ACHIEVE

ACHIEVING HIGH-INTEGRITY VOLUNTARY CLIMATE ACTION

D1.1 – Trends and roles of voluntary climate action

WP1 – Mapping and defining voluntary climate action, high-integrity principles and methods

28/10/2024

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EC Summary Requirements

1. Changes with respect to the Description of Action (DoA)

No changes with respect to the work described in the DoA.

2. Dissemination and uptake

This report from the ACHIEVE project offers insights for a diverse range of stakeholders involved in climate governance, voluntary climate initiatives, and voluntary carbon markets.

Within the project, it serves as a useful tool for the research team and partners, helping to guide future studies on climate action and governance. Cooperative Climate Initiatives (CCIs) involved in the project can use the findings to reflect on their own practices, particularly in areas like transparency, accountability, and inclusiveness. Subnational actors, such as cities, may find the report helpful in understanding how their participation in CCIs can drive more ambitious climate goals and collaborative efforts.

Outside the project, the report can assist policymakers and government agencies in evaluating the role of CCIs and the voluntary carbon market in meeting climate objectives. It also offers perspectives on improving inclusiveness and representation, particularly for actors from the Global South. Non-governmental organizations (NGOs) might use the findings to promote stronger accountability in voluntary initiatives, aligning with broader climate goals.

For businesses and voluntary carbon market participants, the report highlights the importance of adopting more transparent and reliable standards in the face of increasing scrutiny over carbon credits and offsetting claims. Multilateral organizations, such as the UNFCCC, and researchers may also find the data and analysis beneficial for informing global climate frameworks and further academic inquiry.

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3. Short summary of results (<250 words)

The ACHIEVE project provides a comprehensive analysis of voluntary climate actions, focusing on three key areas: the integrity of Cooperative Climate Initiatives (CCIs), the influence of CCIs on subnational actors, and the role of climate initiatives in shaping a credible carbon market.

First, the report assesses the integrity of CCIs, which involve non-state and subnational actors in climate mitigation and adaptation efforts. The study identifies significant disparities in transparency, accountability, and effectiveness among 267 initiatives. While initiatives with stricter reporting and membership standards show better outcomes, challenges such as the underrepresentation of actors from the Global South and Indigenous Peoples undermine credibility. The report emphasizes the need for greater accountability, inclusiveness, and sustainability to strengthen CCIs' contributions to global climate governance.

Second, the report explores how CCIs impact the climate commitments of subnational actors, particularly cities. Drawing on data from 1,180 cities and 61 CCIs, the analysis reveals that cities participating in multiple initiatives, especially those focused on standards, are more likely to set ambitious climate targets. In contrast, lobbying-centred initiatives have little to no impact on individual target-setting .

Third, the report examines which initiatives aim to address integrity in the voluntary carbon market, addressing both the supply-side (carbon credit quality) and the demand-side (credit use). Through the mapping of 43 integrity initiatives, it gives an overview of what elements are considered relevant for integrity of carbon credits and their use, and assesses which initiatives are likely to be impactful in the voluntary carbon market.

4. Evidence of accomplishment

This report.

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Preface

In recent years an unprecedented number of voluntary climate commitments have been made by a wide array of non-state and subnational actors. These voluntary climate actions aim to reduce greenhouse gas emissions and build climate resilience and are crucial for lowering risks of exceeding warming limits. However, the full potential of voluntary climate action can only be realised when integrity-related concerns are overcome. ACHIEVE aims to identify opportunities to strengthen and scale up high-integrity voluntary climate action towards achieving net-zero emissions by mid-century. The project will generate transformative and timely scientific insights on the role, effectiveness and integrity of voluntary climate action including carbon credits; assess the integrity and impacts of such action; analyse how policies and regulations, and high-integrity voluntary climate action can strengthen each other; and use scientific findings to support the scaling up of high-integrity voluntary action. This will be achieved through a highly inter- and transdisciplinary consortium that, from the start, actively engages policymakers and other societal stakeholders in co-creating outcomes that respond to end users' needs. ACHIEVE is aligned with the Work Programme of Cluster 5, Destination 1 "Climate sciences and responses for the transformation towards climate neutrality" as the project directly contributes to advancing knowledge and providing solutions for climate change specifically on high integrity voluntary climate action. ACHIEVE will develop transition pathways to climate neutrality that integrate voluntary climate action by cities, regions and companies; it will develop novel social science insights for climate action; contribute to better understanding sustainability co-benefits and trade-offs; and increase transparency and trust in voluntary climate action by strengthening integrity and making scientific results easily accessible for different stakeholder groups.

RU – Stichting Radboud Universiteit	NL	Radboud Universiteit
NCI – New Climate Institute for Climate Policy and Global Sustainability GmbH	DE	NEW CLIMATE INSTITUTE
PBL – Ministerie van Infrastructuur en Waterstaat	NL	Ministerie van Infrastructuur en Waterstaat
OEKO – Öko-Institut E.V. – Institut für Angewandte Ökologie	DE	Öko-Institut e.V. Institut für angewandte Ökologie Institute for Applied Ecology
E3M – E3-Modelling AE	EL	E3Modelling Energy Economy Environment
UEF – ITA-Suomen Yliopisto	FI	
CATIE – Centro Agronomico Tropical de Investigacion y Enseñanza Catie	CR	CATIE
SU – Stockholms Universitet	SE	Stockholm University
HOL – HOLISTIC IKE	EL	HOLISTIC
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CDP – CDP Worldwide (Europe) Gemeinnützige GmbH	DE	CDP
UOXF – The Chancellor, Masters and Scholars of the University of Oxford	GB	UNIVERSITY OF OXFORD

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Executive Summary

This report synthesizes the intermediate results of the ACHIEVE project, providing a comprehensive mapping of voluntary climate actions and analysing the role of initiatives and actors in global climate governance. Chapter 1 outlines the report's objectives and introduces three analytical sections. The report specifically focuses on three key areas: (1) the current landscape of Cooperative Climate Initiatives (CCIs) with an emphasis on their integrity (Chapter 2); (2) the relationship between CCIs and individual climate actions, particularly those of subnational actors (Chapter 3); and (3) the potential of climate initiatives to shape a high-integrity voluntary carbon market (Chapter 4).

Chapter 2 evaluates the credibility and integrity of CCIs, which are voluntary efforts involving non-state and subnational actors aimed at climate mitigation and adaptation. While these initiatives are becoming more prominent, their integrity and effectiveness remain underexamined. This study provides an initial assessment, focusing on key dimensions of integrity: transparency and accountability, capacity and effectiveness, ecological integrity and sustainability, and justice and equity. Using data from 267 initiatives in the Climate Cooperative Initiatives Database (C-CID), the study reveals significant disparities in accountability and effectiveness, with more rigorous reporting and membership standards linked to better outcomes. However, issues such as the underrepresentation of actors from the Global South and Indigenous Peoples continue to hinder overall credibility. The chapter concludes that while CCIs play a valuable role in climate governance, addressing gaps in accountability, inclusiveness, and sustainability is essential for enhancing their credibility and integrity.

Chapter 3 examines the intersection between CCIs and the individual climate commitments of subnational actors, particularly cities. As major contributors to global emissions, cities are central to climate mitigation. Many cities are part of CCIs, which facilitate knowledge exchange and support climate action, but limited research has explored how these initiatives influence cities' climate targets. This chapter investigates whether participation in CCIs leads cities to set more ambitious climate goals. Using social network analysis and regression models on relationships between 1,180 major cities and 61 CCIs, the study finds that cities involved in multiple initiatives or central to networks are more likely to adopt ambitious targets. While CCIs focused on enhancing standards and norms positively influence city-level climate policies, initiatives centred on lobbying show weaker links to target-setting. The chapter underscores the importance of CCIs in driving urban climate action, although further research is needed to understand the impact of these targets on emissions reduction.

Chapter 4 responds to growing scrutiny and criticism of carbon offsetting and ambiguous compensation claims. It analyses initiatives that have emerged to improve the quality of carbon credits (supply-side) and how they are used (demand-side). The chapter maps 43 initiatives, evaluating their characteristics, strength and weaknesses and what elements they consider central to integrity in the voluntary carbon market. Key supply-side issues include additionality, quantification of emission reductions and removals, non-permanence, double counting as well as environmental and social impacts. Frequently addressed issues on the demand-side are transparency about the use of carbon credits, climate-related claims, the prioritisation of own emission reductions over the use of carbon credits, and emission quantification. Moreover, a small number of initiatives stands out, as they are likely impactful in the carbon credit market, due to their comprehensiveness and influence on other initiatives. These are the ICVCM and the CCQI on the supply side, and the VCMI and the SBTi on the demand side.

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1 Overall introduction to mapping report

This report synthesises the results of ACHIEVE research that maps voluntary climate action, to understand trends in voluntary climate action and the role that committing initiatives and actors play in the context of global climate governance.

Voluntary climate action is a very broad category of efforts by a multiplicity of actors beyond 'traditional' governments, including the private sector, civil society, local communities, and networks of different kinds of state and non-state actors. The current study particularly focusses on (1) cooperative climate initiatives (CCIs), collaborative networks that involve multiple non-state (and state) actors aim to address climate change mitigation and/or adaptation; (2) the (subnational) members that take part in CCIs; (3) and initiatives (some of them CCIs) that aim to govern the integrity of carbon markets.

The broad scope allows this report to give a broad overview of non-state climate action, which can help identify cases and samples for further assessment (as is envisaged in ACHIEVE's Working Package 2), moreover, this synthesis report also sets a baseline for further investigations and annual updates of the analyses of trends and roles (envisaged between 2025 and 2027), to gain insight into the growth, development, and outcomes of voluntary climate action.

The growing prominence of voluntary climate action in climate policy and governance raises many questions related to governance and integrity. Some argue that the growth of voluntary climate action should primarily be considered positively because it fosters innovation, enables rapid response to emerging climate challenges, while encouraging broader participation from various stakeholders, including private sector entities and civil society. Critics, however, argue that the voluntary climate action is often insufficiently robust, leading to issues such as greenwashing, lack of accountability, and uneven contributions. Moreover, complex interactions between manifold efforts by a multiplicity of (state and non-state) actors may produce very different outcomes. For instance, 'bottom-up' action may enable more ambitious public policies and regulatory measures. Such 'ambition loop' is, however, is but one possible outcome. Alternative scenarios may involve stagnation of overall climate action, for instance when low ambition from governments and businesses lead to diminished ambition from both sides, or when the presence of private sector initiatives might be used as an excuse to avoid more stringent and ambitious regulation and policies.

The many questions raised cannot all be addressed within this report, yet they effectively point to the need to understand questions of integrity not only from the perspective of individual instances of climate action (e.g. through individual commitments or CCIs), but also from a broader perspective of interactions between actors and institutions.

The current report responds to this need by looking at (1) features in the current landscape of CCIs that indicate integrity of climate actions (at the individual level); (2) the relation between CCIs and individual climate actions; and (3) the potential for climate initiatives to shape a higher integrity carbon market.

Important questions related to the further assessment of voluntary climate action fall beyond scope of the current report. The ACHIEVE project will continue further assessments, e.g. whether commitments made by individual actors and CCIs are kept; and, whether voluntary efforts are ambitious enough in the light of the PA and climate goals; and they contribute to other sustainability aspects. The work presented in the current report provides an initial mapping and basis for such further assessment.

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Chapter 2 maps the current landscape of cooperative climate initiatives, particularly looking at a set that includes all cooperative initiatives featured by UNFCCC's Global Climate Action Portal and launched at the latest Conferences of the Parties to the UNFCCC (COP 26, 27, 28).

Chapter 3 maps the role of individual subnational actors within Cooperative initiatives and their efforts towards achieving Net-Zero mid-century. The mapping will help identify central players, particularly among cities, and how cooperative initiatives relate to individual commitments.

Chapter 4 identifies initiatives which aim to address integrity in the voluntary carbon market, addressing both the supply-side (carbon credit quality) and the demand-side (carbon credit use).The mapping shows their characteristics, strength and weaknesses and what elements they consider central to integrity in the voluntary carbon market.

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2 Mapping and Assessing the Integrity of Cooperative Climate Initiatives (CCIs) - (Intermediate results)

2.1 Authorship, contributors, acknowledgements

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Contributing organizations
This report was prepared as part of the Achieving High Integrity Voluntary Climate Action (ACHIEVE) project, with contributions by project partners: Radboud University, University of Eastern Finland, Tropical Agricultural Research and Higher Education Center (CATIE).

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The current mapping/analysis represents an intermediate assessment that captures the state of CCIs at the time. The ACHIEVE team will continue to update the analysis to be more comprehensive, e.g., by including more CCIs; by including more and more refined data categories; and/or capturing more time-series data. Hence, the analyses and findings in this report are preliminary.

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The 2024 version of C-CID was developed by Sander Chan (Radboud University/IDOS), Sebastian Reyes de la Lanza (Radboud University), Kiri van den Wall Bake (Radboud University), Pablo Imbach (CATIE), and Andrew Deneault (IDOS).

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2.2 Introduction and background

2.2.1 Positioning of study within current research

The ACHIEVE project aims to understand the current landscape of voluntary climate action, especially with a view on their credibility and integrity. The current study presents a preliminary mapping of Cooperative Climate Initiatives (CCIs), which are voluntary multi-stakeholder governance arrangements that target climate mitigation, adaptation, or both, and involve one or more non-state or subnational (local and regional) actors. CCIs play an important role in the broader landscape of voluntary climate action. Their estimated potential impact has been considered very substantive, in comparison e.g. with the potential of aggregated Nationally Determined Contributions (NDCs) (Lui et al., 2021; Roelfsema et al., 2018). Moreover, CCIs can contribute through experimentation, learning, innovation, leveraging of more resources for climate action, co-benefits in other areas of sustainable development, as well as incentivizing more individual commitments by a multiplicity of actors (Bernstein and Hoffmann, 2018; Hale, 2020).

Few studies, however, have assessed the integrity and actual impacts of CCIs. Notable exceptions include discussions over the legitimacy of climate initiatives (Bäckstrand et al. 2018; Kuyper et al., 2018), political dynamics in the interaction between non-state and state action (Andonova et al., 2017; Jernnäs & Lövbrand, 2022), and preliminary studies on the likelihood that climate initiatives might deliver on their targets, e.g. by looking at their design and the activities and outputs they develop (Chan et al., 2018, 2022; Kuramochi et al., 2024; Ruiz Manuel & Blok 2023). Although critics highlight the need for credibility and legitimacy of climate initiatives, especially in the realm of UNFCCC-centered climate governance (Bäckstrand et al., 2021; Bäckstrand & Kuyper, 2017), initiatives recognized by the UNFCCC are not subject to transparency requirements, assessment frameworks (e.g. stocktakes), and monitoring, reporting and verification (MRV) processes as e.g. national contributions are (Streck, 2021; Widerberg & Pattberg, 2017). This landscape analysis aims to contribute to a better understanding of the integrity of CCIs, mapping how initiatives launched at recent Conferences of the Parties (COPs) and recognized by the UNFCCC secretariat (on its 'Global Climate Action Portal' or GCAP) relate to various aspects of integrity, as well as identifying knowledge gaps which hinder a better understanding of integrity.
Integrity is a complex concept and may refer to different interpretations (Breakey & Cadman, 2016; Schneider & La Hoz Theuer 2019; Mishra et al., 2024). Related concepts include legitimacy and accountability (Biermann & Gupta, 2011), however, integrity goes beyond compliance with rules and standards. It emphasizes ethical consistency, transparency, and alignment between actions and values such as honesty, trustworthiness, and the upholding of principles (even when faced with external pressures or competing interests). In this sense, CCIs with high integrity should be procedurally and ethically sound. Given the important role they play in climate action towards achieving a sustainable and net zero future, CCIs with higher integrity are important for building trust in international and transnational climate governance and politics.

Although policy efforts have highlighted the importance of high-integrity climate action (HLEG, 2022), concerns have largely centred on net-zero initiatives, which pledge to achieve a balance between greenhouse gas emissions and removals by mid-century. These actions, often led by individual corporate and subnational actors, are intended to facilitate the transition to this equilibrium, yet they frequently face scrutiny regarding their actual contribution to long-term climate goals. These efforts are crucial and urgent in the face of growing evidence of weak and sometimes misleading claims, e.g. over 'climate neutrality' or

'net-zero', and questionable offsetting mechanisms (Green & Reyes, 2023; Hale et al., 2022; Kreibich & Hermwille, 2021). Perhaps paradoxically, the growing attention for integrity of net-zero commitments may unintentionally limit the scope of integrity, by focusing too narrowly on specific types of actions, such as large-scale mitigation projects and corporate-led voluntary actions. The focus on credible mitigation, while crucial, also risks overshadowing other aspects of integrity, including questions of inclusivity and equity, broader climate action (incl. nature-based solutions, adaptation, and actions by non-corporate actors), and their contributions to systemic change towards sustainability. Hence, this mapping aims to broaden the discussion of integrity, by looking into legitimacy and accountability, ecological integrity and sustainability, and justice and equity of CCIs that engage a multiplicity of actors in collaborative action.

2.2.2 Research questions

Although the current mapping of climate action cannot encompass all aspects and principles of the multifaceted concept of integrity, it seeks to broaden the study of voluntary climate action by focusing on four key dimensions: (1) transparency and accountability, (2) effectiveness; (3) sustainability and ecological integrity, and (4) justice, equity, and inclusion. Building on previous valuable research on legitimacy and accountability (Bäckstrand et al., 2018), as well as effectiveness and impact (Andresen & Hey, 2005; Hale et al., 2021), this study distinguishes itself by addressing these four sets of questions together, across a broader range of CCIs closely linked to or recognized by (recent) UNFCCC processes. While the findings presented here are preliminary, the study provides an overview of how various dimensions and principles of climate action are being addressed. It also identifies knowledge gaps that hinder a more comprehensive understanding of the integrity of CCIs and points out possible next steps in research and policy-making in support of higher integrity among CCIs.

For the study, we understand **transparency** as the clear and accessible dissemination of information regarding CCIs' commitments, actions, and outcomes, which could e.g. allow stakeholders to monitor progress and assess the validity of claims. We understand transparency as a necessary requirement for **accountability** (Hale, 2008), which would furthermore involve mechanisms to ensure CCIs and their participants are held responsible for fulfilling their climate commitments, and for explaining discrepancies between stated goals and actual achievements. Transparency and accountability are understood as relational concepts that question who is accountable and to whom, about what, and how (Grant & Keohane, 2005). Key related interrogations include: what targets can CCIs be held accountable for, whose accountability is expected to whom (e.g., are participants expected to account for the CCI they are involved in), and do CCIs set standards, report publicly, and monitor progress?

