant dimensions of the constitutive role of accounting within the flow of accounts, despite the entanglement. Secondly, this study makes more visible how the enabling and constraining attributes of accounting technologies interact in accounting's performance of its constitutive role. Thirdly, it shows how, through tagging, tracing, and earmarking, climate change can be organised in a governable entity within the flow of accounts despite limited evidence concerning the 'economising' of the reformed agenda. A further reflection on these spheres is developed in the following paragraph.

This thesis contributes to unveil the dominant constitutive role of accounting within the flow of accounts. As shown in Figure 9.35, through the entanglement of constitutive roles of accounting, this study offers alternative insights to show productive forces can be performed effectively. This research therefore adds to the contributions of prior studies which have discovered diverse results in the interplay between territorialising, adjudicating and mediating roles in the operation of the accounting across diverse settings (Bebbington *et al.*, 2020; Free *et al.*, 2020). In this study, however, subjectivising is equally interconnected given the chains of decisions and actions of climate tagging within the flows offer flexibility and control at a distance (Miller and O'Leary, 1987).

To enable the elements of the constitutive roles of accounting to be analysed, Figure 9.35 represents primary dimensions that are more prevalent to enable the productive forces in the flow of climate-related accounts.

Miller and Power (2013) argue that accounting is a highly subjective practice that subjects individuals to external control and regulation while also presuming that individuals are free to make choices. Figure 9.35 situates the subjectivising role of accounting within the domains of the constitutive role of accounting. In this thesis, the relationship between accounting and subjectivising is discussed in depth in Chapters 6, 7, and 8. It is shown that subjectivising is manifested in various accounting practices, such as climate tagging, tracing, and earmarking, which are used to assign climate, green, and sustainability-related themes to state budget accounts. However, these practices create problematisations that can either enable or constrain the operationalisation of aspirations into practices. As illustrated in Figure 9.35, the approach to assigning tags, traces, and earmarks varies across the dimensions of territorialising, mediating, and adjudicating.

In the process of subjectivising, there are two dimensions that are seen as standing out. One concerns the acceptance of accounting-based values, as articulated through its naming and counting, by which accounting objects are constituted and acted upon. The second concerns the way in which these accounting objects are then able to reconcile and provide flexibility in constituting the compliance required to maintain compatibility between local domains and objectives in addressing climate change, and between the different levels of the green sukuk infrastructure and its location in the existing public budget system. In that sense the



subjectivising process is also a process that enables and constrains the constitution of attributes.

Furthermore, this study argues that the productive forces of accounting can be performed more effectively when the enabling and constraining attributes are discursively developed. This thesis offers a fresh contribution on the constitutive role of accounting (through tagging, tracing, and earmarking) developed by Miller and Power (2013) and responds to the call from Martinez, Pflueger and Palermo (2022) by introducing attributes in enabling and constraining the flows.

This research observes that the role of accounting via climate tagging, tracing and earmarking primarily performs to organise climate change in multi-dimensional settings. This is through aspirations in pursuing ethical governable subjects (Frandsen and Hoskin, forthcoming; Hidayah, Lowe and Woods, 2019). However, this form of climate tagging did not offer a sufficient accounting infrastructure to perform economisation, instead the tagging was seen as a limited pathway to financialise climate actions.

To elaborate further, the following paragraphs details each of the key dimensions in the constitutive role of accounting.

Firstly, this thesis extends the territory that has been constructed in enabling and constraining the flows, following the call from Martinez, Pflueger and Palermo (2022). By departing from Miller and Power (2013) concept of territorialising, in which calculative spaces have been constructed and reconstructed to render intertwined aspirations, this study shows the flow of accounts were reformulated in distinctive domains. This indicates that understanding the flow

of financial instruments has channelled the domain of the market (green sukuk accounts), the public accounting system (climate accounts), and the project level (green asset accounts). The prominent utilisation of the territorialising concept is situated in designing and reconstructing climate accounts and building the connectivity within the climate accounts as shown in Chapter 7.

Consequently, while maintaining the programmatic agenda of climate change, this research recursively reconstructs calculable spaces alongside the flows in which the extension of programmatic agenda can be imparted; however, this may be problematic – given the nature of the instruments and co-existing agenda in local domains. As such, the construction of accounts that incorporate programmatic agenda into the generation of a facticity which can be evaluated by the entity (Miller and Power, 2013) could not be fully achieved. Instead, this study highlights that attempts to impart programmatic agenda into accounting technologies have resulted in the co-production of accounts, that rearrange the scope of calculative space as previously noted by O'Dwyer, Owen and Unerman (2011).

As the green sukuk funds stream to the general treasury account and loss its traceability, this study indicated a horizontal form of accountability by observing the construction of climate tagging to set climate accounts. This thesis has provided a novelty in constructing the direct and indirect relation of assigning climate change in the government accounting system with the absence of command and control. This is through the recursive development in the design and features of tagging and compatibility to prevailing governing technologies, key expertise across budgeting, planning, financing, sectoral ministries who deliver NDC target, and MRV were dynamically interacted. This form of interaction and exchange of knowledge enabled to

construct a horizontal form of accountability. This also adds to the discussion of de-territorialisation and re-territorialisation (Lovbrand and Stripple, 2006) dynamically constituted and reconstituted (Mennicken and Miller, 2012) through interactive and diagnostic accounts (Gond *et al.*, 2012). This evidence, therefore, has extended unexplored domains (Alawattage, Graham and Wickramasinghe, 2019) within the flows (Martinez, Pflueger and Palermo, 2022) of a climate-related financial instrument.

Secondly, this thesis highlighted that the constitutive role of accounting (Miller and Power, 2013), which enables and constrains the flows, performs its mediating role within multiple contexts. This research indicated the contexts where the mediation was dominant to perform – counterflows – the downstream and upstream form of accountability. However, this study emphasises the attributes to shift from procedural to material outcomes as the primary accounting objects. There are similarities to prior studies in observing discrete arenas (Larrinaga, Luque-Vilchez and Fernández, 2018; MacKenzie, 2009; Miller and O'Leary, 2007; Power, 2019; Thomson, Grubnic and Georgakopoulos, 2014; Wise, 1988). However, the emphasis of this thesis extends the discussion by offering the performativity role of accounting – mediating proposed aspirations and functions to construct the green sukuk accounting objects. As such, the novelty is located in the constant efforts to develop connectivity from disconnectivity of shifting from processual basis to outcomes. However, the ongoing problematisations and enhancements across relevant governing technologies continues to persist in advocating contested aspirations and functions.

Thirdly, this research provides a contribution in extending the debate on the adjudicating role of accounting. Departing from its role to enable the measurement and comparison of

performance (Miller and Power, 2013), this thesis sheds light on the approach to aggregate, measure and compare in forming a new development of shadow accounts – green asset accounts – from the co-existing performance measurements. This thesis responds to prior studies that emphasised the difficulties in the aggregation process and potential changes (Argento *et al.*, 2020), selection approach (Barman, Hall and Millo, 2020; Hall and Millo, 2018; Hall, Millo and Barman, 2015), and dynamics in adjudicating financial forms and non-financial materials (Chiapello, 2015, 2018; Thomson, 2021). By offering empirical insight where outcomes – green asset accounts – were constructed, this thesis also offers insights where changes were observed in the governing devices. Even so, there remains widespread uncertainty in defining and categorising environment-oriented finance instruments. As such, in the light of moral responsibility and adherence to Sharia-based principles (Belal, Abdelsalam and Nizamee, 2015; Hidayah, Lowe and Woods, 2019), the empirical evidence highlighted the outcome – through the green asset accounts – becomes the object of accounting to perform its roles in minimising the ambiguity.

Fourthly, this thesis offers a novel contribution in subjectivising accounts which encompass flexibility while being assigned functionality and incorporating climate change aspirations. Miller and Power (2013) and Chiapello (2018) argue that giving subjects to accounts produces reimagined aspirations in local realms where a new object will be reconstructed. It is through naming and counting (Bassnett, Frandsen and Hoskin, 2018; Frandsen and Hoskin, 2018, forthcoming), assigning climate change aspiration becomes visible in other prevailing accounts and the discursive process in counting the alignment between GHG and financial accounts. However, this form of naming and counting does not directly encompass material outcomes

such as Sharia, development and environmental principles alongside the flow of green sukuk funds. Therefore, this study adds to the discussion in the dynamics of reconstitution in subjectivising a governable entity to incorporate ethical materials (Frandsen and Hoskin, forthcoming; Hidayah, Lowe and Woods, 2019).

Instead of being taken for granted as a subject of the accounts, this study traces the initial process of aligning climate change aspiration was deemed to be failure without the exchange of knowledge. It is through the interaction among the agents of expertise, imparting climate change aspiration has enabled redevelopment of the governing technology to situate climate accounts (see section 7.3 in Chapter 7). By doing so, this thesis responds to absence of subjectivising previously noted by Bebbington *et al.* (2020). Despite the struggle over multiple forms of subjectivity as emphasised in Frandsen and Hoskin (forthcoming); Hidayah, Lowe and Woods (2019), pursuing the balance between flexibility and compliance to maintain the level of goodness – environmental integrity, Sharia principles – has been a highlight in this research. The balance aims at accommodating the flexibility of a public budget (Alesina and Passalacqua, 2016; Posner, 2007), while assigning a relation to the flow of funds (Bandelj, Wherry and Zelizer, 2017; Zelizer, 2012).

