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The Synergy between Climate Change Adaptation and Mitigation

Cross-Country SNAPFI study

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About this study

Project
Strengthen National Climate Policy Implementation:
Comparative Empirical Learning & Creating Linkage to Climate Finance
The project explores how international climate finance can support the implementation of NDCs in emerging economies and EU countries through comparative analyses and by providing a better understanding of the interface between finance and policy implementation.

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The German Institute for Economic Research - DIW Berlin

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Table of Contents

List of Tables

List of Figures

List of acronyms

A	Adaptation
AR4	Fourth Assessment Report
CCA	Climate Change Adaptation
CCM	Climate Change Mitigation
CO_2	Carbon dioxide
DAC	Development Assistance Committee
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
ESG	Environmental, Social, and Governance (framework)
EU	European Union
FDI	Foreign Direct Investment
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GHG	Greenhouse gas
IPCC	Intergovernmental Panel for Climate Change
LT LEDs	Long-Term low emission development Strategy
M	Mitigation
MDB	Multilateral Development Bank
MRV	Monitoring, Reporting, and Verification
NAP	National Adaptation Plan
NbS	Nature-based Solution
NEFCO	Nordic Environmental Finance Corporation
NDC	Nationally Determined Contribution
OECD	Organization of Economic Cooperation and Development
R&D	Research and development
SME	Small and medium-sized enterprises
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

Chapter one

Introduction

1. Introduction

International climate finance is crucial in helping developing countries reduce their greenhouse gas (GHG) emissions and adapt to the impacts of climate change (Weiler et al., 2018). Based on the Copenhagen Accord of 2009, developed countries pledged USD 30 billion between 2010 and 2012 with the aim of mobilising USD 100 billion in long-term funding annually by 2020. With this funding, developing countries were encouraged to reduce their GHG emissions and the most vulnerable developing countries were supported to adapt to the impacts of climate change (UNFCCC, 2009). Estimates of overall climate finance contributed and mobilized by developed countries for developing countries vary significantly depending on what is counted as , climate finance'. At the upper bound of the range of estimates, OECD's member countries report an amount of USD 83.3 billion in 2020, the original year of the USD 100 billion target, although analysts assess that the net financial value may be less than half what is reported (Zagama et al. 2023). Despite a 4% rise from 2019 in reported finance, the annual goal was again missed and the accumulated shortfall continues to grow (OECD, 2020).

To address the challenge of global climate change, the world must mobilise significant investment volumes to both limit global warming and adapt to its effects. The IPCC (Intergovernmental Panel on Climate Change) in its Sixth Assessment Report, and UNEP (United Nations Environmental Programme) in its Emission Gap Report, estimated that global investment should increase by the factor of 3 to 6, to address mitigation needs (IPCC, 2022; UNEP, 2022b). In developing countries, especially in the least developed countries, investment flows should increase by the factors of 4 to 8 (ibid). In its Adaptation Gap Report, the UNEP estimated that international adaptation finance flows to developing countries in 2020 were 5-10 times lower than the estimated needs, a gap that continues to increase (UNEP, 2022a).

Based on a review of a substantial body of peer-reviewed literature, Chapter 15: "Investment and Finance" of the IPCC Sixth Assessment Report (IPCC, 2022), argued that the extent of climate finance gaps is not the sole factor driving the magnitude of the challenge. On the one hand, several bi- and multilateral donors claim difficulty disbursing funds due to a lack of fundable projects, particularly in adaptation (UNFCCC Standing Committee on Finance, 2018). Many developing countries, on the other hand, have difficulty accessing available resources due to a lack of capacity and the inability to fulfil requirements specified by donors or financing institutions (ibid).

One of the opportunities to help close the adaptation financing gap, according to Klein et al. (2005), is to build a good synergy between climate change mitigation and adaptation. Synergies can also be used to leverage climate finance and maximise efforts to meet climate targets. Historically, climate finance has been allocated to either mitigation or adaptation, with funding instruments not explicitly encouraging mitigation and adaptation synergies. Climate finance contributed and mobilized for mitigation and adaptation synergies tended to increase between 2016 and 2020, but remains much smaller than adaptation or mitigation finance volumes (OECD DAC online). According to Leonard et al. (2016), many synergistic projects are implemented at the local level, where policymakers play an especially crucial role.

The report aims to explore how policymakers may identify and capitalise on the potential for synergies between mitigation and adaptation, as well as how international climate finance can support these

synergies. Particular focus is on Brazil, India, Indonesia, and South Africa. A perspective from Germany is given to illustrate how the relationship between federal and local government might affect the governance of mitigation and adaptation projects, and which barriers inhibit the implementation of a more integrated approach.

The research relied on qualitative analysis of primary and secondary literature and data from the focus countries. The report begins by reviewing literature in Chapter 2 on the concept of synergies between climate change mitigation and adaptation, as well as the associated benefits and limitations. The literature review also examines how international climate policy incorporates these synergies and which share of international climate finance these synergies account for. In Chapter 3, the report provides an assessment of the synergies in the focus countries, before concluding with policy take-aways and recommendations in the last chapter.

The paper argues that it is critical to integrate climate change mitigation and climate change adaptation actions so that the combined effects of their synergies exceed the sum of their co-benefits if these actions were applied separately. The paper proposes a set of recommendations to aid in the implementation of these actions across the economies. It is important to note that, while the authors are convinced of their conclusions, there is little hard evidence to back them up. These were formulated based on an analysis of recent practices, assuming their positive effects, rather than on an assessment of ex-post impacts that have not yet been observed.

Furthermore, there have been a number of relevant concepts to which discussion goes in parallel. This includes compensation for loss and damage caused by the anthropogenic climate change that has been increasingly a focus of negotiations, i.e. the 27th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC). Again, due to a relative novelty of this topic, there is little hard evidence and thus, a gap in the understanding of the linkages between climate change mitigation and adaptation synergies and trade-offs, and loss and damage compensations to developing countries. This is especially relevant for finance-policy linkages to resource responses to impacts that are already happening or unavoidable. This is why the paper does not draw on these discussions.

Chapter two

Revisiting Literature

2. Revisiting Literature

In this section, this report tries to revisit the literature related concept of synergy between climate change adaptation and mitigation, synergy between climate change mitigation and adaptation in UNFCCC decisions, and financial flows that promotes synergy between climate change adaptation and mitigation.

2.1. Synergy between Climate change mitigation (CCM) and adaptation (CCA)Concepts

2.1.1. The Inter-relationship between CCM and CCA

Feedback and the interrelationship between climate change mitigation and adaptation has gained attention mostly after the release of the IPCC's Fourth Assessment Report (AR4) in 2007. Since then, several studies suggested that national-level policies must address and acknowledge the inter-relationship between mitigation and adaptation, as well as investigate the fair balance between the two (Klein et al., 2005; Stoorvogel et al., 2004; Berry et al., 2014; Landauer et al., 2015; Leonard et al., 2016). Understanding the links, synergies, and tradeoffs between climate change mitigation and adaptation is crucial for informing policy decisions. In the long run, mitigation responses will affect future adaptation needs and influence climate-resilient pathways (OECD, 2021).

Klein, et al. (2007), in the IPCC AR4, identified and explored interrelationships between climate change adaptation and mitigation, namely: (1) adaptation actions that have consequences for mitigation ($A \rightarrow M$); (2) mitigation actions that have consequences for adaptation ($M \rightarrow A$); (3) decisions that include tradeoffs or synergies between mitigation and adaptation ($\int[A, M]$); and (4) processes that have consequences for mitigation and adaptation ($A \cap M$). A significant gap in the literature is on CCA-CCM synergies and trade-offs, and linkages to loss and damages; this is especially relevant for finance-policy linkages to resource responses to impacts that are already happening or unavoidable. Table 1 below describes a typology of actions for each type of interrelationship.

Table 1 — Typology of Actions for Each Interrelationship Between Climate Change Mitigation and Adaptation

A→M	M→A	∫ [A, M]	A∩M
• Individual responses to climatic hazards that increase or decrease GHG emissions	• More efficient energy use and renewable sources that promote local development	• Public-sector funding and budgetary processes that allocate funding to both A and M	• Perception of impacts (and limits to A) motivates M; perception of limits to M motivates A
• More efficient community use of water, land, forests	• CDM projects on land use or energy use that support local economies and livelihoods	• Strategic planning related to development pathways (scenarios) to mainstream climate responses	• Watershed planning: allocation of water between hydroelectricity and consumption
• Natural resources managed to sustain livelihoods	• Urban planning, building design and recycling with benefits for both A and M	• Allocation of funding and setting the agenda for UNFCCC negotiations and funds	• Cultural values that promote both A and M, such as sacred forests (e.g., Satoyama in Japan)
• Tourism use of energy and water, with outcomes for incomes and emissions	• Health benefits of mitigation through reduced environmental stresses	• Stabilisation targets that include limits to adaptation (e.g., tolerable windows)	• Management of socio-ecological systems to promote resilience
• Resources used in adaptation, such as large-scale infrastructure, /increase emissions	• Afforestation, leading to depleted water resources and other ecosystem effects, with consequences for livelihoods	• Analysis of global costs and benefits of M to inform targets	• Ecological impacts, with some human element, drive further releases of GHG gases
	• M schemes that transfer finance to developing countries (such as a per capita allocation) stimulate investment that may benefit A	• Large scale M (e.g., geoengineering) with effects on impacts and A	• Legal implications of liability for climate impacts motivates M
	• Effect of mitigation, e.g., through carbon taxes and energy prices, on resource use		• National capacity-building increases ability to respond to both A and M
			• Insurance spreads risk and assists with A; managing insurance funds has implications for M
			• Trade liberalisation with economic benefits (A) increases transport costs (M)
			• Monitoring systems and reporting requirements that cover indicators of both A and M
			• Management of multilateral environmental agreements benefits both A and M

Source: Klein et al., 2007

As follows from Table 1, the true synergies between mitigation and adaptation are ∫[M, A]. In other words, an action must benefit both, climate change mitigation and adaptation, to be labeled synergetic. The other three are complementary actions, which can have co-benefits (A→M and M→A) or side-effects stemming from actions in other areas (A∩M). According to this typology, synergy could be defined as an interaction of mitigation and adaptation so that the combined effect exceeds the sum of the effects when applied separately (Klein et al., 2007). Locatelli et al. (2015) simplified the typology separating three types of actions: those with joint outcomes, unintended side effects, and joint objectives. Table 2 compares the typologies by Locatelli et al. (2015) and by Klein et al. (2007):

Table 2 — Comparison of the Typologies of Interrelationships Between Climate Change Adaptation and Mitigation according to Locatelli et al. (2015) and Klein et.al. (2007)

TYPOLOGY BY LOCATELLI ET.AL. (2015)	TYPOLOGY BY KLEIN ET.AL. (2007)
Joint Outcomes	**(A∩M)**
Activities with nonclimatic primary objectives deliver joint adaptation and mitigation outcomes	Processes that have consequences for mitigation and adaptation
Unintended Side Effects	**(A→M)**
Activities aimed at only one climate objective—either adaptation or mitigation—also deliver outcomes for the other objective	Adaptation actions that have consequences for mitigation
	(M→A)
	Mitigation actions that have consequences for adaptation
Joint Objectives	**(∫[A, M])**
Associating both adaptation and mitigation objectives leads to interactions that strengthen or weaken outcomes	Decisions that include trade-offs or synergies between mitigation and adaptation

Source: Modified Klein et al., 2007 & Locatelli et al., 2015

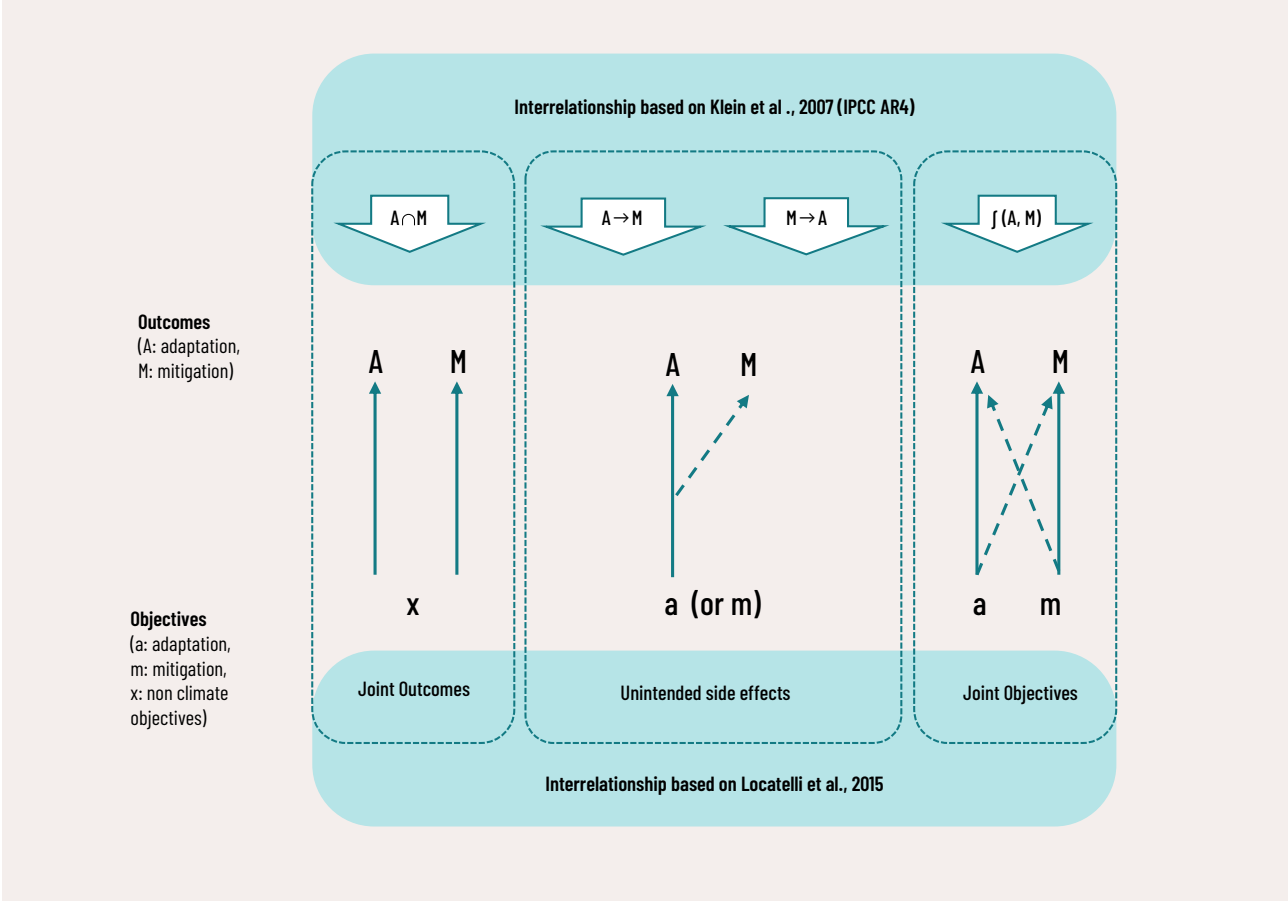
Table 2 illustrates that the concept offered by Locatelli et al. (2015) employs the same idea as that of Klein et al. (2007). „Joint outcomes" represent the delivery of joint mitigation and adaptation outcomes by activities with no primary climatic objectives. However, according to the reviewed literature, this classification can also occur when both actions are performed concurrently but solely focus on their respective outcomes, which is the same as A∩M.

There were various examples of „unintended side effects", such as co-benefits (IPCC, 2014; Grafakos et al., 2019; Berry et al., 2015; Sharifi, 2021) or co-impacts (Chastin et al., 2021). Co-benefits may occur when activities aiming at only one climate objective (either adaptation or mitigation) create an outcome for the other objective, the same as A→M or M→A. Lastly, „joint objectives" represent the

possible effects of considering mitigation and adaptation objectives concurrently, which might result in interactions that strengthen (synergy) or weaken (trade-off) outcomes.

The following figure illustrates the correlation between the concepts of interrelationship by Klein et al. (2007) and Locatelli et al. (2015) where the two typologies are still related to each other:

Figure 1 — Interrelationship Between Climate Change Adaptation and Mitigation

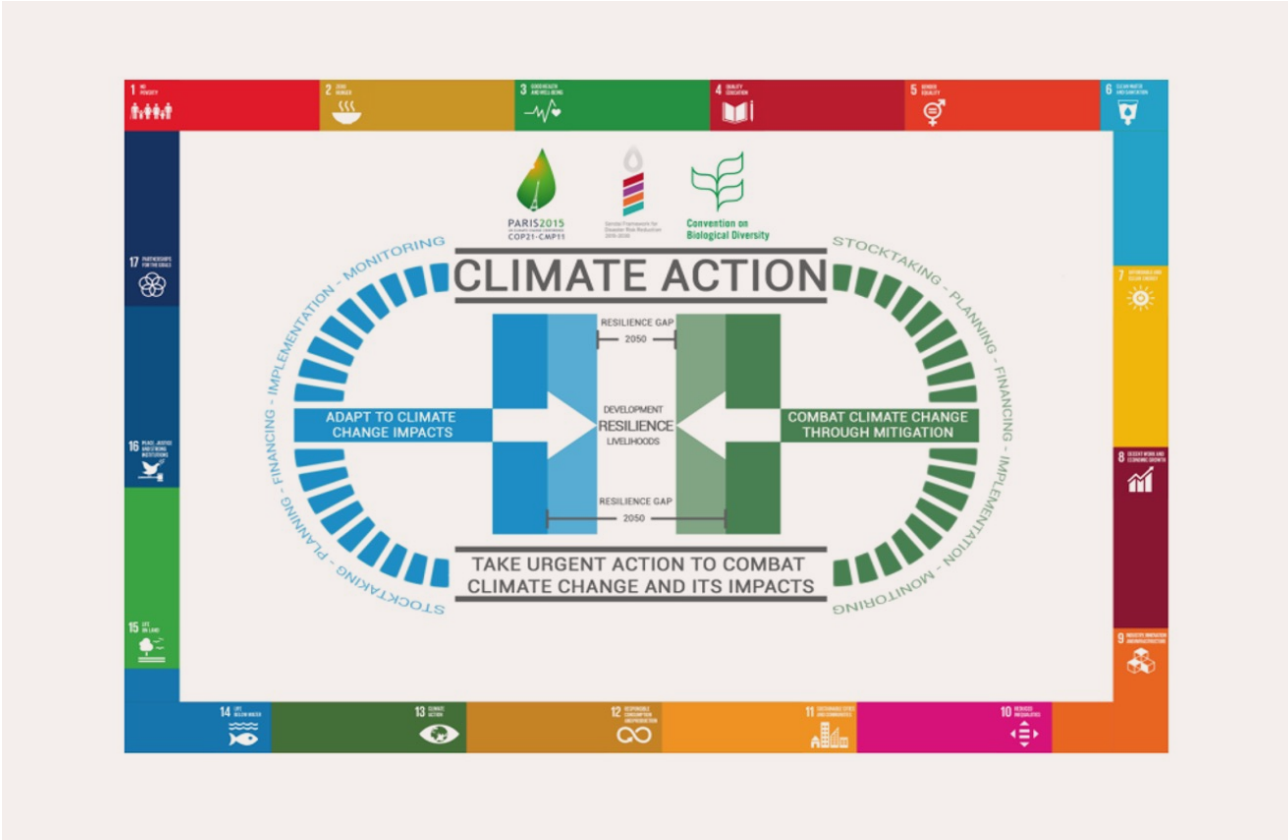


Source: Modified Klein et al., 2007 & Locatelli et al., 2015

Both concepts also emphasised an important distinction between synergy and unintended side effects, such as co-benefits. While synergies are specifically designed so that the actions of mitigation and adaptation can be interconnected and affect one another, co-benefits are side effects that are not considered when implementing adaptation or mitigation actions. To integrate mitigation and adaptation actions, decision-makers must understand this fundamental distinction between synergy and co-benefits.

In addition, to overcome the impacts of climate change that are difficult to avoid, climate resilience is also very important. Adaptation and mitigation actions are essentially related through their impact on climate change resilience. Climate resilience is the ability of a system to apply adaptive capacity. Thus, resilience to climate change is not a function of mitigation and adaptation alone, but depends on the development of a holistic approach that allows efforts to be concentrated from multiple, aligned perspectives. If these important issues are ignored, climate change will destroy and enlarge a series of new and existing gaps, making it difficult for existing international frameworks to bridge them. The concept of the Gap Resilience Model (Figure 2) links mitigation and adaptation measures by demonstrating that the two are complementary and interdependent. As an illustration, if mitigation efforts are reduced in favor of strengthening adaptation actions, then the adaptation side will grow bigger and reduce the resilience gap. However, the resilience gap widens on the right as mitigation actions are reduced. In addition, limiting mitigation actions will result in an increase in the emergence of more extreme and intense consequences of climate change, which are increasingly difficult to adapt to (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2019).

Figure 2 — The Adapted Resilience Gap Model



Source: (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2019)

The Gap Resilience Model can serve as a diplomatic tool to overcome negotiation obstacles. Where countries or communities express different interests or priorities regarding which forms of climate action they consider important, frameworks such as the Adaptation Resilience Gap model can assist in mediating a shared understanding of the interrelationships of different approaches (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2019).

2.1.2 Benefits and Challenges of CCM and CCA

Many studies have found that integrating climate change mitigation and adaptation offers significant benefits that should be investigated further for better implementation of climate change actions. Researchers stated that a synergy approach to climate change mitigation and adaptation is preferable since it is more effective and efficient than doing it as an afterthought (Klein et al., 2007). The synergy between climate change mitigation and adaptation brings several benefits, including:

- Increase cost-effectiveness and make the actions more attractive to stakeholders, i.e. potential funding agencies (IPCC, 2007). More effective and efficient mitigation and adaptation activities, particularly in developing countries, may help support sustainable development (Dang et al., 2003; Swart & Raes, 2007).
- Reduce costs and help balance the twin objectives of climate change mitigation and adaptation with limited resources, which is a real and practical challenge in high-emission and high-vulnerability locations (Fu, Zheng, and Wang, 2014). Climate-safe seating, energy-efficient architectural features, and reduced transit requirements, for example, may all be considered in urban design. This action will minimize energy use and exposure to the potential negative impacts of climate change in coastal or flooded areas (Swart & Raes, 2007). It is also applicable in the forestry and land use industries. For example, reforestation may prevent floods and erosion while absorbing carbon emissions (Dang et al., 2003).
- Increase adaptation financing to ensure that climate change mitigation and adaptation are adequately addressed, which is critical for vulnerable developing nations (Duguma et al., 2014b). Furthermore, because mitigation activities can help or damage adaptation, and vice versa, supporting activities that contribute to both aims might improve the efficiency of money allocation and minimize trade-offs, particularly in land-related activities like agriculture and forestry (Locatelli et al., 2016).

However, synergies have limitations that may impede their application, including:

- Synergies are not equally possible in all sectors because essential features and multiple supportive components (such as technology, money, social capital, and know-how) that promote mitigation and adaptation activities are not equally available or required in all sectors.
- The lack of well-documented research at the regional and sectoral levels also makes it difficult to execute mitigation-adaptation synergies. Thus, one of the challenges of more broadly implementing integrated adaptation and mitigation strategies is a lack of knowledge about how adaptation can benefit mitigation (and vice versa) in practice, what added value integrated strategies bring, in what contexts they should be pursued, and whether mitigation and adaptations should be mainstreamed separately or together (Locatelli, 2011).
- Others are skeptical of combining climate change adaptation with mitigation. To obtain funding, a project developer may describe the mitigation project as an adaptation project or vice versa (Klein et al., 2005). According to research conducted in Vietnam and Indonesia, competition for finance resources, as well as a lack of expertise and competence among related stakeholders, support the two policy approaches on opposite tracks (Pham et al., 2014).
- The integration of mitigation and adaptation projects might also be complicated, generating problems with project coordination (Dang et al., 2003). It also places a burden on beneficiary

nations and project developers who lack technical skills and awareness when applying for and reporting to various climate funds (Adaptation Committee, 2020).