As procedural requirements relating to transparency and accountability are insufficient to gauge whether CCIs are credibly delivering, analysis should also focus on understanding expected and/or actual impacts of CCIs. Therefore, our mapping also considers the **effectiveness** of CCIs (Hale et al., 2021) . Effectiveness is, without a doubt, a complex and multifaceted concept. For instance, this study does not address questions related to the scaling of CCIs, their ability to generate catalytic impacts (e.g., the replication of approaches), or the longevity of their outcomes. Instead, this study investigates the extent to which CCIs command the *capacity* to potentially achieve their goals, the extent to which they give evidence of *implementation*, and their *likelihood of achieving expected outcomes and impacts*, including behavioural changes or improvements in social and/or environmental indicators, for example tangible reductions in greenhouse gas emissions, and contributions to climate resilience. Key questions related to *capacity*

include whether CCIs command dedicated staff and financial capacity and have clear organizational structures. Questions concerning *implementation* pertain to the functions that CCIs aim to fulfil—and succeed in fulfilling—such as on-the-ground implementation, knowledge production, lobbying, advocacy, and standard-setting. Additionally, the *likelihood of achieving meaningful change* relates to whether CCIs produce tangible outputs that might result in desirable behavioural or environmental changes.

While we distinguish transparency and accountability, and effectiveness as separate sets of questions for heuristic purposes, they are closely interrelated. More accountability may correlate with increased effectiveness. For example, we ask whether CCIs that engage in regular reporting and monitoring demonstrate a higher level of implementation and a greater likelihood of achieving desirable outcomes and impacts.

Moving beyond primarily procedural questions concerning transparency, accountability, and effectiveness, we examine **sustainability and ecological integrity** to better understand the broader impacts of CCIs beyond their climate aspects. This involves assessing whether the CCIs *co-benefit* sustainable development, and the extent to which they address possible *trade-offs and conflicts* and deal with *risks* (e.g. sufficiently reflecting urgency, considering planetary boundaries). Sustainability and ecological integrity arguably represent the most complex dimension of CCI integrity, as they involve normative debates and are highly context dependent. What constitutes sustainable or ecologically-sound practices can vary widely depending on specific ecosystems, socio-economic conditions, and cultural values. As a result, CCIs must navigate these complexities, striving to balance global climate objectives with local environmental needs and development priorities. Furthermore, ensuring ecological integrity often necessitates addressing challenging trade-offs, such as those between economic interests and long-term environmental sustainability, while also managing uncertainties, particularly regarding the future impacts of climate change. The current mapping of CCIs, which explores specific co-benefits, trade-offs, conflicts, and risks, will necessarily be of modest scope. Large-n quantitative methods, while useful for identifying broad patterns, are not particularly well-suited to capturing the nuanced social, ecological, cultural, and economic contexts in which these initiatives are implemented. As a result, it may overlook the depth and complexity of local conditions that significantly influence the outcomes of CCIs. Yet, by focusing on particular questions related to co-benefits, trade-offs, conflicts, and risks, we highlight key areas and salient concerns where CCIs may succeed or face challenges in aligning with broader sustainability and ecological integrity goals. This enables us to point to areas where more context-specific, in-depth analyses are needed. Hence our investigation particularly addresses questions related to (positive) linkages to *Sustainable Development Goals (SDGs)* and goals and targets related to the *Global Biodiversity Framework (GBF)*. Moreover, we explore possible *trade-offs* (negative linkages) specifically pertaining to the use of *voluntary carbon offsets*, and *controversial memberships* and possible conflicts of interest between climate objectives and participants in CCIs (e.g. by fossil fuel industries). While these questions do not capture the full scope of sustainability and ecological integrity, they broaden the study of CCIs by shifting towards a more holistic perspective that goes beyond climate action, examining how these initiatives contribute to wider environmental, social, and economic dimensions of sustainability.

Finally, we investigate **power and influence** with a view on questions related to **justice, equity and inclusiveness**. The decision-making processes, funding mechanisms, and organizational structures within CCIs offer critical insights into how power is distributed, and which actors are likely to benefit. These

elements reveal underlying dynamics of control and influence, shaping not only the priorities and outcomes of the initiatives but also the extent to which they promote equitable participation and resource allocation among diverse stakeholders. Consequently, these structural features impact justice-related outcomes, particularly in terms of *distributive justice*—the fair allocation of resources—and *recognitional justice*, which addresses the acknowledgment and inclusion of diverse groups and their rights within the decision-making process. Key questions related to power, influence, and justice include: What roles do different types of actors play in leading, funding, and shaping decision-making within CCIs, and to what extent are targeted or affected groups granted influence? Who stands to benefit from participating in CCIs, in terms of actor types and their region of origin, the functions performed by initiatives and their policy focus? How are the benefits of CCIs distributed between countries (e.g., do they effectively address North-South disparities, uphold the right to sustainable development, and address environmental justice)? Additionally, do CCIs meaningfully include vulnerable and marginalized communities, as well as diverse epistemic communities, in their processes and outcomes?

Figure 1. Assessment of dimensions, aspects and questions of CCI integrity.

Assessing the Integrity of Cooperative Climate Initiatives (CCIs)		
Dimensions of integrity	**Aspects of integrity dimensions**	**Questions**
Accountability and Transparency	**Targets**	What targets do CCIs set and how precise are they?
	Internal accountability	Do CCIs set internal accountability requirements?
	External accountability	Do CCIs engage in monitoring, and does monitoring relate to internal accountability?
Capacity and Effectiveness	**Organizational capacities**	Do CCIs command capacities for implementation?
	Effectiveness	What functions do CCIs implement?
		How do CCIs perform? (output performance analysis)
Ecological Integrity and Sustainable Development	**Co-benefits of climate action**	How do CCIs link to SDGs and the GBF
	Trade-offs, conflicts and risk-management	How do CCIs relate to the voluntary carbon credits market?
		What role do controversial actors play in CCIs?
Justice and Equity	**Procedural justice**	Who participates in decision-making in CCIs?
	Distributive justice	Who stands to benefit from CCIs?
	Recognitional justice	Who gets recognized in CCIs?
	Epistemic justice	Whose knowledge counts in CCIs?

The current study will investigate key aspects across the four integrity dimensions, specifically focusing on related empirical questions (Figure 1). While our study examines these key aspects, integrity is inherently complex and multifaceted, encompassing a wide range of issues.

2.3 Method

2.3.1 Climate Cooperative Initiatives Database (C-CID)

Our mapping involves systematically identifying, categorizing, and analyzing CCIs, in order to assess participatory patterns, patterns of implementation, implementation gaps, and analyze their transparency and accountability, effectiveness, sustainability and ecological integrity, justice, equity, and inclusiveness. This study builds on the continued development of the Climate Cooperative Initiatives Database (C-CID; Chan et al., 2024)[1], which has previously been used e.g., to assess trends and performance of initiatives (Chan et al., 2018, 2022); to gauge their mitigation potential (Kuramochi et al., 2022); and to assess the impact of orchestration in the context of the UNFCCC process (Kuramochi et al., 2024). Its versatility makes C-CID particularly suitable to explore intricacies of complex questions related to integrity. For this study, we expanded C-CID to include initiatives launched at the three most recent COPs (28, 27, and 26), and all CCI entries in the Global Climate Action Portal (GCAP; UNFCCC, 2024), administered by the UNFCCC Secretariat. In addition, we updated all existing entries (e.g., new participants, newly produced outputs, etc.) through September 2024, enabling us to provide longitudinal data on some indicators (e.g. on outputs and performance) dating back to 2013. This allows for an analysis of trends over time, offering valuable insights into the evolution and performance of CCIs. Moreover, to facilitate a better assessment of integrity, new indicators were included such as linkages to goals and targets of the Global Biodiversity Framework goals (GBF), compositions of governing and advisory bodies; information on commitments expected from the initiatives' members, mentions of net-zero targets, and (restrictions on) the use of carbon credits.

To our knowledge, the updated and expanded C-CID is the largest and most comprehensive database of CCIs, incorporating all entries from other datasets (e.g., UNFCCC, 2024; Fennhann et al., 2018) along with a broad range of indicators which include those used in other datasets as well as novel ones. C-CID now collects data on over 900 CCIs, registering over 140 thousand instances of actor engagement, and includes over 100 variables, across seven data categories, including: organizational/governance characteristics, participatory data; targets and plans; functions; output and output performance; geographic implementation; and sustainability linkages. The Supplementary Material provides a comprehensive list of all variables included in C-CID which underpin the report's results. Most of the analysis discusses aggregate results for one or more of the variables through descriptive statistics; additionally, we employed inferential statistical techniques, such as t-tests, chi-squared tests, linear and logistic regressions, and Analysis of Variance (ANOVA), among others, to further provide insights into significant relationships between variables related to one or more dimensions of integrity.

Besides these common statistical techniques, we use the Function-Output-Fit (FOF) method to determine initiative performance (Chan et al., 2018). FOF assesses whether initiatives produce outputs (e.g. activities or products) that are consistent with their relevant functions (e.g. knowledge production, standard setting, or technical "on-the-ground" implementation). The method assumes that outputs are a precondition for more effective outcomes and impacts. By assessing the extent to which an initiative's functions are matched by fitting outputs, FOF produces a score between 0 (no outputs that correspond to the initiative's

[1] C-CID variable definitions and methodological supplements are available upon request with the authors.

functions) and 1 (the initiative produces relevant outputs for all its functions). A higher FOF score indicates minimal criteria of output performance and suggests a higher likelihood of an initiative meeting its targets, but it is not an indicator of realized outcomes (e.g. behavior change) or impacts (changes in environmental or social indicators). FOF can be calculated on a yearly basis (considering only outputs produced in a given year) or as a cumulative indicator (considering all outputs since the initiative's launch). For the purpose of this report, we use annual FOF when considering trends over time, but use the highest annual FOF (maximum FOF) for each initiative when considering FOF in relation to other indicators. The use of maximum FOF instead of an average over the years reduces prevalent biases that are associated with variability in FOF over the years, for example due to lower FOF scores during COVID-19 times or during the first year(s) after the launch of the CCI. The Supplementary Material further details the FOF method.

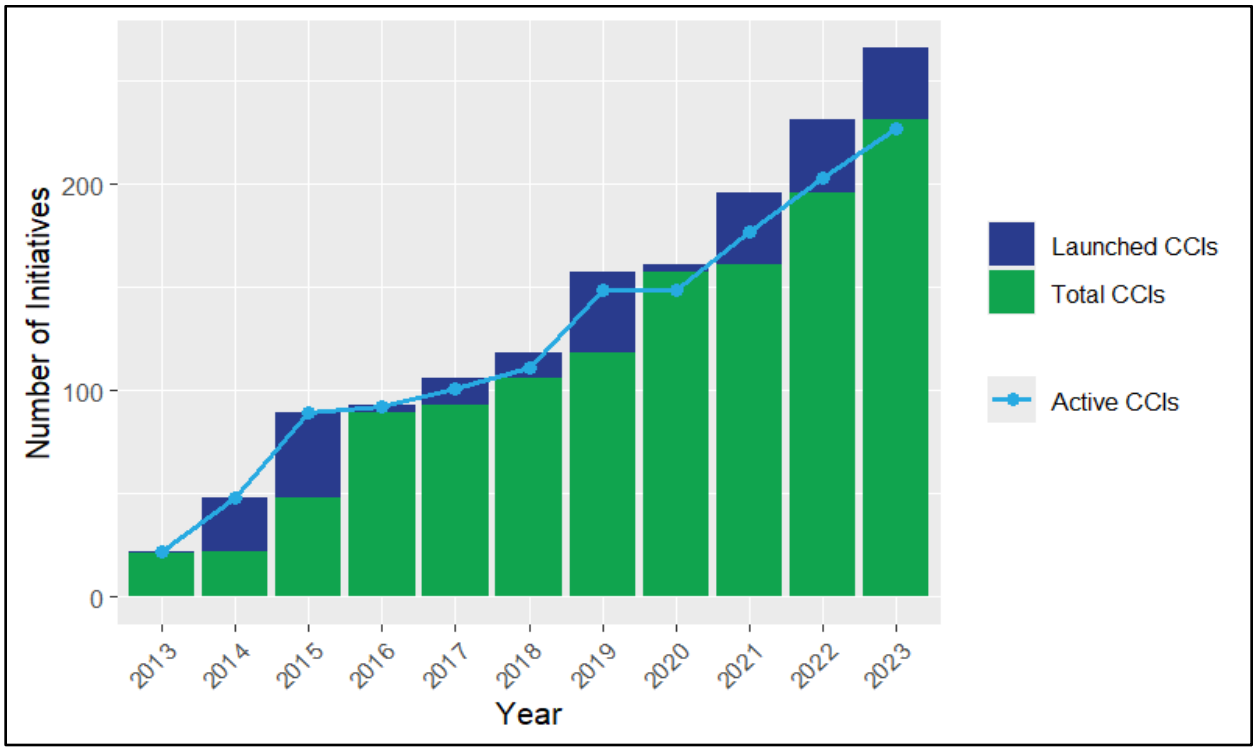
2.3.2 Sampling, data collection and limitations of the study

Our analysis primarily focuses on a sub-sample of 267 initiatives[2] which includes CCIs recorded on GCAP as of August 2024 as well as initiatives launched at the three most recent COPs (26, 27 and 28). Of the total sample, we also determined the activity status of initiatives based on their launch year and yearly production of outputs. In 2023, 227 initiatives (85.0%) could be considered active[3]. Altogether this sample of initiatives were launched over a period of ten years, Figure 2 shows cumulative growth of this set over time.

[2] Some analyses and descriptive statistics will focus on alternative selections of initiatives. For example, when examining linkages to the Global Biodiversity Framework, only initiatives that address both biodiversity/nature and climate change were considered. In cases where the analysis does not encompass the sub-sample of 267 initiatives, the number of initiatives considered in that part of the analysis will be clearly indicated.

[3] Active status of initiatives was determined based on launch year and the last year of available output activity. If no outputs have been produced, only the year of launch is considered.

Figure 2. Cumulative growth of active CCIs recorded in GCAP and launched at COPs since 2013.



This unique set helps to elucidate integrity among initiatives that are recognized in the most recent UNFCCC process. The specific context of the UNFCCC matters because it provides a global, multilateral framework that sets expectations for transparency, accountability, and ambition in climate action. By focusing on CCIs that are recognized (and often launched) within this context, we can assess how well they align with expectations and concerns over integrity in the international climate regime. Furthermore, this selection allows us to evaluate the integrity of CCIs in light of recent climate negotiations and commitments. Although the current study particularly focuses on how CCIs relate to different aspects of integrity, future studies can offer further insight on their contributions to the broader objectives of the Paris Agreement.

The data collection primarily involves the interpretation of publicly available sources, with occasional addition of information obtained through direct correspondence with CCIs. Reliance on publicly available sources and interpretation by coders ensures a significantly lower level of missing data — an issue prevalent in other databases that rely on self-reported information from CCIs. This comprehensiveness of C-CID data enables the most extensive analysis of climate initiatives to date, while it also helps to highlight comparative data gaps that need to be addressed to improve integrity assessments of climate initiatives.

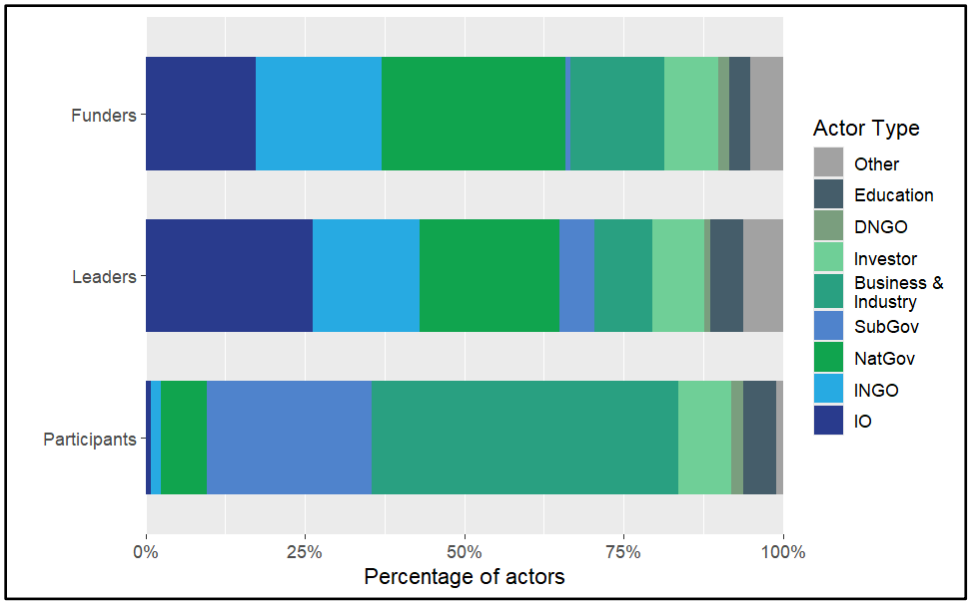
The interpretative nature of C-CID data introduces certain risks, particularly regarding the consistency and accuracy of data interpretation. To mitigate these risks, we implemented several strategies: thorough training of coders, regular meetings to discuss and refine coding decisions, and joint decision-making processes. Additionally, we employed proxy variables to ensure data completeness, further enhancing the reliability and robustness of our dataset.

2.3.3 Sample description

The sample of initiatives included in this study encompasses a very diverse set of CCIs. In terms of climate policy focus, the analysis covers initiatives that primarily target climate change mitigation (139 initiatives), adaptation (58), and others with a roughly equal focus on both (78).

CCIs have very different actor constellations. The database registers 66,855 instances of engagement by nonstate actors such as subnational governments (SubGov), businesses and industry, investors, education and research organizations (education), and non-for profits and non-governmental organizations operating internationally (INGOs) or domestically (DNGOs), as well as national governments (NatGov) and international organizations (IOs). Additionally, for every actor we register their country or territory of origin. We differentiate whether engaging actors provide financial support (*funders*), or, lead or coordinate initiatives (*leaders*), as well as other *participants* in initiatives (including members, partners, and signatories). Overall, the database lists 981 funders, 980 leaders, and 64,894 participants (Figure 3 shows the distribution of these instances by type of actor). Future iterations of the analysis will aim to identify unique actors that engage as funders, leaders, and/or participants in multiple initiatives, for instance to provide insights into which are the most common *orchestrators* of cooperative initiatives, or which are specific individual actors that most frequently engage in climate initiatives. As of now, the database and this analysis only account for participation instances, without identifying unique actors in the dataset.

Figure 3. Distribution of funding, leading, and participation instances in CCIs by type of actors engaged.



There is also high degree of variance between initiatives in terms of the sheer number of actors they engage, with some averaging less than 10 while others engage more than 10,000. To illustrate this, Table 1 groups initiatives into five distinct categories based on the total number of actors in each initiative.

Table 1. Average number of actors per initiative.

Category	Actor count			No. of initiatives by policy focus		
	Average	Minimum	Maximum	Mitigation	Adaptation	Equally focused
Very low	8	1	14	24	19	16
Low	32	17	57	51	23	27
Medium	126	60	253	51	15	22
High	662	267	1252	11	1	3
Very high	10,532	4,966	14,682	2	0	2

Note: Groups were determined through a logarithmic transformation of total actor counts in initiatives and five natural breaks (Jenks optimization) minimizing within group variance and maximizing variance between.