By unfolding and drawing from the domains of the constitutive role of accounting, this thesis was able to highlight these key components to enable and constrain the flows (as presented in Figure 9.35). Thus, the theoretical approach facilitates this thesis to provide novelty to knowledge by extending the present accounting literature on the constitutive role of accounting and addresses research question 2 – how the productive force of accounting was effectively performed to organise and economise climate change in a governable field. This

thesis enhances the theoretical framework by presenting the richness of the data from the empirical evidence.

## 9.5 Summary

This chapter concludes by summarising the empirical data presented in Chapters 5,6,7, and 8. This thesis highlights how the accountability mechanism of a climate-related financial instrument can be understood and explained empirically and theoretically to enable and constrain the flow. By offering the enabling and constraining attributes, this research contributes to the empirical settings in which highlighted the prominent uses of tagging, tracing and earmarking. As such, this chapter also discussed and unpacked the performance of the constitutive roles of accounting to organise and economise climate change in a governable field. In this sense, the contribution to the extension of analytical framework can be discovered.

Departing from contextualising the global agenda of climate change in climate-related financial instruments (Charnock and Hoskin, 2020; Rose and Miller, 1992), this research reveals instruments to articulate climate change within the flow of sovereign green sukuk. Moreover, this chapter has outlined the context of shifting transparency and traceability. This has also explained the construction of climate accounts in public accounting systems that co-exist with the development agenda of a national government. Also, it has explained the reformulation of impacts amidst a diversity of measurement provisions and the demand to find equivalency between financial accounts and non-financial impact accounts.

Drawing upon the empirical evidence and contextualising the setting within the flows from the issuance of the green sukuk to impact measurement, this study discovers attributes to

enables and constrain the flows. It extends prior studies in tracking the flows (Martinez, Pflueger and Palermo, 2022; Power, 2019, 2021), from the evidence of a climate-related financial flow. This thesis introduces a direction of the flow, such as counterflows resulting from the demand of the downstream and upstream form of accountability for the issuance of sovereign green sukuk. This direction triggers the dynamics of horizontal and shadow performativity to advocate the construction of climate accounts and green asset accounts. Within the tracking of climate-related financial flows, this research also indicates the intensity of the flows within each of the accounts. To enable and constrain the flows, the intensity is manifested in the element of ensuring the compatibility to intertwined aspirations, balancing between flexibility and compliance, unpacking connectivity and disconnectivity, also continuous problematisation and enhancements. In designing and operationalising the attributes to perform the productive forces, the evidence shows the importance to situate within the dominant dimension of the constitutive role of accounting.

Despite the entanglement between the dimensions of the constitutive role of accounting, this thesis was able to unpack each of the dimension by analysing from the empirical evidence. By doing so, this study adds to the discussion within prior studies who indicated diverse results (Bebbington *et al.*, 2020; Free *et al.*, 2020; Miller and Power, 2013). As shown in Figure 9.35 in Chapter 9 that the extension of the analytical framework is situated in the enabling and constraining attributes to perform its productive force. However, each of the dimensions, from territorialising, mediating, adjudicating to subjectivising, entails different dominant attributes of connectivity and disconnectivity, and problematisations and enhancements. This study also redraws that enabling and constraining attributes for subjectivising, which primarily cover compatibility to intertwined aspirations, and flexibility and compliance. The

advancements to the attributes could not be detached from the dynamics to construct accounting objects alongside the flow of funds.

In setting green sukuk accounts, mediating the compatibility within discrete domains becomes prevalent (Miller and O'Leary, 2007; Thomson, Grubnic and Georgakopoulos, 2014). The primary emphasis was situated between transparency and traceability (Quattrone, 2022). In this sense, this research highlights the connectivity and disconnectivity (Power, 2019; Raeni, Thomson and Frandsen, 2022) in shifting the process basis to outcome-oriented accounting objects (Mol, 2010, 2015). Here the ongoing problematisations and enhancements was merely to balance between contested aspiration and functions (Bebbington, Russell and Thomson, 2017; Milne and Grubnic, 2011).

In formulating climate accounts, the dynamics in territorialising was recursively developed in the process of incorporating climate tagging in the government budgeting cycle. Developing connectivity and disconnectivity was situated in the designs and features of climate tagging whereby ongoing problematisation was resulted from the exchange of knowledge between expertise and governing technologies. The climate accounts as a result of climate tagging process and practices becomes the basis for constructing green asset accounts.

Green assets become the underpinning measure of the optimum amount for the green sukuk issuance. However, this study highlights that formulating green asset accounts by departing from climate accounts requires adjudication between multiple measurement provisions. This research highlighted the disconnectivity and connectivity within the expertise and governing technology has resulted in an interactive domain to formulate equivalency to impacts. Problematisation and enhancement were continuously developed as a result of the exchange



of knowledge among multiple areas of expertise and practices to build connectivity of governing technologies to account for GHG and financial accounts. This process implies the need to the question aspirations and functions in the redeployment of existing accounts to carry material outcomes from the newly developed accounts.

Despite the construction of accountability mechanisms through tagging, tracing and earmarking seems to be a mundane process, this study showed that assigning the name of climate and green to encompass relevant aspirational beliefs could not be detached from the counting. However, this study revealed that this form of naming and counting could not create a governable entity or carry material outcomes and beliefs unless it was traceable and embedded in relevant accounting infrastructures, such as tagging, tracing and earmarking. Therefore, this thesis emphasises the importance of accounting technologies to seek compatibility between aspirations amid the demand for flexibility and compliance. Alignment and transition approaches were manifested in an authoritative framework, extended methodological approaches and primary principles that a governable entity needs to uphold. As such, this study offers insight in the discussion between naming and counting (Bassnett, Frandsen and Hoskin, 2018; Frandsen and Hoskin, 2018, forthcoming) and struggles in assigning ethical beliefs (Hidayah, Lowe and Woods, 2019).

Furthermore, this chapter has enriched the analytical framework initially developed by Miller and Power (2013) by introducing the analytical framework to enable and constrain the flow of accounts. Through the case study of the green sukuk, the evidence also contributes to the direction and intensity in territorialising – by focusing on the constitutive role of accounting through tagging, tracing and earmarking. In this sense, this research demonstrates the

importance of accounting technologies to tackle climate change within public accounting system, as to respond to the call of research from Lapsley and Miller (2019). By extending the innovative analytical framework – the constitutive role of accounting – it has made examination of the organising and economising programmatic agenda of climate change in technological instruments possible.

## CHAPTER 10. CONCLUSION

### 10.1 Introduction

This chapter aims to offer a comprehensive summary of the thesis in response to the research questions outlined below:

RQ 1: How can the global climate action agenda translated into accounting objects connected with a specific financial instrument be understood and explained?

RQ 1.1: How is climate change contextualised in the flow of accounts?

RQ 1.2: How are green sukuk accounting objects mediated between transparency and traceability from issuance to impact?

RQ 1.3: How are climate accounts constructed in the public accounting system?

RQ 1.4: How are measurement provisions adjudicated to channel green sukuk funds to green projects?

RQ 2: How can the productive force of accounting be effectively performed to organise and economise climate change in a governable field?

By investigating a case study of Indonesia's sovereign green sukuk from the life cycle perspective to address the research questions this thesis contributes to the construction of accountability mechanisms to mobilise a climate-related financial instrument by introducing attributes in enabling and constraining the flows. This study extends the analytical framework on the constitutive role of accounting by discovering the novel use of tagging, tracing and

earmarking as accounting technologies to organise; yet there is limited evidence to economise climate change in a governable entity. By offering empirical and theoretical explanations, the extended analytical framework should shed light on the productive forces of accounting to accelerate and constrain climate-related financial flows.

This chapter presents research contributions and implications in three sections. The following section 10.2 provides an overview of research contributions. Next, section 10.3 will reflect on the research method and analysis. Section 10.4 discusses research implications, limitations, and future research.

## 10.2 Research Contributions

As discussed throughout the chapters, this thesis has revealed the construction of accountability mechanisms for a climate-related financial instrument by examining the case study of Indonesian sovereign green sukuk. By doing so, this study offers novel empirical evidence on the importance of traceability attached to accounting infrastructures to set a governable field, here via tagging, tracing, and earmarking. This study introduces attributes to enable and constrain the accountability mechanisms that can be constructed to mobilise a climate-related financial flow. Furthermore, despite the entanglement of dimensions that constitute the productive forces of accounting, this research unfolds each dominant dimension within the flow of accounts. By highlighting the research evidence and analytical framework, this thesis also provides insights for decision-making for policymakers and in practices.

### 10.2.1 Contribution to Research in Accounting and Climate Finance

This study augments to the scarce of research examining the impact of environment-connected innovations at the financial instrument level and its accountability mechanism as highlighted by Bridge *et al.* (2020); Chen, Letmathe and Soderstrom (2021); Larcker and Watts (2020); Monk and Perkins (2020). Despite the challenges of embedding climate change mitigation processes given the inability to earmark the proceeds as emphasised by the International Monetary Fund (2022), this study identified the role of climate tagging in performing the constitutive role of accounting alongside the flow of funds. By borrowing the concepts of attribution and consequential processes in examining the life cycle of the funds (Brander, 2016, 2017), the chain of actions, decisions, connectivity, and the discursive construction of accountable objects for climate change can be discovered in multiple governable fields.