Swart and Raes (2007) propose several factors to consider when evaluating synergetic climate change mitigation and adaptation policy designs, including (1) avoiding trade-offs when designing policies for mitigation and adaptation; (2) identifying synergies; (3) improving response capacity; (4) developing institutional links between mitigation and adaptation, such as in national institutions and international negotiations; and (5) mainstreaming mitigation and adaptation into broader sustainable development actions. As a result, a deeper understanding of these issues is essential to ensure that successful integration maximises synergies while avoiding conflicts between mitigation and adaptation.

2.2. Synergy between climate change mitigation and adaptation in UNFCCC decisions

2.2.1. Integrating CCM and CCA in the Paris Agreement

The importance of climate change actions as well as the importance of equal access to sustainable development and poverty eradication was emphasised in the preamble to the Paris Agreement. This suggests that policies and initiatives for climate change mitigation and adaptation have the potential to enhance sustainable development goals, particularly when mitigation and adaptation are better integrated. The Paris Agreement goals were outlined in Article 2, and paragraph 1(b) provides a first hint of the need to consider mitigation and adaptation together: "Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production."

Although this formulation may not always account for synergies, it does link enhanced climate resilience and adaptation to the need to decouple development and GHG emissions. This eliminates the traditional dichotomy of adaptation and mitigation as separate areas and promotes an integrated approach at higher policy levels. As a result, it might be regarded as facilitating, but not insuring, more synergy. Table 2 provides an overview of inter-relationships between climate change adaptation and mitigation mentioned in the Paris Agreement.

Table 3 — Overview of Climate Change Adaptation and Mitigation Interrelationships Mentioned in the Paris Agreement and Decision Texts

Element	Paris Agreement	Decision	Interrelationship
Purpose	Article 2, para 1c	—	Stipulates that adaptation and low emission development should be ensured
NDCs and mitigation	Article 4	Ch. III, para 22–40	Synergies is mentioned in decision para 39, and co-benefits are mentioned in the Paris Agreement 4(7)
Adaptation	Article 7	Ch. III, para 41–46	Co-benefit, but in the terms that increased M may reduce need for A
Finance	Article 9, but no clear mention of synergy	Ch. III, para 52–64	A couple of examples of synergy in policy design and implementation
Technology transfer	Article 10	Ch. III, para 65–70, but no clear mention of synergy	No classified, as it argues about a balance of support for mitigation and adaptation
Capacity building	Article 11, but no mention of synergy	Ch. III, para 71–83, but no clear mention of synergy	No synergy
Global stocktake	Article 12	Para 99-101	No synergy
System of transparency	Article 13, but no mention of synergy	Para 84-98	An action to be reported in elsewise mitigation focused reports: Does not qualify as synergy
Pre2020 action	—	Para 108	Mitigation co-benefits for adaptation are recognised

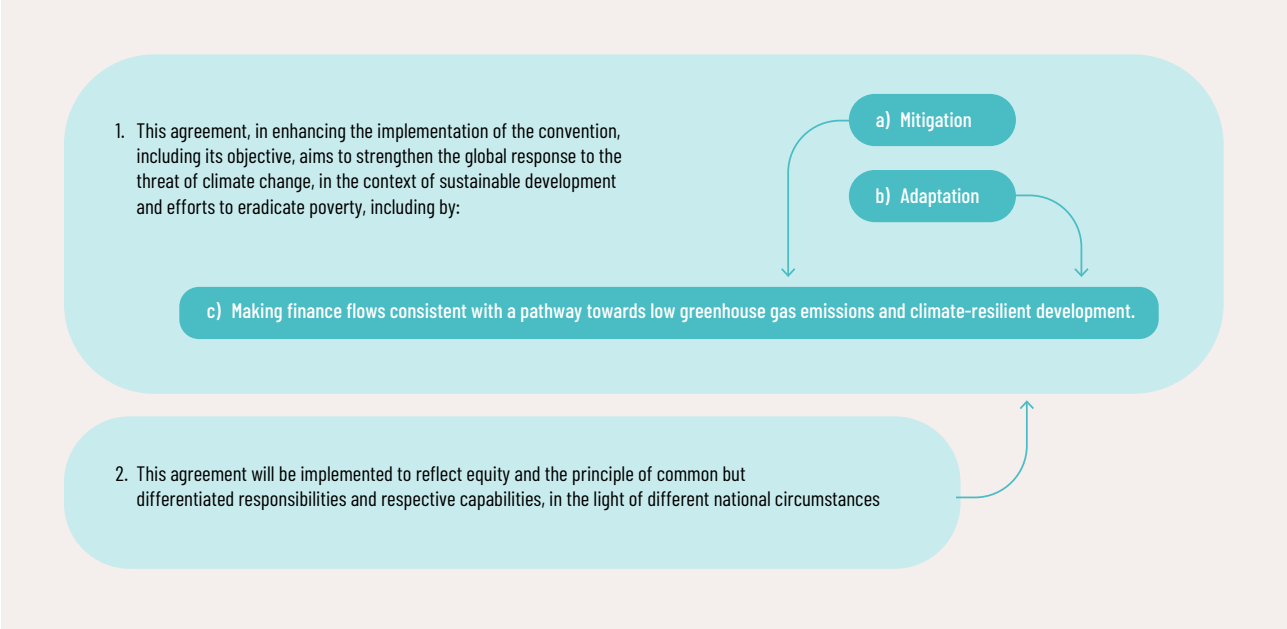
Source: Nordic Council of Ministers, 2017

However, Nordic Council of Ministers (2017) noticed that the link between mitigation and adaptation was mostly only co-mentioning and was not yet emphasizing synergy. Based on the table above, one prominent example of climate change mitigation and adaptation being debated side by side, although with some expected additional benefit, is climate finance. A complete explanation of the extent to which adaptation and mitigation linkages are considered in climate financing and mainstreamed in the NAP or NDC documents of several Paris Agreement counties is presented in Table 4. For example, Indonesia mentions the potential relationship between mitigation and adaptation in the several adaptation action as the co-benefit of mitigation in the AFOLU and water sectors in its updated NDC document.

Article 2 of the Paris Agreement (UNFCCC, 2015) introduced definitions of climate finance (please see Figure 2). Paragraph 2.1 seeks to improve the global response to climate challenge in the context of sustainable development and efforts to eradicate poverty efforts. Paragraph 2.1a aims to limit the increase in the global average temperature to less than 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, while Paragraph 2.1b aims to improve the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emission development, in a manner that does not jeopardise food production. Paragraph 2.1c stipulates that finance flows be aligned with a pathway towards low GHG emission and climate-resilient development

Meanwhile, Article 9 of the Paris Agreement (UNFCCC, 2015) mandates finance flows to balance climate change mitigation and adaptation, taking into account priorities and strategies of developing countries. Furthermore, Paragraph 2.1c mandates that all finance flows be consistent with both, a pathway towards low GHG emissions and (not or) climate-resilient development simultaneously. As a result, it is expected to address the trade-offs between mitigation and adaptation measures in an explicit way (Zamarioli et al., 2021).

Figure 3 — Article 2 of the Paris Agreement

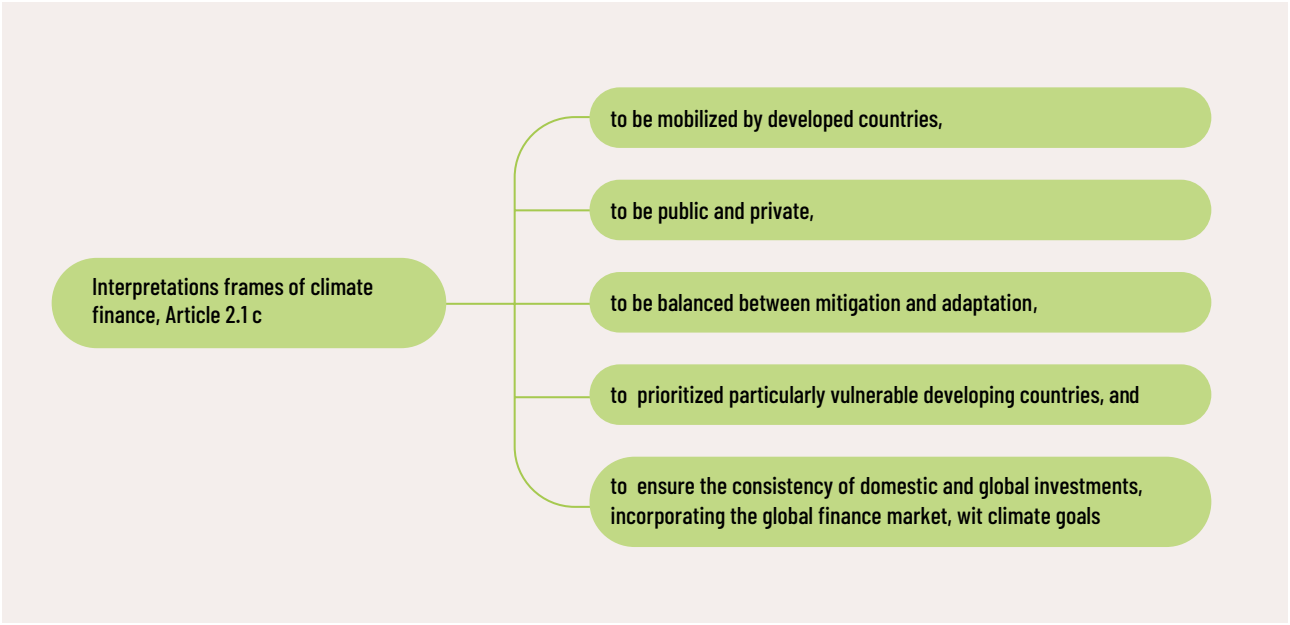


Source: Zamarioli et al., 2021

Zamarioli et al. (2021) argue that Article 2 of the Paris Agreement (UNFCCC, 2015) has one more broad interpretation that has been gaining traction (please see Figure 3). Given that the article calls for a global response, namely [making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development], it encompasses the entire global economic system, including the financial system, which must also contribute to the consistency of domestic and global investments with climate goals that would amount to tens of trillion dollars.

In its 2018 Biennial Report, the UNFCCC's Standing Committee on Finance explicitly argued about the importance of the financing sector in the provision of climate finance for the first time (UNFCCC Standing Committee on Finance, 2018). The most recent Emission Gap Report (UNEP, 2022b), released in October 2022, argued for the importance of realigning the financial system to enable the transformations required for low-carbon and climate-resilient development, including private and public banks and institutional investors, as well as public institutions that regulate the system and co-lend or finance directly.

Figure 4 — Interpretation of climate finance under Article 2 of the Paris Agreement



Source: Zamarioli et al., 2021

Zamarioli et al. (2021) highlight, however, that, while the financial sector integration may leverage investment, it is coupled with a trade-off due to the incorporation of climate risks in investment decision-making. Such consideration is likely to have an adverse impact on the investment environment of poorer and more vulnerable countries that are already at greater risk from climate impacts (Task Force on Climate-related Financial Disclosures, 2017), as investors will likely invest less in climate vulnerable and thus risky countries. The result could be the opposite, with such countries' investments declining and their borrowing costs rising (Volz et al., 2020).

This hypothesis was recently validated by Moody's Investors Service's recent announcement that island states' sovereign credit might be downgraded due to climate risks, which will increase the borrowing costs of islands and negatively impact their whole economies (Zamarioli et al., 2021). Climate risks include physical risks from intense acute events such as forest fires, and chronic events including continued drought, and transition risks stemming from policy and regulatory changes, advances in low-carbon technologies, and changes in customer/stakeholder preferences adding to the complexity, compliance, reporting, and growth strategy (Moody's on Climate, n.d.). The IMF in its study on climate shocks and credit ratings also states that countries that are more resilient to climate change have higher credit ratings, relative to countries with greater vulnerability to risks associated with climate change (Cevik & Jalles, 2020). According to the study, an improvement of one percentage point in climate change resilience is associated with an increase of 0.09 percent in sovereign credit rating in 67 sample of countries in the world during the period 1995–2017 (Cevik & Jalles, 2020).

Finally, if one-size-fits-all requirements are applied to the calculation and incorporation of climate risks in investment decision-making, the poorest countries may face extra challenges (ibid). However, Qi & Terton (2022) concluded in their recent review of available literature on linking adaptation and mitigation that the overall effect will create more benefits that are mutually reinforcing and working toward the common goal of addressing the climate challenges and sustainable development.

2.2.2 Integration of CCM and CCA in NDCs, NAPs, and LT-LEDSs

Mitigation and adaptation linkages are now acknowledged in the climate policies of an increasing number of countries in documents such as NDCs, NAPs, and LT-LEDs (due to the Paris Agreement Article 4, paragraph 19 on submitting LEDs (see also Art 2.1b, 2.1c (on finance)). Table 3 demonstrates that the majority of G20 countries mention adaptation-mitigation linkages in their National Adaptation Plans (NAPs) or their Nationally Determined Contributions (NDCs). While most countries emphasise the need for synergies between adaptation and other environmental goals, generally in the context of coordination mechanisms and financing, the linkages are rarely examined in-depth, and particular financing specifics are rarely stated.

Table 4 — Adaptation-mitigation linkages in climate actions across sectors

	Does the NAP or NDC mention adaptation - mitigation linkages?	Are adaptation-mitigation linkages covered in the following policy areas discussions of the NAP or NDC?					
		Biodiversity and ecosystems	Urban development	Agriculture, forestry and other land uses	Water	Infrastructure	Waste
Argentina*	√	√					
Australia	√					√	
Brazil	√						
Canada	√		√	√			
China*	√			!!! (NbS)			
France	√	√ (NbS)		!!!	√		
Germany	√		√	√			
India**	√		!!!	!!!	!!!	!!!	!!!
Indonesia*	√			√ (NbS)	√		
Italy	√			!!!	√	√	
Japan	√						
Korea	√						
Mexico	√	√	√	√	√	√	√
Russian Federation	√						
Saudi Arabia*	√	√	√		√		
South Africa	√						
Turkey	√			√	√		
United Kingdom	√			!!!	√ (NbS)		
United States***	√				√ (NbS)		

Notes: √ mentioned, !!! mentioned in detail, NbS – tied to a nature-based solution; * based on NDCs, for countries without a NAP. ** refers to India's National Climate Change Plan. *** refers to the 2014 US Environmental Protection Agency policy document presenting adaptation implementation strategies.

Source: Gamper et al., 2021 based on G20 members' NAPs and NDCs

Additionally, to NAPs and NDCs, the Paris Agreement (Article 4.19) requires all countries to establish and communicate long-term low GHG development strategies (LTSs) mindful of Article 2. The long-term low GHG development strategies are thus the primary document for decision-makers to ensure that the programming of future finance flows is consistent with a pathway towards low-carbon climate-resilient development in the long term (Pauw et al., 2021). The authors investigated the long-term strategies of 33 countries. They found that, despite their significant role in shifting trillions of dollars in investments, most governments do not comprehend how to facilitate Article 2.1c implementation. More than half of all analysed strategies do not mention the article. Furthermore, LTSs and NDCs' ambitions and priorities are not necessarily synced and matched. Only six countries (Austria, France, Hungary, South Africa, Singapore, and Switzerland) discuss the necessity of redirecting financial flows towards low-carbon climate-resilient development until 2050. Except for the frontrunners, the information on how the governments intend to establish the regulatory environment is generally lacking in LTSs.

Case study 1 highlights measures provided in the Hungarian LTS which facilitate Article 2.1c implementation. The strategy recognizes the importance of finance in combating global climate change. It proposes a set of funding instruments and mechanisms, including green budgeting, green bond issuance, mainstreaming environmental, social, and governance (ESG) principles, promoting a green mortgage market, applying the EU sustainable investment taxonomy, establishing a state green guarantee institution, and others, to make the appropriate amount available from public and private sources.

Table 5 — Case study 1. Measures facilitating Article 2.1c implementation in the Hungarian LEDs

Climate friendly budget planning	
Strong strategic framework	The Government aligns the objectives of environmental and climate strategies with decisions on tax policy (e.g., green taxation), state aid (phase out of fossil fuel subsidies) and public spending (e.g., green public procurement).
Tools for justification and coherence of green budget measures/ decisions	Green budget tools show how certain budget measures/decisions affect environmental and climate goals. These tools include: • Green budget labeling: classification of budgetary measures according to their environmental and/or climate impact. • Environmental impact assessment: carrying out environmental impact assessments for new budgetary measures. • Ecosystems valuation and pricing of environmental externalities, such as the price of greenhouse gas emissions, through taxes and emissions trading schemes. • Green review of expenditure: considering the impact of expenditure on environmental and climate objectives. • Green performance requirements: aligning budgetary performance requirements targets with environmental and climate objectives
Green reporting for accountability and transparency	The Government submits a green budget report to the Parliament together with the annual budget, which provides a thorough picture of how the budget aligns with the green objectives in the given fiscal year.
Governance and implementation of green budgeting	Thei green budgeting implementation is based on strong political leadership, clearly defined roles and responsibilities within the government, a well-planned sequence of implementation, adequate internal mechanisms, and continuous improvement of the government officials' skills and knowledge.
Develop domestic financial markets	
Development of a National Sustainable Capital Market Strategy:	A project promoting the "greening" of the domestic capital market was launched in Hungary under the auspices of the European Union Structural Reform Support Service, with the participation of the European Bank for Reconstruction and Development (EBRD) and the Central Bank of Hungary, investment service providers, investors and other market participants, ministries and all other relevant stakeholders . The project goal is to enable the capital market to finance investments in environmental sustainability to a greater extent than is currently possible, and to provide "green" enterprises with more advantagoues capital or bond-type resources.
Green bonds	The Hungarian government issued first green government securities worth EUR 1.5 billion in the European market and JPY 20 billion in the Japanese market in 2020, raising dedicated funds for government investments to support the implementation of Hungary's climate and environmental goals. The goal was to encourage the issue of domestic corporate, bank or even municipal green bonds, as well as the expansion of venture capital to finance climate-friendly innovations, through various regulatory incentives.

Green investment and venture capital funds, "greening" of fund portfolios:	At the moment, domestic sustainability funds and investment funds can only add foreign green assets to their portfolios. As a result, retail green investments flow abroad. The rise of domestic green bonds, as well as the establishment of ESG ratings for publicly traded corporations, may transform this situation and contribute to the growth of investment funds. Domestic fund managers' shift towards ESG-based portfolio management strategies is a positive trend. Improving venture capital is another strategy for financing climate-friendly innovations.
Sustainable Stock Exchange:	In 2019, the Budapest Stock Exchange joined the Association of Sustainable Stock Exchanges, and it is committed to promoting stock market issuers to be more environmentally conscious. Should the data on climate and other environmental performance of large domestically listed corporations becomes more transparent, green corporate assessments will make it possible to accelerate the green capital flow. In conjunction with investors, regulators, and enterprises, the Sustainable Exchange Initiative can increase sustainability and ESG conscerns for investments.
Climate-neutral transition as a means of attracting foreign investment	
Attracting foreign direct investment (FDI)	The Hungarian Investment Promotion Agency (HIPA) was founded in 2017 to help foreign investors in Hungary. Within total exports, Hungary has one of the largest shares of high-tech exports in Central and Eastern Europe. This is a good opportunity to use knowledge and network to obtain a similar position in the green industry. Additional financial incentives planned in the LEDs(tax breaks, low-interest loans, etc.) have been proved to provide incentives for green FDI and hence create local jobs, contributing significantly to knowledge transfer.
Hungarian financial and capital market through policies of the central bank	
Combining monetary and fiscal policy instruments	In its regulatory competence, the Central Bank of Hungary "directs" the financial sector in a green path by calibrating prudential regulation, with advice and warnings, while not jeopardising the Central Bank Act's core objectives. Through different fiscal measures, the government stimulates green financing of banks and capital market participants, as well as other market participants (businesses, households, etc.), impacts the realization of the necessary investments in the transition on the demand side.
Guarantee institutions to promote green financing	
Guarantee institutions	The formation of a specialized green guarantee institution would ensure that green funding is expended in a planned and delibarate manner. The basic guarantee multiplier effect is also evident here: a unit of guaranteed amount allows for a loan of 10 or even 20 times, which can multiply the growth rate of green investments.

Source: Ministry for Innovation and Technology of Hungary, 2021

2.2.3 Realising synergy in international and national contexts

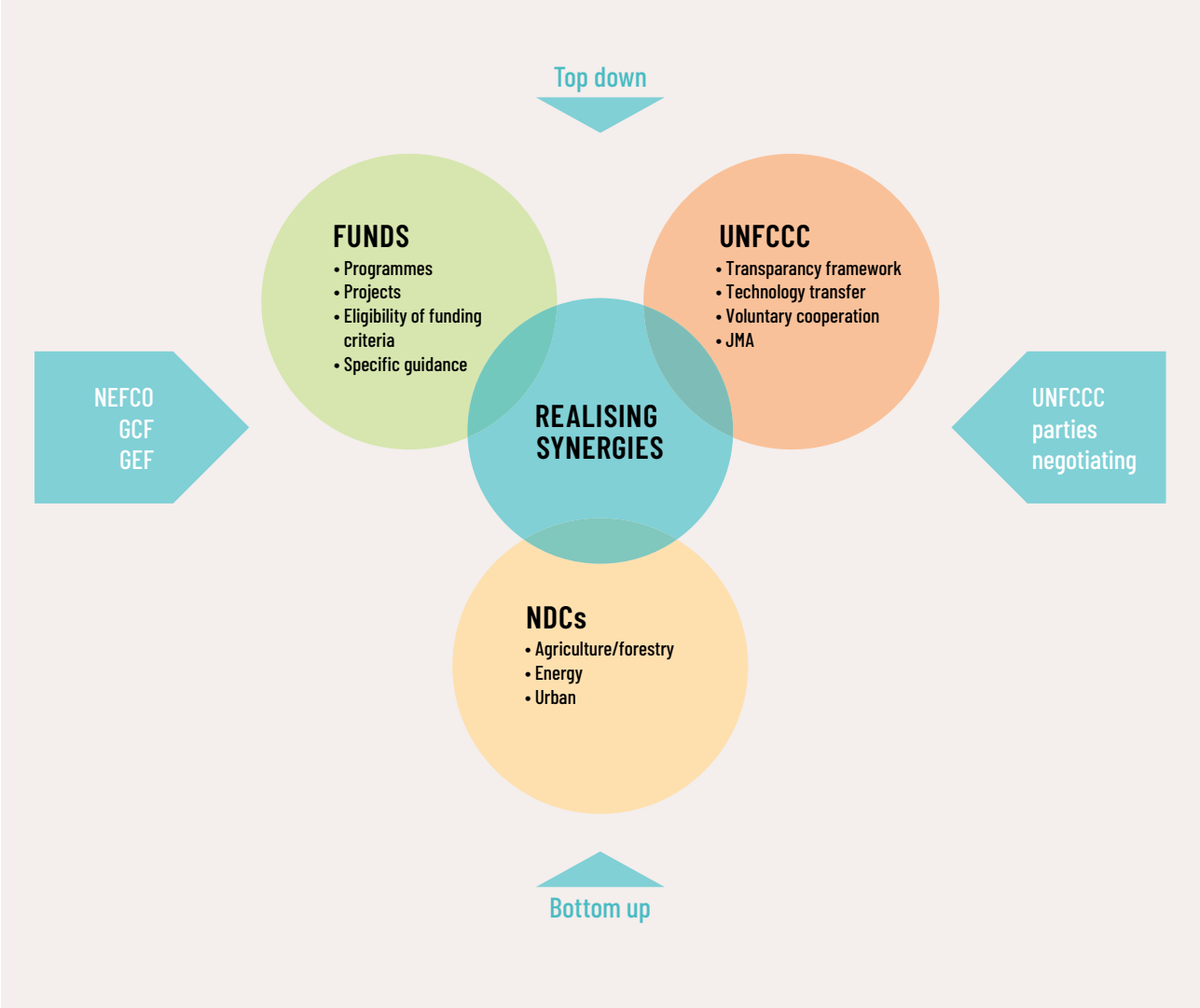
The preceding section illustrates that the synergy between climate change mitigation and adaptation appears to be rarely studied in-depth. These are scenarios in which „proactive mitigation strategies at one level fail to link or synergize with adaptation processes at another and may even work at cross-purposes to planned or autonomous adaptation processes at other levels and scales", according to Thornton and Comberti (2013). However, a significant body of literature shows that there are additional benefits when mitigation and adaptation are handled concurrently rather than as an afterthought.