2.4 Analysis

2.4.1 Accountability and transparency

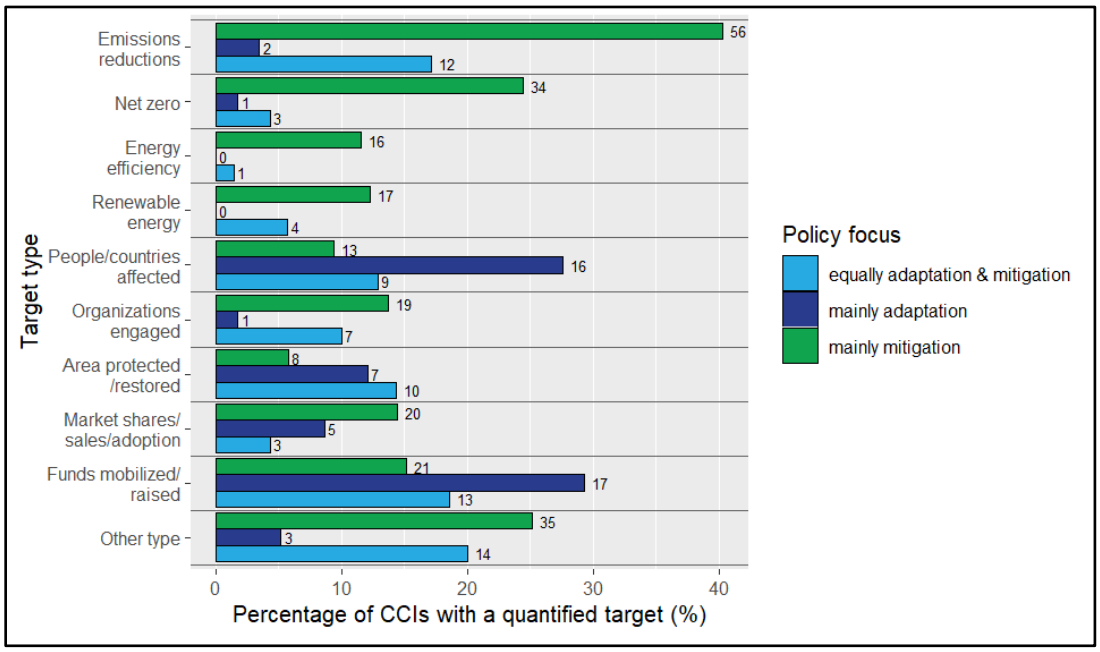
2.4.1.1 What targets do CCIs set and how precise are they?

Transparent, measurable targets are key to enabling accountability in climate action. While a majority of (181 out of 267) initiatives in our sample set at least one quantified target, almost a third of initiatives (85) do not, potentially hindering efforts to hold them accountable. When considering the climate policy focus of initiatives, 112 out of 139 mitigation initiatives (80.6%), 29 out of 58 adaptation initiatives (51.7%), and 34 out of 70 equally focused initiatives (55.7%) have a quantified target.

The database distinguishes between different types of targets. Emissions reductions, net zero, energy efficiency, and renewable energy targets aim to capture goals directly related to mitigation efforts. C-CID also registers quantified targets in terms of number of people or countries (positively) affected, organizations (newly) engaged, areas protected, improved or restored, market shares, sales or scale of adoption of products or solutions, and funding mobilized or raised. Emissions reductions targets are the most common target type (70 in total), followed by fundraising and mobilization (51), net zero targets (38) and numbers of people/countries to be (positively) affected (38).

Some types of targets are more relevant for initiatives with a particular policy focus (mitigation, adaptation, or both). Figure 4 summarizes the total number of CCIs that have a quantifiable target by type and their distribution by policy focus. For example, 40% of mitigation initiatives have an emissions reduction target, and one fourth have a net zero target. Funding mobilization and people/countries (positively) affected by the initiative are the most common target types in adaptation initiatives, each present in about 30% of all initiatives with this policy focus.

Figure 4. Quantified targets of CCIs by type and policy focus.



Note: Numbers show the total amount of targets for each policy focus; percentages do not add up to 100% since one initiative can have multiple targets belonging to different types.

A series of chi-square tests revealed that climate initiatives involving a very low number of actors, as defined in Table 1, are significantly less likely to have quantified targets compared to initiatives with larger actor groups. In particular, these smaller initiatives tend to have fewer emission reduction targets and fewer targets related to the number of newly engaged organizations. No other significant correlations were observed between the presence of quantified targets and the size of initiatives.

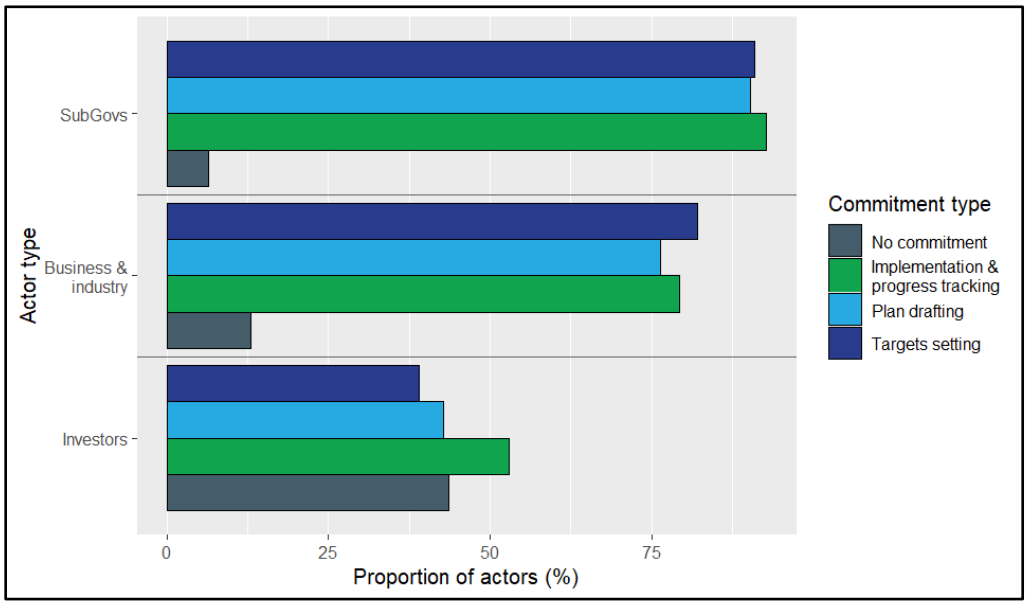
2.4.1.2 Do CCIs set internal accountability requirements?

Internal accountability concerns relations between initiatives and their participants, specifically when CCIs require their participants to set individual targets, draft implementation plans, and track implementation progress. 120 CCIs (44.9%) have such membership control mechanisms. Of these initiatives, 82 require target setting, 69 require implementation plans, and 96 ask their members to track implementation progress. Membership control mechanisms often address more than one of these aspects of climate action together. For instance, 45 CCIs (37.5% of 120 that have a membership control mechanism) set all three requirements, while 37 CCIs set two of the three requirements. Conversely, 38 CCIs have set only one. We see significant differences between initiatives by policy focus, for instance, fewer adaptation initiatives set membership requirements (27.6%, p=0.0013); compared to CCIs that focus on both adaptation and mitigation (44.3%) and mainly mitigation (55.4%).

When analyzing internal accountability mechanisms within climate change initiatives (CCIs), it is crucial to quantify the total number of participating actors who assume responsibility for setting targets, drafting plans, and/or monitoring progress upon joining an initiative. The total number of participation instances

in CCIs amounts to 64,894, with the primary actor types[4] being business and industry (48.2%) and subnational governments (25.8%), followed by investors (8.4%).

Figure 5. Share of actor types subject to membership control mechanisms.



Note: Percentages do not add to 100% since some instances of participation are associated with one or more commitment types.

The proportion of participants who are subject to membership control mechanisms varies widely across actor types (Figure 5). Only 6.5% of all subnational governments and 13.0% of all business & industry are not required to make a climate commitment through a CCI, whereas a larger share of investors (43.7%) are not required to make commitments as participants of CCIs. This large proportion of participants subject to internal accountability mechanisms among some actor types seem to be linked to a few initiatives that require very large memberships to set targets, draft plans, and monitor progress. For instance, the Global Covenant of Mayors registers 13,485 instances of subnational participation that are required to comply with all three types of commitments. Similarly, the Race to Zero and the Science Based Targets Initiative respectively set requirements for 11,387 and 8,681 instances of participation, mostly from business and industry.

Given the prominent role of these large-actor initiatives, their role in establishing accountability needs to be further interrogated. Although initiatives might set requirements, it is not clear whether they align with internationally agreed climate and sustainability goals and high integrity standards, and whether membership control requirements are actually enforced.

[4] National governments are not included in this analysis because their commitment(s) can be considered to be enacted mainly through the UNFCCC processes and not in the transnational/subnational space.

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Regional patterns of participation can also be linked to membership control data. A Chi-squared test of independence was conducted to assess whether participation by specific actor types and regions is associated with varying levels of membership requirements. For example, businesses from Europe and Northern America are particularly prevalent in initiatives that require members to fulfill all three membership obligations: setting targets, drafting implementation plans, and tracking progress. In contrast, Asian businesses in the dataset are overrepresented in initiatives with no required commitments. For subnational governments, European actors again are overrepresented in initiatives with more stringent internal accountability requirements, whereas Northern American subnationals are notably underrepresented. These geographical patterns of participation warrant further investigation to address accountability concerns, particularly in relation to demands for integrity and historical responsibility for climate change.

While we discuss transparency and accountability, and effectiveness as separate sets of questions, they are in fact intertwined (Kramarz & Park, 2016; Scharpf, 1999). We, therefore, assessed the association between internal accountability mechanisms and performance as measured by Function-Output-Fit (maximum FOF value that each CCIs has produced over the years). A statistical significant t-test showed that CCIs that set membership requirements are more likely to have demonstrated a higher performance than CCIs without such requirements (with requirements, maximum FOF = 0.5774; without requirements, maximum FOF = 0.4469; p = 0.0004).

2.4.1.3 Do external accountability and internal accountability co-occur?

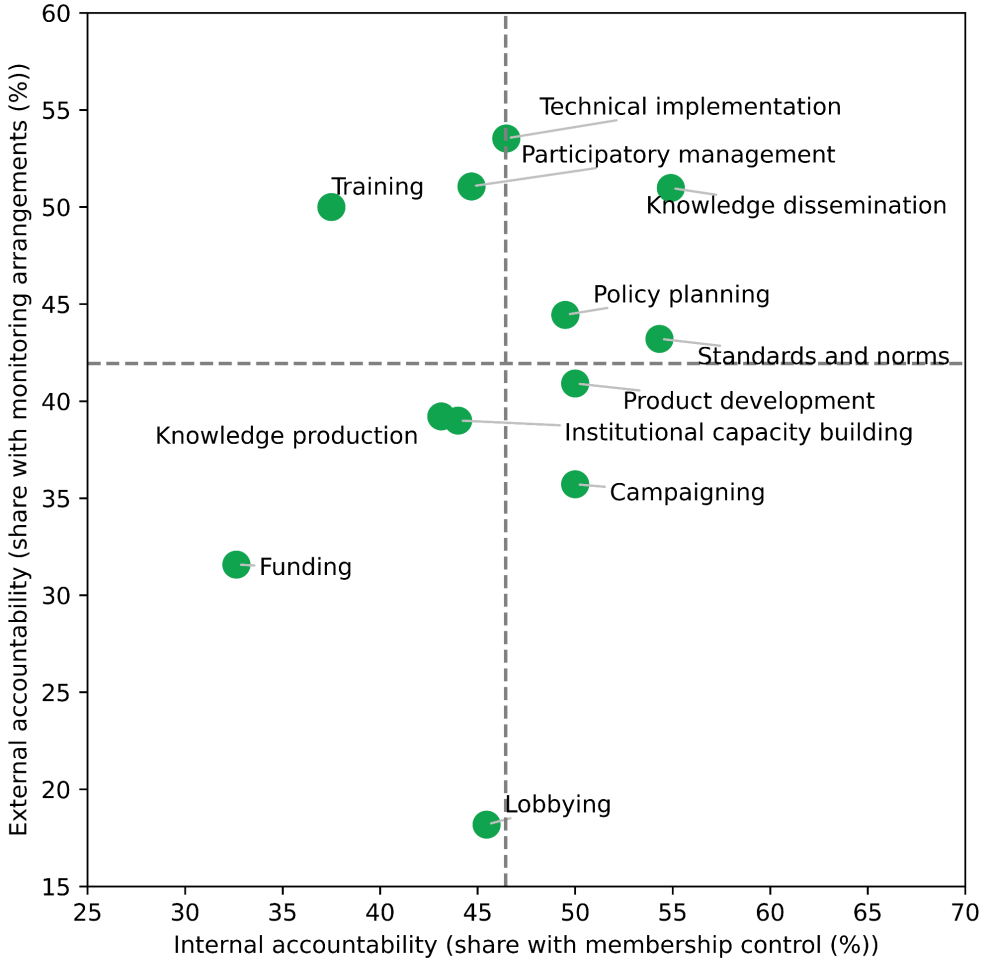
External accountability and transparency require explicit monitoring arrangements. In our sample, 112 CCIs (41.9%) have an explicit monitoring arrangement, while 155 do not. Knowledge dissemination CCIs and technical implementation CCIs are more likely to have monitoring arrangements (51.0%, p=0.0261; and 53.5%, p=0.0048, respectively) than other types of CCIs. Lobbying CCIs and funding CCIs have fewer monitoring arrangements in place (18.2%, p=0.0057; and 31.6%, p=0.0154, respectively).

Accountability can be operationalized both internally (as described by membership requirements above) and externally (as explicit monitoring arrangements). We find that 72 CCIs (27.5%) operationalize accountability both internally and externally, by having both explicit monitoring arrangements and membership requirements. There are 37 CCIs (14.1%) that operationalize accountability externally and 52 CCIs (19.8%) that operationalize accountability internally. On the other hand, 101 CCIs (38.5%) have neither monitoring arrangements nor membership requirements, and can thus be considered less accountable. This association between monitoring arrangements and membership requirements is also statistically significant ($p<0.0001$). CCIs with monitoring arrangements are also more likely to have membership requirements and vice versa. In other words, external and internal accountability are often co-occurring in the same initiatives.

In Figure 6, we show how each function relates to internal and external accountability by showing the share of CCIs for the functions that have monitoring arrangements and membership requirements in place. By employing a Chi square test of Independence, we find that knowledge dissemination CCIs typically perform better on both external and internal accountability. On the other hand, funding CCIs have fewer monitoring arrangements and membership requirements, and, thus, perform lower on external and internal accountability. We also employed an Analysis of Variance (ANOVA) test, to examine if the quadrants in

which each CCI can be placed correlates with the function targeted by the CCI. We find that the functions knowledge dissemination, technical implementation, lobbying, and funding have a correlation with the four quadrants that the CCIs can be placed in. Knowledge dissemination CCIs score higher than average on both internal and external accountability, and technical implementation CCIs score better on external accountability, while internal accountability is closer to the average of the total sample. Lobbying CCIs score relatively low on external accountability but average on internal accountability, while funding CCIs score lower than average on both internal and external accountability.

Figure 6, The share of CCIs that have explicit monitoring arrangements (y-axis) and membership requirements (x-axis) in place for each function.



As accountability of an initiative also reflects on its participants, it is relevant to assess whether monitoring arrangements and membership requirements are common in various sizes of initiatives. This allows estimating the number of actors that are influenced by these measures of accountability and transparency. We employed a set of Chi square tests to assess correlations between the size of initiatives as defined in Table 1 and their monitoring arrangements and membership requirements. We find that initiatives with a very low number of actors have typically fewer monitoring arrangements and membership requirements.

2.5 Capacity and effectiveness

2.5.1 Organizational capacities

Important indicators for capacity of CCIs include the presence or absence of dedicated staff, budgets, and funding raised. In our sample,163 CCIs (59% of all CCIs) have dedicated staff, 50 CCIs (18.7%) mention a budget and 37 CCIs (14%) report concrete operating budget amounts in one or more years. The presence of dedicated staff is more common among initiatives that are focused on specific functions than other functions. For example, initiatives focused on participatory management and knowledge dissemination are more likely to have dedicated staff.

Although availability of budgets and successful fundraising may be important indicators for CCIs capacity, we find that initiatives generally disclose few budgetary details, whether funding raising targets and or actual funds raised. For instance, only 19.1% of initiatives mentioned quantified targets for fundraising/mobilization, and only 12.6% disclose amounts for funding raised[5]. The low level of disclosure may point towards limited capacities for CCIs to implement activities. We find significant variations between initiatives with different functional foci. Initiatives that list the provision of funding among their main functions are more likely to report quantified targets for funding raised or mobilized, and also to report on actual funding raised or ongoing fundraising. By contrast, none of the initiatives that are primarily focused on lobbying report quantified targets, funding raised or ongoing fundraising. Also, initiatives that primarily engage in technical implementation tend to underreport on funding targets but are more likely to report actual funding raised or ongoing fundraising.

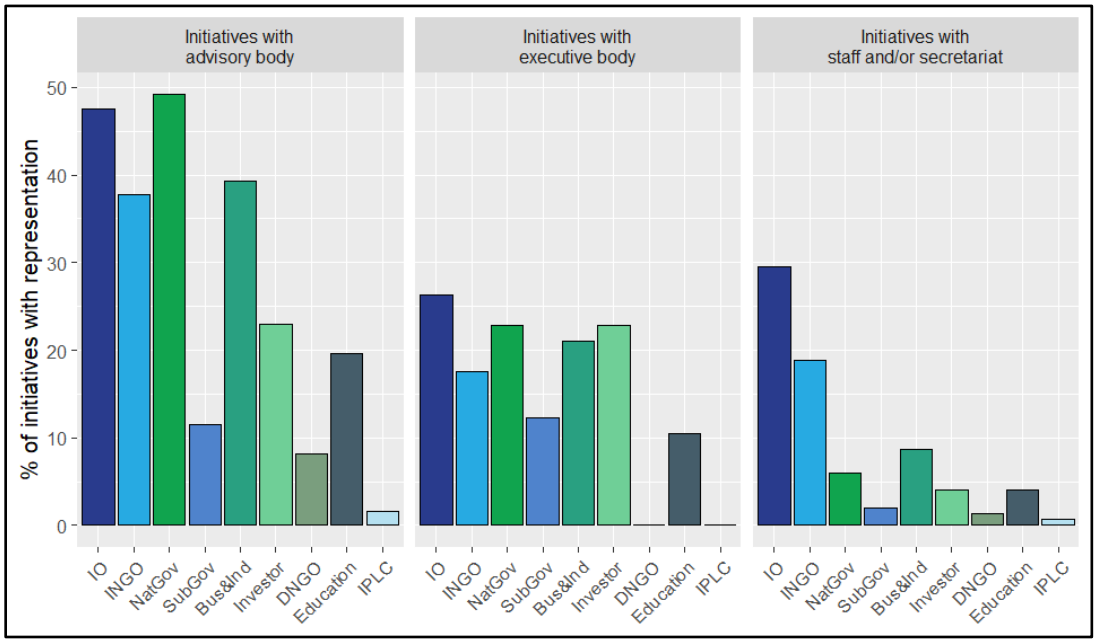
However, we should be cautious drawing conclusions based on availability of budgets and successful fundraising. Our findings might also relate to a lack of transparency in the provision of budgetary details, rather than a lack of capacity. A lack of budgetary transparency may also explain why the presence or absence of dedicated staff seems to be a better predictor of effectiveness - as measured by FOF - than available budgets or successful fundraising. An Analysis of Variance (ANOVA) using dichotomous independent variables on funding and budgets shows that the existence of funding and budgets does not appear to explain variation in FOF, while the employment of dedicated staff for an initiative does. Particularly, the employment of dedicated staff explains higher levels of FOF compared to initiatives that do not keep dedicated staff. Moreover, we do not find a relation between the presence of a budget and the presence of dedicated staff, which - again - may indicate that budgets are underreported rather than absent.