This study identified the flow of account streams from green sukuk accounts, climate accounts to green asset accounts. Each governable field represents the construction of climate change mitigation as accountable objects in market instruments, public finance, and climate-related projects respectively. This research revealed the dynamics of accounting for GHG emissions given the complex and ambiguous practices and processes together with competing interests of national priorities (Bebbington, Russell and Thomson, 2017; Milne and Grubnic, 2011). However, by examining meticulously the constitutive role of accounting in unfolding the dynamics to set the accounts, this thesis introduces the attributes of accountability mechanisms in enabling and constraining the flows of a climate-related financial instrument.

It is evident that accountability mechanisms in climate-related financial flows demand a multi-dimensional form of construction. By conceptualising from the empirical evidence, this thesis indicated that counterflows, horizontal accountability, and shadow performativity construct a form of accountability in green sukuk accounts, climate accounts and green asset accounts respectively. The green sukuk initiative demands a distinctive form of accountability that this research named as counterflows formed of accountability that embeds material outcomes aligned with Sharia, green and development principles. As the funding streams to the government accounting systems resulting in a loss of traceability, the form of accountability is constructed with a discursive horizontal relation across budgeting, financing, and imperative delivery of climate actions. This horizontal form of accountability stimulates the exchange of knowledge among experts and builds reconnections in existing governing technology. The discursive processes and practices led to the reconstruction of design and features of climate tagging in the government budgeting and planning cycle. By doing so, the problematisation emerged alongside the learning process among key experts resulting in the enhancement of primary governing technologies in accommodating climate change issues.

However, the creation of climate accounts was not sufficient to construct underlying green assets, which this thesis named as green asset accounts. The research indicated shadow performativity was constructed to demonstrate the classification, calculation and comparison of green assets in the Indonesian public accounting system despite the absence of direct traceability. This form of shadow performativity was achieved through earmarking assets that are included in the climate tagging process to minimise potential *gharar* (excessive ambiguity and uncertainty) which are against Sharia principles. As countries need to finance the

transition to a low carbon economy and pledge to achieve net-zero targets, this study suggests the importance of examining and comprehending the directional form of accountability mechanisms and the intensity of materials in tracking the flows.

In addition to the multi-direction of the flows, this research has indicated enabling and constraining attributes to facilitate the constitutive roles can be performed effectively to construct accountability mechanisms in a climate-related financial flow. The attributes cover compatibility to intertwined aspirations, flexibility and compliance, connectivity and disconnectivity and problematisation and learning for continuous enhancements. However, this thesis indicated that the attributes were situated in distinctive settings to facilitate the performance of the productive forces of accounting. Furthermore, the element of connectivity and disconnectivity, problematisations and enhancements cannot be clearly distinguished as they are evolving, instead this study presented the dominant elements in each setting. By doing so, this thesis enriches the discussion on the constitutive role of accounting in performing productive forces to organise and economise a reformed agenda in a governable field (Bebbington *et al.*, 2020; Free *et al.*, 2020; Miller and Power, 2013).

#### 10.2.2 Research Contribution to Analytical Framework

Theoretically, in the light of the entanglement of the constitutive role of accounting in performing “productive forces” in organising and economising (Miller and Power, 2013, p. 558), this thesis has offered a fresh perspective by examining the focus in each of the dominant dimensions that emerged from the flow of accounts. Firstly, by extending the work of Charnock and Hoskin (2020); Rose and Miller (1992) and the development of accountability

and environmentalism (Bebbington, Russell and Thomson, 2017; Gray, 1992), this thesis presented the use of various governing technologies to articulate the global agenda of climate action in the flow of funds. In setting the accounting for climate change mitigation, the existing governing technologies were utilised among respective entities. As shown above, the contextualisation facilitates the revelation of a set of accounts within the flows, green sukuk accounts, climate accounts, and green asset accounts.

Secondly, the notion of mediation (Miller and Power, 2013) emerged dominantly in the demand for transparency and traceability (Power, 2019, 2021; Quattrone, 2022) of material outcomes. This thesis discovers the connectivity and disconnectivity to shift from a procedural basis to material outcomes to formulate accountable objects. As such, dominant problematisations and learning for enhancements set compatibility between aspirations and prevailing functions. By uncovering the dynamics in these processes and practices, this study extends prior studies in utilising the concept of mediation, including Kurunmäki and Miller (2011); Miller and O'Leary (2007); Thomson, Grubnic and Georgakopoulos (2014).

Thirdly, the concept of territorialising (Martinez, Pflueger and Palermo, 2022; Miller and Power, 2013) is dominantly present in this thesis to construct climate accounts. The alignment approach was initially deployed to configure climate change by extending the methodological framework. This is in line with the production of new accounts from the “old” accounts (Gray, Brennan and Malpas, 2014; O'Dwyer, 2005; O'Dwyer and Boomsma, 2015). What is interesting in this thesis is that connectivity and disconnectivity were reconfigured given the dynamics in the exchange of knowledge resulting from interactions between expertise and the operationalisation of governing technologies.



Fourthly, the notion of adjudicating (Miller and Power, 2013) is pertinent in explaining how climate change accounts were aggregated and compared to construct green asset accounts. However, this evidence shows that the distinction between multiple shades of green could not be indicated clearly in the material outcomes. By formulating green assets as underlying projects for the green sukuk impact allocation, this typical form of constructing assets is similar to other Sharia-based transactions (Belal, Abdelsalam and Nizamee, 2015; Chapra, 2007). However, once assets were designated as green assets, the endeavour to evaluate and contrast the assets against GHG emissions was observed. Despite this pathway to economise carbon emissions by fostering connectivity and disconnectivity, problematisations and enhancements in measuring equivalency of the green impacts continue to persist.

It is evident that this thesis has highlighted the ambiguity that remains in the existence of multiple measurement provisions in constructing green asset accounts that is parallel with Höchstädter and Scheck (2015); Sandberg *et al.* (2009). Despite operationalisation to govern from financial instrument level to project level continuing to invite problematisation (Argento *et al.*, 2020), this study indicated the alignment and transition approaches were prevalent in building connectivity from disconnectivity in constructing green impacts. Furthermore, the alignment to Sharia principles in parallel with green and development principles minimises uncertainty by tracing, tagging and earmarking green assets that are utilised as underlying green projects.

In addition, the underpinning formulation of tagging embeds the attributes from the subjectivising role of accounting (Miller and Power, 2013). This implies flexibility when the accounts are assigned as climate-related accounts while the function remains in compliance

with the prevailing nature of the accounts. In particular, this research highlights tagging, tracing and earmarking as accounting infrastructures that perform naming and counting in setting a governable subject (Bassnett, Frandsen and Hoskin, 2018; Frandsen and Hoskin, 2018, forthcoming). The processes and practices of subjectivising were evident in the allocation of climate-related and green attributes within the state budget accounts. These practices were continually evolving, with the development of green fund accounts, climate accounts, and green asset accounts that incorporated Sharia principles. The dynamics were observed in the tagging processes and practices to create categorisation of funding in line with green or climate alignments. However, the monies were not fully designated as the flows are blended with other funds. This research also adds to the discussion in formulating ethical and governable subjects that carry dual materiality (Frandsen and Hoskin, forthcoming; Hidayah, Lowe and Woods, 2019).

#### 10.2.3 Research Contribution to Policy and Practice

The findings of this research offer insights for policy and practice that can inform and guide decision-making in relevant fields.

Firstly, in encouraging the development of innovative green financial instruments to mobilise the flow of funds among market and non-market participants. This finding highlights a collaborative effort between state and non-state actors enables the creation of sovereign green bonds/sukuk that connect participants from financial domains to the delivery of climate change projects. This thesis makes visible and shows the necessity for market and government actors to collaborate with the development of life cycle of sovereign green bonds, including green sukuk to enhance the mobilisation of the flow of green funds. This includes the

partnership between agencies in financing, budgeting, and planning that are indirectly associated with delivery projects in climate mitigation and adaptations and direct agencies that accelerate the decarbonisation. Therefore, this research suggests the demand to foster a strong partnership to promote the use of climate-related financial instruments as a means of finance in tackling climate change.

Secondly, policymakers need to strengthen the continuous enhancement of the accounting infrastructure and connectivity between governing technologies to channel the flow of green funds. For instance, governing technologies that connect GHG accounting systems at national and project levels, budgeting and planning systems, and financing systems. Also, developing further connectivity with direct and indirect governing technologies that can construct a balance between green assets and projects to expand project financing and refinancing mechanisms. In this context, the exchange of knowledge between experts, including experts from financing, budgeting and planning, and climate-related imperative deliveries, enables the reconstruction of the configuration of climate change in the budgeting and planning cycle. By doing so, mainstreaming climate change mitigation into the budgeting and planning cycle facilitates reforms in the practices and processes of public accounting systems to be more sustainable.