A mitigation and adaptation nexus may already be in existence, but not to the extent specified in the NDCs. According to Leonard et al. (2016), „a growing number of synergistic initiatives are being implemented on the ground". In that context, policymakers play a crucial role in identifying opportunities for this and putting in place mechanisms to maximize synergies while avoiding trade-offs. Based on past experience, comprehensive analysis of mitigation and adaptation goals and potentials might be incorporated as financing requirement.

In the long term, synergy concerns should be better integrated into the programming of climate finance that do not yet incorporate it into the financing criterion. Figure 4 below demonstrates one possible approach of enabling more synergies. It is based on the notion that action must be determined from the ground up at the national level, particularly in developing nations. According to different NDCs, challenges exist in developing countries in transferring chances to utilise synergies and lessons learned about synergies to national and subnational/regional policy levels.

This indicates that existing international financing and policy framework established by the Paris Agreement must be integrated to realise potential synergies. As a result, rather than aiming to impose a consistent, pre-established structure across all countries, the framework must adapt to national-level circumstances. National policies are more likely to incorporate synergistic thinking if funds are made available to generate synergies and if the policy framework encourages or even mandates synergistic thinking.

Figure 5 — Realising Synergies in the NDCs – Top-down and Bottom-up Approaches



Source: Nordic Council of Ministers, 2017

Following the concept above, three types of improvement opportunities have been identified. The first opportunity relying on a so-called bottom-up approach is how national NDCs are structured to represent country climate actions. Two other opportunities rely on a top-down approach, focusing on the global climate policy framework and suggestions for improving the programming and implementation of international climate finance.

2.3. Financing Flows Promoting both, Adaptation and Mitigation

In this section, financing flow is examined based on OECD and GCF funding. In the context of climate finance, the OECD sees the link between adaptation and mitigation as a co-benefit, where identification is carried out on projects that are already running. The terminology used is overlapping projects. Meanwhile, the GCF assesses the relationship between adaptation and mitigation as a synergy project with cross-cutting terminology. In this case, cross-cutting projects are identified before the project runs.

2.3.1. Methodologies for tracking international climate-related finance

There are different methodologies for accounting finance provided for climate change mitigation and adaptation. Since the early 2000s, the members of the OECD Development Assistance Committee (DAC) have used the Rio markers methodology to report on their bilateral climate-related official development assistance (ODA), as have a number of other bilateral and multilateral donors. Multilateral development banks (MDBs), who also report data to the OECD, have used the climate components methodology. Although the scopes and accounting procedures of the two methodologies differ, their concepts of mitigation and adaptation finance accounting are similar. Table 6 presents the Rio markers methodology and the climate components methodology.

Table 6 — Methodologies for tracking and reporting climate finance

Reporting of OECD DAC members with the Rio markers	Reporting of MDBs on climate components
The Rio marker methodology incorporates a climate component into development co-operation portfolios. It has three levels of scoring:	The climate components methodology identifies project components that directly contribute to or promote adaptation and/or mitigation. The components are calculated in accordance with the joint MDB methodology for tracking climate mitigation finance and the joint MDB methodology for tracking climate adaptation finance. The data do not include multilateral climate finance.
• Principal (2): when the objective (climate-change mitigation or adaptation) is explicitly stated as fundamental in the design of, or the motivation for, the activity.	
• Significant (1): when the objective (climate-change mitigation or adaptation) is explicitly stated but it is not the fundamental driver or motivation for undertaking it.	
• Not targeted (0): meaning that the activity was examined but found not to target the objective (climate-change mitigation or adaptation) in any significant way.	
The Rio markers methodology applies to activities as a whole, i.e. the score applies to all components of an activity, even though some of which may be more climate-related than others. As a result, the markers allow for an approximate rather than precise quantification of development finance that targets climate objectives, mitigation, adaptation or both.	

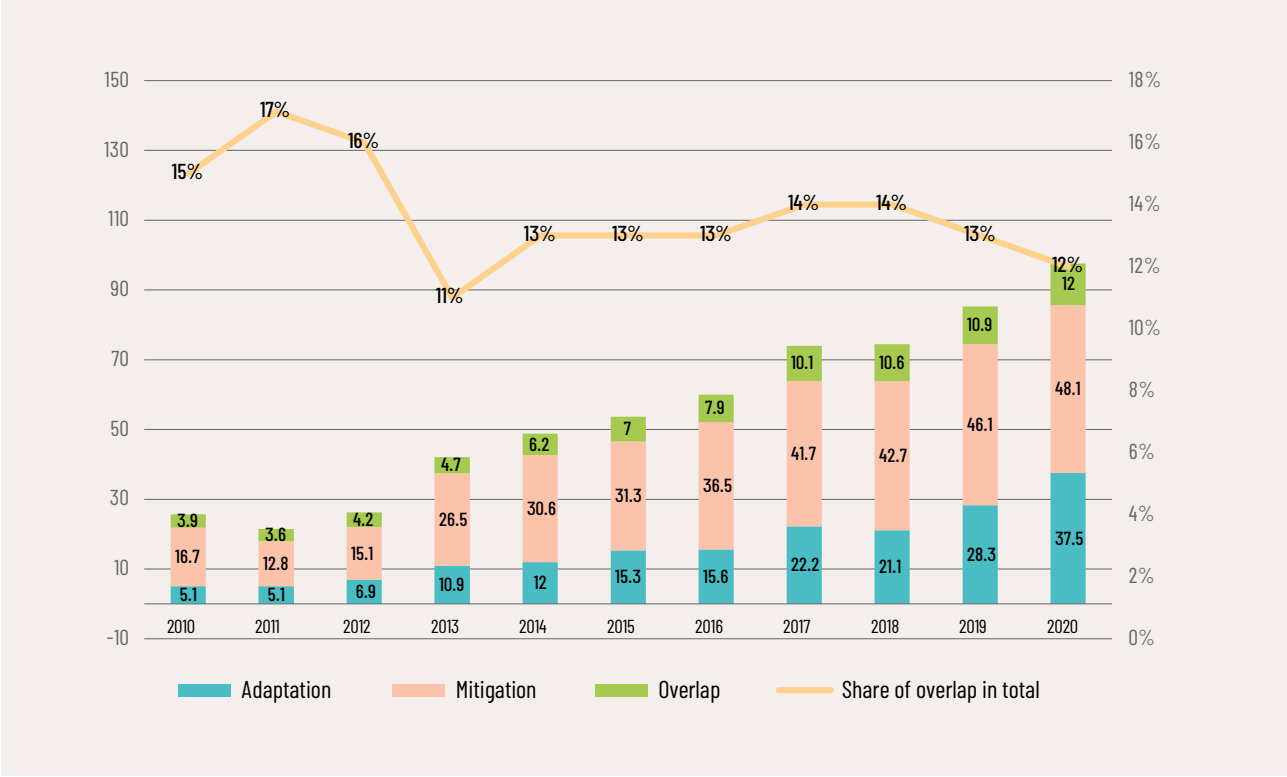
Source: OECD (2022), Climate-related Official Development Assistance: A snapshot. URL: https://www.oecd.org/dac/climate-related-official-development-assistance-update.pdf.

2.3.2 Assessment of International Climate Finance Flows

Organizations such as the Climate Policy Initiative (CPI) use available data on foreign aid to track international climate finance committed by bilateral, multilateral, and private philanthropic sources. Multilateral sources include development agencies, multilateral development banks, as well as international environmental and climate funds, whereas bilateral sources typically include ministries and development agencies of donor countries to the governments of recipient countries. Importantly, international climate finance may also go through private recipient channels.

Figure 5 presents the trends in international climate finance, recorded by the OECD as climate-related ODA and other foreign aid, using either of the methodologies described in the preceding section. The figure illustrates that all sources contributed a record USD 97.6 billion to climate objectives in 2020. Mitigation-related finance surpassed adaptation-related finance. Of all climate-related finance, 38% had adaptation objectives, 49% had mitigation objectives and 12% had both. This breakdown has significantly changed during the last 10 years: in 2010, these shares were 20%, 65%, and 15% respectively.

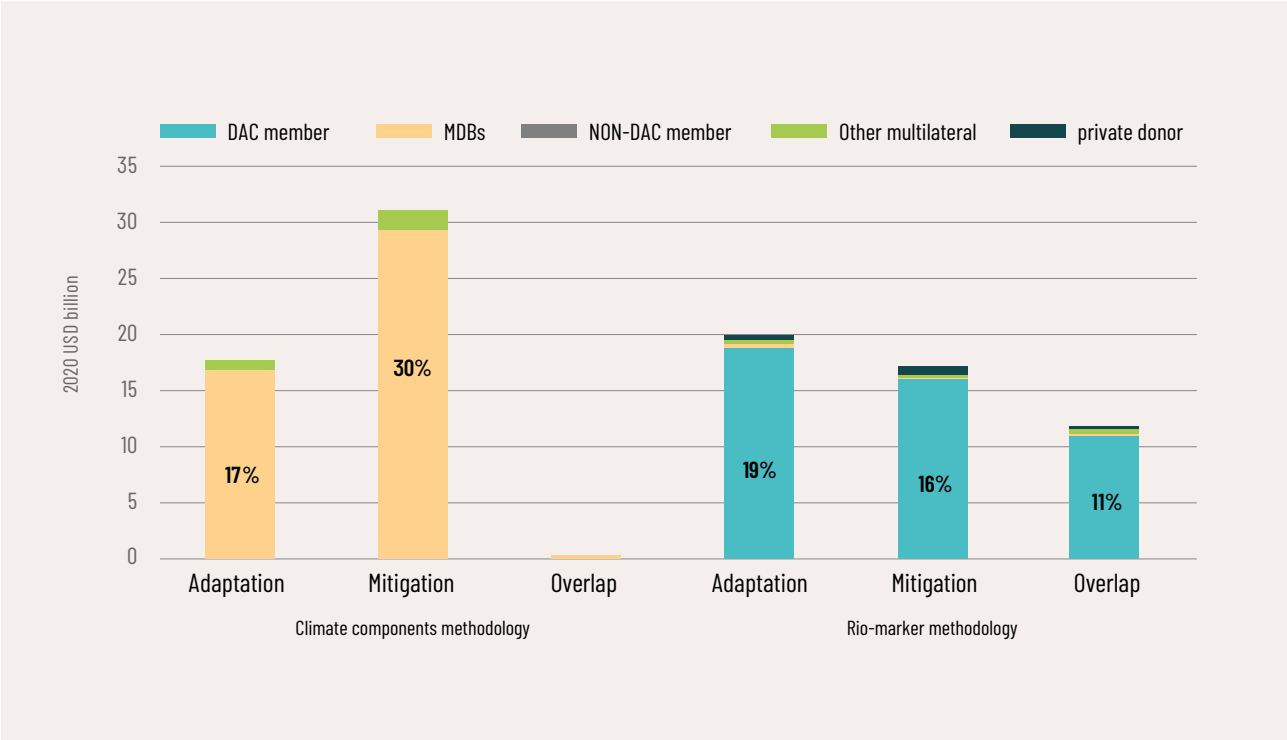
Figure 6 — Trends in international climate finance committed between 2010 and 2020



Source: constructed using data from OECD DAC online, with the last update on 20 May 2022 (https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/climate-change.htm)

Figure 6 presents the breakdown of international climate finance in 2020 by climate area and finance sources. It also identifies either of the accounting methodologies, which these sources used, as explained in the preceding section. Using the climate components methodology, MDBs and other multilateral sources, including climate and environmental funds, accounted for 52% of the international finance volume, with the largest share of this going to mitigation. Bilateral sources, including DAC and non-DAC members, accounted for 47% of the international climate finance volume, with the adaptation share slightly exceeding the mitigation share. The rest of the volume flowed from the private sources. Activities, which supported both mitigation and adaptation, were supported mostly exclusively by bilateral sources.

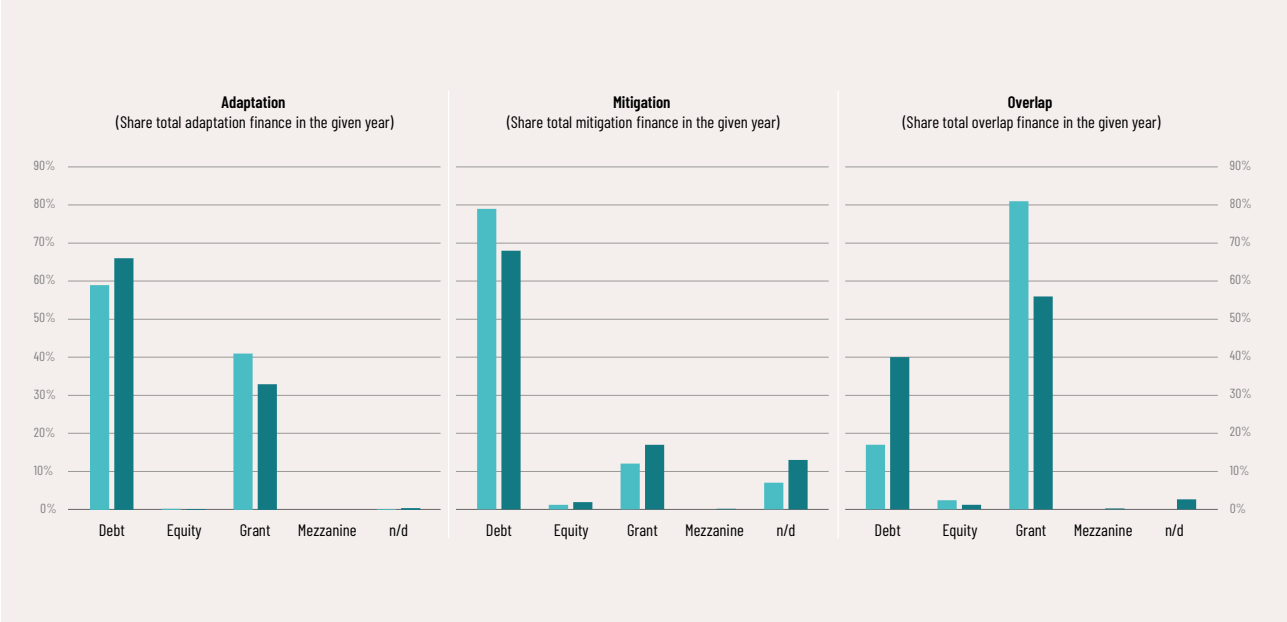
Figure 7 — Breakdown of international climate finance by source (the whole volume of international climate finance is 100%) with specification of the accounting methodology, 2020)



Source: constructed using data from OECD DAC online, with the last update on 20 May 2022 (https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/climate-change.htm)

Figure 7 illustrates that the most popular financial instruments to provide international climate finance in 2022 were grants and debt instruments, with debt accounting for a much higher share in mitigation funding and a somewhat higher share in adaptation funding. The figure also illustrates that between 2015 and 2020, the share of grant funding had been growing for mitigation and the share of debt funding had been growing for adaptation. The largest share of volume supporting both, adaptation and mitigation, was provided in a form of grants in 2020, however it had dropped significantly between 2015 and 2020.

Figure 8 — Financial instruments delivered international climate finance in 2015 and 2020, by climate area



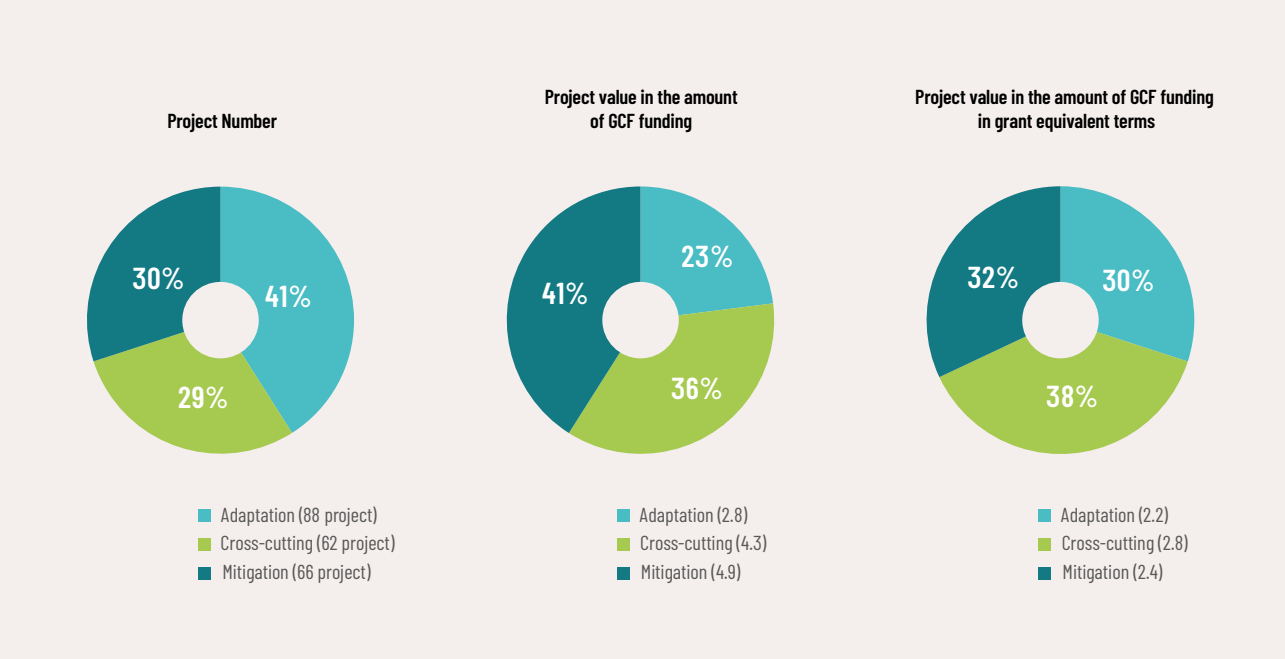
Source: constructed using data from OECD DAC online, with the last update on 20 May 2022 (https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/climate-change.htm)

The fact that MDBs rely primarily on debt-based instruments, even though there is wide range of of climate finance instruments available to support climate mitigation and adaptation, has important consequences for developing countries. While debt-based instruments come with an obligation to repay the borrowed funds with interest, equity-based instruments link returns to the success of the project. The choice between these instruments can significantly influence the financial structure of climate finance initiatives and determine how financial risk is allocated. Reforms advocated to these institutions thus should also be considered from the perspective that it could enhance effective climate finance.

2.3.3 Assessment of Finance Disbursed by Green Climate Fund

The Green Climate Fund (GCF) supports a substantial portion of international climate finance; thus, this section examines its portfolio and leverage. Figure 8 depicts the GCF project portfolio in terms of number of projects and project volume. The GCF had approved 216 projects, as of March 2023, with 184 already under implementation. According to the simplified approval process, GCF funds projects up to USD 25 million. The approved projects had a total value of USD 45.0 billion, with 3.6 billion already disbursed, including USD 12.0 billion in GCF funding and USD 33 billion in co-financing from other sources (this means that a significant portion of international climate finance assessed in the preceding section is co-financing GCF projects). Cross-cutting projects contributed 29% to the total project number, 36% to the total value of projects in the amount of GCF funding, and 38% to the total value of projects in the amount of GCF funding in grant equivalent terms. Impact projection anticipates a billion people with increased resilience as well as 2.9 billion CO_2 equivalent emission avoided.

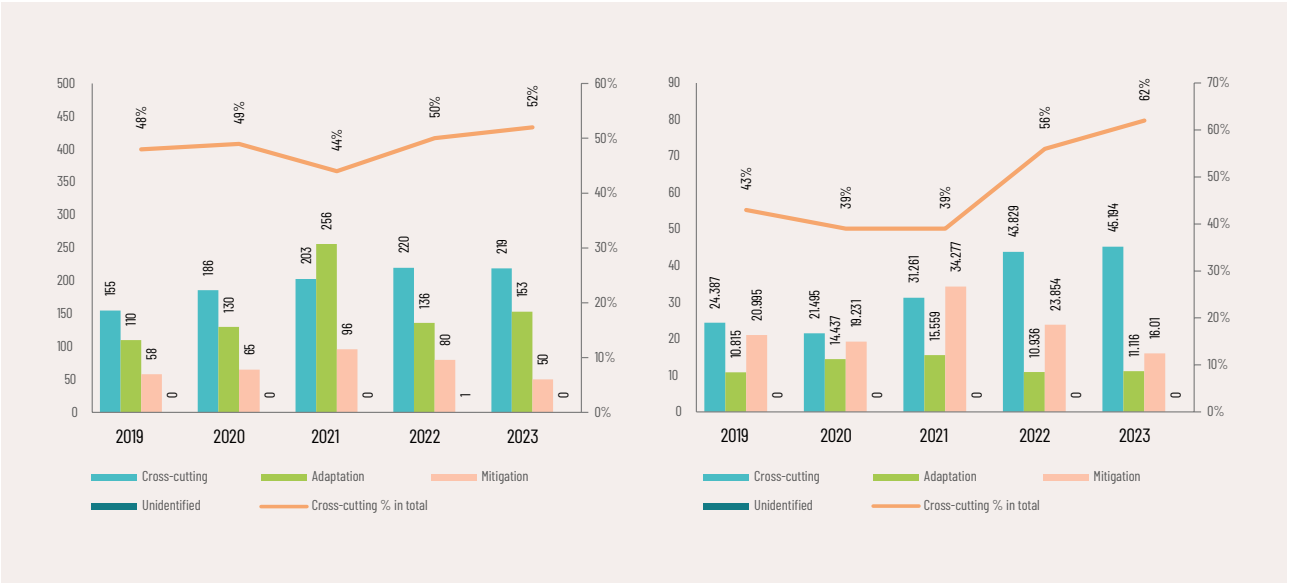
Figure 9 — Breakdown of the GCF Portfolio by Area (Theme), as of March 2023



Source: GCF. GCF at a Glance. Project Portfolio as of 24 March 2023.
URL: https://gcfrod.blob.core.windows.net/public/odl/pdf/project-portfolio-1.pdf

The share of cross-cutting projects is likely to increase due to a higher share of cross-cutting projects in the GCF project pipeline, as compared to the present situation. Figure 9 illustrates the project GCF pipeline from January 2019 to January 2023. The pipeline includes GCF project applications that were either at the concept note, funding proposal, or secretariate review state. The figure illustrates that the project number and project volume in the GCF pipeline increased by ca 30% in 2023, as compared to 2019. During this time, the share of cross-cutting projects in project number and project volume increased from 44% to 52% and from 43% to 62% respectively.

Figure 10 — Breakdown of the GCF Pipeline by Area (Theme) from 01.2019 to 01.2023



Source: GCF. GCF Monthy Report. Pipeline Updates: January 2019, January 2020, January 2021, January 2022, January 2023.

The GCF define a cross-cutting project as a project that intrinsically presents opportunities for adaptation and mitigation impacts. However, it was argued at the 15th GCF Board meeting that the adaptation-mitigation balance was unclear due to the lack of transparent, quantifiable rules for what counts as a cross-cutting project. The GCF is also aware that defining the requirement for a cross-sectoral project is challenging, especially when the national context must be considered.

Chapter three

Revisiting Policies, Implementations and Financial Support of Synergy in Respective Countries and beyond

3. Revisiting Policies, Implementations and Financial Support of Synergy in Respective Countries and beyond

3.1. Worldwide review of recent developments in integrating CCM and CCA climate finance

Policymaking tools to promote coordination between climate finance and address climate change mitigation and adaptation may include policy, implementation, and finance aspects. In the following section, we will evaluate the progress of these measures in various countries globally.