The presence of particular organizational structures was also analysed as a proxy of initiatives' capacity to deliver on their targets besides the presence of dedicated staff and funding. Over a fifth of initiatives have either an executive decision-making body (22.8%) or an advisory body (21.3%). Figure 7 gives an overview of the composition of these governance structures and whether the executive bodies, advisory bodies, and secretariat of initiatives incorporate different actor types. For example, national governments and IOs are

[5] There is an overlap between initiatives that mention quantified targets for fund raising/mobilization and all initiatives that actually disclose amounts for funding raised.

represented in just under half of the advisory bodies within CCIs that have established such a body.

Figure 7. Composition of organizational governance structures of CCIs.

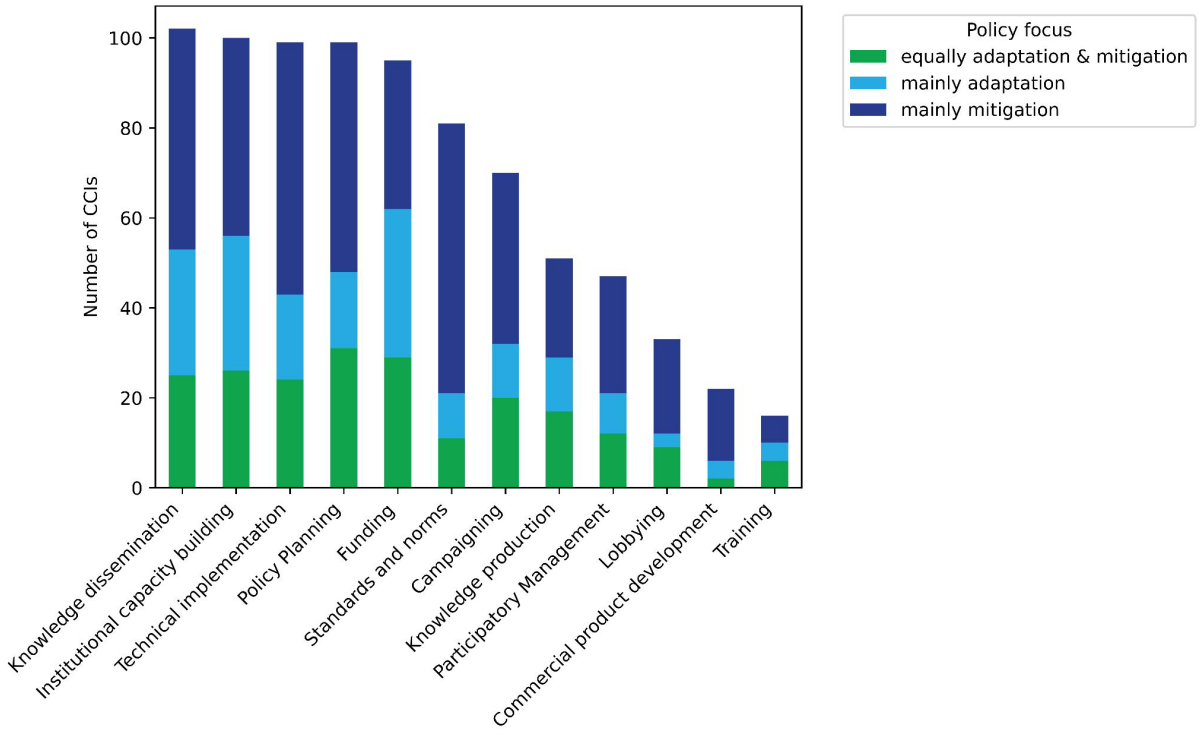


To provide insights into decision-making in initiatives, we compared the composition of these governance structures with expected distributions based on the actors the initiatives aim to influence or engage (*target actors*). The analysis provides insights into whether actors who are targeted are also participating in decision-making processes. On average, less than half of the target actor types of initiatives are represented in their advisory bodies (40.9%) and executive bodies (42.2%). A significant Chi-squared test of independence at a 95% confidence level between the observed and expected distributions shows that subnational governments are underrepresented in advisory bodies, while domestic NGOs are underrepresented in both executive and advisory bodies. This raises questions about whether local actors are sufficiently partaking in decision-making, even when they are targeted by CCIs. Conversely, international organizations are overrepresented in advisory and executive bodies, which might be due to their prominent role as leaders in CCIs. However, questions of representation in organizational capacity will need to be further explored.

2.5.2 Effectiveness of implementation based on functions and outputs

To paint a comprehensive picture of how implementation relates to integrity, we assess which functions are addressed by CCIs. We distinguish 12 functions, and for each CCI, we map all the relevant functions, as well as their 3 most important functions. The analysis focuses mainly on the three most important functions, to prevent diluting the results by initiatives that address many functions. We observe that knowledge dissemination, technical, "on-the-ground" implementation, institutional capacity building, funding, and policy planning are most often addressed (Fig. 8). On the other hand, training, commercial product or service development, and lobbying are the least addressed functions.

Figure 8. Number of CCIs by (top three) most important functions and policy focus (mitigation, adaptation, and both).



As each function can be addressed in the context of either mitigation or adaptation, we assessed whether the functions are more or less equally divided among policy focus. We employed an ANOVA test to assess whether various functions are more often addressed in the context of particular climate aspects. Adaptation CCIs target institutional capacity building more often compared to mitigation initiatives ($p=0.0294$). Adaptation and equally focused CCIs target funding more often than mitigation CCIs ($p=<0.0001$). On the other hand, mitigation CCIs are more likely to set standards compared to adaptation and equal focused CCIs ($p<0.0001$).

Furthermore, we also examined possible correlations between functions targeted by CCIs and thematic areas (as defined by the Marrakech Partnership Action Agenda [MPAA]) addressed (Table 2). By employing a Chi-squared test of Independence, we find that knowledge producing CCIs target oceans and coastal zones, water, and finance more often. Knowledge dissemination CCIs target industry and land use more often and technical implementation CCIs target energy more often, but oceans and coastal and finance less. Moreover, standard setting CCIs target industry more, but human settlements less; funding CCIs target water and finance more, but industry and transport less. Lastly, policy planning CCIs target settlements more.

Table 2. Statistically significant correlations between the functions targeted by CCIs and the addressed MPAA themes.

CCI Function	Thematic area of the initiative							
	Energy	Human settlements	Industry	Land use	Oceans and coastal zones	Transport	Water	Finance*
Knowledge production					+		+	+
Knowledge dissemination			+	+				
Technical implementation	+				-			-
Standard setting		-	+					
Funding			-			-	+	+
Policy planning		+						

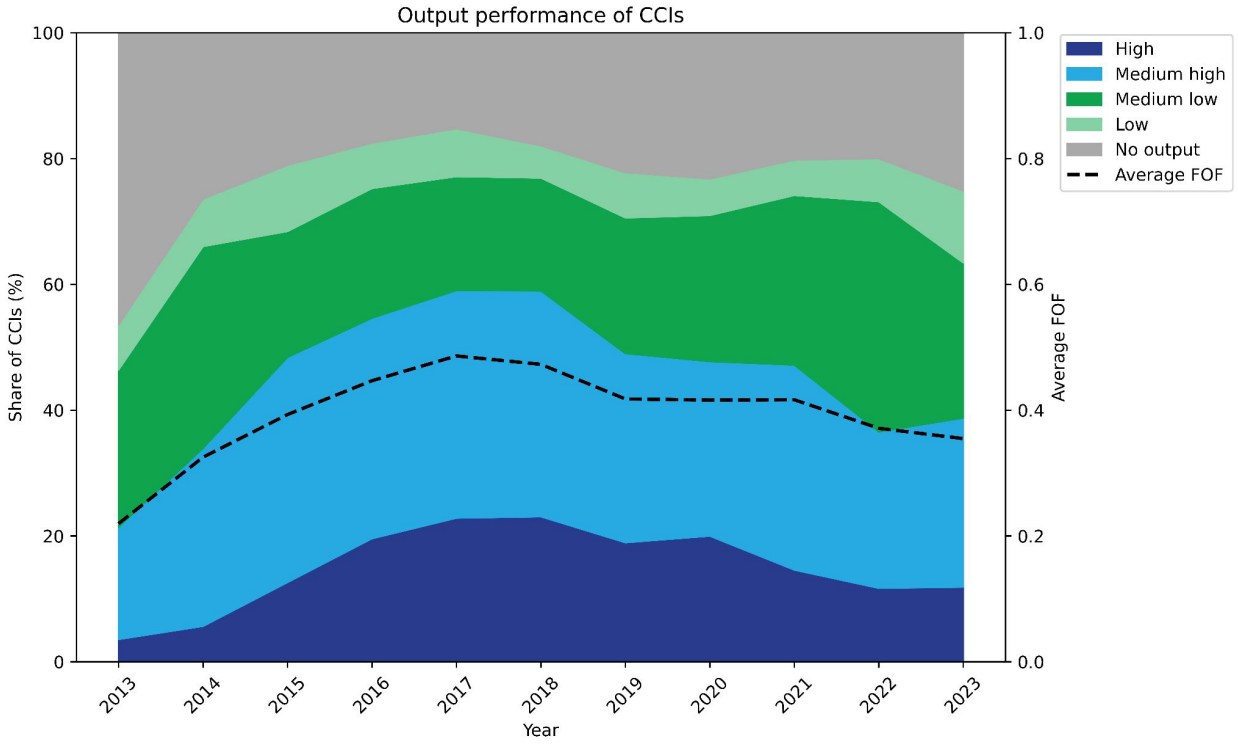
Note: Finance is not a MPAA theme but is considered a cross-cutting theme. A plus (+) symbol shows a frequent correlation, while the minus (-) symbol shows less frequent combinations.

2.5.3 Output performance (FOF analysis)

To indicate effectiveness, we calculated the Function-Output-Fit (FOF) for each CCI as a proxy. Although this indicator does not give evidence of problem-solving effectiveness, it does show the potential likelihood of achieving progress and implementation for their relevant functions. The FOF score is based on all relevant functions, which enables some initiatives to address a larger number of functions. In Figure 9, we show the distribution of low to high FOF scores, as well as the average FOF scores per year. We observed a progressive trend in average FOF scores between 2013 and 2017, followed by a decline starting in 2017. While this trend may be concerning, it should be interpreted with caution. Most initiatives in our sample were launched within the last three years, and newer initiatives may require more time to fully implement their activities. Additionally, since FOF scores are calculated for each year an initiative is active, the launch year may not represent a full year of operations, potentially resulting in lower scores for that period.

To assess if the downwards trend is statistically significant, we employed a polynomial regression with degree two. We found a statistically significant model that showed a downwards trend from 2018. However, the R-squared value is quite low (R-squared = 0.023), which can be explained by the wide range of FOF values each year. This means that the model cannot predict individual FOF scores but can better predict the average trend. Although the trend is statistically significant, the sample includes several CCIs that were launched in the last three years. This results in possible biases as initiatives typically show lower FOF scores in their first few years.

Figure 9. Distribution of CCIs by annual FOF values.



Note: Only the CCIs that were active in the corresponding year were considered; initiatives that did not have any outputs are shown in grey; the dashed line shows the average FOF for each year; low performance: FOF < 0.25, medium low: 0.25 <= FOF < 0.5, medium high: 0.5 <= FOF < 0.75, and high: FOF >= 0.75.

Furthermore, we investigated the variation of performance among CCIs with different policy foci (adaptation, mitigation, or both). By employing an ANOVA test, we found that adaptation and mitigation initiatives score relatively similar in terms of FOF scores. Moreover, we also employed a t-test to examine possible correlations between the CCI functions and maximum FOF. We find that knowledge dissemination CCIs have on average a higher maximum FOF, while funding CCIs typically do not reach significantly high levels of FOF.

To gain a better understanding of how effectiveness plays a role in climate initiatives, we also assessed whether initiatives' maximum annual FOF value is correlated with the size of the initiative by employing a set of t-tests. We defined the size of the initiative as presented in Table 1. We found that initiatives with a very low number of actors involved typically have lower maximum FOF scores, whereas CCIs with a medium, high, or very high number of participants successively have higher FOF scores (see Table 3). Employing linear regression analysis, we find support for the notion that larger CCIs are more likely to have higher maximum FOF.

Table 3. Mean maximum FOF for CCIs with very low to very high number of actors involved.

Size	Maximum FOF	Number of CCIs
Very low	0.3398	76
Low	0.5186	93
Medium	0.6091	78
High	0.7316	16
Very high	0.8592	4
Average	0.5341	267

Although effectiveness is an important dimension of CCI integrity, it should not be considered separately from other dimensions of integrity. A particularly important question concerns the relation between accountability, transparency and effectiveness. Hence, we performed a t-test to investigate whether the presence of monitoring arrangements - as a proxy for external accountability and transparency - is correlated with higher maximum FOF scores. We found that CCIs with monitoring arrangements typically score higher on maximum FOF than CCIs without monitoring arrangements (with monitoring: max. FOF = 0.6241; without: max. FOF = 0.4329; p=0.0103). This finding highlights the need to view CCI integrity as a multi-dimensional concept, where external accountability and transparency are also crucial for enhancing the effectiveness of CCIs.

2.5.4 Geographies of implementation and location-based outputs

C-CID records data on the countries or territories where CCIs are planning to or are currently implementing actions. Overall, the database registers 6,602 unique instances of implementation by initiatives (unique countries or territories for each initiative). To assess evidence of actual implementation, we compared the stated geographies of implementation for each initiative with observed, location-specific outputs to identify any implementation gaps. Only relevant outputs were considered for this analysis, based on the functions that initiatives carry out (Table 4 lists relevant location-sensitive outputs by function).

Table 4. Relevant location-sensitive outputs by function category.

Function	Location-sensitive outputs
Knowledge production	Event organization (science-to-science)
Knowledge dissemination	Event organization (science-to-science, science-to-policy, policy-to-policy, and popular)
Technical implementation	Infrastructure
Institutional capacity building	Institutions setup, event organization (policy-to-policy)
Lobbying	Commercial products and services - advice, event organization (policy-to-policy)
Participatory management	Institutions partners, event organization (popular)
Funding	Funding provided
Product and service development	Commercial products and services - new
Policy planning	Event organization (science-to-policy, policy-to-policy)

When considering only the main functions of initiatives, the average implementation proportion for all CCIs is 14.2%[6]. That is, for every 10 countries or territories where an initiative reports planned or ongoing implementation, we register less than 2 countries where at least one relevant output has been produced, on the basis of the three most important functions of initiatives. When accounting for performance relative to income level of countries or their geographical region, as well as the climate policy focus of initiatives, no significant differences were found. However, implementation proportions vary significantly between initiatives with monitoring arrangements (19.5%) versus those without (9.7%) according to a t-test (p-value = 0.007). The presence of dedicated staff is also significantly associated with a higher implementation proportion (18.2% vs 10.7% with a p-value = 0.026). Thus, both the presence of monitoring arrangements and dedicated staff significantly influence the performance of initiatives, and their integrity.

Although the low implementation gaps are concerning, it is important to note that C-CID output data is not exhaustive, and that location is currently only registered for 10 out of 26 types of outputs. Outputs that are not location sensitive may still benefit countries of implementation. Furthermore, when we broaden the analysis to include not just the three main functions of the initiatives but all relevant functions, the implementation gap narrows significantly. On average, at least one relevant output is observed in one country or territory for every five reported as planned or ongoing geographies of implementation. Finally, we highlight that this analysis is also highly dependent on transparency by CCIs regarding the outputs they produce, and the limitations of coding based on self-reported data by initiatives, as discussed in the introduction.

[6] The sub-sample for the analysis included 225 CCIs carrying out one or more of the functions with location sensitive outputs as one of their three main functions, and one or more geographies of planned or ongoing implementation.

2.6 Ecological integrity and sustainable development

2.6.1 Co-benefits of climate action

Many initiatives also have co-benefits that could be linked to the Sustainable Development Goals (SDGs). In C-CID, these linkages are mapped based on specific keywords that are established for each SDG. In Figure 10, we show the percentage of CCIs that link to each SDG (excluding 'SDG 13 - climate action', as all initiatives in our sample are classified as such). CCIs most frequently address SDG 17 (Partnerships for the Goals), SDG 7 (Clean Energy for All), SDG11 (Sustainable Cities and Communities), and SDG 9 (Industry, Innovation, and Infrastructure). By contrast, CCIs infrequently address SDG 4 (Quality Education), SDG 16 (Peace, Justice, and Strong Institutions), SDG 14 (Life Below Water), SDG 5 (Gender Equality), and SDG 10 (Reduced Inequalities).