Thirdly, harmonising and strengthening the framework for measuring green impacts need to be enhanced to effectively mobilise climate-related financial instruments. As shown from the research findings, this study classifies multiple scenarios in formulating performance measurements. These measurements demonstrate the extent of configuration between financial and non-financial accounts. Harmonisation between delivery ministries and the

issuers is required to formulate multiple scenarios of performance-based financing that can be mainstreamed to offer a transition pathway in measuring green impacts. Also, the formulation of green assets as a basis to demonstrate the results of societal development could be strengthened and connected to achieve a wider impact. This includes harmonising the role of independent assurances for the green framework between pre-issuance and post-issuance. In parallel, direct incentives for the success of the implementation towards additional green impacts need to be accommodated.

### 10.3 Reflection on Research Processes and Analysis

Methodologically, the case study research design (Scapens, 2004; Yin, 2014) together with the life cycle approach (Brander, 2016, 2017) have been proven effective to examine the construction of accountability mechanisms in mobilising a climate-related financial flow. Nevertheless, the researcher admitted that the wealth of empirical data from the case study might render it difficult to conceptualise the data with a clear boundary of relevant notions. Therefore, after rigorous processes, this research draws empirical evidence to explain the phenomena based on the dominating characteristics that emerged from the data using the most applicable analytic framework. The following paragraph elaborates the benefits and the potential enhancements to consider in deploying the research design.

By analysing the case study of the Indonesian sovereign green sukuk and using a life cycle method, it has been shown that the research design offers a number of benefits. The life cycle approach allowed this research to trace the chain of activities and implications involved in articulating climate objectives into the routine practises of delivery officers, and within development planning and climate-related measurements. The empirical data acquired

through document analysis, interviews, and observations with state and non-state actors enabled the researcher to discover connectivity and disconnectivity in the chains of actions, decisions and dynamics in constructing accountability mechanisms for a climate-related financial instrument. Furthermore, the depth and the balance of empirical evidence were obtained through access to novel empirical evidence from influential respondents who designed, redeveloped and implemented climate targets into regular practices and processes. In addition, preserving data integrity, audit trails, and managing cultural variation among study participants were important in this research.

In addition to the thematic analysis, the abductive method was utilised for analysing data. This analysis approach enabled interactions between empirical data and the initial analytical framework on an iterative basis. The results allowed for the expansion of the analytic framework and aided in the expansion of the level of analysis. The examination was expanded to include not only the programme, practices, procedure, and expertise, but also the proposed material outcomes that resulted from reformed agenda. This expands previous research analysing the translation of programmatic goals, practices, procedures, and expertise (Kurunmäki and Miller, 2011; Thomson, Grubnic and Georgakopoulos, 2014) by extending the emphasis to material outcomes (Mol, 2010, 2015).

To summarise, the research methodology has been proven useful to address the research questions within the disconnectivity and connectivity of governing instruments and complexities of key actors within multifaceted sectors and institutions. Consequently, the originality of this research approach should be relevant to the investigation of a case study with comparable features. In addition, the study design has contributed to "our knowledge of

accounting and, at times, the practises of accounting itself" (Hopwood, 2007, p. 1367). This study situates the research object within the construction of accounting objects and the constitutive role of accounting to organise and economise a reformed agenda into a governable field. This enables us to examine 'at the time' of the development of accounting in constructing social reality (Miller and Power, 2013).

#### 10.4 Implications of the Research, Limitations and Future Research

This thesis offers a number of implications to the discourse among social and environmental accounting academics in the following areas. Firstly, in accounting for climate change in the agenda of tracking the consistency of climate-related financial flows (UNFCCC Standing Committee on Finance, 2014, 2016, 2018, 2021). Secondly, this thesis makes a relevant contribution to the dialogue in the engagement with the IPCC as discussed in Charnock and Thomson (2019); Thomson and Charnock (2022) on the green categorisation of environmentally oriented financial innovations (IPCC, 2022b). Thirdly, in the reconstruction of climate tagging as accounting infrastructures to operationalise the global agenda of climate action in public accounting systems (OECD, 2021; World Bank, 2021) by extending the use of tagging, tracing and earmarking.

The demand to accelerate the mobilisation of financing for net-zero targets pledged by the majority of countries (UNFCCC, 2022) requires a stringent methodological approach to align the financial flows with long-term global goals (IPCC, 2022b; Kreibiehl *et al.*, 2022). This research has introduced attributes to reconstruct accountability mechanisms in enabling and constraining climate-related financial flows that can be adapted to other financial instruments with similar characteristics. These attributes encompass the demand for accountability

mechanisms to attentively examine the directions of the flows, such as counter flows, horizontal and shadow performativity. Together with the direction, accounting technologies need to consider compatibility with intertwined aspirations, flexibility and compliance, connectivity and disconnectivity, and problematisations and enhancements.

These attributes should be applicable for a country with similar characteristics in constructing public accounting systems in alignment with article 2.1c of the Paris agreement (UNFCCC Standing Committee on Finance, 2014, 2016, 2018, 2021) to channel sovereign green bond issuance. Technologies such as tagging, tracing and earmarking have been proven useful to track the flow of sovereign green bonds and measure green impacts, despite remaining limitations and dynamics. It is evident from this research that relevant design, implementation and redevelopment of climate tagging that covers tagging, tracing and earmarking offers the potential to minimise greenwashing, even though over-tagging and under-tagging should be addressed (OECD, 2021; World Bank, 2021).

In this respect, this research 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 expenditure contributes to reducing material climate impacts (Arjaliès *et al.*, 2022; Bebbington *et al.*, 2021; Bhandary, Gallagher and Zhang, 2021; Mol, 2010, 2015). This research also contributes 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. An example of this is encouraging the participation of private financial flows in this kind of green initiative, particularly from within Islamic capital markets. Finally, this study notes that this type of traceability mechanism could also apply to other

financial instruments, such as impact investing, crowdfunding, and other thematic funding innovations.

Despite this research providing relevant contributions to academic research, analytical frameworks, policy and practices as mentioned in sections 10.2 and 10.4, it has a number of limitations. These limitations offer opportunities for studies to develop further research in this sphere.

Firstly, given that this research was limited to sovereign green sukuk, its conclusions are not necessarily directly applicable to other sovereign green bonds or Sharia-based financial instruments in general. This is due to the challenges in implementation and available data being bounded by contextual domains. For instance, it can be difficult to operate mechanisms for accountability for sovereign green bonds due to the need for cooperation and coordination among various stakeholders, such as government agencies across relevant sectors, investors, and issuers. The accountability mechanisms are also closely associated with available data on the actual impacts of the flow of funds that can be generated in reducing greenhouse gas emissions or relevant climate-resilient development indicators. This area can limit the capacity to measure the effectiveness of these climate-related bonds. Therefore, it is feasible for accounting research to conduct comparative examinations across numerous sovereign green bond issuers or financial products. By doing so, it will enable the discovery of the best practices that can be adopted by other countries with the respective characteristics of the countries' national priorities and global climate commitments.



Secondly, since the primary emphasis of this research is the construction of accountability mechanisms, this study does not evaluate the efficacy of the overall configuration of green sukuk-funded projects and other climate adaptation or mitigation initiatives. Measuring the impact of sovereign green bonds on reducing greenhouse gas emissions and tackling climate change can be challenging due to the complex nature of the issue. There may also be difficulties in accurately attributing the impact of these bonds to the selected use of proceeds. Even if the objective of this research had been to do this review, the constraints of the GHG accounting systems would certainly render the effort problematic. The GHG accounting system in Indonesia uses an attributional territorial production technique; however, assessing climate effectiveness would need data on the life cycle consequences of GHG accounting (Brander, 2016, 2017). The mismatch of the timing of GHG accounting associated with climate-related financial instruments requires more research. Currently, reports of the GHG effect are needed throughout the life of the financial instrument, although the GHG impacts may extend beyond that time; for instance, a reforestation project may continue to remove GHG from the atmosphere for more than 500 years. The GHG accounting system is closely related to the mitigation agenda, while sovereign green bonds are also designed to tackle the adaptation agenda.

Thirdly, this study excludes the process to determine the efficacy of climate finance assurance projects (CICERO, 2018; Liu and Lai, 2021; Moghul and Safar-Aly, 2014). One of the distinctions between green bonds and conventional bonds is the existence of external assurance to ensure credibility, transparency, and traceability. For the green sukuk the assurance also needs to assess the alignment with the Sharia principles. It is extremely important to promote the use

of independent third-party assurance in encouraging the effectiveness of climate-related financial instruments to achieve the proposed objectives. Therefore, future studies may examine the external assurance provided or selected, including the opportunity to encourage international cooperation despite the lack of standardised assurance at this stage of market development. It is also pertinent to assess the exchange of information and best practices on assurance services for climate-related financial mechanisms.

Moreover, it is acknowledged that this research process encountered several obstacles. Firstly, the evolvement of research inquiry. At the beginning of the research, there was a lack of development, but mobilising climate-related financial flows has recently attracted additional momentum due to the development of governing instruments and expertise, also with the involvement of various institutions, both market and non-market participants. Secondly, tracking and observing attributional and consequential aspects of the construction of an accountability mechanism in a newly developed instrument may result in ongoing new themes and interesting aspects to investigate, therefore determining data saturation can be challenging. Thirdly, the COVID-19 pandemic during fieldwork delayed the research process as some interviews and working group meetings were cancelled and postponed. Despite that, the representation of each primary actor within the green sukuk life cycle has been fully obtained. Subsequently, further research needs to accommodate the above challenges in designing research “at the time of accounting practice” (Hopwood, 2007, p. 1367).