3.1.1. Policy

Integrating climate change adaptation and mitigation can be enhanced by improving institutional and governance frameworks to involve all stakeholders in the identification and management process (Adaptation Committee, 2020). Governments can establish classification systems that define climate-friendly and harmful investments, ensuring consistency across financial and non-financial institutions (Gamper et al., 2021). These systems aim to facilitate informed investment decisions by investors, corporations, and the public sector, ideally with support from governments and the financial sector (OECD, 2020).

In recent years, numerous geographical jurisdictions and financial intermediaries have recognized the importance of such classification systems and developed their own. These classifications vary from more prescriptive taxonomies to less prescriptive guidance and principles. Examples of governments implementing classifications include Bangladesh, Chile, China, Georgia, Malaysia, Mongolia, South Africa, Kazakhstan, and the Russian Federation (Bangladesh Bank Sustainable Finance Department, 2020; Ministry of Finance et al., 2021; Qing & Wang, 2020; National Bank of Georgia, 2019; Central Bank of Malaysia, 2021; Financial Stability Commission of Mongolia, 2019; South African National Treasury, 2022; Government of Kazakhstan, 2021; Ministry of Economic Development of the Russian Federation, n.d.). Additionally, investors/financiers (such as the International Capital Market Association) and think tanks (such as the Green Bond Initiative) have also adopted these classifications, which often draw inspiration from or use the EU Taxonomy as a benchmark (C. Gondjian and C. Merle, 2021).

The EU taxonomy on environmentally sustainable activities, established through the Regulation adopted in 2020 (EUR-Lex, 2020), has been influential and widely referenced. This taxonomy is a scientific-based system that helps determine if an investment aligns with the long-term sustainability and climate plans of the European Union. The Regulation provides a framework and empowers the European Commission to develop technical screening criteria for sustainable economic activities. The EU taxonomy focuses on six environmental objectives: climate change mitigation, climate

change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, waste prevention and recycling, pollution prevention and control, and protection of healthy ecosystems. Within the climate change mitigation objective, an activity can be classified as taxonomy-aligned if it contributes to reducing greenhouse gas emissions, whether through being already low-carbon (green activities, e.g., afforestation), transitioning while still emitting (greening of activities, e.g., cleaner production of steel and cement), or enabling low-carbon performance (greening by activities, e.g., production of solar panels). Non-compliance with the taxonomy may pose challenges for investors soon, potentially resulting in restricted access to capital or higher costs from financial intermediaries like EU funds and undermining project competitiveness (Gamper et al., 2021; EUR-Lex, 2020).

Standing in stark contrast with the bottom-up market facilitation approach of the EU and the US is the Chinese model. The development of green finance in China is rooted in its top-down political economy system. Central governments play a guiding role by setting the direction for green financing through policies and regulations (including top-level design, evaluation system, taxonomies, and disclosure), and by leveraging public finance support (e.g. establishment of the National Green Development Fund). The China Banking and Insurance Regulatory Commission issued the Guidelines for Green Finance in June 2022, raising green finance to a strategic level in the industry. The guideline aims to mobilize more green finance by requiring that ESG factors shall be included in the management process and comprehensive risk management system. For green taxonomies, the Green Bond Standards Committee released the China Green Bond Principles in July 2022, unifying the domestic green bond market and better aligning it with international standards. This comes after China was the first country to launch a green bond taxonomy in 2015 by the People's Bank of China (PBoC). In 2021, the PBoC updated the Green Bond Project Endorsed Catalogue, which removed projects related to the clean use of coal and several fossil fuels from the definition of 'eligible green project'. This is noticeably different from the EU green taxonomy, which classified gas as a sustainable investment. However, contrary to green incentives, PBoC simultaneously expanded incentives for fossil fuels. For example, in November 2022, an RMB 200 billion (USD 31 billion) relending program for clean coal was introduced (Nedopil & Song, 2023).

In this context, the EU and China initiated a Working Group on taxonomies, to collaboratively assess their respective taxonomies and identify similarities and differences in their approach. This work resulted in the International Platform on Sustainable Finance Common Ground Taxonomy, a report looking to deepen global collaboration and reduce fragmentation across green taxonomies in order to avoid negative impacts on emerging markets.

3.1.2. Implementation

To promote synergies of climate change mitigation and adaptation and minimize trade-offs, activity classifications may incorporate a requirement to consider multiple sustainable objectives simultaneously or avoid conflicting aims (Adaptation Committee, 2020). However, current classifications that simultaneously promote multiple sustainable objectives, such as climate change mitigation and adaptation, are lacking, leaving room for improvement in defining and programming climate finance (Adaptation Committee, 2020). Notably, the „do no significant harm" (DNSH) principle has been implemented in at least two classifications: the EU sustainable finance taxonomy and the Malaysia climate change and principle-based taxonomy (EUR-Lex, 2020; Central Bank of Malaysia, 2021).

The EU taxonomy discussed in the previous section prevents potential trade-offs between different environmental policy objectives. An activity is considered sustainable if it contributes to at least one of the six environmental objectives, respects the technical screening criteria, adheres to the DNSH principle, and upholds minimum labor and human rights standards (EUR-Lex, 2020). The DNSH criteria vary depending on the potential environmental risks associated with each economic activity. The delegated acts provide technical screening criteria to ensure that an activity does not cause significant harm to any of the other five environmental objectives of the EU taxonomy (EUR-Lex, 2020).

The Climate Change and Principle-based Taxonomy of Malaysia, issued by Bank Negara, is a Shariah-compliant impact-based risk assessment framework based on the „Value-based Intermediation Financing and Investment Impact Assessment Framework (VBIAF) Guidance Document 2019" (Central Bank of Malaysia, 2021; Gamper et al., 2021; I4CE, 2022; OECD, 2020). This taxonomy is a reference for developing environmental, social, and governance (ESG) risk management practices in Malaysia. Similar to the EU taxonomy, it includes an activity-level classification system. The Malaysian taxonomy is guided by principles such as the direct/indirect contribution to climate mitigation and adaptation, avoidance of significant unintended harm to the environment, willingness to improve business practices and transition to sustainable operations, and exclusion of prohibited activities (Central Bank of Malaysia, 2021; Gamper et al., 2021; I4CE, 2022; OECD, 2020). These principles ensure the application of the DNSH principle within the Malaysian taxonomy.

3.1.3. Climate Finance

Fragmented policymaking in the field of climate could be overcome with a whole-of-government integration approach under green budgeting. Such budgeting would help integrate, mainstream, and align national expenditure and revenues with climate and other environmental goals across government entities. Factoring climate considerations into national financial management processes can ensure that domestic budgets are well spent from the climatic point of view, by identifying and expanding public finances that deliver positive climate change benefits, re-designing investments vulnerable to future climate risks to withstand the risks, and reducing investments in activities that increase vulnerability to these risks (Venkatramani & Hillier, 2021).

In 2017, the OECD established the Paris Collaborative on Green Budgeting (PCGB), as a multi-disciplinary dedicated research and analysis platform. It aims to support the achievement of the objectives of the Paris Agreement, the Aichi Biodiversity Targets, and the United Nations' Sustainable Development Goals (SDGs) by means of aligning national policy frameworks and financial flows, including both expenditure and revenue, on a pathway towards low-carbon climate-resilient and environmentally sustainable development (OECD, 2021). Since then, a number of countries has introduced green budgeting.

The EU green budgeting reference framework established is often referred to as one of the world-leading practices. The framework aims to serve as a resource for EU member states for the adoption or upgrade of their national green budgeting concepts (European Commission, 2022b). The framework includes five elements: (i) the coverage of environmental objectives, budgetary items, and public sector entities, (ii) the methodology used to assess consistency of budgetary policies with environmental goals, (iii) the deliverables, (iv) the governance, setting responsibilities for each player, as well as (v) the transparency and accountability of the process. The framework offers three levels

of possible development, orienting to different degrees of ambition and comprehensiveness across its five elements. The framework allows identifying revenue and expenditure that contribute to the achievement of an environmental objective. A budgetary item is considered favorable if it does not harm other objectives and unfavorable if it is without being favorable to other objectives. A budgetary item may be considered with a mixed impact if it has a positive effect on one or several environmental objectives and a negative effect on another one or several others. The tagging of activities as mixed helps identify and prioritize activities with trade-off effects (EUR-Lex, 2020, 2021; European Commission, 2022b; I4CE, 2022; OECD, 2021). The framework does not allow identifying activities having multiple environmental objectives, i.e., synergies.

In 2022, twenty-three EU Member States volunteered to be trained on and eleven EU Member States started implementing a form of green budgeting (I4CE, 2022) (Bova, 2021) and the joint publication of the European Commission, the International Monetary Fund, and the OECD (European Commission et al., 2021) discuss green budgeting experiences of the EU member states and other geographical jurisdictions.

Climate-integrated financial management processes in the public budget can also reduce the financing gap by leveraging international funding, by strengthening evidence that shows domestic finance gaps, and by showing how domestic spending can be used for project co-financing. Institutionalizing this approach, rather than undertaking a one-off exercise, may provide a basis for evidence-based decision-making of international donors (Venkatramani & Hillier, 2021). The assessment conducted by the World Bank (2021) revealed that countries which have recently improved transparency in their budgets have also shown sharp improvements in Millennium Development Goals spending allocations (World Bank, 2021).

Central banks have a crucial role to play in greening financial systems. The Network for Greening the Financial System (NGFS) brings together central banks and supervisors to enhance the role of the financial system in managing climate and environmental risks and mobilizing capital for green and low-carbon investments. As of October 2022, the NGFS counts 121 members and 19 observers, including central banks, supervisors, and international organizations (NGFS, 2022). Central banks can contribute to greening financial systems by incorporating climate considerations into their policies and operations. Examples of measures include greening asset purchases, prioritizing green assets in collateral frameworks, and implementing direct funding and refinancing schemes that support climate objectives (Dattels et al., 2021).

Corporate stakeholders also recognize the importance of addressing environmental risks and opportunities. Environmental, Social, and Governance (ESG) disclosure has gained prominence, with many companies providing information on their management of these factors. ESG reporting standards, such as those set by the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB), have been adopted by an increasing number of companies worldwide. The EU and China have been at the forefront of ESG disclosure policies, with China aiming for mandatory environmental information disclosure for all listed companies and the EU implementing directives and regulations requiring non-financial reporting and sustainability disclosure (Financial Stability Board, 2017; TCFD, 2020).

In the financial sector, additional disclosure practices have emerged to track ESG-associated risks

and opportunities. The Task Force on Climate-related Financial Disclosures (TCFD), established by the Financial Stability Board, has developed recommendations to improve reporting of climate-related financial information. These recommendations cover areas such as governance, strategy, risk management, and metrics and targets (TCFD, 2017). The EU has been leading in developing requirements for climate information disclosure in the financial sector. The Sustainable Finance Disclosures Regulation (SFDR) established sustainability disclosure obligations for financial market participants, emphasizing the consideration of negative externalities on the environment and social justice. The SFDR aligns with the EU taxonomy of sustainable activities and requires disclosure in line with environmental objectives, including climate change mitigation and adaptation (European Commission, 2020).

Labeling schemes, such as the Climate Bonds Standard & Certification Scheme, provide a signal about the synergies and trade-offs between climate change mitigation and adaptation. The scheme, introduced by the Climate Bonds Initiative, originally focused on climate change mitigation but expanded to include climate resilience principles. It allows for the certification of bonds and other debt instruments that finance climate-aligned assets and projects (Climate Bonds Initiative, n.d.).

3.2. Policies and Challenges in adopting synergies between CCM and CCA

A series of analyses allow us to sketch the current situation of CCA/CCM synergy actions and the main perceived challenges and chances for these respective countries. Analysis of the report is conducted qualitatively with descriptive analysis. Data was obtained from various secondary sources through policy documents, reports, previous studies, and primary data from interviews with relevant informants.

3.2.1. Brazil

In Brazil's updated NDC, there is no mention of mitigation and adaptation interactions or synergies. In the country's National Climate Change Policy, from 2009, one of its guidelines is to integrate "climate change mitigation and adaptation strategies on local, regional and national levels." According to the National Adaptation Plan from 2016, one of the principles that must be observed when integrating climate-related risk management into sectoral policies and plans is to "implement mitigation and adaptation measures from the standpoint of co-benefits". Although there are a few mentions of adaptation-mitigation interactions and co-benefits in the abovementioned policies, as far as we can tell, there are not yet concrete implementation plans. Moreover, the National Adaptation Plan's implementation cycle ended in 2020[1], and the draft bill (Draft Bill 4,129/2021) seeking to establish guidelines for the development of adaptation plans, although already approved in the Chamber of Deputies, is still awaiting consideration in the Senate. According to the document, if approved, adaptation measures will be formulated at the federal, state, and local levels and the economic sectors "to ensure social participation of the most vulnerable to the adverse impacts of this change"[2].

1 https://www.gov.br/mma/pt-br/assuntos/climaozoniodesertificacao/plano-nacional-de-adaptacao
2 https://www.camara.leg.br/proposicoesWeb/fichadetramitacao?idProposicao=2308223

One entity that could potentially integrate mitigation-adaptation synergy into documents submitted to the UNFCCC (NAP, NDC, LTS) is the Interministerial Committee on Climate Change and Green Growth, a permanent body within the executive branch tasked with establishing guidelines and ensuring the coordination of all policies and actions related to climate change in the country. The Executive Office chairs the Committee, and the Ministry of the Environment holds the executive secretary. However, the Committee has only met seven times since October 2020, although a few Working Groups were established to discuss specific topics, such as updates to the NDC[3].

Another entity that discusses climate change issues is the Brazilian Climate Change Forum, aiming to promote awareness, mobilise society and contribute to discussions about actions necessary to face climate change. This Forum comprises representatives from the public sector (including State Ministers and presidents of regulatory agencies and public entities), civil society, corporations, and academia.[4] How the Forum will operate in the new administration is not publicly available.

Furthermore, to encourage social participation, the national public administration adopts a public consultation mechanism by requesting citizens to manifest their opinion and criticisms on matters such as draft bills and public policies under development. It is open to anyone who wishes to contribute. Hence, a public consultation would allow the population to express their opinion on upcoming climate-related policies.[5]

In sum, the synergy concept and measures from the Brazilian case are still far and unclear.

3.2.2. India

India is a key emerging economy to set up ambitious climate action targets. However, CCA-CCM synergies in the Indian policies have been more theoretical than in practice. India submitted its Intended Nationally Determined Contributions (INDCs) in 2015 with three quantifiable targets up to 2030 and five non-quantifiable targets. India's INDCs mainly included mitigation targets with cumulative electric power installed capacity from non-fossil sources to reach 40%, reduction of the emissions intensity of the GDP by 33 to 35 percent compared to 2005 levels, and creation of additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover. The INDCs also emphasized adaptation targets (though non-quantifiable), highlighting better adaptation to the changing climate and enhanced capacity building across communities and institutions. India updated its NDC targets in 2021 at the Glasgow Climate Summit. As per the updated NDC, India is committed to reducing the Emissions Intensity of its GDP by 45 percent by 2030 from the 2005 level and achieving about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. However, the updated NDCs do not include any CCA-CCM synergies. The CCM-CCA linkages are better found in India's state and local policies than national ones.

The National Action Plan on Climate Change (NAPCC) is one of the pivotal climate change policies that outlines a national strategy for India toward climate action. The NAPCC is probably one of India's

3 https://www.gov.br/casacivil/pt-br/assuntos/comite-interministerial-sobre-mudanca-do-clima
4 http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2017/Decreto/D9082.htm#art14
5 https://www.gov.br/participamaisbrasil/consultas-publicas

best examples of CCM-CCA synergy-based policies with a fairly decent balance of mitigation and adaptation interventions highlighted in the policy document. There were eight missions under the policies with targets under those missions which had a CCM-CCA synergy. For example, one of the missions under the NAPCC was the Green India Mission, which aimed to enhance the green cover across the nations. Under this mission, there were targets to enhance community resilience through the provided services of fuel, fodder, and non-timber forest products (NTFPs). India recently launched its LT-LEDs at COP-27 in Sharm-El—Sheikh, which briefly mentions the need for CCM-CCA linkages.

The policies rarely explicitly recognize CCM-CCA linkage. However, quite a few policies have an indirect linkage, most of them under the agricultural and LULUCF sectors. The PM KUSUM Scheme, launched to enhance solar energy uptake in the nation, provides solar pumps to farmers, which has an obvious linkage with the Indian updated NDCs' (all mitigation-based) targets along with adaptation benefits, including water security and enhanced agricultural production leading to better livelihood standards of the beneficiaries. The newly launched Mission LiFE in India is another potential example of CCM-CCA linkage. It aims for innovative solutions that promote wider adoption of traditional, climate-friendly, sustainable practices and/or create livelihood options for communities that may lose their jobs with a shift towards climate-friendly production. The Indian Cooling Action Plan (ICAP) primarily focuses on an integrated vision towards cooling across sectors encompassing, among other things, reduction of cooling demand, refrigerant transition, enhancing energy efficiency, and better technology options by 2037-38 through forging synergies with ongoing programmes/schemes of the Government. One of the key targets under this mission is to organize training and certification of 100,000 servicing sector technicians by 2022-23, synergizing with Skill India Mission.

The CCM-CCA linkage is also starting to be mainstreamed at the state level through the State Action Plan on Climate Change (SAPCC). The Ministry of Environment, Forest and Climate Change (MoEFCC) has notified the states to revise their SAPCCs in line with the national and global climate priorities. Most of the revised SAPCCs have identified interventions that have significant CCM-CCA synergies. For example, the revised SAPCCs have a dedicated , Cross-Cutting' section with interventions with overlapping mitigation and adaptation synergies. Implementation and financing for these cross-cutting interventions is primarily a joint responsibility of concerned departments in the state government, with possible additional resource mobilization from central government schemes and project financing options.

This current situation shows that there has been a growing consensus amongst Indian policymakers that mitigation and adaptation actions cannot be implemented in silos. However, several key suggestions need to consider integrating CCM-CCA linkage in the documents submitted to the UNFCCC, namely:

1. There is a need for a multi-stakeholder approach to integrating CCM-CCA linkages into the documents submitted to the UNFCCC. Many organizations carry out significant research and assist the Government of India in preparing to report documents, particularly the National Communications and Biennial Update Reports. These documents invariably draw from the domestic policy landscape. For example, as mentioned above, the revised SAPCC has several cross-cutting interventions with mitigation and adaptation benefits. They are prepared by civil society organizations, philanthropies, and academic institutions in consultation with the state governments and hence have flexibility in shaping up the document. The benefits of CCM-CCA

synergy can be highlighted in such documents, which will be useful for the Government of India as a best practice when formulating a national document such as the LTS.
2. As adaptation is seen as a primarily regional and localized issue, India must focus on forming state and local policies centering CCM-CCA synergies. While the provisions such as mandatory gender budgeting in projects/programmes require such synergies, the execution is lacking.
3. Finance is key to enhancing CCM-CCA synergies in India. Bilateral and multilateral lending focus on projects with a prominent CCM-CCA synergy and nudges projects towards such synergies. The India LT-LEDs highlights that mainstreaming such synergies is subject to the availability of funds. Hence along with international finance, the annual budget in India needs to highlight CCM-CCA synergies-based projects as a priority, which, once implemented, will automatically be highlighted in the national documents submitted to the UNFCCC.

From several points above, the mobilisation of funds is the key to facilitating synergies between adaptation and mitigation. Through domestic and international finance, the synergies can be mainstreamed in India's climate action policies. Undoubtedly, it has been proven that mitigation interventions are much more investment-friendly than adaptation interventions. Hence, there is a need to develop projects with a prominent synergy that will regain investor confidence as the mitigation interventions will ensure a guarantee of returns. The MDBs also need to change their operation strategies and lend money to projects with CCM-CCA synergies. Regional coalitions can also facilitate synergies and inform the national governments regarding their benefits. For example, the C40 Cities works extensively in India on projects with many CCM-CCA linkages. These experiences can be built upon to devise ways for better integration of CCM-CCA synergies into national policies. Lastly, a multi-stakeholder approach in policy design and implementation can bring in diverse perspectives and eventually CCM-CCA synergies.

Apart from several suggestions above, it is essential to acknowledge that India's risks to changing climate include economic and social consequences. The economic consequences include monetary loss resulting from the loss of lives and livelihoods, and trade patterns to reduce global emissions. The social consequences include uneven impacts of the changing climate towards the marginalized sections of society intensifying further due to the transition of fossil fuel-based resources into renewable resources. Hence, to ensure the implementation of CCM-CCA synergies and measures during the risk transition, the Government of India may consider the following enabling conditions.

1. Energy security is one of the key aspects highlighted in India's LT-LEDs. The nation is actively pursuing energy efficiency as a key means of low carbon development strategy. Hence, the emerging policies should ensure energy transition with avenues of consequent job creation and capacity building through training and skill development programs.
2. Capacity building of the relevant actors and stakeholders that are a part of the policy-making process. This will then entail the development of projects that have prominent CCM-CCA linkages.
3. Gender mainstreaming is a key piece of the puzzle for India to ensure the implementation of synergies. For example, a million , Self Help Groups' are primarily led by women in India. These are excellent avenues to implement projects that have a CCM-CCA linkage.
4. A standardized framework can be made with a multi-stakeholder approach facilitated by the Government of India to develop projects with prominent CCM-CCA linkages.
5. The financial institutions (international and national) need to change their operations and target

to fund projects with CCM-CCA synergies.
6. There is also a scope to formulate policy/planning/regulatory instruments in line with CCA/CCM linkages.

Lastly, the Feedback mechanism that considers recommendations from the local level is also needed to measure the implementation of CCA and CCM. India's LT-LEDs categorically recognize that the key for India towards climate action is to create effective coordination between national, state, and local governments.

3.2.3. Indonesia

In general, the CCA-CCM synergy in Indonesia has only focused on identifying potential co-benefits, or when referring to Locatelli et al. (2015), it has only come to "unintended side effects". It can be seen from two main documents submitted by the Government to the UNFCCC, i.e., the NDC and LTS-LCCR (We did not make identification from the NAP document because it is not submitted yet). Even though both documents have addressed mitigation and adaptation actions, there is no explicit commitment or statement to integrate these two actions.

The most visible efforts to integrate mitigation and adaptation actions are in Indonesia's Enhanced NDC document, submitted in 2022. Nonetheless, the integration efforts referred to in this document have only reached the identification of potential co-benefits of adaptation actions against mitigation actions. Identifying potential co-benefits is also limited to specific sectors (namely, ecosystem and energy sectors), even though other sectors or programs have potential co-benefits or synergies. The results of the mapping of Indonesia's Enhanced NDC documents regarding the potential synergies of climate change mitigation and adaptation can be seen in Appendix I.

Based on the mapping, the potential for synergy in the enhanced NDC document appears only up to the potential co-benefits in the ecosystem and energy sectors. Although several other activities also have co-benefit potential, especially in the ecosystem sector, such as social forestry, coastal zone protection, ecosystem conservation and restoration, and integrated watershed management. These activities can not only increase community resilience but also absorb GHG emissions.

However, identifying potential co-benefits in enhanced NDC documents is still better than in Indonesia's LTS-LCCR documents submitted in 2021. The LTS-LCCR document was meant as long-term strategies intended to guide short- and mid-term action and feed into future NDC submissions. Still, the document does not explicitly encourage synergy, as Appendix II shows. It shows that the identification of co-benefits has begun to be seen in the LTS-LCCR Indonesia document. However, it is not as explicit as the Enhanced NDC document. Climate change mitigation and adaptation actions are mentioned in the food sector. Strategies to reduce food loss and waste are expected to increase resilience in food, water, energy, and environmental health (economy, social and livelihood, ecosystem and landscape), and include achieving mitigation targets.

However, even though there is no clear statement on adaptation-mitigation synergy, there is a clue in the Update NDC Document back in 2021 that one of the foundational principles of the strategic

approach mentioned the innovative climate change mitigation and adaptation efforts (page 2). This innovative way is possibly interpreted and developed next as adaptation-mitigation synergy.