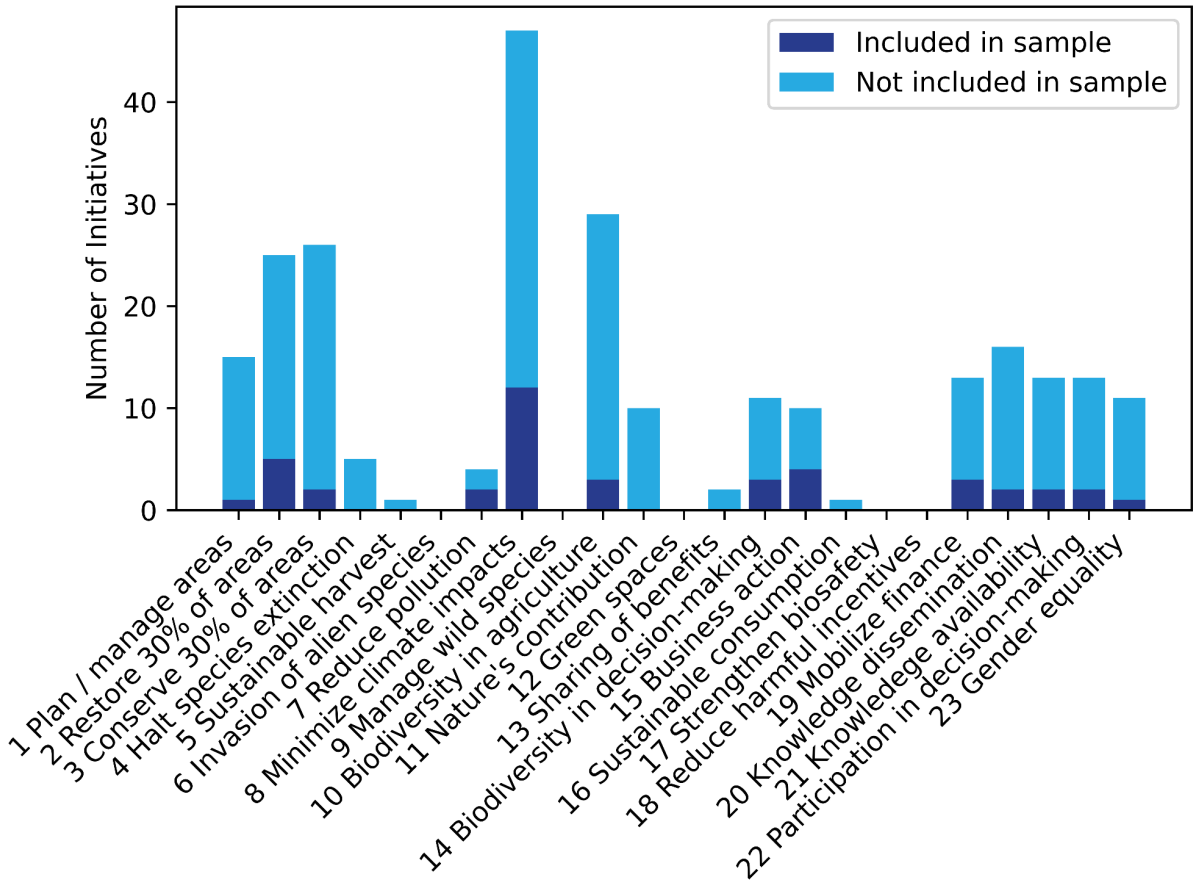
Figure 10. Linkages to the Sustainable Development Goals (SDGs) as a share of CCIs in the sample (%).

Note: CCIs can have linkages to more than one SDG, so percentages do not add to 100. The size of the pie chart slices reflects the share of all linkages to a specific SDG vs all other possible associations. We omitted SDG 13 (Climate Action) from the figure, as all CCIs have an explicit link.

To examine ecological integrity, we zoom in on biodiversity related co-benefits. We see that 15% of CCIs address terrestrial biodiversity (SDG 15 - Life on Land) and only 4% address marine biodiversity (SDG 14 - Life Below Water). For all nature-related CCIs, we mapped the link to the targets set by the Global Biodiversity Framework (GBF). The subset of nature-related CCIs in our sample consists of 21 CCIs. However, to provide meaningful results, we assess all 98 nature-related CCIs in C-CID to map the links with GBF targets. In Figure 11, we show the number of CCIs that explicitly link to each GBF target. We see that Target 8, (Minimize the Impact of Climate Change on Biodiversity and Ecosystems) is most often addressed, which is in line with the climate focused nature of the database. Other targets that CCIs often link to are Target 10 (Enhancing Biodiversity in Agricultural Systems); Target 3 (Conservation of 30% of All Areas); and Target 2 (Restoring 30% of All Degraded Ecosystems). On the other hand a number of targets are not explicitly addressed by CCIs in our sample and in the larger sample of nature-related CCIs in C-CID, particularly: Target 6 (Reducing the invasion of alien species); Target 9 (Managing Wild Species); Target 12,

(Including Green Spaces in Urban Environments); Target 17 (Strengthening Biosafety); and Target 18 (Reducing Harmful Incentives).

Figure **11**. Number of CCIs that explicitly link to the Global Biodiversity Framework (GBF) targets.



Note: The CCIs that were considered consist of the 98 nature-related CCIs, totally included in C-CID, of which 21 are included in our sample consisting of CCIs on GCAP and launched during three recent COPs.

As biodiversity can be addressed differently when focusing on mitigation or adaptation, we also assess the association between the addressed GBF targets and policy focus. Using the ANOVA test, we find that Target 1 and Target 3 are more often addressed by mitigation or equal focused CCIs. We find no correlation between policy focus and the other targets.

We assessed characteristics of the 21 nature-related CCIs in our sample and compared them with the other CCIs to gain understanding of how nature-related CCIs perform on certain integrity aspects compared to other initiatives. By performing a set of chi square tests and t tests, we found that nature-related initiatives typically address a higher number of SDGs, and specifically address SDG 16 (Peace, Justice, and Strong Institutions) more often. As expected, nature-related initiatives address land-use more often as a theme, and they also mention the generation of carbon credits more often. On the other hand, they do not target Indigenous Peoples and Local Communities (IPLCs) more, even though they are important in the context of land-use, nature-based solutions, and the generation of carbon offsets. In terms of effectiveness, nature-related CCIs have typically a higher maximum FOF value and are thus more likely to achieve their targets

and goals. We did not find any correlations with the functions these initiatives aim to fulfil. Furthermore, the external accountability of nature-related CCIs is stronger, as they have typically more monitoring arrangements in place. However, we did not find any correlation with internal accountability, which is assessed through membership requirements. Importantly, the subsample of nature-related initiatives in the sample is quite small, resulting in less statistically significant correlations.

Co-benefits can substantially support social and environmental sustainability, but it can also reduce the focus on achieving the primary goals related to climate change mitigation and/or adaptation when capacity is limited. As both are important aspects of integrity, we examined if there is an association between the focus on co-benefits - using the number of SDG links as a proxy - and accountability, transparency and effectiveness. First, we performed a chi square test of independence to assess the correlation with monitoring arrangements. We found that CCIs with monitoring arrangements are likely to address more SDGs ($p=0.0163$), which suggests that the external focus of accountability is linked to mentions of more SDGs (with monitoring, 5.9; without 5.1 SDGs). We also performed this analysis with internal accountability, using membership requirements as a proxy, however the chi square test showed no correlation.

We also examined the correlation between co-benefits and effectiveness, employing a linear regression analysis with the maximum FOF as the dependent variable, and the number of SDGs addressed as the explanatory variable. The analysis did not show a correlation between co-benefits and effectiveness.

Subsequently, we assessed the role of the functions that are targeted by CCIs on the number of SDG links by employing a Chi square test. We find that technical implementation CCIs and funding CCIs are more likely to address a higher number of SDGs, while standard setting CCIs on average address fewer SDGs.

Finally, we assessed whether the size of initiatives has an association with the number of SDGs addressed. First, we employed multiple Chi square tests to assess whether the size of initiatives, divided in groups as defined in Table 1, impacts the number of SDGs addressed. We found that initiatives with a very low number of actors involved address fewer SDGs, while medium-sized CCIs on average target more SDGs. A linear regression analysis, however, did not show statistical correlations between the number of SDG addressed and the total number of participants or the logarithm of the number of participants.

2.6.2 Trade-offs, conflicts and risk-management

Credits, such as carbon offsets, and controversial memberships, like the involvement of oil and gas companies in climate initiatives, are both crucial to consider when addressing trade-offs, conflicts, and risk management. Carbon offsets can help achieve net-zero targets, especially in hard-to-abate sectors, but they also raise concerns about environmental integrity, greenwashing, and their long-term effectiveness. Similarly, the participation of companies with high emissions profiles, such as those in the oil and gas industry, can create conflicts of interest and credibility issues, potentially undermining the integrity of the initiatives. Managing these risks and ensuring transparency are essential to prevent such mechanisms and memberships from diluting the impact of climate efforts and to foster genuine progress toward sustainability. In the following, we therefore discuss the role of carbon offsets and controversial memberships in our sample of CCIs.

2.6.2.1 Carbon offsets

Carbon offsetting is often seen as an important measure to achieve net zero goals and targets, particularly in hard-to-abate sectors. However, they are also scrutinized in the literature and public debate, and their effectiveness is often questioned (see for example Probst et al., 2023). Moreover, the use of carbon offsets is also linked to greenwashing practices (e.g., Fankhauser et al., 2024). CCIs have the potential to mitigate the risks that are associated with the use of carbon offsets in various ways. For example, CCIs could set standards for higher integrity carbon offsets, e.g., guiding actors to use carbon offsets in a more transparent and synergistic manner, regulate climate claims based on carbon offsets, or discourage the use of carbon offsets (Trouwloon et al., 2023). Examples of standard-setting initiatives include the Integrity Council for the Voluntary Carbon Market (ICVCM), Science Based Targets initiative (SBTi) and the Voluntary Carbon Markets Integrity Initiative (VCMI).

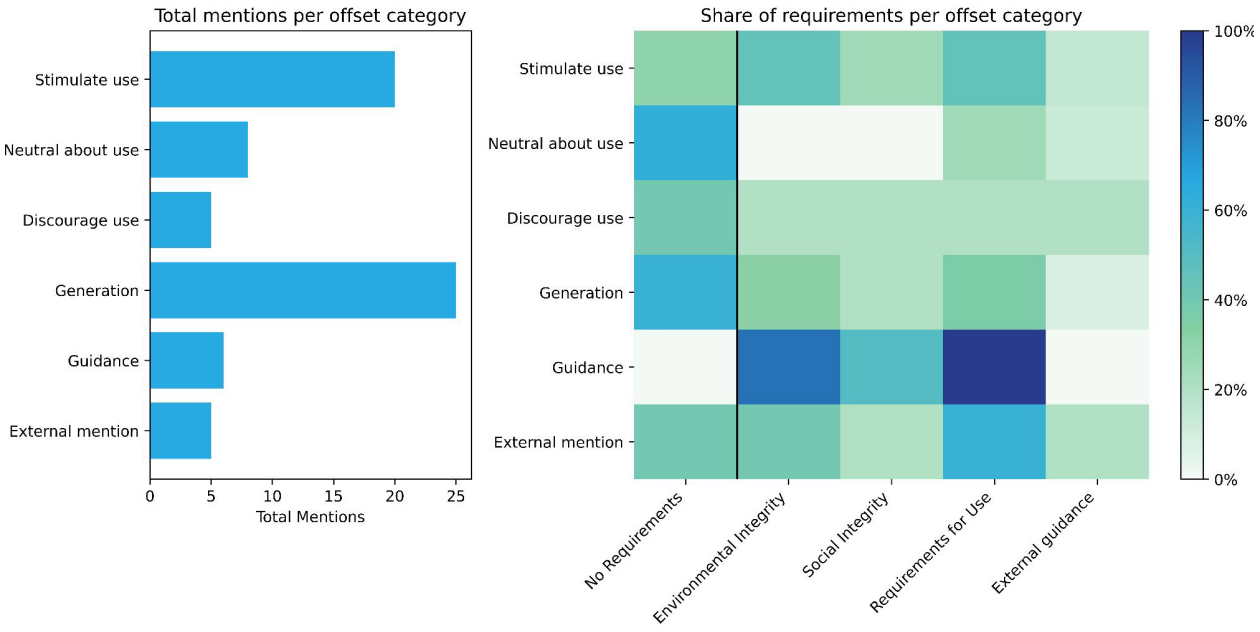
To map how our sample of CCIs addresses the risks associated with carbon credits, we mapped whether they mention carbon credits, and if so, whether they stimulate, are neutral about, or discourage the use of carbon credits. Alternatively, they could mention the generation of carbon credits, set guidelines or requirements for carbon credits or refer to external guidelines or requirements.

In our sample, we find that 217 CCIs (81.3%) do not mention carbon credits and are, thus, not addressing the risks associated with them; for some initiatives this can be expected, for instance, many of those that mainly focus on adaptation. In total, 50 CCIs (18.7%) mention carbon offsets in one or more categories, 20 (7.5%) of these stimulate the use of carbon offsets; 8 (3.0%) are neutral about their use; and 5 (1.9%) discourage them. In addition, 25 CCIs (9.4%) mention the generation of carbon offsets. Finally, 6 CCIs (2.2%) set standards for carbon offsets, while 5 CCIs (1.9%) refer to external guidelines.

C-CID also maps the requirements set by the CCIs for dealing with carbon credits. These requirements are divided in i) ensuring environmental integrity such as biodiversity protection, ii) social integrity including the avoidance of social harms, iii) specific requirements for the use of carbon credits such as guidelines for offset-based claims or limiting the use of offsets to only residual emissions, and, iv) references to external guidelines and requirements related to carbon offsets such as the Integrity Council for the Voluntary Carbon Market (ICVCM) or Voluntary Carbon Market Integrity Initiative (VCMI). Out of 50 CCIs that did mention carbon credits, 28 of them (56%) do not set any requirements. We find that environmental and social integrity is required by 12 (24%) and 7 CCIs (14%), 14 CCIs (28%) set requirements for use and 5 (10%) refer to external guidelines. Note that these requirements are not mutually exclusive.

Figure 12 shows the count of carbon offset mentions per category and the share of CCIs that set any requirements for offsets. We find CCIs that stimulate carbon offset use set more requirements than CCIs that are neutral about carbon offset use or CCIs that mention the generation of carbon offsets. Particularly, CCIs that stimulate carbon offset use set more often requirements for environmental integrity (9 out of 20) or for use of offsets (9 out of 20), compared to social integrity (5 out of 20). We also find that all 6 CCIs that set requirements for carbon offsets set specific requirements for use and 5 out of these 6 set requirements for environmental integrity. Social integrity requirements are less common and are only included by half of the CCIs in this category. Only 8 out of 25 CCIs that mention the generation of carbon credits set requirements for environmental integrity, and even less set requirements for social integrity (5 out of 25).

Figure 12. Count of carbon offset being mentioned in initiatives and frequency of requirements by category of carbon offset mention.



Note: The left panel shows the count of mentions regarding offsets by CCIs, divided into six categories. In total, 50 CCIs mentioned carbon offsets and are included in this figure, CCIs can be included in more than one category. The right panel shows the frequency of requirements regarding offsets that CCIs set. The left column represents no requirements set and is mutually exclusive with any of the other columns. The four right columns are commonly overlapping. The colours are scaled to the share of CCIs that are placed in each mentioned category, and the total number can be found in the left panel.

As carbon offset use and generation can be linked with either mitigation or adaptation of CCIs, we performed an ANOVA test to examine the possible correlation between policy focus and carbon credit mentions. However, we did not find any correlations. We also assessed if CCIs targeting particular functions are correlated with carbon offset mentions to gain a better understanding of the role carbon offsets play in the landscape of transnational voluntary climate governance. However, again we did not find any correlations.

Carbon offsets are mainly seen as relevant in the context of net zero targets, as carbon credits make it possible to offset any residual emissions. Therefore, we examined if CCIs with net zero or emission reduction targets mention offsets more often by employing a Chi square test of Independence. The test shows that CCIs with net zero targets are more likely to mention carbon credits. More specifically, they are more likely to stimulate carbon offsets, mention the generation of carbon offsets, and refer to external guidelines. Moreover, we find that CCIs that have quantified emission reduction targets are also more likely to mention carbon credits. They are specifically more likely to stimulate the use of carbon offsets and mention the generation of carbon offsets.

Furthermore, as business and industry, investors, and subnational government actors are most relevant in the context of the voluntary carbon market, we also assess if these are indeed the actors that are targeted by the CCIs that mention carbon offsets. We employed a chi square test to examine the correlation between

the target actors of CCIs and the carbon credit mentions. We find that CCIs that refer to external guidelines are less likely to target national governments. Additionally, we also find that CCIs that mention carbon offsets in at least one of the categories are also less likely to target national governments. This implies that CCIs are less often aiming to influence behaviour related to carbon offsetting of national governments compared to other actor types, such as business and industry, subnational governments and investors.

Lastly, we aimed to gain a better understanding of the type of climate initiatives mentioning carbon offsets, for example by looking at the size of initiatives. We employed multiple chi square tests to assess possible correlations between the size of initiatives, as defined in Table 1, and if they mention carbon offsets. We found that initiatives with a very high number of actors are more likely to stimulate the use of carbon offsets. In contrast, initiatives with a high number of actors involved are more likely to discourage carbon offset use or set guidelines for the carbon market.

2.6.2.2 Controversial memberships

In the context of trade-offs, conflicts and risk-management related to ecological integrity and sustainable development, membership of certain actors in CCIs can be controversial. In the context of trade-offs, conflicts and risk-management related to ecological integrity and sustainable development, membership of certain actors in CCIs can be considered controversial. For example, as major contributors to climate change fossil fuel producers are controversial since their core business model relies on the extraction and sale of coal, oil, and natural gas. Many of them are also engaged in opposing and/or diminishing the push for new climate policies (Nasiritousi, 2017). These corporate efforts encompass a variety of actions, including funding extensive misinformation campaigns, engaging in large-scale corporate promotional advertising, and conducting traditional lobbying and political campaign contributions (Brulle et al., 2024). Nevertheless, engagement with fossil fuel producers may not be questionable in itself, since they have the potential to play a key role in achieving more ambitious climate mitigation goals in the energy sector. An increasing number of smaller fossil fuel producers are beginning to acknowledge the necessity of transitioning to renewable energy sources, with some even rebranding themselves as "energy companies" (Piggot et al. 2020).

By accounting for the top 21 oil and gas companies by revenue and the 23 largest coal mining companies in the world (Aranca, 2024) (Fig. 13), we identify 24 initiatives that involve major fossil fuel producers as leaders, funders or participants. All the initiatives focus on climate change mitigation, except for two which equally focus on both mitigation and adaptation. Most of the initiatives tend to target either business actors and large investors (19), or national and subnational governments (8). The initiatives that have the most major fossil fuel producing company members are Climate Action 100+ (28), Task Force on Climate-Related Financial Disclosure (22), and the Oil and Gas Climate Initiative (11). It is important to point out that Climate Action 100+ and the Task Force on Climate-Related Financial Disclosure (defunct since 2023) engaged with fossil fuel companies as both disclosing parties and as focus companies. The Oil and Gas Climate Initiative is distinctly focused on oil and gas companies based on its missions and comprises world's largest energy companies to reduce greenhouse gas emissions. Similarly, the Oil & Gas Methane Partnership involves fossil fuel producers that commit to its measurement-based reporting framework.