In addition, future research has an opportunity to expand the creation of innovative GSS-related financial instruments, and enhanced accountability, thereby extend the formulation of sovereign green sukuk, which offer lessons for developed countries to learn

from developing countries. In particular, consideration should be aligned with other developments in sustainability, climate change, accountability and responsible business initiatives in the local context of respective countries and introduce attributes for the design and implementation. As an illustration, this study introduced the attributes of building connectivity between governing technologies to which climate-related aspirations can be mainstreamed and sustainably incorporated. Also, the experience includes the failure and success in building collaborative efforts between experts with direct and indirect relations to achieve the NDC targets and developing capacity building among them.

## APPENDICES

### Appendix 4.1 List of Analysed Documents

| Year                  | Organisation   | Title                                                                                                                                                                          |
|-----------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Climate Action Agenda |                |                                                                                                                                                                                |
| 1988                  | United Nations | UN General Assembly Resolution 43/53 of 6 December 1988                                                                                                                        |
| 2009                  | UNFCCC         | Copenhagen Accord                                                                                                                                                              |
| 2014                  | UNFCCC         | Handbook on Measurement, Reporting and Verification for Developing Country Parties                                                                                             |
| 2014                  | UNFCCC         | How to COP UNFCCC                                                                                                                                                              |
| 2015                  | UNFCCC         | Decision 1/CP.21 Adoption of the Paris Agreement                                                                                                                               |
| 2016                  | UNFCCC         | Reference Manual for the Enhanced Transparency Framework under the Paris Agreement                                                                                             |
| 2020                  | UNFCCC         | Reference Manual for the Enhanced Transparency Framework under the Paris Agreement                                                                                             |
| 2021                  | UNFCCC         | Nationally determined contributions under the Paris Agreement: Synthesis report by the secretariat                                                                             |
| 2022                  | UNFCCC         | Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021 |
| 2022                  | UNFCCC         | Summary of Global Climate Action at COP 27                                                                                                                                     |
| 2019                  | UNDP           | Knowing what you spend: A guidance note for governments to track climate finance in their budgets                                                                              |
| 2006                  | IPCC           | IPCC guidelines for national greenhouse gas inventories                                                                                                                        |
| 2009                  | IPCC           | Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories                                                                                                 |

| Year | Organisation            | Title                                                                                                                                                                                                                 |
|------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2022 | IPCC                    | Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change                                                              |
| 2022 | IPCC                    | Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change                                                                       |
| 2009 | Government of Indonesia | Law Number 32 of 2009 on Environmental Protection and Management                                                                                                                                                      |
| 2011 | Government of Indonesia | Presidential Regulation No. 61 Year 2011 on The National Action Plan for Green House Gas Reduction (Peraturan Presiden Nomor 61 Tahun 2011 Tentang Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca (RAN GRK)     |
| 2016 | Government of Indonesia | First National Determined Contribution Republic of Indonesia                                                                                                                                                          |
| 2016 | Government of Indonesia | Law (UU) No. 16/2016 On the Ratification of Paris Agreement to the United Nations Framework Convention on Climate Change                                                                                              |
| 2018 | Government of Indonesia | Indonesia Second Biennial Update Report                                                                                                                                                                               |
| 2021 | Government of Indonesia | Indonesia Third Biennial Update Report                                                                                                                                                                                |
| 2021 | Government of Indonesia | Laws of The Republic Indonesia Number 7 Year 2021 Concerning Harmony of Tax Regulations                                                                                                                               |
| 2021 | Government of Indonesia | Presidential Regulation No. 98 of 2021 regarding the Implementation of Carbon Economic Value for Achieving Nationally Determined Contribution Targets and Control of Greenhouse Gas Emissions in National Development |

| Year        | Organisation                             | Title                                                                                                                                                                                                                                        |
|-------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2013        | Ministry of Transportation               | Decree of the Minister of Transportation No. KP201 Year 2013 Concerning the Establishment of The National Action Plan to Decrease Greenhouse Gas Emissions in The Transportation Sector and Transportation Sector GHG Inventory in 2010-2020 |
| 2016        | Ministry of Environment and Forestry     | Academic Study: The Draft Laws of the Republic of Indonesia on the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change                                                                          |
| 2019        | Ministry of Environment and Forestry     | Roadmap Nationally Determined Contribution                                                                                                                                                                                                   |
| 2019        | Ministry of Energy and Mineral Resources | Guidelines for the Implementation of Greenhouse Gas Inventory and Mitigation in the Energy Sector                                                                                                                                            |
| 2011        | National Development Planning Agency     | Guideline for Implementing Green House Gas Emission Reduction Action Plan                                                                                                                                                                    |
| 2020        | National Development Planning Agency     | Inisiasi Pemetaan Awal Pendanaan Pembangunan Rendah Karbon (Early Mapping to Finance for Low Carbon Development)                                                                                                                             |
| Green Bonds |                                          |                                                                                                                                                                                                                                              |
| 2018        | International Capital Market Association | The Green Bond Principles                                                                                                                                                                                                                    |
| 2021        | International Capital Market Association | The Green Bond Principles                                                                                                                                                                                                                    |
| 2021        | International Capital Market Association | Green Project Mapping                                                                                                                                                                                                                        |
| 2021        | International Capital Market Association | Handbook Harmonised Framework for Impact Reporting                                                                                                                                                                                           |
| 2022        | International Capital Market Association | Guidelines for Green, Social, Sustainability and SustainabilityLinked Bonds External Reviews                                                                                                                                                 |
| 2022        | International Capital Market Association | Pre-issuance Checklist for Green Bonds / Green Bond Programmes                                                                                                                                                                               |
| 2018        | Government of Indonesia                  | Offering Memorandum                                                                                                                                                                                                                          |
| 2019        | Government of Indonesia                  | Offering Memorandum                                                                                                                                                                                                                          |

| Year                         | Organisation                             | Title                                                                                |
|------------------------------|------------------------------------------|--------------------------------------------------------------------------------------|
| 2020                         | Government of Indonesia                  | Offering Memorandum                                                                  |
| 2021                         | Government of Indonesia                  | Offering Memorandum                                                                  |
| 2022                         | Government of Indonesia                  | Offering Memorandum                                                                  |
| 2018                         | CICERO                                   | 'Second Opinion' on the Republic of Indonesia's Green Bond and Green Sukuk Framework |
| 2021                         | CICERO                                   | Best Practices 2021                                                                  |
| 2020                         | Climate Bond Initiative                  | Green Bond Market Summary                                                            |
| 2021                         | Climate Bond Initiative                  | Sovereign Green, Social, and Sustainability Bond Survey                              |
| 2017                         | Financial Service Authority (OJK)        | Regulation number 60/POJK.04/2017                                                    |
| 2015                         | OECD                                     | Green bonds: Mobilising the debt capital markets for a low-carbon transition         |
| 2020                         | World Bank                               | Capital Markets Development: A Primer for Policymakers                               |
| 2020                         | World Bank                               | Pioneering the Green Sukuk: Three Years On                                           |
| Public Accountability Report |                                          |                                                                                      |
| 2014                         | National Development Planning Agency     | Performance Accountability Report                                                    |
| 2015                         | National Development Planning Agency     | Performance Accountability Report                                                    |
| 2016                         | National Development Planning Agency     | Performance Accountability Report                                                    |
| 2017                         | National Development Planning Agency     | Performance Accountability Report                                                    |
| 2015                         | Ministry of Energy and Mineral Resources | Performance Accountability Report                                                    |
| 2016                         | Ministry of Energy and Mineral Resources | Performance Accountability Report                                                    |
| 2017                         | Ministry of Energy and Mineral Resources | Performance Accountability Report                                                    |
| 2018                         | Ministry of Energy and Mineral Resources | Performance Accountability Report                                                    |
| 2019                         | Ministry of Energy and Mineral Resources | Performance Accountability Report                                                    |