> **"Highlighting existing best practices by recognizing significant strides in multi-stakeholder efforts in combating climate change, Indonesia intends to scale up the diversity of traditional wisdom as well as innovative climate change mitigation and adaptation efforts by the Government, private sector, and communities."**

Nevertheless, several mechanism options can be implemented so that innovative ideas such as synergy can be integrated into documents submitted to the UNFCCC (NAP, NDC, LTS) and are ready to be implemented in Indonesia, including:

- Preparation and dissemination of Policy Brief on how synergy CCA/CCM to be integrated into NDC LTS-LCCR and NAP documents that would be revised/ submitted in the UNFCCC at the next cycle (2025). The target of this Policy Brief is decision-makers from key line ministries;
- Provide technical advice and/or advisor when the relevant line ministries conduct policy formulation activities/events on integrating the synergy into the implementation policy of NDC. The Government is in the process of Regulation developing of 19 ministerial regulations as mandated by the Presidential Regulation (Perpres) no. 98/ 2021 on carbon-economic value.
- Provide technical advice and/or advisor when the relevant line ministries conduct policy formulation activities/events on development planning on climate change integration.

However, due to the Coordinating Minister for Maritime and Investment being the current leading ministry on coordination of climate change issues (particularly on policy development on matters related to regulations mandated by Perpres no. 98/2021), a special approach needs to be conducted in order to make the synergy between climate change mitigation and adaptation raised and discussed at the national level, and eventually adopted. Whereas to realize a better implementation of climate change converge at the national level, the Government of Indonesia has already formed the Directorate of Adaptation and Directorate of Mitigation under the Directorate General of Climate Change (DGCC) through MoEF Regulation No. P.18/MENLHK/II/2015 as a follow-up to support the implementation of climate change mitigation and adaptation actions in Indonesia. This institutional arrangement, on one side, has been appreciated because it has merged power on implementation at the local level. However, on the other side, it has made weaker power on cross-sectoral coordination matters the main task component of the NFP.

This commitment to integrating climate action is also reflected in establishing Low Carbon Development Indonesia (LCDI). LCDI is a new development platform by MoNDP that aims to maintain economic and social growth through low GHG development activities and natural resource exploitation. There are three development topics in the LCDI: climate-resilient development, low-carbon development, and circular economy. While climate-resilient development focuses on the marine, coastal, water, agriculture, and health sectors, low-carbon development focuses on forestry and peatlands, agriculture, coastal and marine, energy, transportation, and waste management.

On 29 October 2021, Indonesia enacted Presidential Regulation No. 98/2021 on the Carbon Economic Value (NEK). The Regulation was developed based on Indonesia's ratification of the Paris Agreement

(via Law No. 16 of 2016), under which Indonesia expressed hope to manage the impact of climate change better and stated its commitment to reducing GHG emissions and achieving NDCs. The Regulation prescribes climate change adaptation and mitigation actions as the two main methods to tackle climate change and achieve the NDC. The Regulation also became a main reference for development regulation on climate change NDC-related matters (it mandated the development of 20 ministerial regulations for implementation regulations).

However, while existing policies and regulations have sufficiently facilitated climate change mitigation and adaptation actions, they have not explicitly encouraged synergies. The same case also occurs in the SDGs through Presidential Regulation No. 59/2017, primarily Goal 13 (climate action), which encourages strengthening climate change mitigation and adaptation actions. However, the existing targets have not yet led to encouraging synergistic actions.

The implementation of the climate village program (ProKlim) also opens up opportunities to implement synergies on a local scale. In Regulation of the Director General of Climate Change Control P.4/PPI/API/PPI.6/3/2021 on Guidelines for Implementing the Climate Village Program, it has been stated that ProKlim is a form of Joint Adaptation and Mitigation (JAM) mechanism. Even though synergy has not been explicitly intended through this mechanism, it does simultaneously open up opportunities for implementation of mitigation and adaptation actions.

This can open up opportunities for synergy if there is integration between programs related to climate action other than ProKlim. Such as the Energy Independent Village by the Ministry of Energy and Mineral Resources is targeted to utilize local energy sources based on New Renewable Energy (NRE) for the village itself. As well as the Climate Change Response Village by the Ministry of Villages which encourages villages to make environmental sustainability their flagship work program.

However, while there was a great potential synergy to be implemented in Indonesia, institutional complexity, inadequate opportunities, and uncertainties around their efficiency and effectiveness present major challenges to the development of synergies broadly. Besides, there is little knowledge of how such synergy approaches are applied "on the ground'. As a result, we proposed several enabling conditions that the Government of Indonesia must meet to ensure the successful implementation of the climate change adaptation-mitigation synergy, namely:

1. Effective institutions and governance (stakeholders and political leadership)
   A wide range of urban actors (e.g., government, practitioners, public and private companies, the scientific community, and stakeholders from civil society such as boundary organizations) are needed for realizing effective planning and implementation — also broad outreach during the preparation and execution of policies and actions.
2. Standard or relevant guidelines as technical guidelines
   Standards or tools are needed to help understand interactions and support decision-making at local and regional scales.
3. Financial resources
   More specifically, a common climate fund for mitigation and adaptation that combines various sources of funds.
4. Knowledge generation, communication, and capacity building (human & institutional)

Establish communication and disseminate information on adaptation-mitigation synergies to relevant stakeholders (practitioners, decision-makers, and scientists) through various forms (planning process, capacity building, technology transfer, best practices exchange)

5. Policy/planning/regulatory instruments (at any level)
   Instruments that encourage the implementation of the synergy of climate change adaptation-mitigation (e.g., mitigation projects will be approved if they consider adaptation or vice versa).

Based on the five enabling conditions, the following is a proposed NDC update that is needed to meet the enabling conditions to ensure the successful implementation of synergy in Indonesia.

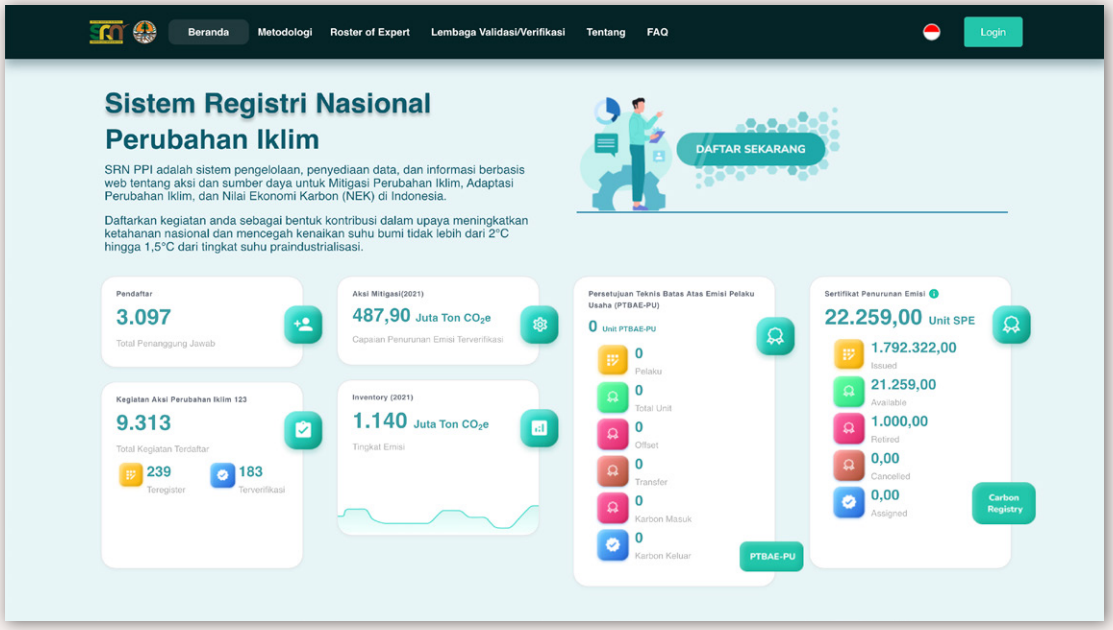
Table 7 — Proposed NDC Update to Ensure Synergy Implementation

Enabling Conditions	National Context of Indonesia
Effective institutions and governance (stakeholders and political leadership)	• ProKlim (Climate Village program) was managed by the MoEF's Director of Adaptation and was designed to implement mitigation and adaptation activities. As such, there is already a coordination mechanism between the Director of Adaptation and the Director of Mitigation in the report of ProKlim activities. However, it still needs further coordination between the Directorates, strengthening the coordination through their application synergy because the GHG reduction report is still limited
	• The Social Forestry Program was managed by the MoEF's Directorate General of SFEP, which has great potential for climate change mitigation and adaptation activities. However, it still needs further coordination with the MoEF's Directorate General of CCC for activities related to climate change. Because, at the time, there were no formal policies to realize this integration effort in real terms.
	• PT PLN (State Electricity Company) is currently carrying out activities related to climate change in electricity generation, distribution, and transmission. The Climate Change Management of PT PLN carries out these activities. However, it still does not link mitigation and adaptation to each other
	• There is a Coordinating Ministry for Maritime Affairs & Investment (Kemenkomarves) whose task is to coordinate, synchronize and control ministerial affairs in administering Government, including efforts to achieve NDC targets and the application of carbon economic values.
Standard or relevant guidelines as technical guidelines	• There was SRN (National Registry System) by MoEF and AKSARA (Low Carbon National Action Plan Planning and Monitoring Application) by MoNDP as a platform for reporting climate change mitigation and adaptation actions
	• Regulation of MoE's Directorate General of Climate Change Control No. P.4/PPI/API/PPI.0/3/2021 and MoEF Regulation No. 84/2016 stated that the Proklim Action embodies the center on mitigation and adaptation actions that the community has carried out at the local level. Therefore, implicitly the issue of synergy already exists but is not binding
Financial resources	• Funding opportunities for both climate change mitigation and adaptation from GCF
	• The growth of ESG in the private sector enables the potential practice of climate change mitigation and adaptation actions
Knowledge generation, communication and capacity building (human & institutional)	• Through ProKlim, it has been mandated that there be a knowledge transfer program and the formation of assisted villages to get the highest ProKlim status (ProKlim Lestari).
Policy/planning/ regulatory instruments (at any level)	• Potential synergy practice on-site scale through ProKlim implementation
	• Establishment of Presidential Regulation No 98/2021 on Carbon Economic Value that become a main reference for development regulation on climate change NDC-related matters (which will be coordinated by Kemenkomarves)

Source: Analysis result, 2023

In parallel with the several enabling conditions for synergies that must be fulfilled, a mechanism that considers recommendations from the local level implementation of CCA and CCM measures to national levels is also needed. In Indonesia cases itself, as part of the development of the Measurement, Reporting, Verification (MRV) System and the translation of the 'transparency framework' in the 'Paris Agreement' into the Indonesian context, the Ministry of Environment and Forestry through the Directorate General of Climate Change Control, as the 'National Focal Point of the UNFCCC' has built a National Registry System for Climate Change Control (SRN-PPI) which can be accessed via the link srn.menlhk.go.id.

Figure 11 — SRN website interface



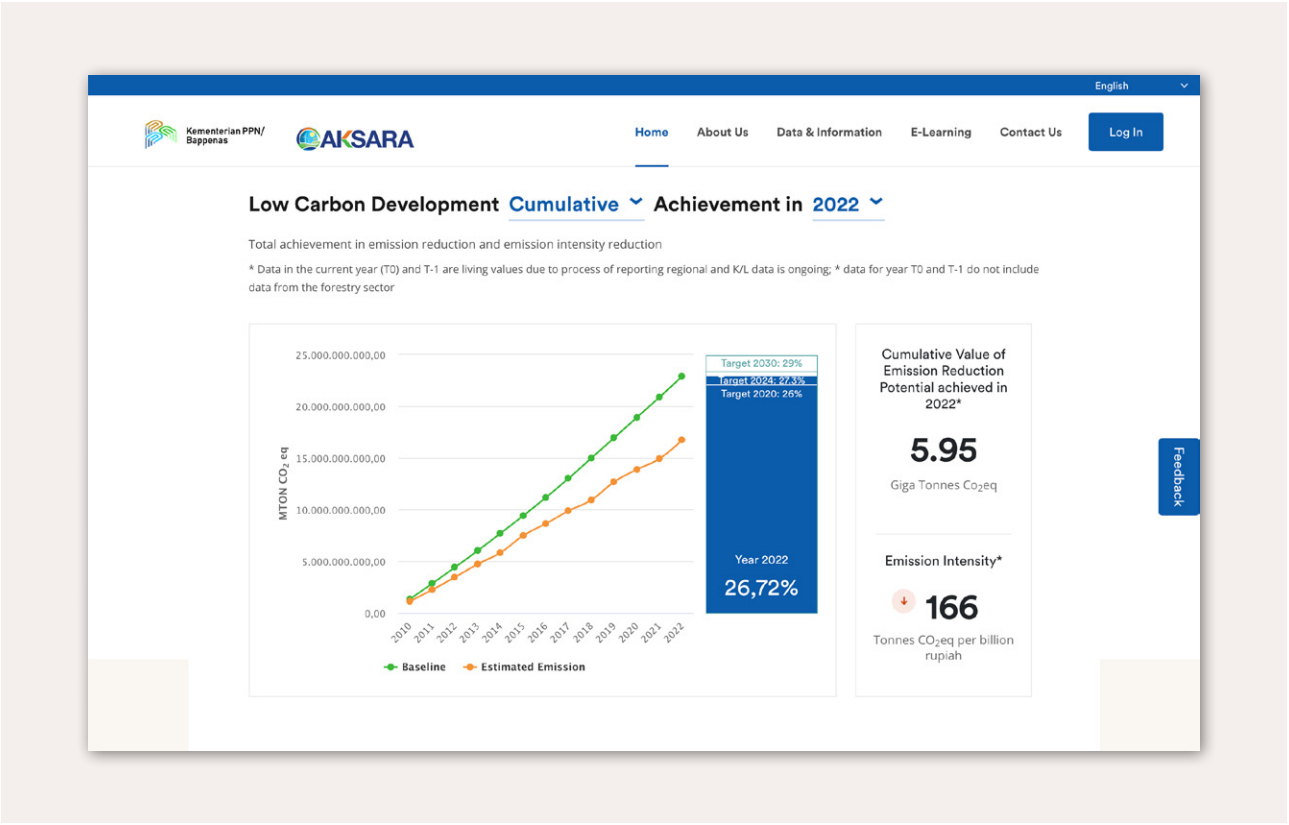
Source: srn.menlhk.go.id, 2023

The development of the SRN-PPI is aimed at:

- Data collection on climate change mitigation and adaptation actions and resources;
- Give recognition to the Government for the contribution of various parties to climate change mitigation and adaptation efforts, including resources (domestic and foreign funding, technology and "capacity building");
- Provision of information to the public on climate change mitigation and adaptation actions and their achievements and
- Avoid double counting/reporting of actions and resources for mitigation and adaptation as part of implementing the principles of 'clarity, transparency, understanding'.

Meanwhile, in 2019, the Ministry of National Development Planning created a Monitoring, Evaluation, and Reporting (PEP) portal called the Low Carbon National Action Plan Planning and Monitoring Application (AKSARA) for the Government of Indonesia in fulfilling its GHG emission reduction commitments. AKSARA is a platform for recording the implementation of low carbon (PRK) and climate resilience (PBI) in a transparent, accurate, comprehensive, consistent, and integrated manner.

Figure 12 — AKSARA website interface



Source: pprk.bappenas.go.id, 2023

AKSARA, which can be accessed via the link pprk.bappenas.go.id/aksara, aims to:

- Provide accurate, transparent, and participatory data and information about LCDI actions in Indonesia,
- Provide a system for collecting and reporting the achievements of LCDI action in cooperation between the central and regional governments to support low-carbon development in Indonesia,
- Supporting the credibility and transparency of reporting on achievements in reducing greenhouse gas emissions and low carbon development in Indonesia to the international community; And
- Provide up-to-date data for a better low-carbon development evaluation and action planning process in the future.

However, there is no interconnection between the two platforms yet. Each platform has different data metrics and reports. Therefore, integration between MoEF and MoNDP is still needed to maximize the potential for reporting and verifying climate action in the future.

3.2.4. South Africa

South Africa's National Climate Change Response White Paper (NCCRWP) outlines the country's goals to manage the impacts of climate change through interventions that build social, economic, and environmental resilience. It also aims to make a fair contribution to the global effort to stabilize greenhouse gas (GHG) concentrations:

> **"Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic, and environmental resilience and emergency response capacity.**
> **Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social, and environmental development to proceed in a sustainable manner."**

However, the policy does not explicitly address the synergies and trade-offs between climate change adaptation (CCA) and climate change mitigation (CCM). South Africa has chosen a mitigation target expressed in a range of targets for emissions in absolute units of Mt CO_2-eq in 2025 and 2030, which makes it different from other parties that opted for mitigation co-benefits of adaptation actions. The updated Nationally Determined Contributions (NDC) refer to the co-benefits of mitigation but not the synergies with adaptation.

The absence of CCA-CCM synergies and trade-off concepts in South Africa's climate policy and funding strategies may relate to a literature finding that these synergies most commonly appear in land-related activities such as agriculture and forestry (Locatelli et al., 2016). In South Africa, agriculture, forestry, and land use sectors (AFOLU) emissions, including the removals from land and harvested wood products, make a relatively small contribution to national emissions: 17 998 Gg CO_2e or 3.7% of the total in the recent National Greenhouse Gas Inventory 2017 (Department of Forestry, Fisheries and the Environment, 2021b). CCM policy for agriculture, land use, and waste emissions is still being developed (The Presidency, 2022). Regarding strategies for climate action funding, agriculture and forestry activities are largely owned by commercial-scale private actors that are seen to be more able to resource adaptation than the smallholder producers that may need financial support or incentives (Presidential Climate Commission, 2022).

Nonetheless, CCA (and environmental and economic) synergies with mitigation policies and measures (PAMS) are identified in South Africa's most recent biennial update report to the UNFCCC; PAMS in agriculture and land use may strengthen economic livelihoods and enhance the resilience of subsistence farmers through ecological restoration and rehabilitation, and conservation agriculture (Department of Forestry Fisheries and the Environment, 2021b).

The relevant forum for participative discussion on integrating synergy into documents submitted to the UNFCCC is the South Africa's Presidential Climate Commission (PCC). The South African PCC is an essential new institution appointed by President Cyril Ramaphosa in December 2020 to facilitate a just and equitable transition towards a low-emissions and climate-resilient economy (Presidential Climate Commission, 2023a). The President chairs the PCC, giving it a high level of authority, and member commissioners represent diverse perspectives from the government, business, labour, civil

society, and research and academic institutions. The Commission aims to build social consensus and partnerships to support the climate policy process and implementation (Presidency, 2020). It serves as the mechanism or forum for analysis and deliberation on the latest ideas in climate policy. The PCC on its website indicates its "purpose is to oversee and facilitate a just and equitable transition towards a low-emissions and climate-resilient economy". It thus includes both low emissions (mitigation) and climate resilience (adaptation).

Policy analysts have described the PCC's work as 'setting strategy' for development that responds to employment and climate imperatives (Winkler et al., 2021a). Recent examples of the PCC's work include technical studies, public engagement to finalize the NDC Update 2021, and public events parallel to developing the Just Energy Transition Investment Plan for South Africa (Presidential Climate Commission, 2023b). In 2022, the Presidential Climate Commission submitted a Just Transition Framework to President Ramaphosa, who accepted it on behalf of the government (Presidential Climate Commission, 2022). While the idea of CCA-CCM synergies and trade-offs has come to the attention of the PCC in recent technical work on planning for just transitions, the Just Transition Framework still does not explicitly address synergies and trade-offs.

The initial context of establishing the PCC was the urgent need to address high unemployment, especially in the youth – more than 50% of the people aged 15-24 years are unemployed (Statistics South Africa, 2022) – and recognition that responding to climate change necessitates great systemic changes to the economy and ways of life. For example, concerns about the negative implications of transitioning out of coal are well-documented (Blended Finance Task Force & Centre for Sustainability Transitions, 2022, Tyler & Mgoduso, 2022). Recognizing the sharp social inequalities and the negative social and economic impacts, risks, and opportunities in climate change-driven transitions, a just transition has been central to South Africa's climate policy.

Other stakeholders have developed their thinking on a just transition. COSATU published a blueprint for workers in a just transition (COSATU, 2021), talking to other formations in organised labour. Its five top demands were employment-creating and sustainable industrial policy; a Universal Basic Income Grant for all aged 18-59; reskilling and upskilling; land redistribution; and ending austerity for a climate-just macroeconomic framework. Arguably, the blueprint points to some critical trade-offs of climate action and development, but again, less CCA-CCM.

As such, South Africa's Climate Change Act is in the draft of the Climate Change Bill to facilitate or incentivize potential synergies. The Bill establishes the legal framework for implementation instruments for an effective climate change response and a long-term, just transition to a low-carbon and climate-resilient economy and society in the context of sustainable development (Department of Forestry Fisheries and the Environment, 2022); it captures the components of the strategic approaches in the Long-term Emissions Development Strategy to 2050 and the National Climate Change Adaptation Strategy. The Bill, tabled in Parliament in February 2022, goes through various public participation and law-making processes to become South Africa's Climate Change Act. The Bill is intended to empower South Africa by regulating greenhouse gas emissions, risk and expected impact assessments, and response plans. It also defines responsibilities for different national government departments and provincial and local governments, including municipalities. The Bill provides the legal basis for the implementation process to motivate action and allocate responsibilities to create measures and take action in the national climate change response.

South Africa's Climate Change Bill also proposes to ensure that the policies of all state organs about the climate change response must align policies with the Climate Change Act (forthcoming) and ensure that the risks of climate change impacts and associated vulnerabilities are considered. The Bill provides for periodic revision of the Act to consider factors including advances in technologies, science, evidence and information, and results from monitoring and evaluation, as well as international commitments and obligations (Department of Forestry Fisheries and the Environment, 2022). In this way, the Bill intends that the adaptation strategy and mitigation targets include consideration of (national and subnational) implementation feedback.

In the end, several key points must be fulfilled to ensure the implementation of synergies and measure their impact, especially during the risk transition. South Africa's risks in transitions include climate change physical impacts, economic and trade risks relating to high carbon intensity and being the largest carbon emitter in Africa, and risks in not managing low carbon transitions and negatively impacting workers, communities, and industries (The Presidency, 2022). Thus, the first one to be needed is the co-creation of transition plans with those most impacted by these risks, which is essential, primarily to address contested issues (Presidential Climate Commission, 2022, Taylor et al., 2022, Tyler & Mgoduso, 2022). However, how this will be achieved warrants greater attention (Boulle, 2023 forthcoming). The experience of the Mitigation Action Plans and Scenarios (MAPS) programme included the co-creation of knowledge as a core element of low emissions development strategies based on learning and doing in the Global South (Boulle et al., 2015, Kane & Boulle, 2018, Raubenheimer et al., 2015).

Further, reaching a consensus on understanding and managing trade-offs requires participatory approaches. Therefore, multiple engagements must also be well-considered to avoid undermining either CCA or CCM agendas or creating incoherent complexity (Taylor et al., 2022). Capacity to assess trade-offs and synergies may also need to be strengthened (Boyd et al., 2022). Important knowledge gaps on assessing impacts in just transition planning include how it will contribute to NDCs (ibid); the same would be true for implementing CCA-CCM synergies.

3.3. Local Cases and Financial Support on Synergies

3.3.1. Brazil

In Brazil, there is not a unified methodology to track progress of domestic climate finance. There are different monitoring initiatives in the country, but, overall, they do not allow for a comprehensive analysis of the extent to which domestic private financial flows are directed toward climate change mitigation and adaptation goals and toward supporting mitigation-adaptation synergies.