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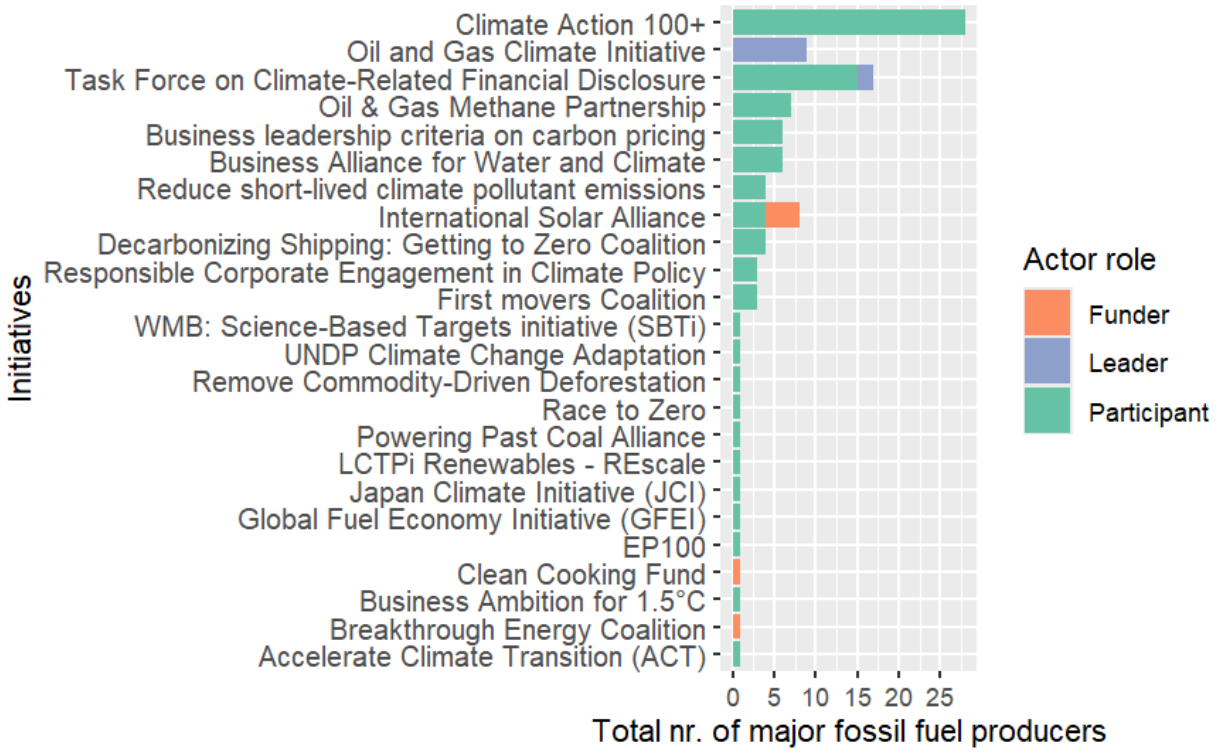
Figure 13. Types of engagement in CCIs by major fossil fuel producers.



Fossil fuel producers are usually participants of initiatives, but in a few cases, they also act as funders or leaders. The multinational oil and gas company Royal Dutch Shell finances the Clean Cooking Fund, the Indian petrochemical and natural gas multinational Reliance Industries funds the Breakthrough Energy Coalition, while the public Indian energy company NTPC Limited and Coal India Limited fund the International Solar Alliance. Many major fossil fuel producers are leaders of climate cooperative initiatives. For instance, the state-owned petroleum and natural gas company Saudi Aramco is one of the leaders of the Oil and Gas Initiative, while the Australian multinational mining and metals company BHP is one of the leaders of the Task Force on Climate-Related Financial Disclosure.

Our mapping of the role of major fossil fuel producers as participants, funders, and leaders in CCIs raises critical questions about the integrity and effectiveness of the initiatives they are part of. Their engagement could signal a willingness to contribute to climate solutions. However, their engagement could also present potential conflicts of interest that may compromise the credibility of CCIs. The leadership roles of these companies warrant scrutiny to ensure that their influence does not undermine ambitious climate goals. Future research should explore whether and how CCIs manage such conflicts, as well as the actual impact of fossil fuel companies' involvement on the overall effectiveness and integrity of climate action.

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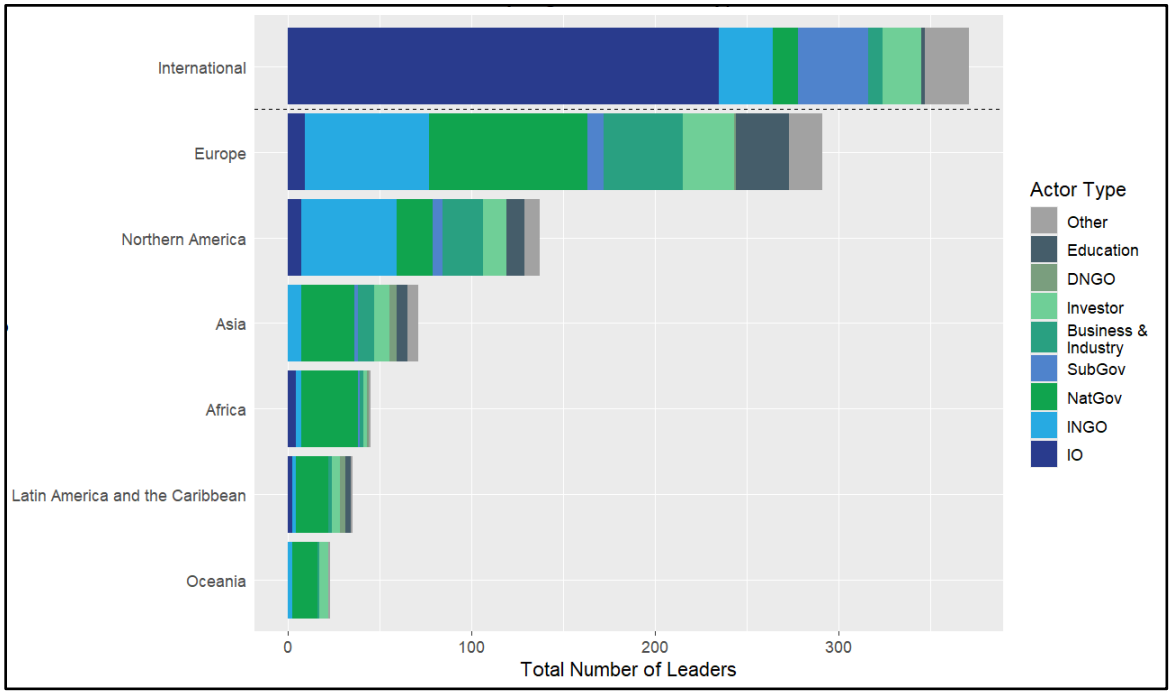
2.7 Justice and equity

2.7.1 Procedural justice: who participates in decision-making

A comparison between the region of origin of their leaders and participants against the regions where CCIs report planned, or ongoing implementation can offer insights into questions of procedural justice. Such an analysis assumes that more inclusive decision-making in climate initiatives would require that leadership and coordination roles within initiatives, as well as all their participants, should proportionally match the geographies where CCIs are implementing or plan to implement climate actions.

The main leaders in initiatives are international organizations (26.2% of all leading instances), national governments (21.9%) and international NGOs (16.7%). When considering the region of origin of leaders, 29.7% come from Europe and 14.0% from Northern America (see Figure 14). If public actors like international organizations and national governments are the main leaders of initiatives, the integrity of CCIs is highly dependent on the actions and priorities of such actors.

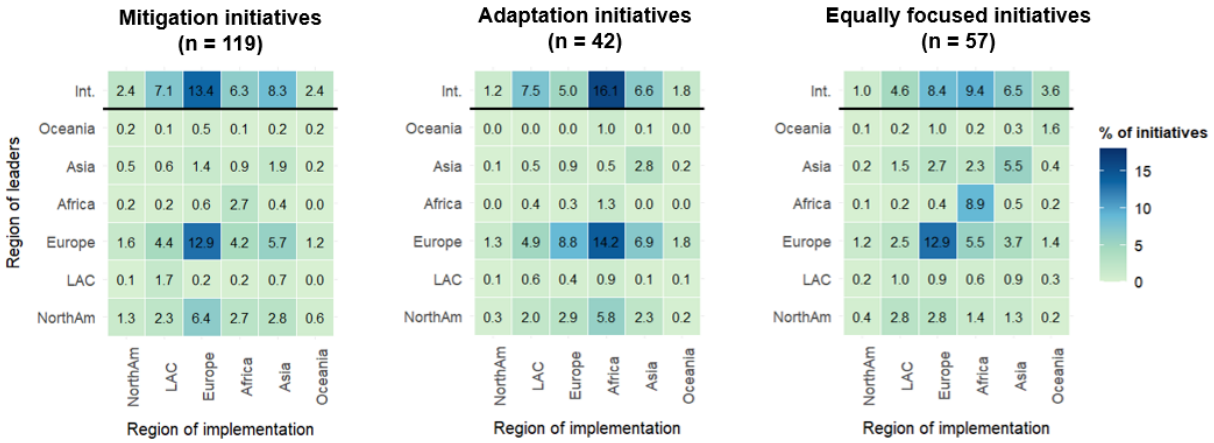
Figure 14. Distribution of leaders by region of origin and actor type.



However, it is important to not only consider the actor type or region of origin of leaders to assess questions of justice in decision-making. The following heatmaps (Figure 15) distribute initiatives into a matrix based on the relative proportions of their leaders and their regions of planned or ongoing implementation. Based on the proportions of leaders and regions of implementation, each cell provides an estimate of the percentage of initiatives that could be considered to be exclusively led by actors from and implemented in a particular region. For example, the top row accounts for initiatives led by international actors, while the diagonal represents initiatives led by actors from the same region. International and European actors are the main leaders of both mitigation and adaptation initiatives. Notably, European actors tend to fund mitigation initiatives within their own region (12.9% of all mitigation initiatives) as well as adaptation initiatives in other regions, namely in Africa (14.2%), Asia (6.9%), and Latin America and the Caribbean (4.9%). For initiatives led by actors from the same region, shares are larger for equally focused initiatives,

particularly in Africa (8.9%) and Asia (5.5%), in comparison with single-focused initiatives.

Figure 15. Region of leaders versus region of implementation of CCIs.



Note: The analysis considered a sub-sample of 218 initiatives with data on leaders and geographies of implementation. The top row represents leaders with an international character, which mainly include international and multilateral organizations. Percentages in each heat map add up to 100%.

About 40% of initiatives constitute cross-regional efforts where leaders come from other regions than those where the initiatives are implemented (excluding leadership by international organizations). Northern American, European and international organizations lead many initiatives in Asia, Latin America and the Caribbean and Africa. However, if these initiatives were to include actors from these regions as leaders, at least in a proportional way, the values in the diagonal would increase. The skewed distribution of the values in the heatmap demonstrates that initiatives are mostly led by international organizations and actors in the Global North despite being implemented in all regions of the world. This raises justice related concerns as initiatives often do not engage leadership coming from the regions they implement in. Most implementation activities also seem to be in Europe (30.6%), reflecting European leadership, but also raising questions about beneficiaries from the CCIs.

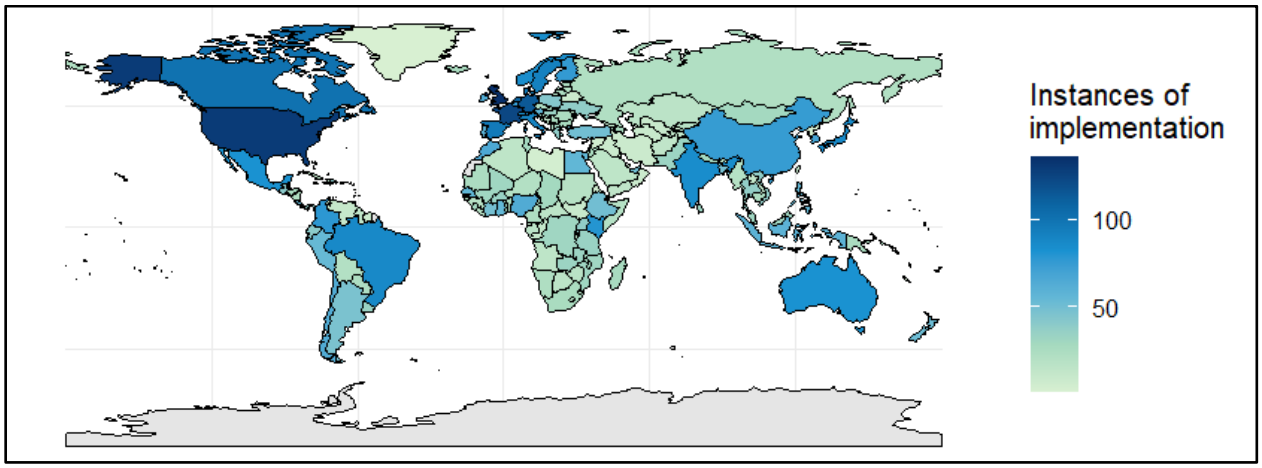
2.7.2 Distributive justice: Who stands to benefit?

A second dimension of justice and equity in CCIs relates to the question of who stands to benefit from the efforts of these multistakeholder partnerships. To answer this question, we draw on C-CID data from planned and ongoing geographies of implementation, together with the region of funders to determine proxies of financial flows between different groups of countries. Finally, we also summarize relevant findings on the basis of target actors and the participants from initiatives.

Geographies of implementation

About 85% initiatives in the sample report one or more countries or territories of planned or ongoing implementation, amounting to a total of 6,602 instances (mean of 29 unique geographies per CCI). The geographic distribution of these instances of planned or ongoing implementation is shown in Figure 16.

Figure 16. Instances of implementation by country or territory.



The analysis of the geographies of implementation reveals that Europe ranks first with nearly one third of total instances (31%). Africa, Asia, and Latin America and the Caribbean follow with 23%, 20% and 16% respectively. The least number of instances are registered in Oceania (6.5%) and Northern America (3.6%). When considering the policy focus of initiatives, more than half of the implementation instances are focused on climate mitigation (53.5%), one-third on equally focused efforts (32.7%), and the rest on adaptation (13.8%).

Commensurate with the principle of *common but differentiated responsibilities* (CBDR), we could expect that more mitigation will be Global North-based, whereas more adaptation action should be expected in the Global South. A set of Chi-square tests of independence were used to assess these implementation patterns. In Table 5, we summarize the results, showing under- and overrepresented regions by policy focus based on standardized residuals. Indeed, implementation efforts in OECD, G20, and European Union countries are predominantly focused on mitigation, while in the Global South—particularly in lower to low-middle income regions and countries—initiatives tend to prioritize adaptation or strike a balance between adaptation and mitigation (equally-focused). For countries with high vulnerability to climate change, namely Landlocked Developing Countries (LLDC), Least Developed Countries (LDC), and Small Island Developing States (SIDS)[7] implementation often focuses on adaptation or equally-focused initiatives, which is considered a priority in these regions (UN-OHRLLS, 2009). It is important to note that although some regions might show over- or underrepresentation, implementation in the Global South remains lower than in the Global North.

[7] UNSD classifications: https://unstats.un.org/unsd/methodology/m49/

Table 5. Over- and underrepresented regions of implementation by policy focus of CCIs.

Region (with percentages of total implementation instances)	Policy focus		
	Mitigation	Adaptation	Equally focused
Income level (Chi-square tests of independence p-value < 0.001)			
High income (41.4%)	+	-	
Upper-middle income (23.6%)			
Lower-middle income (23.0%)	-	+	
Low income (7.9%)	-	+	
EU vs non-EU countries (Chi-square tests of independence p-value < 0.001)			
EU (22.5%)	+	-	
non-EU (77.5%)		+	
G20 vs non-G20 countries (Chi-square tests of independence p-value < 0.001)			
G20 (40.0%)	+	-	-
non-G20 (60.0%)	-	+	+
OECD vs non-OECD countries (Chi-square tests of independence p-value < 0.001)			
OECD (39.0%)	+	-	-
non-OECD (61.0%)	-	+	
Other classifications			
SIDS (p-value = 0.002) (11.7%)	-		+
LDC (p-value < 0.001) (16.7%)	-	+	
LLDC (p-value < 0.001) (11.2%)	-	+	

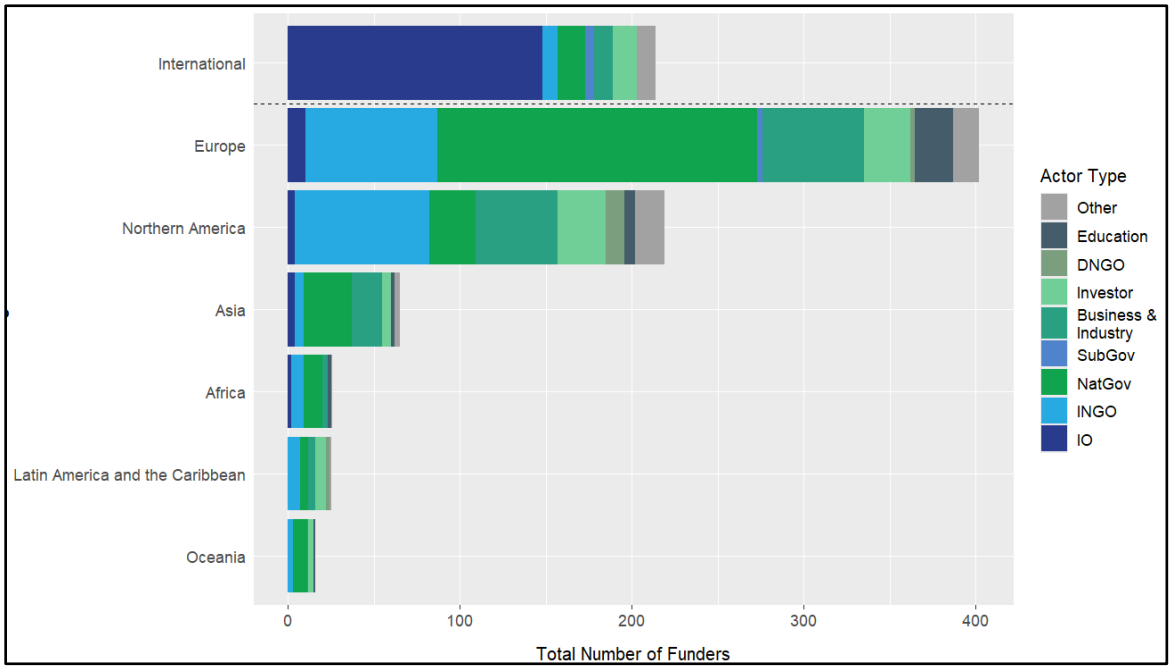
Note: Over/underrepresentation was determined with the absolute values of the standardized residuals of the Chi-square tests of independence (critical value of 1.96). Plus signs (+) indicate overrepresentation and minus signs (-) underrepresentation. Blank cells indicate no significant over or underrepresentation based on the results of the Chi-squared test of independence.