| Year                            | Organisation                         | Title                                                                              |
|---------------------------------|--------------------------------------|------------------------------------------------------------------------------------|
| 2015                            | Ministry of Transportation           | Performance Accountability Report                                                  |
| 2016                            | Ministry of Transportation           | Performance Accountability Report                                                  |
| 2017                            | Ministry of Transportation           | Performance Accountability Report                                                  |
| 2018                            | Ministry of Transportation           | Performance Accountability Report                                                  |
| 2014                            | Ministry of Finance                  | Performance Accountability Report                                                  |
| 2015                            | Ministry of Finance                  | Performance Accountability Report                                                  |
| 2016                            | Ministry of Finance                  | Performance Accountability Report                                                  |
| 2017                            | Ministry of Finance                  | Performance Accountability Report                                                  |
| 2018                            | Ministry of Finance                  | Performance Accountability Report                                                  |
| 2015                            | Ministry of Environment and Forestry | Performance Accountability Report                                                  |
| 2016                            | Ministry of Environment and Forestry | Performance Accountability Report                                                  |
| 2017                            | Ministry of Environment and Forestry | Performance Accountability Report                                                  |
| 2018                            | Ministry of Environment and Forestry | Performance Accountability Report                                                  |
| 2016                            | Ministry of Public Works and Housing | Performance Accountability Report                                                  |
| 2017                            | Ministry of Public Works and Housing | Performance Accountability Report                                                  |
| 2018                            | Ministry of Public Works and Housing | Performance Accountability Report                                                  |
| 2018                            | World Bank                           | Indonesia Public Expenditure and Financial Accountability (PEFA) Assessment Report |
| Tracking Public Climate Finance |                                      |                                                                                    |
| 2003                            | Government of Indonesia              | Law Number 17 of 2003 concerning State Finance                                     |
| 2004                            | Government of Indonesia              | Law Number 1 of 2004 concerning State Treasury                                     |
| 2012                            | Ministry of Finance                  | Indonesia's First Mitigation Fiscal Framework                                      |
| 2014                            | Ministry of Finance                  | The Low Emission Budget Tagging and Scoring System (LESS)                          |



| Year | Organisation                                      | Title                                                                                                                                                                                                 |
|------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2014 | Ministry of Finance                               | Regulation of the Minister of Finance of The Republic of Indonesia Number 136/PMK.02/2014 on Guidance for the Preparation and Study of the Working Plan and Budget of the State Ministry/ Institution |
| 2015 | Ministry of Finance                               | Ministry of Finance Regulation number 143/2015 on Budget Tagging for Climate Change Mitigation                                                                                                        |
| 2015 | Ministry of Finance                               | Sukuk Negara: Sharia-Compliant Financial Instrument                                                                                                                                                   |
| 2017 | Ministry of Finance                               | Climate Change Budget Tagging System                                                                                                                                                                  |
| 2018 | Ministry of Finance                               | Climate Change Budget Report FY 2017-2018                                                                                                                                                             |
| 2019 | Ministry of Finance                               | Green Sukuk Issuance: Allocation and Impact Report                                                                                                                                                    |
| 2019 | Ministry of Finance                               | Pendanaan Publik Untuk Pengendalian Perubahan Iklim Indonesia tahun 2016-2018 [Public Funding for Indonesian Climate Change Control FY 2016-2018]                                                     |
| 2021 | Ministry of Finance                               | Laporan Anggaran Mitigasi dan Adaptasi Perubahan Iklim Tahun 2018 – 2020 [Climate Budget Tagging Report FY 2018-2020]                                                                                 |
| 2021 | Ministry of Finance                               | Green Sukuk: Allocation and Impact Report                                                                                                                                                             |
| 2014 | Ministry of Finance and Climate Policy Initiative | The Landscape of Public Climate Finance in Indonesia                                                                                                                                                  |
| 2021 | Ministry of Finance & UNDP                        | Green Sukuk Handbook                                                                                                                                                                                  |
| 2014 | UNFCCC Standing Committee on Finance              | Biennial assessment and overview of climate finance flows                                                                                                                                             |
| 2016 | UNFCCC Standing Committee on Finance              | Biennial Assessment and Overview of Climate Finance Flows                                                                                                                                             |
| 2018 | UNFCCC Standing Committee on Finance              | Biennial Assessment and Overview of Climate Finance Flows                                                                                                                                             |
| 2021 | UNFCCC Standing Committee on Finance              | Biennial Assessment and Overview of Climate Finance Flows                                                                                                                                             |

| Year | Organisation              | Title                                                                                                                                   |
|------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 2021 | World Bank                | Climate Change Budget Tagging: A Review of International Experience                                                                     |
| 2021 | Climate Policy Initiative | Guidelines for Building a National Landscape of Climate Finance                                                                         |
| 2015 | OECD                      | Green bonds: Mobilising the debt capital markets for a low-carbon transition                                                            |
| 2016 | OECD                      | Projections of Climate Finance Towards the USD 100 Billion Goal                                                                         |
| 2016 | OECD                      | Green Budget Tagging: Introductory Guidance & Principles                                                                                |
| 2018 | UNDP and IBP              | Budgeting for a Greener Planet: an assessment of climate change finance accountability in Bangladesh, India, Nepal, and the Philippines |

## Appendix 4.2 Ethical Approval

### Application for Ethical Review ERN\_19-0758

On behalf of the Committee, I confirm that this study now has full ethical approval.

Please ensure that when that the participant documentation has been translated, it will be clearly understood by the participants.

I would like to remind you that any substantive changes to the nature of the study as described in the Application for Ethical Review, and/or any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

Please also ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at <https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx>) are adhered to and referred to in any future applications for ethical review. It is now a requirement on the revised application form (<https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx>) to confirm that this guidance has been consulted and is understood, and that it has been taken into account when completing your application for ethical review.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at [healthandsafety@contacts.bham.ac.uk](mailto:healthandsafety@contacts.bham.ac.uk).

Kind regards

Susan Cottam

Research Ethics Officer

Research Support Group

C Block Dome

Aston Webb Building

University of Birmingham

Edgbaston B15 2TT

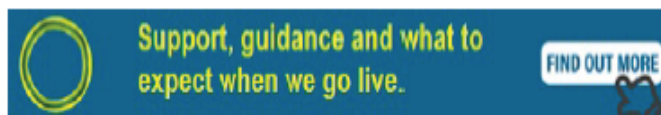
Tel: 0121 414 8825

Email: [s.l.cottam@bham.ac.uk](mailto:s.l.cottam@bham.ac.uk)

Web: <https://intranet.birmingham.ac.uk/finance/RSS/Research-Support-Group/Research-Ethics/index.aspx>

Please remember to submit a new [Self-Assessment Form](#) for each new project.

Click [Research Governance](#) for further details regarding the University's Research Governance and Clinical Trials Insurance processes, or email [researchgovernance@contacts.bham.ac.uk](mailto:researchgovernance@contacts.bham.ac.uk) with any queries relating to research governance.



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## Appendix 4.3 Semi-Structured Interview Guide

### INTERVIEW GUIDELINES

---

|       |                 |                |
|-------|-----------------|----------------|
| Date: | Interview code: | Position code: |
|-------|-----------------|----------------|

---

The following questions will be tailored based on the roles of the institution.

Background: Would you tell me briefly about your role within the organisation?

- 1) How are the internalisation of climate change issues developed within this organisation?
  - a) What motivates the organisation to address climate change issues?
  - b) Where is climate change located within the organisation? Why?
  - c) How does it develop within a different governing infrastructure?
  - d) What involvements does this organisation have about climate tagging?
- 2) How does this organisation harmonise the climate action plan and accommodate the green sukuk initiative within the organisation's governing processes and practices?
  - a) What are the challenges faced by your organisation in the harmonisation process?
  - b) How does this organisation incorporate the reformed agenda within relevant actors and routines?
  - c) What are the direct implications of advocating the reformed agenda in governing and accounting policy?
- 3) How does the demand for accountability mechanisms resulting from green sukuk issuance influence co-existing performance measurements?
  - a) What are the primary elements when engaging with green sukuk impact allocation?
  - b) Are there any changes made resulting from the climate change and green sukuk initiative?

Closure

"Out of all the things we have discussed today, is there any question that would be more interesting to discuss on this topic? What should I pay the most attention to? Would you suggest further respondents with regards to these topics?"