3.3.2. India

Since 2015, it is estimated that 80-85% of financing of climate projects in India has been through domestic sources. A significant part of this financing has come from the budgetary allocations, and

subsequent leveraging from the financial markets in debt instruments. The leveraging is significantly higher in case of mitigation projects, reflected in the fact that more than 90% of total climate finance has gone to mitigation. Accordingly, the key distinction in the project financing for adaptation and mitigation lies in the share of public and private sources of finance and the instrument mix. While adaptation is largely funding through public resources using grant or equity instruments involving sectoral ministries and private sector, mitigation interventions have a wider source of finance, actors, and instruments. For mitigation, public money plays mainly the enabling role through instruments like performance linked incentives, risk guarantees, the private money comes in the form of equity and debt. The share of multilateral and bilateral agencies, overall marginal, includes grants, debt, guarantees, credit-lines, and in few cases equity as well.

iin India there is no policy that directly addresses the synergy of CCA and CCM. India's climate policy so far has been mission-oriented, by and large divided into mitigation-oriented missions and adaptation-oriented missions in the NAPCC. In some of the missions, such as on Agriculture, Forest, Urbanization, there are significant opportunities and examples of synergies. However, they are not by design. The greatest opportunities for synergy exist in developing new infrastructure which can potentially contribute to adaptation as well as mitigation, but that is not well articulated in policy.

Accordingly, financing too is not adequately/strategically conceived. The financial landscape in India is broadly aligned with sectoral growth objectives. While financing and policy from mitigation has evolved in its clarity, there does not exist a clear template for financing adaptation other than development finance. Of course, there are independent examples where adaptation projects have mitigation outcomes (mangroves for flood protection on coastal areas) and mitigation projects have adaptation outcomes (such as solar powered irrigation pumps). But they are embedded in technologies/solutions per se, and not driven by the financial system. The recently launched LT-LEDs, integrated adaptation in the process of urbanization. However, the chapter on finance does not provide adequate elaboration to make any informed prediction. Similarly, the LT-LEDs is said to be aligned with the goals of gender justice, offering opportunities for pushing synergies. But again, how it will be done is not elaborated.

India has long maintained that adaptation is embedded in development and, at times, cited the expenditure on adaptation sectors (health, water, agriculture, infrastructures) as development expenditure. Concrete concepts for adaptation financing therefore don't exist. Mitigation financing relies on indirect concepts such as energy savings or generation-based incentives for RE power generation. There has been discussion on encouraging the use of internal carbon pricing. Interestingly, different financial institutions that do targeted financing are also separate for adaptation (NABARD) and mitigation (SIDBI). While the NAPCC promotes a co-benefits approach, still a concrete concept where adaptation, mitigation, and development goals can come together, it is not integrated into financial market operations/policies. Recent interest and efforts by SEBI to promote ESG based governance has the potential for synergistic finance.

3.3.3. Indonesia

In Indonesia, climate change funding is synchronized into the national development planning and budgeting process through an application "Planning Collaboration and Budget Performance Information (KRISNA)". Through KRISNA, ministries/agencies can carry out budget tagging since

preparing the Work Plan. In the term of Climate Finance, Indonesia has tried to make a distinction on the project financing for adaptation and mitigation, seen from the climate change funding report released by the Ministry of Finance. In the report, climate finance is categorized into adaptation, mitigation and co-benefits. On the ministerial level, the tagging of the mitigation and adaptation budgets can be carried out simultaneously in one activity (multi-tagging). The marking scheme for two types of activity (mitigation and adaptation) shows a co-benefit scheme.

In the policy context, the importance of the synergy between CCA and CCM has been mentioned in many documents, both NDC, LEDs and NAP. The NDC mentions A/M synergy with the term co-benefit. The sectoral co-benefit potential in achieving the key program is explained. However, the NDC document does not mention the funding aspect for co-benefit activities. As the NDC Adaptation Roadmap explains, in general, that climate change funding provided to developing countries can come from various sources, namely public funds and private funds, both from bilateral and multilateral cooperation, including from other alternative sources such as the national investment mechanism. Potential funding for implementing mitigation and adaptation actions contained in the NDC is not only borne by domestic (national) funding through the APBN mechanism but also international funding. NDC funding is expected to increase the differentiation of climate change funding sources through innovative financing instruments, access to global funding, and private investment. The roadmap document also does not mention measurable regarding funding for adaptation, mitigation or co-benefits.

Meanwhile, the LEDs 2050 document emphasizes the importance of synergy between climate change mitigation and adaptation. The LEDs mention the importance of a financial strategy to achieve ambitious climate change targets through optimizing the climate funding system, optimizing funding sources, and funding institutions. However, similar to the NDC document, the LEDs also do not explain in a measurable way the funding for adaptation, mitigation or co-benefits. This document explains that basically, the climate finance strategy in Indonesia is still in the preliminary stage. The concept of financing strategy is built with the assumption that the finance needs for climate actions should be addressed by optimizing the climate finance system, starting from finance sources, finance institutions and their mechanisms as well as institutions receiving finance to carry out programs/ activities to achieve the set target. Currently, the government's efforts in climate financing include increasing diversification of sources of finance, strengthening the capacity of finance institutions, and strengthening the capacity of stakeholders in accessing finance. The government of Indonesia has taken a number of policies that open opportunities to increase the diversification of financial sources from both national and international – public and private sources. At the national level, the opportunities to optimize the state budget are explored (e.g., using instruments of green sukuk or green bonds, and the draft of PERPRES NEK on Carbon Pricing Instruments such as fees and carbon levy; instruments of intergovernmental fiscal transfer). In addition, Indonesia also continues to mobilize international financial sources through bilateral, regional and multilateral channels, including result-based payments for REDD+ under the Paris Agreement, grants and other potential sources and mechanisms.

On the other hand, the NAP as the main reference in the planning of climate change adaptation actions does not address issues regarding the CCA/CCM synergy. In the context of funding, the NAPs explain that the funding mechanism for adaptation does not only use the state budget (APBN and APBD), but also utilizes international funding, both bilaterally and multilaterally, private investment and

Corporate Social Responsibility (CSR). International fund resources are available for governments, private sectors and communities. This adaptation effort then needs to be mainstreamed in all affected development sectors. The proactive role of the government at both the national and local levels, as well as other stakeholders (private sectors, development partners, and communities) is important to support adaptation efforts.

Table 8 — Comparisons among policies in the context of finance in Indonesia

	LTSs	NDCs	NAPs
Purpose	Defines pathways in achieving low emission development until 2050 and is expected to guide the implementation and development of the subsequent nationally determined contributions (NDCs)	Describes the enhanced actions and the necessary enabling environment during the 2015-2019 period that has laid the foundation for more ambitious goals beyond 2020, contributing to the concerted effort to prevent 2oC increase in global average temperature and to pursue efforts to limit the temperature increase to 1.5oC above pre-industrial levels	The main reference in the planning of climate change adaptation actions through the adoption of adaptive criteria.
Synergy issues	The LTS-LCCR 2050 emphasizes the importance of synergy between climate change mitigation and adaptation	The NDC mentions A/M synergy with co-benefit terminology. In the NDC, sectoral co-benefit potential in achieving key programs is explained	-
Climate Finance	• Financing strategy for climate mitigation and adaptation in Indonesia is currently at the preliminary stage of development.	There is no mention of the funding aspect for co-benefit	In the document, it is not explained in detail about funding for adaptation, mitigation or co-benefits (only in general
	• In the document, it is not explained in detail about funding for adaptation, mitigation or co-benefits (only in general)		

Source: Analysis result, 2023

Although in the policy document, co-benefit funding is not explained much, in the financial landscape, the government of Indonesia categorizes funding into adaptation, mitigation and co-benefits. Based on budget realization and types of activities, from 2018 to 2019, the climate change budget has been spent more on mitigation. In that year, funding for adaptation was only 31.8% of the total existing climate funding. One of the reasons for the low level of climate funding for adaptation activities is the difficulty of getting agreement on evaluating performance achievements, even though the government has realized the importance of the impacts and benefits of adaptation activities (BKF.2020). In addition, the government has now realized the importance of co-benefit activities, namely activities that have a positive impact in terms of reducing emissions and increasing resilience to climate change. In 2018-2019, 6.2% of climate finance was recorded as co-benefit funding. This funding is used to finance projects regarding infrastructure in the water sector, which are carried out by the Directorate of Water Resources of the Ministry of Public Works and Housing.

In order to balance funding for the synergy of CCA and CCM, the government is trying to create a multi-tagging mechanism in climate finance, by enabling ministries to tag funding into 2 activities at once (adaptation and mitigation). In a global context, the government is also trying to encourage funding that supports balancing finance and synergies, one of which is by raising this issue as the main issue in the GST.

In the Ministry of Finance's climate funding report, there is currently one concrete project that is regarded as co-benefit. The program is related to irrigation development and embankment maintenance (mitigation co-benefits). Irrigation development is carried out in various areas with several objectives, namely to increase rainfed rice fields to become irrigated rice fields, rehabilitation and modernization of irrigation areas that have expired, development of groundwater irrigation, supported by the development of water sources (reservoirs/dams), development surface irrigation, and development of swamp irrigation, especially for food estates by considering the management of swamp water in the context of preventing greenhouse gas emissions and considering spatial planning. Referring to the concept of synergy put forward by Locatelli et al. (2015), irrigation development activities are included in the synergy with the type of joint outcomes. Where emission reductions (mitigation) and crop yield increases (adaptation) result from strategic objectives that are not explicitly aimed at climate change (non-primary climatic purposes), namely increasing support for food and energy sovereignty.

3.3.4. South Africa

Climate finance and policy support are needed for research, policy, planning and implementation. Climate finance can support research that contributes to domestic evidence on CCA-CCM synergies and trade-offs.

IPCC WGIII developed the concept of shifting development pathways towards sustainability (SDPS). The SDPS concept is designed to highlight that, to make a non-incremental, discontinuous changes possible, it is necessary to strengthen the enabling conditions for mitigation and sustainable development. The concept of SDPS emerged for the first time in the assessment of literature by the IPCC's Working Group III Sixth Assessment Report (AR6) in its summary for policy makers and a cross-chapter box (Lecocq et al., 2022). As framed in the report, "shifting development pathways towards sustainability offers ways to broaden the range of levers and enablers that a society can use to accelerate mitigation and increases the likelihood of making progress simultaneously on climate action and other development goals" (Pathak et al., 2022). This means that there is growing evidence in the literature that integrated public policies that focus on choices taken by many actors that shift development pathways can broaden and deepen mitigation action. WGIII defines key terms in its glossary. Development pathways evolve as the result of the countless decisions being made and actions being taken at all levels of societal structure, as well due to the emergent dynamics within and between institutions, cultural norms, technological systems, and other drivers of behavioural change (IPCC 2022: see Glossary). Shifts of development pathways (SDP) introduce the concept that transitions aim at redirecting existing development trends – though the direction is not signalled in SDP. IPCC WGIII found that societies may put in place enabling conditions Shifting development pathways towards sustainability, an intended shift with a direction to increased sustainability (IPCC 2022: see Glossary). A recent paper (Winkler et al., 2022) aims to make the concept of SDPS more concrete, by outlining several examples of SDPS – and analysing them against the enabling conditions that make shift possible, in different contexts.

A CRD (climate resilient development) pathways approach is a proposed possible approach for just transitions planning at subnational scale, for example in a water catchment or jurisdictional or economic area. Extending a CDR pathways approach to a national scale, for example for policy such as LT-LEDSs, NDCs and NAPS, may be possible through nested processes; this may surface trade-offs and synergies implied for different spatial or temporal scales (Price et al., 2022, Taylor et al., 2022). Concrete initial proposals for climate finance include for strengthening capacities to enable a CRD pathways approach, and localised test projects – two in areas already experiencing impacts of changing climates and another test concept in agricultural, rural, and urban settings (Price et al., 2022).

Analysis of various enabling conditions for deeper climate action through development suggests that support for integrated policy packages — beyond climate policies and recognising interactions between enabling conditions for policy objectives — can bring about development-climate synergies to the extent that trade-offs become recognised as being socially acceptable (Winkler et al., 2022). At the local level, some larger South African cities have developed local climate change action plans in which they highlight CCA-CCM synergies and trade-offs, and development imperatives. For example, the city of eThekwini's plan includes criteria to assess impacts on greenhouse gas emissions, climate resilience, and high returns for society and the economy (City of eThekwini, 2019). The City of Johannesburg identifies four key CCM-CCA synergies and trade-offs (City of Johannesburg, 2021). As of 2023, all provincial governments are integrating their adaptation and mitigation strategies (Personal communication from DFFE, 2023).

In South Africa, climate finance is geared towards either adaptation or mitigation and this divide is reflected in the landscape of actors. For adaptation, the primary finance source is domestic governments (public budgets), and the main conduit for international climate finance in the form of grants is the South African National Biodiversity Institute (SANBI) as accredited entity to the Adaptation Fund and the Green Climate Fund (GCF) (for adaptation only) (Cassim et al., 2021, Winkler et al., 2021a). Bilateral grants also play a role in implementation (Keen et al., 2022). Development banks and financier loans and some equity transactions characterise finance targeting mitigation objectives. The Development Bank of Southern Africa, which has a mitigation focus, is the regional entity accredited to the GCF.

In terms of organisations that actively support finance for CCA and CCM, the National Treasury department leads sustainable finance initiatives, working groups focused on private sector finance for climate change and the just transition, and initiatives to support subnational governments' efforts on climate finance (National Treasury, 2020, National Treasury Department, 2022a). The National Treasury's Cities Support Programme's Resilience Component seeks synergies between urban climate resilience and other development agendas (Duminy et al., 2020).

Regarding climate financing at the local level (provincial and city), climate spending on adaptation and mitigation is not ringfenced or nor is it tracked in the public finance system. Local government implementation projects mainly target development (infrastructure and, or services delivery) objectives and the accounting for distinct investments in adaptation and mitigation objectives is a challenge. In 2021/2022 the National Treasury piloted implementing climate budget tagging (CBT) in 11 test sites in national, provincial and local governments (National Treasury Department, 2022b). The pilot project aimed to develop an indicative framework for monitoring climate change relevant

to public expenditure. The level of system readiness of the Public Finance Management system and operating and support needs for possibly institutionalising CBT is being tested (National Treasury Department, 2022b).The implication of the lack ring-fencing of climate response budget and tracking of finance flows in public finance systems including at the local level is that information on what is already spent on adaptation and mitigation actions is not readily available; this is a barrier to readily accounting for co-finance which is a requirement for some finance instruments.

To support the synergy between CCA and CCM, a concrete concept is needed in balancing CCA and CCM funding. One of the concepts used by the GCF is a 50:50 split from mitigation to adaptation at portfolio level (GCF Board, 2014), but such a balance is not being achieved in South Africa. The SNAPFI UCT team's country case study in Year 2 found that flows of international climate finance into South Africa were "almost entirely mitigation, less than a tenth for adaptation activities" (Winkler et al., 2021b), based on analysis for the study drawing on data in the Aid Atlas (Atteridge, 2021).

Underlying causal factors include that technical data and cost assessment availability is biased in favour of mitigation. In contrast, knowledge creation and collation for adaptation may include evidence of adaptation implementation, which anecdotally is under-reported because it is inadequately identified.

At the level of local government, estimates of avoided costs as a result of investing in enhanced climate resilience is perceived to support driving investment decisions that are sensitive to mitigation, adaptation and equity. Comparing development options under different spatial and temporal scales and linking local with national needs may be useful to surface synergy and trade-off implications in terms of the balance of spending and finance needs between mitigation and adaptation, and loss and damage.

Chapter four

Germany Perspective

4. Germany Perspective

The German Strategy for Adaptation to Climate Change (2008) emphasizes the important of harvesting synergies and avoiding conflicts between CCA and CCM. Illustrative cases include co-benefits from forest conversion, housing insulation and crop rotation techniques, as well as potential trade-offs between CCA and CCM due to intensified urban density. Hence, the integrated approach is emphasized as a viable technique to prevent conflicts and reap co-benefits of CCA and CCM. Such cooperation between the federal and state levels has the potential to be fruitful during policy design and implementation stages.

In the Second Progress Reports on the German Strategy for Adaptation to Climate Change (2020) CCA and CCM are mentioned in a mutual context during the introduction of financial incentives for both CCA and CCM measures by making them a "mandatory condition of [financing] eligibility". Most mentions of synergies imply a practical perspective of finding interdependencies between adaptation programmes – indeed, most mechanisms, which are reported in the document, have several co-implementors. The Update of the NDC of the European Union and its Member States (2020) mandates the Parties to disclose the information on co-benefits between CCA and CCM which are "consistent with Article 4, paragraph 7, of the Paris Agreement", particularly "how the economic and social consequences of response measures have been considered in developing the nationally determined contribution" and characteristics of relevant projects and measures. The German Sustainable Development Strategy (2021) gives a reference to the work of the Federal Ministry of Food and Agriculture (BMEL), which has a potential for synergetic effects between CCA and CCM by integrating the objectives of various federal programmes, devoted to resource management, biodiversity, nutrition, etc.

Beyond the national level of strategic planning, the International Climate Initiative (IKI) recognizes the importance of incorporating both CCA and CCM at the project level, especially in the planning stage. Given the abundance of international projects, additional proposals have a high potential in producing synergies and thus enabling collaborative work among various project implementors.

As the text analysis of strategy documents gives only a shallow picture of the state-of-the-art approach towards the interrelationship between CCA and AAM, DIW interviewed 5 experts from the government, academia and NGOs to draw a general understanding of how climate change adaptation and mitigation projects are planned, financed and implemented in Germany.

As in the partner countries, there is also a certain imbalance between adaptation and mitigation in Germany. The following explanations were given in the interviews:

Adaptation benefits are neither clearly defined nor in most cases measurable, and adaptation is not a key topic. From this, it follows that certain measures are not even counted as adaptation, even though they could be (e.g., population protection measures (Bevölkerungsschutz)).

Climate mitigation measures typically have measurable and immediate economic advantages, which implies easier access to budget allocations for mitigation projects in comparison to adaptation ones.

The new federal government has recognized the prevailing deficits in terms of adaptation and has therefore intensified measures under the framework of the German adaptation strategy, which entails progress reports every five years. Extreme weather catastrophes (e.g. floods in the summer of 2022) raised awareness in the population about climate change and its implications. In combination with media coverage, this increased the pressure on the government. Consequently, the coalition plan of the new government has included adaptation task forces and put more focus on adaptation measures, which also resulted in the recent announcement of the coming into force of an adaptation law.

One of the main challenges in implementing the adaptation measures that was highlighted in the interviews is the lacking coordination between different levels (federal, state, cities, municipalities, etc.).

Adaptation topics are most visible on the municipal level, which is most impacted by direct consequences of climate change, such as floods. However, adaptation (just like mitigation, in fact) is not a mandatory task for municipalities. That is, municipalities that implement such measures do so on a purely voluntary basis. This leads to a big discrepancy in the implementation of adaptation measures: municipalities that are particularly impacted by climate change, for example, tend to enforce more measures than less affected ones. Also, smaller municipalities often struggle due to low budgets.

To make adaptation a mandatory task, state governments would need to provide budget for it (Konnexitätsgrundsatz). Thus, the states are typically reluctant to do so. The federal government itself has no way of directly instructing municipalities to address adaptation, as it must go through the states instead. Interviewees referred to this as being a structural deficit of federalism. All funds that come from federal and state levels are thus only disbursed on a project basis and there is no dedicated continuous funding for adaptation, which complicates the development of a long-term strategy for climate change adaptation. Existing structures of local government associations (Kommunalspitzenverbände) and other initiatives attempt to strengthen the coordination among different levels, but are perceived as insufficient.

Two recent empirical studies support the interview findings that structural and budgetary factors have a high influence on the interrelationship between CCA and CCM. Otto et al. (2021) assessed synergies as well as trade-offs of mitigation and adaptation actions of German urban areas. For this, the authors ranked 104 cities on climate policy incorporating multiple indicators related to local commitments on CCA and CCM, urban CCM and CCA plans, and CCA and CCM ambitions. The authors found that cities with above-average scores in all sub-indicators for mitigation and adaptation include the three city states (Berlin, Hamburg, Bremen), most of the biggest cities (including the state capitals Frankfurt/Main, Stuttgart, Hanover and Munich) and also a few medium-sized cities (e.g. Münster and Rostock). Cities with a relatively low performance are relatively small (six of the 14 have fewer than 100,000 inhabitants). The authors showed taking synergies and trade-offs between mitigation and adaptation at local level into account depends on structural factors, such as city size, the history of local climate policies since the 1990s and, in the absence of mandates and hard regulation, funding programmes for both CCM and CCA.

Grafakos et al. (2020) assessed the degree of CCA and CCM integration in 147 European cities. For this, the authors developed the Urban Climate Change Integration Index based on twenty-five variables, with nine among these relating directly to the integration of these policy fields. Analyzing the local

sustainable energy and climate action plans, the authors revealed that most plans show a moderate amount of integration between CCA and CCM translating into some qualitative consideration of synergies however without a systematic consideration of potential integration opportunities. Around a quarter of the plan addressed synergies or conflicts between CCA and CCM in sufficient detail. One of the main gaps of the evaluation and implementation of more integrated climate change actions in cities is the insufficient quantitively evaluation of the costs and funding schemes for the implementation of CCA and CCM actions. According to Grafakos et al. (2020), the other critical factor is the joint organizational institutionalization of CCA and CCM (i.e. joint departments) for their joint implementation, that is less critical for joint climate action plans.

Though it was argued in the interviews that synergies between adaptation and mitigation are inherently present in any climate-related measure, it was also argued that using these synergies to push forward adaptation measures is not necessarily the best option.

Firstly, the administration separates the two fields: on the federal level, adaptation measures lie with the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU), while climate change mitigation is the responsibility of the Federal Ministry for Economic Affairs and Climate Action of Germany (BMWK). This is also reflected in the type of measures that are typically implemented in relation to adaptation, e.g. mainly traffic reduction or greening and de-settling of areas. Trade and industry, however, are barely touched by such measures (one could think of adaptation in terms of risk readiness, securitizing of the delivery chain, etc.). Secondly, there is an active effort to separate climate change mitigation and adaptation in an attempt to strengthen adaptation specifically.

One suggested solution by the interviewees is to try out model projects on a very local level (e.g. neighborhoods). By bringing together diverse actors at that level as well as by trying out new ways of working, it was argued that existing working structures could be refreshed.

In general, the German case study shows that adaptation and mitigation are planned, financed and implemented in co-existence, not in a combined or synergistic approach. The main reasons are: (i) different perceptions of climate change mitigation and adaptation, which have implications for budget access, and (ii) insufficient coordination of adaptation governance, which is complicated by structural deficits, budgetary implications, and the nature of climate change.

In the context of Germany, the synergetic effects of adaptation and mitigation are inherently present in climate-related measures. An implementation of an integrated approach is intricate due to current governance structures, which have specific implications for the allocation of the budget.

Chapter five

Conclusion and Recommendation for Design and Implementation of Policies and ICF to Support Synergies and Minimize Trade-offs

5. Conclusion and Recommendation for Design and Implementation of Policies and ICF to Support Synergies and Minimize Trade-offs

5.1. Conclusion: Respective Countries

This report aims to explore to what extent policy makers can maximize potential opportunities for synergies between adaptation and mitigation and to what extent international climate finance can support synergies.

To meet these objectives, the framing in this report uses the synergy concept of adaptation and mitigation which was adapted from Locatelli et al. (2015) and Klein et.al. (2007) and reviewed the extent to which this synergy was accommodated in UNFCCC decisions, especially in the Article 2 Paris Agreement. In addition, as an illustration of the condition of climate finance in the context of synergy, this report also provides an overview of international climate finance trends. If we look at trends in international climate finance, recorded by the OECD, there is USD 97.6 billion in funding for climate objectives in 2020. Mitigation-related finance surpasses adaptation-related finance. Of all climate-related finance, 38% had adaptation objectives, 49% had mitigation objectives and 12% had both. This breakdown has significantly changed over the last 10 years, where these shares were 20%, 65%, and 15% respectively. The findings of the literature review were corroborated by the findings of the country studies using bottom-up approaches and SNAPFI partner inputs. Policies, Implementations and Financial Support of Synergy emerged as a key priority.