Financial flows

From an integrity standpoint, funding should ideally contribute to equitable distributions. However, what constitutes just distributions within the context of CCIs is open to debate. Should resources be allocated based on historical responsibility for emissions, the current vulnerability of regions to climate impacts, or the capacity of different actors to implement effective solutions? These considerations raise critical questions about fairness, accountability, and the long-term sustainability of climate action. While our analysis does not fully address all these questions, we might anticipate more investment in mitigation efforts in the Global North, and greater emphasis on adaptation efforts in the Global South. Additionally, we might expect funders and investors from the Global North to bear a larger share of financing climate action. In our analysis, we examine the regional distribution of funders, their origins, and the regions of implementation as a proxy for recipient countries.

About 72% of all initiatives have at least one funder (average of 5.1). Funding instances add up to 981, 43% of which focus on mitigation initiatives, 22% on adaptation initiatives, and 35% on equally-focused initiatives. National governments (28%), international NGOs (20%), and international organizations (17%) represent the largest shares of funders, followed by business & industry (15%) and investors (9%). When considering the number of initiatives with at least one funder in an actor type category, nearly half (46%) have an international organization as a funder. IOs and national governments are also the main funder in 35% and 30% of all initiatives (determined as the largest share of funder types in an initiative).
Similarly to the analysis of leaders, if such a large share of funding instances comes from actors in the Global North (see Figure 17), integrity can be highly dependent on these actors, and much is at stake based on what they decide to fund (or not).

Figure 17. Distribution of funders by region of origin and actor type.

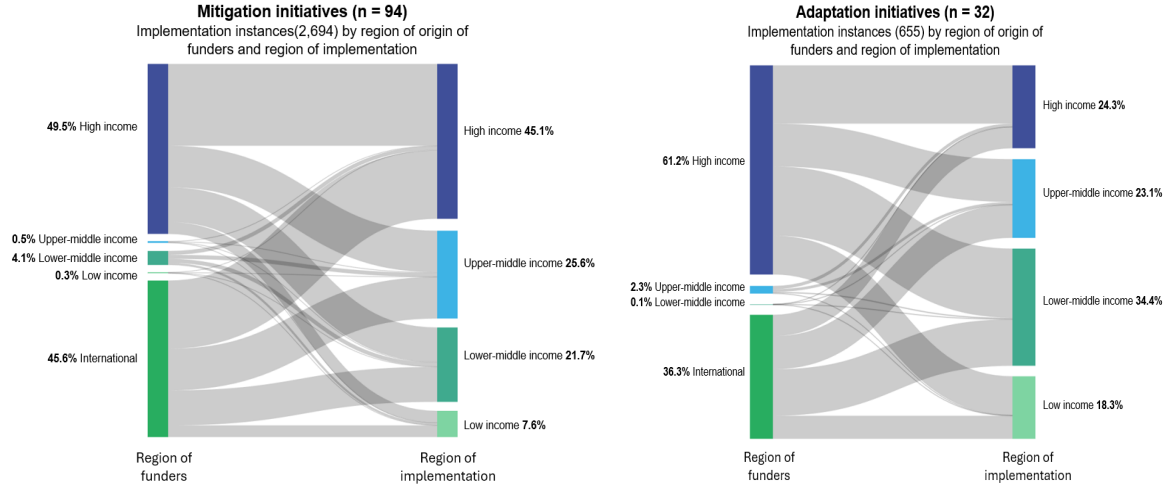


The analysis of distributive justice must consider not only where funders come from, but where they actually implement. The best proxy in the dataset for this is the data on geographies of planned or ongoing implementation. By comparing the region of funders with the region of implementation, we can gain insights into financial flows. In this regard, we would expect significant Global North to South flows in line with expectations on financial and technological transfer outlined in international agreements (Khan et al., 2020), particularly in relation to climate adaptation. For mitigation, much action needs to occur in the Global North in line with historical responsibility on greenhouse gas emissions (Hickel, 2020). The following analysis is a first step in using C-CID data to assess questions related to distributive justice.

The Sankey diagrams in Figure 18 link funders with the geographies of implementation of initiatives while accounting for the income level of both the countries or territories of origin of funders and those of implementation instances. The diagram distributes instances of implementation across funders based on their overall proportion. For example, if one initiative registers 10 geographies of implementation classified

as low-income countries, and half of its funders come from high-income countries, then 5 instances of implementation are allocated to the high-income (funder) to low-income (implementation) flow. The diagram once again confirms that most implementation happens in high-income countries, for both sub-samples of adaptation and mitigation initiatives for which there is data on their funders and their geographies of implementation (94 mitigation initiatives and 32 adaptation ones). Most implementation in lower income countries is mainly financed by international actors or organizations coming from high-income countries, with a particular focus on adaptation rather than mitigation. Although these results provide evidence of relevant financial flows from the Global North to the Global South, future analysis should aim to account for differentiated contributions by funders, attempt to quantify the development, and magnitude of, financial flows, and seek to understand development of financial flows over time. Based on currently available data, however, we can only show numbers of implementation instances associated with particular funders. Moreover, the fact that a certain country or territory is reported as a geography of implementation does not indicate actual outcomes or impacts of cooperative climate action.

Figure 18. Implementation instances by region of origin of funders and region of implementation (by income level) for mitigation and adaptation initiatives.



Note: Based on the World Bank's country classifications by income level.

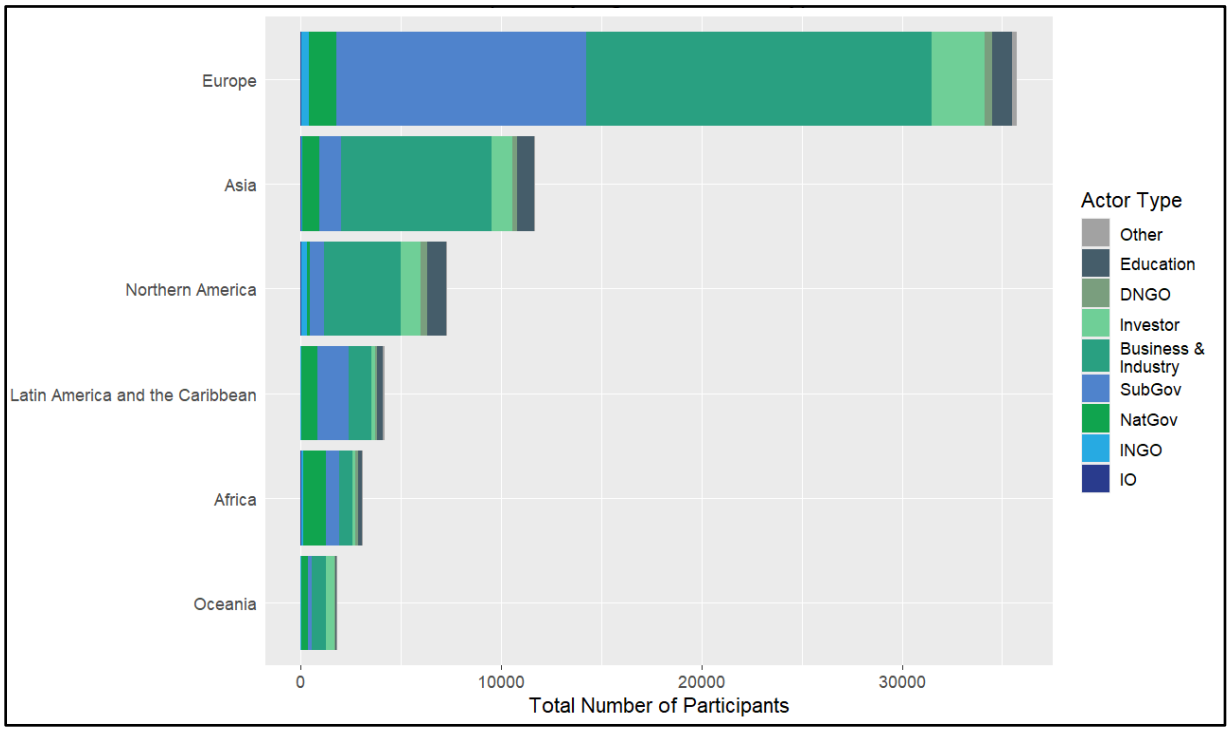
Target actors and participation by actor type

A last analysis to assess potential beneficiaries from the activities of CCIs is based on data on the target actors that initiatives aim to influence or engage with, as well as information on participants by actor type and region.

Actor participation in CCIs includes members, partners, signatories and a broad range of engagement categories within cooperative initiatives besides funding and leading/coordination. As such, participating actors might or might not be positioned to benefit from the activities of CCIs, depending on what exactly their role is. However, they can be considered a proxy of potential benefits. If that is the case, most beneficiaries, based on their region of origin and actor type of participants, are European subnational governments and businesses (see Figure 19). Other relatively overrepresented groups according to a significant Chi-square tests of independence include subnational governments from Latin America and the Caribbean; business & industry actors from Eastern Asia; investors from Northern America and Oceania; education actors from Northern America and Southern Asia; DNGOs from Northern America, and National

governments from Africa and Latin America and the Caribbean. Notable under representations include national and subnational governments from Northern America, Latin American and African businesses and investors, as well as subnational governments from Southern Asia.

Figure 19. Distribution of participants by region of origin and actor type.



Another set of Chi-square tests of independence was used to assess the over- and underrepresentation of regions in the dataset vis-a-vis climate policy foci, to identify actors more likely to benefit from climate initiatives in comparison to overall distributions. Results show that actors from LLDCs, LDCs and SIDS tend to participate more in adaptation initiatives. However, in the data set, they only make up 2.8% (LDC), 2.0% (LLDC), and 1.8% (SIDS) of all participants. When accounting for the income level of countries, businesses and investors from high-income nations are more likely to potentially benefit, as they are overrepresented in the sample, together with subnational governments from upper-middle income countries. Notably, subnational actors, businesses, and investors in low and lower-middle income countries, which are often the main actors in CCIs, are all underrepresented (see Table 6).

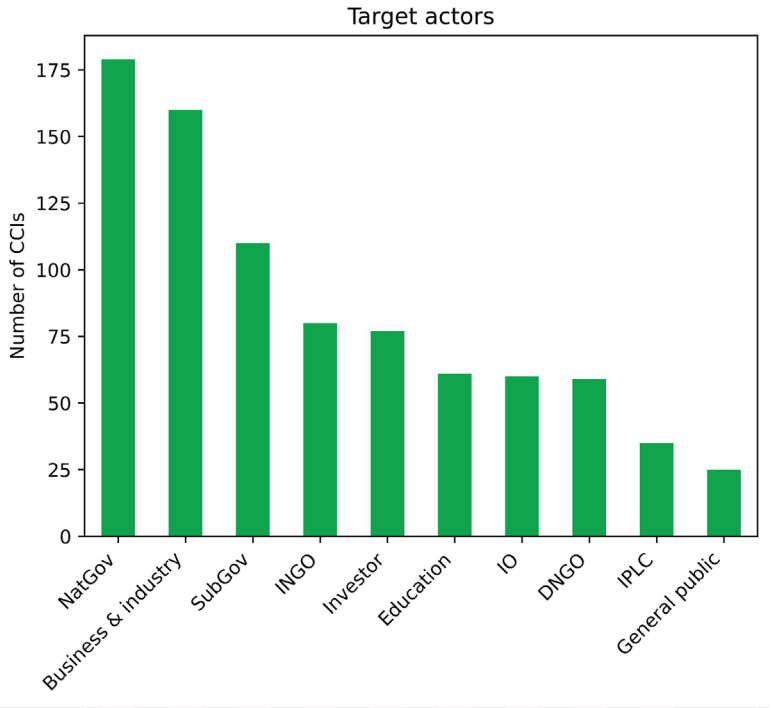
Table 6. Over- and underrepresented actors by type and income level.

Income level	Actor type							
	IO	INGO	NatGov	SubGov	Bus. & ind.	Inv.	DNGO	Edu.
High			-		+	+	-	-
Upper-middle		-	+	+	-	-		
Lower-middle			+	-	-	-	+	
Low			+	-	-	-	+	

Note: Over/underrepresentation was determined with the absolute values of the standardized residuals of the Chi-square tests of independence (critical value of 1.96). Plus signs (+) indicate overrepresentation and minus signs (-) underrepresentation. Blank cells indicate no significant over or underrepresentation based on the results of the Chi-squared test of independence.

The target actors, the types of actors that CCIs aim to engage or influence, can also be used as a proxy of potential beneficiaries. Overall, most initiatives target national governments (67%), business & industry (60%), subnational governments (41%), or investors (29%), as shown in Figure 20.

Figure 20. Target actors of CCIs.



Some target actors stand to benefit more or less from some particular functions of initiatives. A correlation analysis between the main functions carried out by CCIs and the actors they target was used to identify significant associations. For instance, technical implementation is often performed by initiatives that target more subnational governments, while standard setting initiatives often target businesses and investors. This indicates that these actor types are more likely to benefit from specific functions. Table 7 summarizes significant correlations at a 95% confidence level.

Table 7. Correlations between the main functions of initiatives and the actor types they target.

Function	Actor type							
	Nat Govs	Sub Govs	Bus. & Ind.	Inv.	INGO	DNGO	IOR	Edu.
Knowledge production	-							
Knowledge dissemination			+					
Technical implementation & 'on the ground' action		+						
Institutional capacity building	+		-					
Norm & standard setting	-		+	+		-		-
Lobbying								-
Funding	+		-		+	+		
Policy planning	+	+						

Note: Campaigning, participatory management, training, and commercial product or service development functions are not significantly correlated with any target type, and therefore not included in the table. Colour coding is used to indicate when significant correlations ($p < 0.05$) are negative (red colour: initiatives performing the function target that type of actor less often) or positive (green colour).

2.7.3 Recognitional justice

The multifaceted nature of recognitional justice is reflected by different scholars, who highlight the importance of acknowledging diversity and multiple perspectives within society, and their implications for fairness and inclusion (Amorim-Maia et al., 2022; Newell et al. 2021). These dimensions include the recognition (or lack thereof) of the diverse needs and aspirations of different societal groups, the acknowledgment of structural causes of vulnerability and historical injustices (such as exclusion from participation and access to resources), the incorporation of intersectionality, and the promotion of respect for marginalized groups. As the current investigation can only address a limited scope of recognitional justice, it focuses on the crucial issue of recognizing Indigenous Peoples and Local Communities (IPLCs). IPLCs play a unique role in safeguarding biodiversity and environmental integrity within climate actions, rooted in their distinct cultural identities and traditional knowledge. However, they also face disproportionate challenges in securing their rights and resources, often stemming from historical inequities and long-standing marginalization.

Out of 267 initiatives in our sample, 35 (13%) specifically target IPLCs. The following analysis focuses on this sub-sample of 35 initiatives, describing the types of actors involved, the countries where initiatives are based in, the organizations leading them, and the extent to which IPLCs play a role within these initiatives. Notably, our analysis reveals that a significantly higher proportion of IPLC-targeted initiatives prioritize adaptation over mitigation compared to non-IPLC initiatives (42.9% vs. 18.5% for adaptation and 34.3% vs. 54.7% for mitigation), with the difference being statistically significant (p-value = 0.004296, Chi-squared test). The distinct climate action focus of initiatives targeting IPLCs highlights key dimensions of recognitional justice. As IPLCs are disproportionately impacted by climate change, their emphasis on

adaptation over mitigation reflects their immediate needs to address vulnerabilities and protect their livelihoods, which are closely tied to their environments and cultural identities. Such prioritization suggests that IPLCs are more concerned with building resilience to the direct impacts of climate change, rather than solely contributing to global mitigation efforts. Similarly, we find that CCIs targeting IPLCs (17.14%, or 6 out of 35) are significantly (p-value = 0.03199, Chi-squared test) more likely to address SDG10 (Reduced Inequalities) compared to those that do not (8.19%, 19 out of 232).

While the focus on adaptation and reducing inequalities building might align with a greater recognition of the priorities of IPLCs, the same cannot be said of patterns of participation and leadership.
Current C-CID data shows very low participation by IPLC in CCIs, just one initiative engaging (six) IPLCs as participants. While IPLCs are historically underrepresented in climate action (as compared to e.g., biodiversity action), this low number may be cause for concern, considering the fact many CCIs advocate nature-based climate actions (Boran et al. 2024), which are often implemented in areas with IPLCs. However, caution must be applied when interpreting these findings. IPLC organizations were previously coded in C-CID as domestic NGOs and nonprofits, and only collects data on IPLC as a separate category since May 2024. Hence, C-CID-based analysis most likely underestimates IPLC engagement in CCIs.

In terms of leadership and the location of secretariats, significant geographic imbalances emerge. CCIs targeting IPLCs are predominantly led by international organizations (37%), followed by national governments (22%), and international nonprofits and NGOs (19%). Most actors involved in these initiatives—whether as funders, leaders, or participants—originate from high-income countries (HIC, 50%) with comparatively fewer actors from upper-middle-income countries (UMIC, 15%), lower middle-income (LMIC, 15%) and lower-income countries (LIC, 12%) (Figure 21). National government and international non-profits and NGOs also play an outsized role in the funding of these initiatives, making up respectively 63% and 16% of all funders. Additionally, 7.1% of the actors are classified as international, further highlighting the dominant role of countries from the Global North and international bodies in these initiatives. Moreover, the majority of CCIs targeting IPLCs have secretariats based in high-income countries, with 63% located primarily in Europe and the US. In contrast, 9% are based in low-middle-income countries, primarily in Sub-Saharan Africa, while only 3% are based in low-income countries and another 3% in upper-middle-income countries. Additionally, 9% of the initiatives have secretariats located in multiple countries, combining different income levels. For 14% of the initiatives, the location of the secretariat remains unknown. These imbalanced distributions and overrepresentation of the Global North based actors in CCI leadership and secretariats raises important questions. According to the ILO (2020), only 12.9 million indigenous peoples, or 2.7 per cent of the total, live in high-income countries, while the highest proportion of indigenous peoples in the total population are found in low-income countries. The patterns we find hence indicate a potential disconnect between those leading and coordinating initiatives and those targeted.