Appendix 4.4 Observation Guide

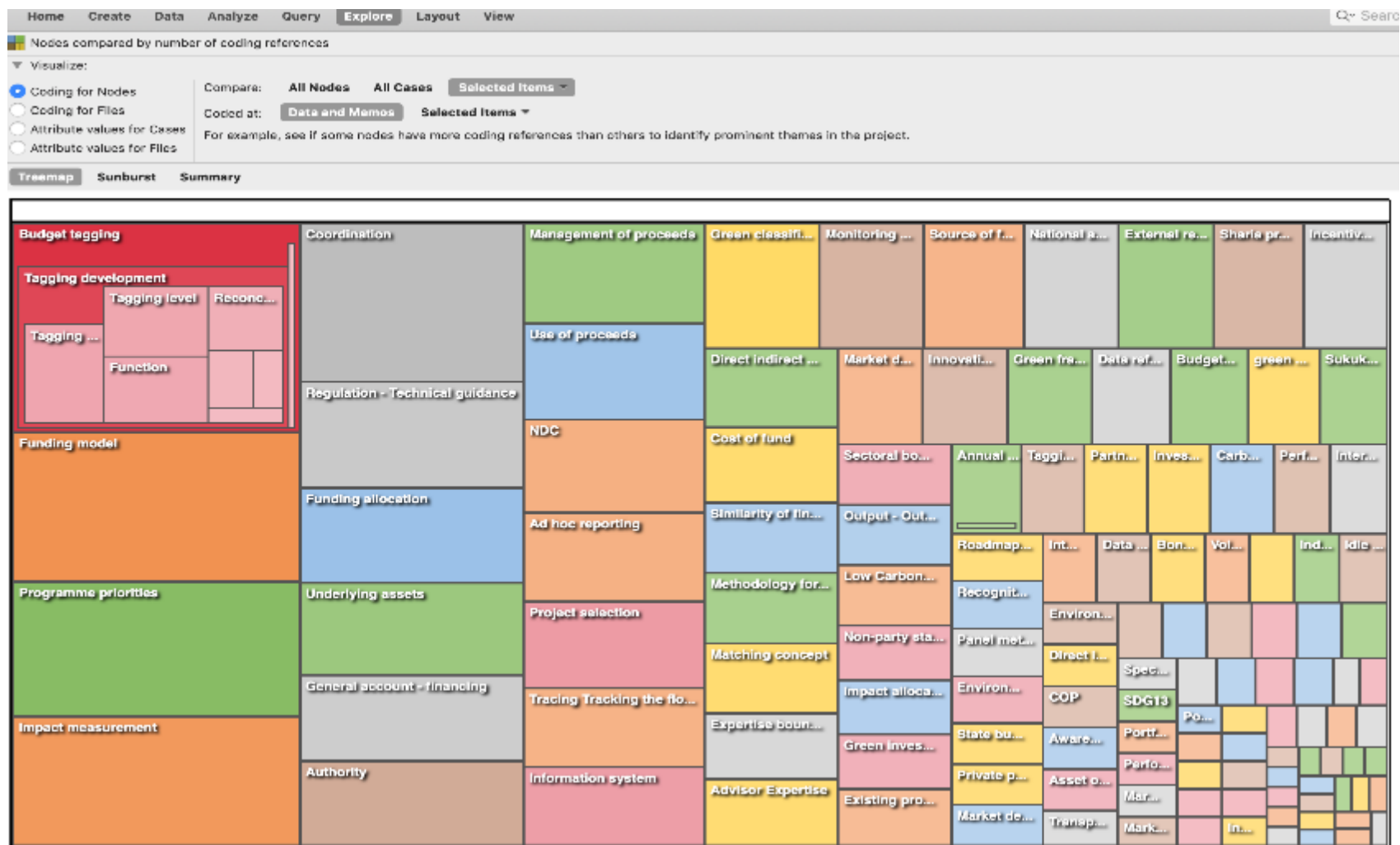
**OBSERVATION GUIDELINES**

|                     |   |  |
|---------------------|---|--|
| Date                | : |  |
| Observation code    | : |  |
| Activity/Event code | : |  |

Guidance for observations.

- 1. Who was involved in the observed activity?
- 2. What were the most frequent and less frequent discussions within the scheduled topics?
- 3. What were the signals that a particular activity was being ended?
- 4. What were the key takeaways from a public meeting or a conference?
- 5. How did participants react to the ending of the activity?

## Appendix 4.5 Initial Coding



# Appendix 5.6 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                                                      | 144A/Reg S Trust Certificates                                                     |
|-----------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Structure             | Wakala                                                                           | Wakala                                                                      | Wakala                                                                            | Wakala                                                                             | Wakala                                                                            |
| Tenor                 | 5 years                                                                          | 5.5 years                                                                   | 5 years                                                                           | 30 years                                                                           | 10 years                                                                          |
| Issuance Date         | Mar-18                                                                           | Feb-19                                                                      | Jun-20                                                                            | Jun-21                                                                             | Jun-22                                                                            |
| Maturity Date         | Mar-23                                                                           | Aug-24                                                                      | Jun-25                                                                            | Jun-51                                                                             | Jun-32                                                                            |
| Amount issued         | USD 1.25bn                                                                       | USD 750 mm                                                                  | USD 750mm                                                                         | USD 750mm                                                                          | USD 1.5bn                                                                         |
| Oversubscription      | 2.4 times                                                                        | 3.8 times                                                                   | 7.37 times                                                                        | 3.43 times                                                                         | 3.3 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                                                     | 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.                                         | 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 | Baa2 Moody's Investor Service, BBB S&P Global Ratings Services, BBB Fitch Ratings |

Sources: Ministry of Finance (2018b, 2019c, 2020, 2021c, 2022)

## Appendix 6.7 Notes in the Offering Memorandum

**Perusahaan Penerbit SBSN Indonesia III**  
**Issue of U.S.\$1,250,000,000 3.75% Trust Certificates due 2023**  
**Under the U.S.\$25,000,000,000 Trust Certificate Issuance Program (the "Program")**

**22 February 2018**

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Issuer and Trustee:             | Perusahaan Penerbit SBSN Indonesia III ("PPSI-III")                                                                                                                                                                                                                                                                                                                                                                               |
| Obligor                         | Republic of Indonesia (the "Republic")                                                                                                                                                                                                                                                                                                                                                                                            |
| Issuer Rating:                  | Baa3 Pos (Moody's) / BBB- Stb (S&P) / BBB Stb (Fitch)                                                                                                                                                                                                                                                                                                                                                                             |
| Expected Certificate Rating:    | Baa3 (Moody's) / BBB- (S&P) / BBB (Fitch)                                                                                                                                                                                                                                                                                                                                                                                         |
| Status of the Certificates:     | Each Certificate represents an undivided beneficial ownership interest in the Trust Assets (subject to the Transaction Documents and the Terms and Conditions of the Certificates) and the Certificates will rank pari passu, without any preference or priority among themselves                                                                                                                                                 |
| Format:                         | Registered, 144A / Regulation S                                                                                                                                                                                                                                                                                                                                                                                                   |
| Currency:                       | U.S. dollar ("U.S.\$")                                                                                                                                                                                                                                                                                                                                                                                                            |
| Issue Size:                     | U.S.\$1,250,000,000                                                                                                                                                                                                                                                                                                                                                                                                               |
| Denominations:                  | U.S.\$200,000 and integral multiples of U.S.\$1,000 in excess thereof                                                                                                                                                                                                                                                                                                                                                             |
| Tenor:                          | 5 years                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Pricing Date:                   | 22 February 2018                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Settlement Date:                | 1 March 2018                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Assets on the Issue Date:       | Certain assets consisting of land and buildings as scheduled to the Supplemental Purchase Agreement (between the Trustee (as purchaser) and the Republic (as seller) to be entered into on the Issue Date) and certain assets consisting of project assets as scheduled to the Supplemental Procurement Agreement (between the Trustee (as purchaser) and the Republic (as project seller) to be entered into on the Issue Date). |
| Scheduled Dissolution Date:     | 1 March 2023                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Issue / Re-offer Price:         | 100.000%                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Periodic Distribution Rate:     | 3.75 per cent. per annum payable semi-annually in arrear                                                                                                                                                                                                                                                                                                                                                                          |
| Benchmark:                      | 2.375 per cent. U.S. Treasury due January 31, 2023                                                                                                                                                                                                                                                                                                                                                                                |
| Benchmark Yield:                | 2.655 per cent.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Re-offer Spread:                | 109.5 bps                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Periodic Distribution Date:     | 1 March and 1 September in each year up to and including the Scheduled Dissolution Date                                                                                                                                                                                                                                                                                                                                           |
| First Period Distribution Date: | 1 September 2018                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Day Count Fraction:             | 30/360                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ISIN Code:                      | Rule 144A: US71567PAJ93<br>Reg S: US71567RAJ59                                                                                                                                                                                                                                                                                                                                                                                    |
| Common Code:                    | Rule 144A: 175504869<br>Reg S: 175504354                                                                                                                                                                                                                                                                                                                                                                                          |
| CUSIP:                          | Rule 144A: 71567PAJ9<br>Reg S: 71567RAJ5                                                                                                                                                                                                                                                                                                                                                                                          |
| Clearing Systems:               | Clearstream, Luxembourg, Euroclear and DTC                                                                                                                                                                                                                                                                                                                                                                                        |
| Listing:                        | Application will be made by the Issuer for the Certificates to be listed on Nasdaq Dubai and Singapore Exchange Securities Trading Limited                                                                                                                                                                                                                                                                                        |

Source: Pricing Term Sheet p. 1/4 (Ministry of Finance, 2018b)



## Appendix 6.7 Notes in the Offering Memorandum

|                            |                                                                                                                                                                                                                                         |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Governing Law:             | English and Indonesian Law                                                                                                                                                                                                              |
| Documentation:             | Issued under the U.S.\$25,000,000,000 Trust Certificate Issuance Program                                                                                                                                                                |
| Dealers:                   | CIMB Investment Bank Berhad<br>Citigroup Global Markets Inc.<br>Dubai Islamic Bank PJSC<br>The Hongkong and Shanghai Banking Corporation Limited<br>Abu Dhabi Islamic Bank PJSC                                                         |
| Co-managers:               | PT Bahana Sekuritas<br>PT Danareksa Sekuritas<br>PT Trimegah Sekuritas Indonesia Tbk                                                                                                                                                    |
| Billing and Delivery:      | Citigroup Global Markets Inc.                                                                                                                                                                                                           |
| Use of Proceeds:           | The Republic will use the proceeds it receives from the issue of the Certificates exclusively to finance or refinance expenditure directly related to "Eligible Green Projects" as defined in the Green Bond and Green Sukuk Framework. |
| External Reviewer:         | Second party opinion from CICERO                                                                                                                                                                                                        |
| Green Structuring Adviser: | The Hongkong and Shanghai Banking Corporation Limited                                                                                                                                                                                   |

Source: Pricing Term Sheet p. 2/4 (Ministry of Finance, 2018b)