Table 9 — Comparisons of policy, implementation, and finance among respective partners

Partner	Policy			Implementation		Finance			
	Interrelationship between CCA-CCM	**Mechanism**	**Encourage Synergy**	**Ensure Implementation**	**Feedback mechanism**	**Tracking Finance**	**Mandates**	**Financial Sources and landscape**	**Strategy**
Indonesia	Acknowledge Co-benefit	Policy brief/ technical advice (eg., carbon-economic value)	LCDI (low-carbon development program), NEK (carbon economic value), SDG, PROKLIM (local climate action program)	Governance: standart; finance; knowledge; policy	SRN-PPI and AKSARA as monitoring platform, however there is no interconnection between them	Budget tagging mechanism	LEDs, LCCR,NDC and NAP	Defined as co benefit Sources: Unclear	Mainstreaming synergy issues on LEDs to GST
South Africa	No link (potential for synergy exists but not explicit)	Presidential Climate Commission	Climate Change Bill	Co-creation; participatory; capacity	Climate Change Bill	Unclear	Unclear	Defined as synergy Sources: Unclear	Comparing development option under different situation and linking local with national needs
India	No link (potential for synergy exists but not explicit)	Multi-stakeholder approach; local policy; finance	Regional coalitions	Energy security; capacity; gender; standardized framework; financial institutions; policy	Not much mention	Unclear	LT LEDs and NAPCC	Defined as co benefit Sources: Unclear	Integrated NAPCC into financial market operations/ policies
Brazil	Acknowledge co-benefits in the National Adaptation Plan and mitigation-adaptation strategy integration in the National Climate Change Policy	Incorporating synergies could be done through the Interministerial Committee on Climate Change and Green Growth	NA	No implementation mechanisms	No comprehensive tracking of domestic financial flows toward climate change mitigation and adaptation goals				

Source: Analysis result, 2023

The extent to which the CCM-CCA synergy has been carried out in each country varies. Overall, each country has the ability to formulate policies towards synergy. However, this synergy has not been explicitly stated in the climate policies of each country, and only potential co-benefit relationships have been identified between CCA and CCM. In Brazil, policymakers aim to integrate CCM and CCA strategies on different levels, assess co-benefits and synergies in the transport and energy sectors, and promote consistency between sectoral actions regarding climate change. Climate change policy in Indonesia also only focused on identifying potential co-benefits. However, there are clues that innovative climate change mitigation and adaptation efforts may be interpreted and developed as CCM-CCA synergy in the future. South Africa's climate policy aims at CCM-CCA but does not explicitly examine synergies and trade-offs. However, CCA-CCM synergies with mitigation policies and measures are identified in South Africa's most recent biennial update report to the UNFCCC. In India, CCA-CCM synergies have been more theoretical than in practice, with indirect linkages in agricultural

and LULUCF sectors and newly launched schemes such as PM KUSUM and Mission LiFE potentially demonstrating such synergies. The State Action Plan on Climate Change (SAPCC) is also starting to mainstream CCM-CCA linkage at the state level in India. The German case study illustrates how a different perception of CCA and CCM affects the governance of climate-related projects planning, financing and implementation.

Therefore, a mechanism is needed to integrate new ideas, such as synergies, into documents submitted to the UNFCCC (NAP, NDC, LTS). In Indonesia, activities such as disseminating policy briefs and providing technical advice are conducted to integrate CCA-CCM synergies into NDC, LTS-LCCR, and NAP documents that will be submitted to the UNFCCC in the next cycle. In South Africa, the Presidential Climate Commission serves as the mechanism or forum for analyzing and deliberating new ideas in climate policy, including CCA-CCM synergies and trade-offs. In India, a multi-stakeholder approach is needed to integrate CCM-CCA linkages into UNFCCC documents. There is a focus on forming state and local policies centering CCM-CCA synergies. Finance is seen as a key factor in enhancing CCM-CCA synergies in India, with bilateral and multilateral lending focusing on projects with such synergies.

In addition, several essential factors to encourage synergies implementation are important and cannot be separated from institutions, regulations, and policies that support synergies. Indonesia has established the Directorate General of Climate Change Control, Low Carbon Development Indonesia, and several regulations, such as the Presidential Regulation on Carbon Economic Value to facilitate and incentivize potential synergies between adaptation and mitigation. South Africa has drafted the Climate Change Bill, which establishes the legal framework for implementation instruments for an effective climate change response and defines responsibilities for different national government departments and provincial and local governments. India promotes dialogue with policymakers through regional coalitions to integrate CCM-CCA synergies into national policies.

Institutions, regulations, and policies are the only important factors enabling the implementation of synergies that need to be fulfilled to ensure the implementation of synergies. Indonesia offers several enabling condition factors such as effective institutions and governance, relevant guidelines, financial resources, knowledge generation and capacity building, and policy and regulatory instruments. Meanwhile, according to South Africa, during the transition, it is important to co-create transition plans with those most impacted by risks and to have participatory approaches to reach a consensus on understanding and managing trade-offs. The capacity to assess trade-offs and synergies may need to be strengthened, and important knowledge gaps in assessing the impacts of just transition planning must be addressed. Finally, India suggests that the capacity building of relevant actors and stakeholders, gender mainstreaming, and standardized frameworks can also ensure the implementation of synergies, along with changes in the operations and funding priorities of financial institutions. Finally, policy and regulatory instruments should align with CCA/CCM linkages.

In addition, a feedback mechanism is essential to measure synergy's impact. The four countries and Germany have different approaches to integrating adaptation and mitigation measures in their local, state, and national development strategies. This difference occurs because the factors considered in each country are different. In Germany, these climate change measures are influenced by the city's size and capacity. In addition, financial access of local governments to address adaptation needs and enhance the synergy between CCA-CCM is inhibited by a lack of coordination between governance

levels and difficulties to provide additional budget from a federal level. From an international perspective, most climate finance cannot flow to sub-sovereign entities, which further complicates local financial access. Other case studies show that the lack of political will and nonstringent policies often become additional barriers for increasing climate finance flows.

In the context of climate change measures, in Brazil there is Brazil's Draft Bill that aims to integrate climate change risk management into local, state, regional, and national development strategies, focusing on ensuring the most vulnerable's social participation. Indonesia has separate platforms for recording the implementation of low carbon and climate resilience, which need to be interconnected to maximize reporting and verification potential. South Africa's Climate Change Bill proposes aligning policies with the forthcoming Climate Change Act to ensure that the adaptation strategy and mitigation targets consider national and subnational implementation feedback. India highlights that the key distinction in project financing for adaptation and mitigation lies in the share of public and private sources of finance and the instrument mix. Overall, it is essential to have an integrated approach to adaptation and mitigation. However, there are challenges in measuring and reporting on the impact of both strategies due to different data metrics and reports, making integration difficult.

In the term of CCA and CCM project funding, four countries experienced an imbalance between adaptation and mitigation funds. In most cases, mitigation outperformed adaptation. Germany also experiences an imbalance. In the context of funding for CCA and CCM synergies, the four countries also have not clearly distinguished synergy between CCA and CCM project funding. In the case of South Africa, climate project funding cannot be tracked in the public financial system, while in the case of Brazil, there is no methodology that can track climate project funding in the country. In the case of Indonesia, funding for climate projects is quite clear, carried out through applications that are integrated with national development planning with a multi-tagging funding mechanism.

In supporting the synergy between CCA and CCM, the role of climate policy and finance is enormous. Policies can encourage and determine the extent to which project synergies are implemented, while climate finance can support research that contributes to showing domestic evidence on CCA-CCM synergies and trade-offs. In some cases, such as in India, mandates of synergy are not available. Existing policies, NAPCC and LT-LEDs are still oriented towards CCA and CCM separately, however, if examined more deeply at the sectoral level, there are several potential synergies. While in the case of Indonesia, existing policy documents have encouraged the importance of synergy, but have not yet included the funding aspect in synergy projects. In the case of Brazil and South Africa, policies regarding synergy CCA-CCM are unclear.

In assessing the linkage of CCA and CCM projects, international financial institutions such as the GCF and OECD have different definitions. The OECD sees the link between adaptation and mitigation as a co-benefit, meanwhile, the GCF assesses the relationship between adaptation and mitigation as a synergy project with cross-cutting terminology. If you look at the results of the identification of partner countries, India and Indonesia tend to see the CCA-CCM linkage as a co-benefit, while South Africa views it as an act of synergy. In addition, in Brazil it is not yet clear.

Based on global trends, climate project funding (CCA and CCM synergy) tends to increase, but is still much lower with CCA and CCM funding, even though the CCA-CCM synergy project can contribute as the leverage of climate finance, and optimizing the efforts to achieve climate goals. In the case

of South Africa, climate funding is still focused on CCA and CCM separately, funding schemes for synergies are not yet available, but synergy issues have been raised at the local level through action plans. Meanwhile in India, climate finance focuses on sectoral aspects. In Indonesia, climate funding schemes have supported funding for synergy projects, but have not been fully utilized and the sources of finance is also unclear defined. In Brazil, the finance sources for support synergy projects is also unclear.

Since we cannot find sufficient evidence on integrating synergies and trade-offs, and the compelling arguments for integration merit testing recommendations made in the literature, some of the ideas/ approaches are contested so we should include sources for the ideas. It is important to have concrete concepts to be implemented, for example through a multi-tagging mechanism, integrated policies that support synergy to financial sources, estimating avoided costs in climate projects, as well as comparing development options under different spatial and temporal scales and linking local with national needs. In practice, the term of donor does not always fit with the implementation, therefore it needs to raise the issue of synergies at high-level conferences such as the COP can also be used as an alternative.

5.2. Recommendations for donors and government-recipients of international climate finance

Though there are clear benefits to integrated climate actions, they are unlikely to happen without a strong commitment by the governments, international actors, and the corporate sector, including the financial sector. Therefore, the convening stakeholders of these sectors must develop a framework for the alignment of integrated climate actions to promote low-carbon AND climate-resilient development, building on synergies and avoiding trade-offs of climate change mitigation and adaptation. The whole-of-government, systems-based approach of this framework applied to governments and international organizations can mainstream climate finance, integrating their climate mandates, objectives, and incentives. Limitations and risk paradigms shall be revised for all instruments, including budgeting, lending, investing, and others (Lopez-Claros, 2021; Mullan & Ranger, 2021).

5.2.1. Recommendations in the context of policy

Public policy has an essential role to play in mobilizing and aligning climate finance. As discussed, there is a broad range of policy levers — including regulations, fiscal measures, financial incentives, etc — that can work together to increase the flows of integrated climate finance and improve its effectiveness. To link all these aspects together, it would be useful to set up an overarching framework for climate change mitigation and adaptation-aligned finance by the governments, international donors, financial intermediaries, and investors. This should promote the consideration of synergies and trade-offs (not only trade-offs) and shall also consider other critical environmental and social aspects, beyond climate. Developing such a framework shall consider existing domestic governance structures and how recommended changes fit into the local context.

As said, most countries recognize the importance of synergies between mitigation and adaptation, but they often insufficiently discuss their coordination mechanisms and their financing in strategic documents, such as NDCs, NAPs, and LTSs. Furthermore, if such measures are articulated in some of these documents (usually NDCs), they are rarely consistent among each other. Long-term low GHG emission climate-resilient strategies are the key documents implementing Article 2.1c and therefore, it is critical for them to identify and detail the financing of mitigation and adaptation, taking into account their synergies and trade-off. The measures should be consistent across LTSs, NDCs, and NAPs, their implementing documents, and other plans and strategies when relevant.

Table 10 — Recommendations in the context of policy for donors and governments actors

	Recommendations for donors	**Recommendations for governments actors**
Promote an overarching framework, including NAPs, NDCs, and LTSs	• Develop recommendations and guidelines on how to set up the whole-of-government, overarching framework for mitigation and adaptation aligned finance for the government and the corporate sector	• Set up an overarching framework for mitigation and adaptation aligned finance for the governments with their departments and agencies at all governance levels
	• Include into the guidelines recommendations on how to translate the framework into NDCs, NAPs, and LTSs in a consistent manner.	• Include the detailed assessment and planning of financing climate change mitigation and adaptation measures, taking into account their synergies and trade-offs, in the next revisions of NDCs, NAPs, and LTSs, in a consistent manner.
	• Support the governments with adoption of the overarching framework as set in the recommendations and guidelines	
	• Support the collection, reporting and dissemination of lessons learned and best practices on the mainstreaming and aligning of integrated climate finance by countries	

Source: Analysis result, 2023

5.2.2. Recommendations in the context of implementation

In the implementation context, there are several things that need to be considered to support the implementation of the CCA-CCM synergy, including through R&D to identify business cases in integrated finance, support an open-access basis for policy-making and decision-making, and promote classifications and taxonomies to assist the standardization and labelling of climate actions.

Given that climate change mitigation and adaptation are a public good, the leverage of finance is a contentious topic. The Stern Review (Stern, 2006) famously proposed that since climate change posits very serious risks, the benefits of strong and early action will always outweigh the costs. Due to the presence of 'fat-tailed risks', Stern advocated for a high social cost of carbon. Other economists, such as Nordhaus, maintain support for a low social cost of carbon and gradual mitigation. In this case, international climate finance will arguably only happen once there is a business case, revealing clear risks and generating revenue. As practice shows, this is especially difficult, and some argue there is a lack of a clear rationale for climate change adaptation. Integrating mitigation and adaptation

actions and making a business case out of them may require going beyond the project itself by harvesting spill-over benefits beyond it. In other environmental and social areas, that is likely to require a reprogramming of climate finance from supporting individual projects to the programmatic support.

Whereas there has been quite extensive research on mainstreaming, aligning, and tracking climate finance, it mostly focused on climate change mitigation, with much less attention to climate change adaptation, and even less on their synergies and trade-offs. Mullan & Ranger (2021) suggested a concept of adaptation-aligned finance that is analogous to mitigation-aligned finance (e.g. that is based on GHG reduction scenarios and benchmarks). There have been few policies and practices adopted in the world which allowed addressing the trade-offs of climate change mitigation and adaptation according to the "do not significant harm" principle. The literature does not sufficiency discuss measures, which would promote synergies of climate change motivation and adaptation. It is therefore critical to conduct research on understanding, mainstreaming, and aligning of integrated actions, with the consideration of their synergies and trade-offs (i.e. not only trade-offs), as well as on how this could be translated into national contexts.

Besides research and development in identifying business cases in integrated finance, the availability of relevant data, its analysis and interpretation are essential for policy- and decision-making of the public sector, financial intermediaries, investors, and investees. Whereas some data collections are in open access, the key data such as ESG disclosure, emission factors, climate risks, and others are not easily available. It would be essential therefore to create such open access resource which would support public and private institutions in their work on promoting and aligning mitigation and adaptation finance.

To understand whether policies help coordinate mitigation and adaptation actions and harvest their synergies, it is practical to track the progress towards the targets that requires appropriate reporting mechanisms. Differences in tracking climate finance among countries and institutions do not allow quick and easy analyses of climate finance, making it more difficult for international donors and investors to take decisions.

In supporting the implementation of the CCA-CCM synergy, classification and taxonomy also need to be developed or improved in a way to identify and classify climate change adaptation measures, additionally to climate change mitigation, and the linkages between them. It is also important to enable the translation of taxonomies of different jurisdictions and institutions from one into the other, to allow for the understanding of the global progress towards these common goals. The complexities of and differences among taxonomies can create challenges for investors, particularly international donors/lenders/investors.

Labelling offers further opportunities for signalling the performance of financial products in terms of climate change mitigation and adaptation actions. Furthermore, labels can reflect the information about different level of performance, for both these dimensions as well as other environmental dimensions.

Table 11 — Recommendations in the context of implementation for donors/lenders/investors and governments actors

	Recommendations for donors/lenders/investors	Recommendations for governments actors
Promote R&D to identify business cases in integrated finance	• Support research on how to target the monetization of risks of climate change adaptation	Assess the tradeoffs and synergies of climate change adaptation, mitigation, and other environmental and social finance in national contexts, analyze barriers of the enabling environment, and changes.
	• Support research on the understanding of benefits and trade-offs of climate change adaptation, climate change mitigation, and other environmental and societal goals.	
	• Analyze barriers of the enabling environment and changes	
	• Develop recommendations for countries to assist them in translating these conclusions into their policymaking	
Support an open-access basis for policy-making and decision-making	• Identify data and analysis needs in promoting the framework, as recommended in recommendation	• Set open-access platforms for country-relevant data collection and disclosure which could facilitate decision-making
	• Support international, regional and sectoral networks of the private sector and the financial sector on information exchange and capacity building on these solutions.	• Report case studies especially best practices
	• Support the development and/or adoption of reporting and tracking methodologies and guidelines	• Develop and/or adopt reporting and tracking methodologies and guidelines
Promote classifications and taxonomies to assist the standardization and labeling of climate actions	• Prepare guidelines for the governments on how develop or improve classifications, taxonomies, and standards	• Adopt or improve the classifications for climate actions
	• Provide the methodology on the translation and/or linking of classifications/taxonomies/standards of different jurisdictions and institutions from one into the other	• Formulate and adopt labeling schemes to allow traded companies labeling their financial instruments in a consistent, trustable, and comprehensive manner
	• Support the design of international labels for financial instruments	• Enhance the literacy on the benefits and tradeoffs, the use of taxonomy and labels
	• Develop guidelines for the governments on how to establish such labels for financial instruments traded at domestic stock exchanges and how to encourage companies use these labels	• Develop platforms for climate information disclosure
	• Assist the governments with the adoption or improvement of the classifications/taxonomies.	

Source: Analysis result, 2023

5.2.3. Recommendation in the context of climate finance

In the context of climate finance, several recommendations can contribute to support the CCA-CCM synergy, including green budgeting, green banking, green bonds and green equity.

Green budgeting aims to align the country's expenditures and revenues with climate and other environmental goals. On the revenue side, the taxation system is a tool which prices negative externalities (such as GHG emissions). On the expenditure side, the rules of green procurement stimulate the penetration of low-carbon climate-resilient technologies and practices. Therefore, the integration of climate priorities and measures into the public financial management framework helps deliver climate targets, including climate change mitigation, adaptation, and their synergies.

Besides green budgeting, financial regulations and supervision from the side of central banks would ensure the consideration of climate risks at macro-level, and regulating appropriate risk pricing and setting standards for financial instruments may help promote climate targets.

As discussed, the MDBs have the potential to integrate both adaptation and mitigation in their portfolio beyond the dedicated budget for climate programmes. The corresponding capacity for implementing the framework shall be built in financial institutions such as local financial institutions, government agencies, international development organizations, and regional and national funds. No instrument can remove the range of possible barriers faced by financiers. Therefore blended finance architectures may be applied to treat risk (e.g., grants for technical assistance to create a conducive policy environment to seat and operate an asset), transfer risk (e.g., loan guarantees to fully or partially transfer the risk of default to a third party), and tax risk (e.g., negative tax such as tax breaks or subsidies or positive tax such as carbon tax to increase the comparative reward of green investments).

In promoting climate targets, green bonds and green equity also offers good opportunities for integrated climate change mitigation and adaptation actions. The Green Bond movement has been clearly gathering pace lately as issuance reaches record high of $351bn in first six months of 2023 with the European Union topping the list. Paving the way, the World Bank issued $14.4 billion of green bonds in twelve years to support more than 100 projects around the world. Furthermore, the Climate Bonds Standard and Certification Scheme allows aligning climate change adaptation and mitigation while preventing their trade-offs could serve as an example how such actions could be promoted.

The equity funds have also a strong long-term potential for a change. This is because once the funds incorporate a metric into their decision making, they tend to promote it starting from its regular measuring, establishing clear targets for it, allocating managerial capacity to ensure the targets are met, and tracking the progress towards their achievement (Eccles et al., 2022). The consistent collection and reporting of the climate information across the equity industry however does not exist. Therefore, mandatory disclosure requirements and guidelines represent an opportunity for private equity to be an enabler for the private markets to contribute to climate actions (Morley et al., 2022).

Table 12 — Recommendations in the context of finance for donors and governments actors

	Recommendations for donors	Recommendations for governments actors
Promote green budgeting	• Develop recommendations and guidelines on the design and standards for green budgeting to keep governments accountable, prevent "green washing," and deliver the objectives.	• Develop a framework which allows the government aligning environmental and climate objectives with decisions on tax policy, state aid and public spending,including the allocation of roles and responsibilities
	• Support countries with setting up and implementing green budgeting	• Develop procedures on regular green reporting for accountability and transparency
Promote Green Banking including Central Banking	• Recommendations and guidelines on how the governments may create the regulatory environment that provides a framework for the financial sector (e.g. taxonomy systems, financial disclosure, application of standards and labels, etc)	• Mainstream physical climate risks as well as mitigation and adaptation needs into government processes and the regulatory environment, including the contribution of central banks in disclosing their exposure to physical climate risks, on alignment of their investment portfolios, etc
	• Assess the potential of the MDBs to integrate low-carbon and climate resilient criteria to the whole their volume of their disbursement (for instance applying classifications of sustainable activities, incorporating the DNSH principle) and make the necessary corrections on the programming	• Champion green banks and green banking functions to drive innovation in financial products for climate projects
	• Support the establishment of blended investor consortia, which may include various interested parties, including international donors, the public and private sectors, that align the finance with project risks and timelines	• In large infrastructure projects, assess interested parties, including corporations practicing corporate responsibility policies, and pilot projects based on blended finance engaging them
	• Support the establishment of the local capacity for central banks and other banks in the implementation of regulations imposed	
Promote green bonds and green equity	• Support the integration of mitigation and adaptation measures, including the consideration of their synergies and tradeoffs, in international standards such as GRI, TCFD, etc for traded companies and certification of green, transition, social, etc bonds	• Develop the procedures for domestic stock exchanges on how to integrate the mandatory climate information disclosure of listed companies into their operations
	• Develop guidelines for the governments on how to establish the mandatory climate information disclosure for all listed companies and bond issuers at domestic stock exchanges	• Formulate and adopt standards on how traded companies shall report climate information in a consistent, trustable and comprehensive manner
	• Develop guidelines on how to encourage listed companies to report the information in a consistent and comprehensive manner	• Enhance the literacy on the benefits and tradeoffs of climate information disclosure of the top management of the financial sector, formulate guidelines on how to apply the standards
	• Establish an international dialogue platform among stock exchanges and encourage their exchange on best practices in the climate information disclosure	• Develop platforms for climate information disclosure, enabling quick and free access of all investors to it
	• Support the introduction of pilot solutions such as blockchain to enable larger-scale investment and transparency for green equity and green bonds	

Source: Analysis result, 2023

Chapter six

References

6. References

Adaptation Committee (2020) Information paper on linkages between adaptation and mitigation. Information paper by the Adaptation Committee.

Bangladesh Bank Sustainable Finance Department. (2020). Sustainable Finance Policy for Banks and Financial Institutions.

Bova, E. (2021). Green Budgeting Practices in the EU: A First Review. In European Economy Discussion Papers (Vol. 140, Issue May). https://doi.org/10.2765/94030

Berry PM, Brown S, Chen M, Kontogianni A, Rowlands O, Simpson G, Skourtos M (2014) Cross-sectoral interactions of adaptation and mitigation measures. Clim Chang 128:381–393. https://doi.org/10.1007/s10584-014-1214-0

C. Gondjian and C. Merle. (2021). Sustainable Taxonomy development worldwide: A standard-setting race between competing jurisdictions. https://gsh.cib.natixis.com/our-center-of-expertise/articles/sustainable-taxonomy-development-worldwide-a-standard-setting-race-between-competing-jurisdictions. https://gsh.cib.natixis.com/our-center-of-expertise/articles/sustainable-taxonomy-development-worldwide-a-standard-setting-race-between-competing-jurisdictions

Central Bank of Malaysia. (2021). Climate Change and Principle Based Taxonomy.

Cevik, S., & Jalles, J. T. (2020). Feeling the Heat: Climate Shocks and Credit Ratings Feeling the Heat: Climate Shocks and Credit Ratings.

Climate Bonds Initiative. (2019). Climate Resilience Principles. A framework for assessing climate resilience investments (Issue September). https://www.climatebonds.net/files/page/files/climate-resilience-principles-climate-bonds-initiative-20190917-.pdf

Chastin, S., Jennings, N., Toney, J., Anadon, D. L., Smith, P. (2021) Co-benefits of climate change mitigation

Council of the European Union. (2020). Update of the NDC of the European Union and its Member States. Submission by Germany and the European Commission on behalf of the European Union and its Member States. Last accessed on June 13, 2023, via https://unfccc.int/NDCREG

Dang, H.H., Michaelowa, A., Tuan, D.D., (2003) Synergy of mitigation and adaptation strategies in the context of sustainable development: the case of Vietnam. Clim. Policy 3 (Suppl. 1) S81–S96, http://dx.doi.org/10.1016/ j.clipol.2003.10.006.

Duguma LA, Wambugu SW, Minang PA, van Noordwijk M (2014) A systematic analysis of enabling conditions for synergy between climate change mitigation and adaptation measures in developing countries. Environ Sci Pol 42:138–148, ISSN 1462-9011. https://doi.org/10.1016/j.envsci.2014.06.003

Eccles, R. G., Shandal, V., Young, D., & Montgomery, B. (2022). Private Equity Should Take the Lead in Sustainability. Harvard Business Reviews, July-August 2022. https://hbr.org/2022/07/private-equity-should-take-the-lead-in-sustainability

EUR-Lex. (2020). Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on budgetary discipline, on cooperation in budgetary matters and on sound financial management, as well as on new own resources, in. 2027(1296), 28–46. https://eur-lex.europa.eu/eli/agree_interinstit/2020/1222/oj

EUR-Lex. (2021). REGULATION (EU) 2021/241 establishing the Recovery and Resilience Facility. 2021(February), 17–75.

European Commission. (2022b). European Commission Green Budgeting Reference Framework. https://ec.europa.eu/info/sites/default/files/economy-finance/european_commission_green_budgeting_reference_framework.pdf

European Commission, OECD, & IMF. (2021). Green Budgeting: Towards Common Principles (Issue November). https://doi.org/10.2765/51675

Fu, C., Y. Zheng, and W. Wang. (2014) Research Perspectives on Synergic Relationships in Addressing Climate Change Measures. Resources Science 36 (7): 535–1542.

Federal Government of Germany. (2008). German Strategy for Adaptation to Climate Change . Last accessed on June 13, 2023, via https://www.preventionweb.net/files/27772_dasgesamtenbf1-63.pdf

Federal Government of Germany. (2020). Second Progress Report on the German Strategy for Adaptation to Climate Change (DAS). Last accessed on June 13, 2023, via https://www.bmuv.de/en/download/second-progress-report-on-the-german-strategy-for-adaptation-to-climate-change-das

Federal Government of Germany. (2021). German Sustainable Development Strategy. Last accessed on June 13, 2023, via https://www.bundesregierung.de/breg-en/issues/sustainability/germany-s-sustainable-development-strategy-354566

Financial Stability Commission of Mongolia. (2019). Mongolian Green Taxonomy. https://www.ifc.org/wps/wcm/connect/0c296cd3-be1e-4e2f-a6cb-f507ad7bdfe9/Mongolia+Green+Taxanomy+ENG+PDF+for+publishing.pdf?MOD=AJPERES&CVID=nikyhlh

Gamper, C., Rambali, M., & Danielson, L. (2021). Strengthening Adaptation-Mitigation Linkages for a Low-Carbon, Climate- Resilient Future (OECD ENVIRONMENT POLICY PAPER NO. 23; POLICY PERSPECTIVES, Issue 23).

Government of Kazakhstan. (2021). Постановление Правительства Республики Казахстан от 31 декабря 2021 года № 996 Об утверждении классификации (таксономии) “зеленых” проектов, подлежащих финансированию через “зеленые” облигации и “зеленые” кредиты. https://adilet.zan.kz/rus/docs/P2100000996

Green Climate Fund (GCF). (2020). SAP013: Scaling Smart, Solar, Energy Access Microgrids in Haiti. https://www.greenclimate.fund/project/sap013#

Green Climate Fund (GCF). (2021a). Accelerating and scaling up climate innovation (Issue 4).

Green Climate Fund (GCF). (2021b). GCF : Financing Our Transformative Approach.

Green Climate Fund (GCF). (2022). Making blended finance work for adaptation. Lahti Adaptation Finance Ministerial, 22 April 2022. https://www.greenclimate.fund/speech/making-blended-finance-work-adaptation

Grafakos S, Trigg K, Landauer M, Chelleri L and Dhakal S (2019) Analytical framework to evaluate the level of integration of climate adaptation and mitigation in cities Clim. Change 154 87–106

IPCC, (2007) Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, B. Metz, O. Davidson, P. Bosch, R. Dave and L. Meyer, Eds., Cambridge University Press, Cambridge, UK. Leary, D.J. Dokken and K.S. White, Eds., Cambridge University Press., Cambridge, 1032 pp.

IPCC (2014) Annex II: Glossary. Mach, K.J., S. Planton and C. von Stechow (eds.). In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.). IPCC, Geneva, Switzerland. (Available from https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_Glossary.pdf).

I4CE. (2022). CSOs discussions on Green Budgeting.

IPCC. (2022). CHAPTER 15. Investment and Finance. In WG III contribution to the Sixth Assessment Report.

Klein, R.J.T., Schipper, E.L.F., Dessai, S., (2005) Integrating mitigation and adaptation into climate and development policy: three research questions. Environ. Sci. Policy 8 (6) 579–588, http://dx.doi.org/10.1016/j.envsci.2005.06.010.

Klein, R.J.T., Huq, S., Denton, F., Downing, T.E., Richels, R.G., Robinson, J.B., Toth, F.L., (2007) In: Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., Hanson, C.E. (Eds.), Inter-relationships Between Mitigation and Adaptation. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, pp. 745–777.

Landauer M, Juhola S, Söderholm M (2015) Interrelationships between adaptation and mitigation: a systematic literature review. Clim Chang 131:505–517. https://doi.org/10.1007/s10584-015-1395-1

Leonard S, Locatelli B, Murdiyarso D, Martius C, Quina M, Baral H, (2016) A match made in Paris: adaptation-mitigation synergies in the land sector. https://doi.org/10.17528/cifor/006106

Locatelli, B., Evans, V., Wardell, A., Andrade, A. and Vignola, R. (2011) Forests and climate change in Latin America: linking adaptation and mitigation. Forests 2: 431-450.

Locatelli, B., Pavageau, C., Pramova, E., Di Gregorio, M.. 2015. Integrating climate change mitigation and adaptation in agriculture and forestry : opportunities and trade-offs. Wiley Interdisciplinary Reviews: Climate Change, 6 (6) : 585-598. http://dx.doi.org/10.1002/wcc.357

Locatelli, B., Fedele, G., Fayolle, V., & Baglee, A. (2016). Synergies between adaptation and mitigation in climate change finance. International Journal of Climate Change Strategies and Management.

Lopez-Claros, A. (2021). Financing Instruments for Climate Change Mitigation and Adaptation. https://globalchallenges.org/wp-content/uploads/2021/11/Financing-Instruments-for-Climate-Change-Mitigation-and-Adaptation-2021-11-08.pdf

Ministry for Innovation and Technology. (2021). National Clean Development Strategy 2020-2050 (Issue 4).

Ministry of Economic Development of the Russian Federation. (n.d.). П О С Т А Н О В Л Е Н И Е от 21 сентября 2021 г. No 1587 МОСКВА Об утверждении критериев проектов устойчивого (в том числе зеленого) развития в Российской Федерации и требований к системе верификации проектов устойчивого. http://static.government.ru/media/files/3hAvrl8rMjp19BApLG2cchmt35YBPH8z.pdf

Minister of Environment and Forestry. (2021). INDONESIA Long-Term Strategy for Low Carbon and Climate Resilience 2050. 3–156.

Ministry of Finance. (2021). Updated Nationally Determined Contribution Republic of Indonesia. Jakarta.

Ministry of National Development Planning. (2019). National Adaptation Plan . Jakarta.

Mullan, M., & Ranger, N. (2021). Framing Paper on Climate-resilient Finance and Investment (ENV/EPOC/WPCID(2021)21; Working Party on Climate, Investment and Development Framing). https://eur-lex.europa.eu/legal-content/PT/TXT/PDF/?uri=CELEX:32016R0679&from=PT%0Ahttp://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52012PC0011:pt:NOT

Moody's on Climate. (n.d.). Retrieved August 12, 2023, from https://climate.moodys.com/

National Bank of Georgia. (2019). Roadmap For Sustainable Finance in Georgia (Issue April).

Nedopil, C. and Song Z. (2023). Green Finance Trends in China: China's Green Finance Policy Landscape. https://greenfdc.org/green-finance-trends-in-china-1-chinas-green-finance-policy-landscape/

Nordic Council of Ministers. (2017). Mitigation & Adaptation Synergies in the NDCs. Denmark: Nordic Ecolabel

OECD. (2020). Developing sustainable finance definitions and taxonomies. A brief for policy-makers. https://doi.org/10.1787/a9c2f75f-en

OECD. (2021). Green Budgeting Framework. In Paris Collaborative on Green Budgeting. www.oecd.org/environment/green-budgeting/

OECD (2021) Strengthening adaptation-mitigation linkages for a low-carbon, climate-resilient future, OECD Environment Policy Papers, No. 23, OECD Publishing, Paris, https://doi.org/10.1787/6d79ff6a-en.

Pham TT, Moira M, Locatelli B, Brockhaus M, Di Gregorio M and Mardiah S. (2014) Integration of adaptation and mitigation in climate change and forest policies in Indonesia and Vietnam. Forests 5:2016–36

Pauw, W. P., König, M., Sadikhova, K., & Stutzmann, T. (2021). Financing Low-Carbon and Climate Resilient Development. Do countries integrate Article 2.1(c) of the Paris Agreement in their long-term strategies? (Issue December).

Qing, X., & Wang, C. N. (2020). Technical Report on SDG finance taxonomy (China). https://beta.unglobalpulse.org/wp-content/uploads/2017/05/3rd-Research-Dive.pdf#page=29

Sharifi, A. (2021) Co-benefits and synergies between urban climate change mitigation and adaptation measures: A literature review. Science of the total environment, 750, 141642.

South African National Treasury. (2022). South African Green Finance Taxonomy 1st Edition (Issue March).

Stern, N. (2006). Stern Review: The economics of climate change.

Swart, R.O.B., Raes, F., (2007) Making integration of mitigation and adaptation work: mainstreaming into sustainable development policies? Clim. Policy 7 (4) 288–303, http://dx.doi.org/10.1080/14693062.2007.9685657.

Task Force on Climate-related Financial Disclosures. (2017). Recommendations of the Task Force on Climate-related Financial Disclosures (Issue June). https://assets.bbhub.io/company/sites/60/2020/10/FINAL-TCFD-Annex-Amended-121517.pdf

UNEP. (2022a). Adaptation Gap Report. Too Little , Too Slow puts world at risk.

UNEP. (2022b). Emissions Gap Report 2022. The Closing Window.

UNFCCC. (n.d.). Cancun Adaptation Framework (CAF). 2010. https://unfccc.int/tools/cancun/adaptation/index.html

UNFCCC (2015) Paris Agreement to the United Nations Framework Convention on Climate Change

UNFCCC Standing Committee on Finance. (2018). 2018 Biennial Assessment and Overview of Climate Finance Flows: Technical Report. In Unfccc.

United Nations. (1992). United Nations Framework Convention on Climate Change (Vol. 62220).

Venkatramani, S., & Hillier, D. (2021). Climate finance: mobilising domestic budgets and external funds for adaptation (Issue November). https://www.opml.co.uk/files/Publications/domestic-budgets-policy-brief-web-final.pdf?noredirect=1

Volz, U., Beirne, J., Preudhomme, N. A., Fenton, A., Mazzacurati, E., Renzhi, N., & Stampe, J. (2020). Climate Change and Sovereign Risk. In SOAS Centre for Sustainable Finance (Issue October). https://doi.org/10.25501/SOAS.00033524

World Bank. (2021). Climate Change Budget Tagging: A Review of International Experience (Issue February). www.worldbank.org

Zamarioli, L.H., Pauw, P., König, M. et al. The climate consistency goal and the transformation of global finance. Nat. Clim. Chang. 11, 578–583 (2021). https://doi.org/10.1038/s41558-021-01083-w

Chapter seven

Appendix

7. Appendix

Appendix I. — Mapping the CCA-CCM Relationship in Indonesia's Enhanced NDC Document

Sector	Program	Strategy	Action	Join Outcome	Unintended Side Effect	Joint Objective
Economic Resilience						
Food, Ecosystem	Sustainable agriculture and plantations	Mainstreaming/ integrating climate change adaptation into agricultural sector, especially for strategic commodities.	Identification, development and implementation of best practices for farmers' economic empowerment		Potential co-benefit to mitigation in AFOLU	
			Enhancing management and provision of ecosystem services in agricultural sector			
			Development of financing scheme for agriculture			
		Development and implementation of climate adaptive technologies for sustainable production of agricultural crops and plantations	Improve agricultural crops protection from pests and diseases			
			R & D to produce high quality (genetically improved) seeds and cultural techniques to increase productivity			
			Improved water management systems for increasing resilience to climate change			
			Application of integrated cropping calendar			
Water, Ecosystem	Integrated watersehed management	Enhancing synergy across sectors and regions in watershed management	Implementation of integrated upstream and downstream approach in forest rehabilitation and restoration, watershed management planning, and protection of terrestrial water resources			
			Creating enabling environment for integrating of Natural Disaster Risk Management into business models and practices			
		Mainstreaming/ Integrating climate change adaptation in watershed management to reduce risks/loss from climate-related natural disasters.	Development of ecosystem services in watershed management			

Sector	Program	Strategy	Action	Join Outcome	Unintended Side Effect	Joint Objective
			Identification, development and implementation of best practices in watershed management			
			Integrating watershed management into Local Spatial Planning			
Ecosystem	Reduction of deforestation and forest degradation	Mainstreaming/ Integrating climate change adaptation in forest management to support mitigation actions and enhancement of economic resilience of communities living in/surrounding forests	Strengthening implementation of deforestation reduction effort		Potential co-benefit to mitigation in AFOLU	
			Sustainable utilisation of non-wood products by local and adat communities			
			Identification, development and implementation of best practices and local wisdom in utilisation of natural forest resources.			
		Development and implementation of environmentally friendly technologies (EFT) in production forest management	Creating enabling environment for EFT			
			Facilitate, oversight, enforcement and compliance on the implementation of EFT			
	Land conservation	Avoiding conversion of productive lands for other uses	Integrated rehabilitation of degraded land and soil and water conservation			
			Facilitate, oversight, enforcement and compliance to spatial plan			
			Strengthening implementation of regulations relating to Spatial Planning			
		Development and implementation of climate adaptive technologies to support sustainable land management practices	Application of soil and water conservation technology using mechanic and vegetation methods			
			Identification, development and implementation of best practices in land utilisation and management			

Sector	Program	Strategy	Action	Join Outcome	Unintended Side Effect	Joint Objective
Energy, Ecosystem	Utilisation of degraded land for renewable energy	Integrated program on rehabilitation of degraded land and development of biomass energy	Rehabilitation of degraded land with species suitable for energy		Potential co-benefit to mitigation in AFOLU	
			R & D to support sustainable biomass energy plantations and the bio-energy industries			
Energy	Improved energy efficiency and consumption patterns	Enhance awareness of all stakeholders on the adaptation benefits of mitigation through improved energy efficiency and consumption patterns	Energy efficiency campaign			
Social and livelihood resilience						
Disaster	Enhancement of adaptive capacity	Reducing vulnerability through improved capacity on social economy and livelihood	Development of Early Warning System (EWS)			
			Capacity enhancement for all stakeholders in responding EWS			
			Awareness campaign, education and training			
Health		Responding to climate change impacts and managing risks including health	Addressing drivers of vulnerability to climate change impacts			
			Enhance stakeholder participation at all levels in building climate resilience, including in health protection and waste management			
			Enhance Community capacity in reducing Climate Change impact on health			
Ecosystem, disaster	Development of community capacity and participation in local planning processes, to secure access to key natural resources	Enhancing community capacity in natural resource management as a source of income, including capacity in risk management and sustainable utilisation of natural resources	Awareness campaign, education and training.			
			Identification, development and implementation of best practices			

Sector	Program	Strategy	Action	Join Outcome	Unintended Side Effect	Joint Objective
		Strengthening community engagement in development planning process at all levels, taking into account gender participation, gender equity and gender balance and vulnerable groups, cross inter-generational needs	Development and implementation of appropriate mechanisms for community participation, taking into account gender participation, gender equity and gender balance and vulnerable groups (diffable, children and elders), and cross intergenerational needs			
			Facilitate and oversight to ensure community interests, including gender, are accommodated in development plan			
Disaster	Ramping up disaster preparedness programs for natural disaster risk reduction	Increase effectiveness of natural disaster preparedness and post disaster recovery program	Development and maintenance of natural disaster control infrastructures			
			Revitalisation of climate related natural disaster control infrastructures based on climate change analysis			
			Protection of cultural and historical sites			
		Empowering communities in natural disaster preparedness and post disaster recovery	Awareness campaign, education and training			
Ecosystem, disaster	Identification of highly vulnerable areas in local spatial and land use planning efforts	Development and utilisation of information system and data provision on vulnerability, risks, and impacts of climate change	Strengthening Information System on vulnerability index (Id. Sistem Informasi Data Indeks Kerentanan/ SIDIK)			
			Integration SIDIK with other related systems regarding vulnerability, risk and impacts of climate change			
Health, ecosystem, disaster	Improvement of human settlements, provision of basic services, and climate resilient infrastructure development.	Mainstreaming adaptation into spatial planning and strengthening compliance in the implementation of spatial plan	Climate awareness campaign, standard enforcement and oversight in human settlement development, including building and environmental health			
Energy, disaster		Integrating adaptation in infrastructure development and maintenance	Increase compliance to carrying capacity related regulations in infrastructure development			

Sector	Program	Strategy	Action	Join Outcome	Unintended Side Effect	Joint Objective
Water, ecosystem			Improve water resource management including soil water, measures to deal with disaster emergency			
Disaster	Conflict prevention and resolution	Strengthening coordination and communication in policy formulation and implementation	Implementation of complain and redress mechanisms			
Ecosystem and Landscape Resilience						
Ecosystem	Social forestry	Enhance engagement of local and adat communities in the social forestry development process.	Awareness campaign on the significant role of forest and forest areas in ecosystem resilience			
		Strengthening implementation of landscape approach in social forestry	Facilitate, oversight and compliance to sustainable principles applied to each scheme of social forestry			
		Implementation of EFT in social forestry	Creating enabling environment for EFT			
			Identification,development and implementation of best practices applicable for social forestry			
Ecosystem	Coastal zone protection	Mainstreaming adaptation into policies and programs on coastal zone and ocean	Implementation of ecosystem-based adaptation in coastal zone development			
			Implementation of integrated management of mangrove ecosystem			
			Enhance coastal zone and ocean pollution control, including marine litter and plastic debris			
		Development of climate resilient coastal zone	Increase communication, Education and Public Awareness (CEPA) on the significant role of coastal ecosystem protection in natural disaster impact reduction			
			Restoration of degraded coastal zone as essential ecosystem			
			Improve livelihood of communities living in or depending on coastal areas			

Sector	Program	Strategy	Action	Join Outcome	Unintended Side Effect	Joint Objective
Ecosystem	Ecosystem conservation and restoration	Enhance ecosystem, species and genetic conservation	Development and implementation of in situ and ex situ conservation			
			Prevention and eradication of invasive alien species			
			Protection of existing and development of new marine protected areas			
		Improve functionality of integrated ecosystem to ensure improvement of essential services	Restoration of degraded mangroves and peatland			
			Enhance conservation education, including engaging adat communities for indigenous knowledge and local wisdom			
Water, ecosystem, disaster	Integrated watershed management	Developing climate resilient watershed ecosystem management.	Improve watershed management planning by taking into account climate vulnerability, risks and impacts.			
			Developing policy instruments and tools to assess climate vulnerability, risks, and impacts to national priority watersheds			
Climate resilient cities	Climate resilient cities	Promote development of climate proof cities.	Awareness campaign on the importance of integrating climate vulnerability, risks and impacts in city planning and development.			
Disaster energy			Capacity building and institutional strengthening			
Ecosystem, disaster			Revitalisation of city infrastructure to increase adaptive capacity and resilience to climate change impacts.			
Disaster Energy			Increase urban forest area and other green open spaces			

Source: (Ministry of Environment and Forestry, 2022).

Appendix II. — Mapping the CCA-CCM Relationship in Indonesia's LTS-LCCR Document

Sector	Cross Cutting Issues	Transformation Needed	Transformative Policy and Measures	Joint Objective	Unintended Side Effect	Joint Outcomes
Mitigation						
AFOLU	Demand for land in agriculture and emission reduction target in FOLU	Improvement in agriculture productivity	Enhanced access to land, finance, technology, capacity building, and market for farmers, to enable them to use high quality seeds and adopt improved technologies and practices			
		Increasing land use efficiency (including integrated farming or complex agroforestry, optimizing the use of unproductive lands/ idle lands)	Optimization in the use of unproductive land in non-forest areas for cropland expansion, along with the enforcement of banning conversion of agriculture lands to other land uses			
		Increasing commitment of large-scale business to environmentally sound practices	Provision of incentives for the contribution to emission reduction and other environmental benefits			
	Demand for land in infrastructure development and emission reduction target in FOLU	Environmentally sound land use across Indonesia's geography	Enhanced compliance on environmental impact assessment and consideration of development needs and the needs to reduce deforestation during the planning process			
Energy	Energy demand and emission reduction target	Implementation of energy efficiency measures, decarbonization in power sector using large renewables, coal with CCS/CCUS, and biofuels in transport	Enhanced investment in renewables and policy alignment across related Ministries/ institutions to minimize 'trade off' between meeting energy demand and achieving emission reduction target			
	Enhancement of biomass energie and competing land use (food security in agriculture and emission reduction target in FOLU	Increasing land use efficiency, taking into account principles of environmentally sound land uses	Enhanced compliance on environmental impact assessment and consideration of development needs and the needs to reduce deforestation during the planning process			
	readiness of domestic industry to supply solar PV and battery for electric vehicle	Capacity building and technology transfer/ development to accelerate domestic industry of solar PV and electric car battery	Provision of incentives and access to capital for domestic companies and acceleration of joint ventures with technology transfer			

Sector	Cross Cutting Issues	Transformation Needed	Transformative Policy and Measures	Joint Objective	Unintended Side Effect	Joint Outcomes
Waste	Population growth - economic development and ER target	Waste management which reduces GHGs emissions	Enhanced enforcement and compliance to the regulatory frameworks relating to waste management			
			Enhanced enabling environment for Circular Economic development.			
IPPU	The growth of manufacturing industry (IPPU emissions intensive industries and energy GHGs emissions intensives) and ER target	The use of environmentally sound / green technology and technology advancement	Creating enabling environment for attracting investments that facilitate the shift from fossil-based technology to green technology			
			Strengthen partnership for technology development			
Adaptation						
Governance	Regional pathway and sectoral pathway	Enhanced effectiveness of the planning and implementation of the two pathways	Policy and programme alignment among line ministries, among regions and between ministries and local governments (vertical and horizontal alignment) and coherent institutional arrangement			
Mitigation and Adaptation						
Food	Increase resilience in food, water, energy, and environmental health (economy, social and livelihood, ecosystem and landscape) – mitigation target	Reducing food loss and food waste	Reducing food loss: improve harvesting tools and techniques to reduce yield losses, supported by cold storage facilities and packaging technology to reduce food loss during food distribution			
			Reducing food waste: for private household through systemic campaign and awareness raising; for largescale consumers through green certification			

Source: (Ministry of Environment and Forestry, 2021).