## Appendix 6.7 Notes in the Offering Memorandum

### Perusahaan Penerbit SBSN Indonesia III Issue of U.S.\$1,750,000,000 4.40% Trust Certificates due 2028 Under the U.S.\$25,000,000,000 Trust Certificate Issuance Program (the "Program")

**22 February 2018**

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Issuer and Trustee:             | Perusahaan Penerbit SBSN Indonesia III ("PPSI-III")                                                                                                                                                                                                                                                                                                                                                                               |
| Obligor                         | Republic of Indonesia (the "Republic")                                                                                                                                                                                                                                                                                                                                                                                            |
| Issuer Rating:                  | Baa3 Pos (Moody's) / BBB- Stb (S&P) / BBB Stb (Fitch)                                                                                                                                                                                                                                                                                                                                                                             |
| Expected Certificate Rating:    | Baa3 (Moody's) / BBB- (S&P) / BBB (Fitch)                                                                                                                                                                                                                                                                                                                                                                                         |
| Status of the Certificates::    | Each Certificate represents an undivided beneficial ownership interest in the Trust Assets (subject to the Transaction Documents and the Terms and Conditions of the Certificates) and the Certificates will rank pari passu, without any preference or priority among themselves                                                                                                                                                 |
| Format:                         | Registered, 144A / Regulation S                                                                                                                                                                                                                                                                                                                                                                                                   |
| Currency:                       | U.S. dollar ("U.S.\$")                                                                                                                                                                                                                                                                                                                                                                                                            |
| Issue Size:                     | U.S.\$1,750,000,000                                                                                                                                                                                                                                                                                                                                                                                                               |
| Denominations:                  | U.S.\$200,000 and integral multiples of U.S.\$1,000 in excess thereof                                                                                                                                                                                                                                                                                                                                                             |
| Tenor:                          | 10 years                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Pricing Date:                   | 22 February 2018                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Settlement Date:                | 1 March 2018                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Assets on the Issue Date:       | Certain assets consisting of land and buildings as scheduled to the Supplemental Purchase Agreement (between the Trustee (as purchaser) and the Republic (as seller) to be entered into on the Issue Date) and certain assets consisting of project assets as scheduled to the Supplemental Procurement Agreement (between the Trustee (as purchaser) and the Republic (as project seller) to be entered into on the Issue Date). |
| Scheduled Dissolution Date:     | 1 March 2028                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Issue / Re-offer Price:         | 100.000%                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Periodic Distribution Rate:     | 4.40 per cent. per annum payable semi-annually in arrear                                                                                                                                                                                                                                                                                                                                                                          |
| Benchmark:                      | 2.750 per cent. U.S. Treasury due February 15, 2028                                                                                                                                                                                                                                                                                                                                                                               |
| Benchmark Yield:                | 2.923 per cent.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Re-offer Spread:                | 147.7 bps                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Periodic Distribution Date:     | 1 March and 1 September in each year up to and including the Scheduled Dissolution Date                                                                                                                                                                                                                                                                                                                                           |
| First Period Distribution Date: | 1 September 2018                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Day Count Fraction:             | 30/360                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ISIN Code:                      | Rule 144A: US71567PAK66<br>Reg S: US71567RAK23                                                                                                                                                                                                                                                                                                                                                                                    |
| Common Code:                    | Rule 144A: 175510770<br>Reg S: 175508945                                                                                                                                                                                                                                                                                                                                                                                          |
| CUSIP:                          | Rule 144A: 71567PAK6<br>Reg S: 71567RAK2                                                                                                                                                                                                                                                                                                                                                                                          |
| Clearing Systems:               | Clearstream, Luxembourg, Euroclear and DTC                                                                                                                                                                                                                                                                                                                                                                                        |

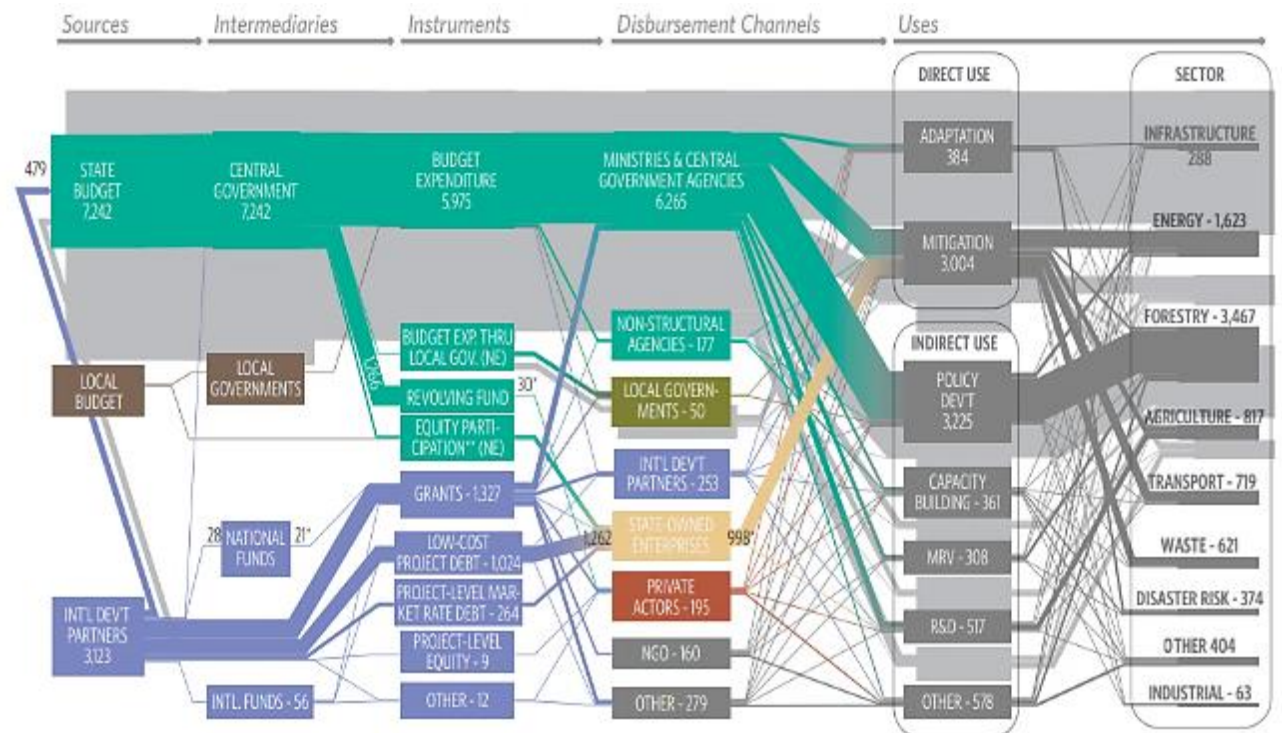
Source: Pricing Term Sheet p. 3/4 (Ministry of Finance, 2018b)

## Appendix 6.7 Notes in the Offering Memorandum

|                       |                                                                                                                                                                                 |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Listing:              | Application will be made by the Issuer for the Certificates to be listed on Nasdaq Dubai and Singapore Exchange Securities Trading Limited                                      |
| Governing Law:        | English and Indonesia Law                                                                                                                                                       |
| Documentation:        | Issued under the U.S.\$25,000,000,000 Trust Certificate Issuance Program                                                                                                        |
| Dealers:              | CIMB Investment Bank Berhad<br>Citigroup Global Markets Inc.<br>Dubai Islamic Bank PJSC<br>The Hongkong and Shanghai Banking Corporation Limited<br>Abu Dhabi Islamic Bank PJSC |
| Co-managers:          | PT Bahana Sekuritas<br>PT Danareksa Sekuritas<br>PT Trimegah Sekuritas Indonesia Tbk                                                                                            |
| Billing and Delivery: | Citigroup Global Markets Inc.                                                                                                                                                   |
| Use of Proceeds:      | The Republic will use the proceeds it receives to meet part of its general financing requirements.                                                                              |

Source: Pricing Term Sheet (p. 4/4) (Ministry of Finance, 2018b)

## Appendix 7.8 The Landscape of The Indonesia Domestic Climate Finance



Notes: Figures are indicative of annual flows for 2010. All data presented relates to disbursements or movements of finance between actors in 2010. Flows are expressed in IDR billions and rounded to produce whole numbers; and as such values might not add up. We show finance that we could identify clearly as climate-specific as "solid" flows. The diagram captures upfront capital investment costs for low carbon and climate resilient activities, plus activities that indirectly support mitigation or adaptation, such as policy development, capacity building, setup of MRV systems, or research and development. We only track upfront investments and not lifetime inflows. There is significant uncertainty around how much climate-specific finance is being disbursed from the state budget to support indirect activities in general, and adaptation activities in particular. We represent the full range, including the band of uncertainty (up to an additional IDR 10,008 billion), in the diagram as a "shadow," reflecting the scale of climate-specific finance and portion of potentially relevant finance that we could not verify. We included movements of finance between actors where we know they happened (ICCTF, Geothermal Risk Mitigation Fund, Esimbark), although there were not disbursements to projects in 2010. \*\* Equity participation is comparable to what we call balance sheet financing in the global landscape.

Source: Ministry of Finance and Climate Policy Initiative (2014)

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