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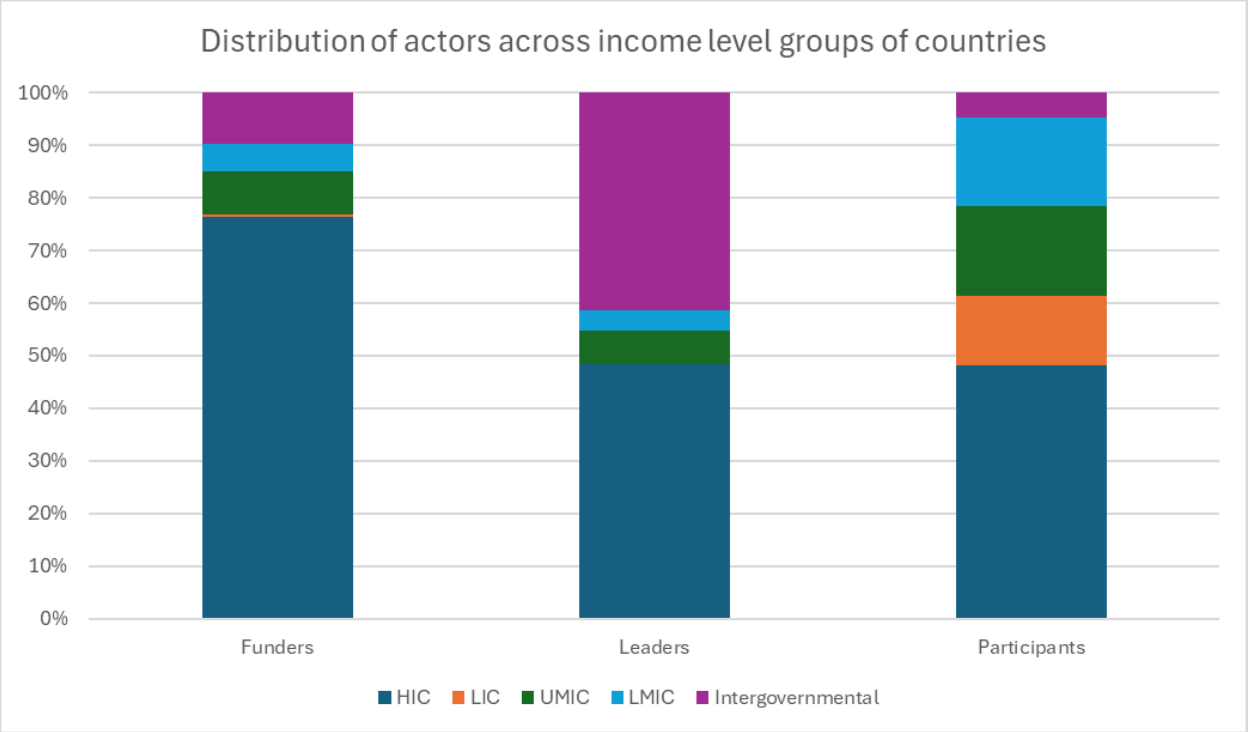
Figure 21. Distribution of actors for each of the actor categories (funder, leader, participant) across different income level country groups.



2.7.4 Epistemic justice

Inclusion of indigenous peoples and local communities

For climate initiatives to be both effective and equitable, they need to recognize diverse knowledge systems and incorporate a wide range of perspectives, from scientific expertise to traditional knowledge, e.g. by IPLCs. Without such epistemic recognition, CCIs risk perpetuating the dominance of perspectives from high-income countries and international organizations, and the marginalization of Global South, local or Indigenous perspectives.

Our investigation of CCIs remains inconclusive regarding their effectiveness in broadening perspectives through increased participation. For example, CCIs that prioritize expanding participation through 'participatory management' do not target IPLCs more frequently (p-value = 1, Chi-squared). Neither are initiatives that engage in knowledge production more likely to target IPLCs, among 51 knowledge production initiatives only 7.84% target IPLCs, compared to 14.4% on average (p-value = 0.3134, Chi-squared). Yet, we find that CCIs with a focus on land use, or agriculture, forestry, and fishing, are more often targeting IPLCs. 32% of CCIs that address land use target IPLCs, compared to just 6.93% of initiatives that do not address land use, p-value = 0.00, Chi-squared) and 27% CCIs in agriculture, forestry, and fishing target IPLCs, compared to 10% of initiatives that do not address this theme (p-value = 0.006664, Chi-squared). This highlights a stronger connection between land-use-related CCIs and the inclusion of IPLCs, possibly reflecting an (appropriate) higher-level of engagement in thematic areas in which IPLCs play an essential role in managing natural resources.

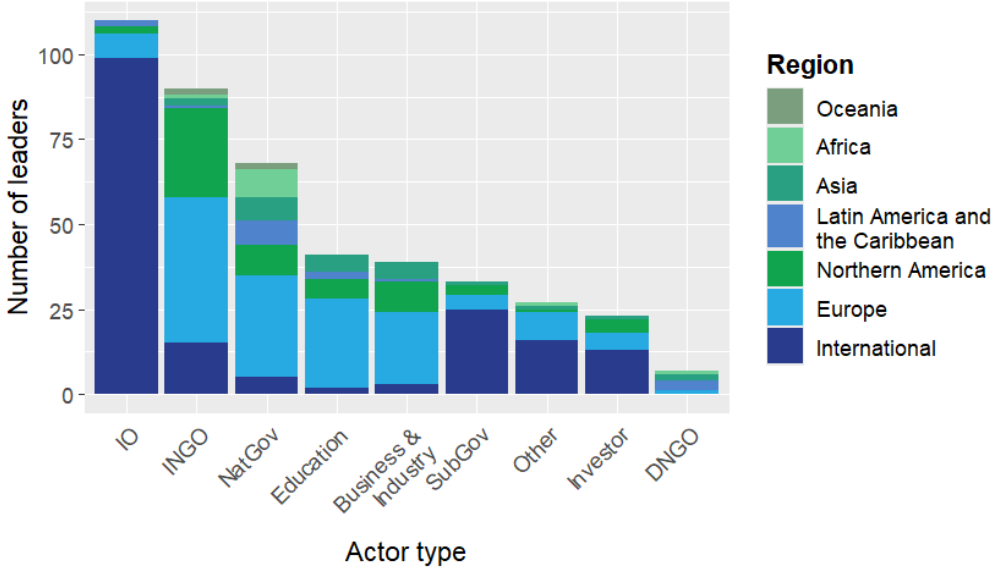
Knowledge Production and Epistemic Communities

Knowledge production is one of the most prominent functions of CCIs and could reveal important patterns

related to epistemic justice. 52 Out of 267 CCIs have knowledge production among their most important functions, for another 67 initiatives knowledge production is a relevant function. The majority of CCIs focusing on knowledge production are led by international non-profits, NGOs, and organizations, with leadership concentrated in high-income countries like the US, UK, France, and Germany (Fig. 22). This concentration suggests a geographical imbalance in the leadership of knowledge-producing CCIs, which may limit the diversity of perspectives integrated into these initiatives.

The overrepresentation of knowledge-producing CCIs based in high-income countries points to an ongoing issue of epistemic inequality. With leadership and knowledge production largely concentrated in Europe and the US, the risk is that local and Indigenous knowledge from regions most affected by climate change may be underrepresented or ignored. For CCIs to achieve true epistemic justice, they must broaden their engagement to include scientists, experts, and knowledge holders from a wider range of geographical and disciplinary backgrounds.

Figure 22. Leadership of knowledge-production CCIs by region and actor type.



2.8 Discussion

2.8.1 Main findings

2.8.1.1 Accountability and transparency

Our analysis reveals significant disparities in the accountability and transparency of CCIs. Initiatives that set membership requirements—such as requiring participants to set targets, draft implementation plans, and track progress—are more likely to score higher on effectiveness, as measured by maximum recorded levels of the Function-Output-Fit (FOF). However, accountability across CCIs varies, with lobbying-focused initiatives particularly underperforming on external accountability while maintaining average internal accountability. Funding-focused CCIs score lower than average on both internal and external accountability, with many initiatives underreporting funding details or failing to disclose fundraising targets, especially those engaged in lobbying. A key concern is the underrepresentation of local actors in decision-making processes, as subnational governments are often absent from advisory bodies, and

domestic NGOs are underrepresented in both executive and advisory bodies, despite being targeted by many CCIs. This disconnect raises questions about whether local actors are sufficiently included in the governance of these initiatives.

2.8.1.2 Capacity, implementation and effectiveness

Capacity and effectiveness in CCIs are closely linked to internal accountability structures and transparency. CCIs that set membership requirements tend to perform better, reflected in higher maximum FOF scores, highlighting the role of accountability in driving effectiveness. However, a general trend of underreporting funding and financing targets—particularly among lobbying initiatives—indicates potential gaps in capacity and transparency. CCIs with dedicated staff are more likely to achieve higher levels of effectiveness than those without, suggesting that human resources play a crucial role in an initiative's capacity to deliver on its objectives. Furthermore, larger initiatives, with more participants, generally demonstrate higher performance, while smaller initiatives with fewer accountability mechanisms show significant gaps in implementation.

Our analysis also reveals a concerning downward trend in average annual effectiveness since 2018, as measured by FOF scores. This may suggest declining capacity or commitment over time, although newer initiatives in our sample may require more time to fully implement their activities. While this trend is statistically significant, further research is needed to explore whether this decline is reflective of broader challenges in the CCI landscape or whether it is influenced by external factors, such as resource limitations or reporting delays. Strengthening accountability and capacity will be essential to reversing this trend and ensuring that CCIs remain effective in achieving their climate goals.

2.8.1.3 Ecological integrity and sustainable development

Our findings suggest that while Climate Cooperative Initiatives (CCIs) make valuable contributions to addressing climate change, they face significant challenges regarding environmental integrity, particularly in relation to biodiversity, co-benefits, carbon offsets, and the involvement of high-emission industries. Although CCIs often align with key Sustainable Development Goals (SDGs) such as clean energy, urban sustainability, and innovation, they frequently overlook important social and biodiversity-related goals like gender equality (SDG 5), reduced inequalities (SDG 10), and life below water (SDG 14). These gaps may undermine the long-term sustainability of both environmental and social outcomes. Our analysis also shows that CCIs linking to multiple SDGs tend to have stronger external monitoring arrangements, suggesting that those with a broader focus on sustainability not only deliver more co-benefits but also achieve higher external accountability. However, addressing a wider range of SDGs does not necessarily improve internal governance or lead to stronger environmental outcomes.

We identified two contentious issues: the use of carbon offsets and the involvement of fossil fuel producers. While some CCIs establish standards for environmental and social integrity, the majority do not adequately address the risks associated with carbon offsets, raising concerns about the credibility of initiatives that rely on them to meet net-zero targets. Ensuring robust standards and transparency in the use of offsets will be critical to maintaining the environmental integrity of these initiatives. Similarly, the participation of major fossil fuel producers in CCIs could signal a commitment to cleaner practices but also introduces potential conflicts of interest that may weaken the ambition and effectiveness of these efforts. Careful scrutiny is needed to determine whether the involvement of high-emission industries in CCIs dilutes

climate goals or contributes meaningfully to environmental sustainability.

2.8.1.4 Justice and equity

Questions of justice and equity in CCIs are multifaceted, involving representation (procedural justice), distributive justice, recognitional justice, and epistemic justice. Our analysis confirms previous findings that CCI leadership is heavily concentrated in the Global North, with international organizations, national governments, and NGOs from high-income countries playing dominant roles. Actors from lower-middle-income countries (LMICs) make up only 15.2% of leadership, even though many initiatives are implemented in the Global South. This imbalance raises concerns about equitable representation in decision-making.
Disparities in distributive justice are evident in the allocation of implementation efforts and financial flows. CCI funding, leadership, and activities remain concentrated in high-income countries, while implementation in low-income countries is limited. This calls into question whether vulnerable communities most affected by climate change are genuinely benefiting from these initiatives.

Recognitional justice, which involves acknowledging the unique role of marginalized groups such as Indigenous Peoples and Local Communities (IPLCs), is only partially realized in CCIs. Although 13% of the initiatives target IPLCs, there is little evidence of their active engagement in leadership or decision-making. While IPLC-targeted initiatives tend to focus on adaptation to address immediate resilience needs, the lack of IPLC representation in leadership undermines the inclusiveness and effectiveness of these efforts.
Lastly, epistemic justice is lacking in CCIs, with knowledge production dominated by actors from high-income countries. This creates an epistemic imbalance, where perspectives from the Global North are prioritized, potentially sidelining crucial insights from the Global South, especially those from IPLCs.

2.9 Discussion

2.9.1 Research gaps

The comprehensiveness of the C-CID dataset offers significant value in identifying patterns and trends across various dimensions of integrity. Given that no other publicly available dataset matches its scope, we can reasonably assume that the C-CID database also highlights the limitations of using large-n quantitative methods to assess integrity. Therefore, the objective of the current analysis is not only to evaluate integrity but also to identify existing data gaps and determine what additional research is needed to deepen our understanding of the integrity of cooperative climate initiatives within the broader context of global climate and sustainability governance.

In the sections that follow, we outline possible follow-up research questions and data gaps for each dimension of integrity, providing a roadmap for future research.

Regarding *accountability and transparency*, research and data gaps relate the target-setting and accountability relations. Our current analysis stops short at more substantive investigations into target-setting. For instance, the current landscape analysis does not investigate the level of ambition of targets, and whether these targets are sufficiently responsive to the urgency of climate change as indicated by scientists (‘science-basedness’ of targets). Beyond target-setting, our investigation also cannot indicate whether and how participants meet CCI requirements and possible sanctions are applied in the case of

non-compliance. Moreover, while using regular reporting and monitoring as a proxy for external accountability, our current analysis does not indicate how CCIs link to the global governance system they operate in. For instance, do CCIs respond to, contribute to the implementation of, and/or exceed ambitions set out in nationally determined contributions (NDCs)? While some of these research gaps can be addressed through additional analyses of the current dataset, others will require additional data collection (including on the application of sanctions, or references to NDCs and national policies).

Regarding *capacity, implementation and effectiveness*, we find much scope for future research that elucidates more on the inputs, impacts and influence of CCIs. For instance, although our current analysis addresses some financial aspects of CCIs (incl. fundraising as a functional category, funding acquisition as an output, funders of CCIs as a distinct role, and the presence of budgets as an indicator for capacity), our analysis cannot indicate actual amounts of funding. Understanding how and how much CCIs channel or invest funding would be highly relevant, e.g. in more comprehensively understanding global climate finance, and e.g. the contribution that CCIs make towards current and future climate financing goals. Knowledge gaps and remaining questions, however, are not limited to finance-related questions. Effectiveness, often understood as 'problem-solving', requires data about behavioural change and changes in environmental and social indicators (Hale et al., 2021), which are currently largely absent in large-n quantitative data collection and analysis. For instance, we have very limited understanding of whether and how CCIs may influence the behaviour of individual participants (Part 2 of this report, aims to shed some light to this, particularly vis-a-vis subnational participants in CCIs). Moreover, the focus on CCIs as a unit of analysis, even when broadened to also looking at individual participants, would still fall short of understanding catalytic impacts and indirect effects of CCIs, e.g. the take-up of replication of innovations, demonstration effects and learning by non-participants. These research gaps will require more accurate data on e.g. funding of, and by, CCIs, as well as the linking of CCI datasets with datasets on individual actions (e.g., by subnational, or, business and industry actors). At the same time, a fuller understanding of e.g. catalytic impacts will require additional research which, e.g. focuses on different units of analysis, including individual participants and non-participants, and/or institutional structures and policies that co-constitute the transnational governance environments that CCIs operate in (see Teunissen & Chan, 2024).

The investigation of *environmental integrity and sustainable development* requires expanding the research focus beyond the predominant input-throughput-output-outcome-impact linearity that characterizes most studies on CCIs (Hale et al., 2021). Such a narrow framing fails to account for unintended effects or moral hazards that may arise when CCIs, their funders, leaders, or participants deliberately downplay or omit the negative impacts of their actions. The current analysis reveals that many CCIs emphasize 'co-benefits' related to broader sustainable development goals. This focus on positive, co-beneficial linkages is unsurprising, as CCIs and their participants are naturally more inclined to highlight their sustainability achievements rather than acknowledge potential harms. Our investigation examines trade-offs and conflicts only in a very limited manner. Particularly, our study focuses on the role of carbon offsetting within initiatives and the controversial involvement of fossil fuel companies. However, it falls short of comprehensively addressing the broader impacts that may undermine the environmental integrity of CCIs. Future research should aim to overcome the existing bias towards synergies and co-benefits by critically examining the involvement of controversial actors from highly polluting sectors and the deployment of contentious technologies. These include geo-engineering approaches such as solar radiation management, carbon capture and storage (CCS), bioenergy with carbon capture and storage (BECCS), and

nuclear energy. However, a precondition for larger-n comparative research of CCIs relating to these aspects of environmental integrity will also require more data e.g. on the magnitude of CCI co-benefits and trade-offs, which are currently missing.

Our investigation into *justice and equity*, while shedding light on procedural, distributive, recognitional, and epistemic dimensions of justice, was constrained by the limited availability of relational data, and data on within-country impacts and organizational aspects of CCIs. More relational data could offer deeper insights into how power dynamics are shaped and exerted through leadership, funding mechanisms, and patterns of participation. Moreover, the single focus on CCIs as the main unit of analysis, also restricts our understanding of influence and power between networks (such as CCIs) and participants, and between networks - which would be crucial to understand whether and how CCIs may shift power and voice within the larger context of climate governance. The tendency of CCI datasets, including C-CID, to abstract data categories to the level of countries and territories can mask the nuanced global dynamics of climate injustice. This approach limits our understanding of within-country distributions of effects, which is essential for analysing many dimensions of justice. Addressing these limitations requires a more comprehensive lens that captures not only subnational and actor categories but also the broader imbalances between Global North and Global South actors. For example, the disproportionately high contributions to emissions from Global North countries contrast starkly with the burdens borne by vulnerable, low-emitting populations in the Global South. More refined data collection—such as further distinguishing indigenous peoples and local communities from domestic nonprofits and NGOs—can begin to remedy this issue. Still, a deeper understanding of justice and equity implications in CCIs requires epistemic considerations that go beyond data alone, recognizing the structural disparities in climate burdens and benefits worldwide.

2.9.2 Limitations

Many of the current knowledge gaps relate to the incomprehensiveness of data reporting. For instance, CCIs - even when they are recognized by the UNFCCC - are not formally subject to *monitoring, reporting, and verification* (MRV) processes like national governments. The lack of transparency requirements for CCIs leads to fragmented reporting, as well as many missing data points, even when CCIs report. By not directly relying on self-reported data, C-CID somewhat overcomes these limitations, e.g. featuring very few missing data points. Yet, we also find our data collection and management is not sufficiently comprehensive, e.g. to demonstrate change in participatory patterns over time, or to accurately indicate the magnitude and quality of social or environmental impacts. While this may call for data collection, greater comprehensiveness only might help to respond to specific integrity questions, and thus incrementally narrow knowledge gaps while the broader, multifaceted concept integrity may remain difficult to grasp.

Our ongoing efforts to enhance data on CCIs should not be interpreted as a move toward a large-n quantitative approach capable of addressing all dimensions and aspects of integrity. For instance, this study does not address critical integrity dimensions such as historical responsibility and intergenerational equity, as these fall outside its scope. Moreover, integrity is not only a multifaceted and complex concept, but it is also deeply rooted in strong normative foundations. For instance, our (positivist) statistical-analytical approach cannot fully account for justice, inclusion, and equity, or for the nuanced dimensions of sustainability and ecological integrity, which are highly context-dependent. While ecological integrity can be partially assessed using this approach, it may fall short in addressing ecosystem services that

support well-being, identity, and culture—non-biological components essential to human values and connections with the environment. Indeed, normative underpinnings of these integrity dimensions, to some degree, defies the comparative epistemology that underpins large-n inquiry. What is considered 'urgent', 'science-based', and how we set (planetary) boundaries, and the desirability of growth or degrowth, fall outside of the remit of most quantitative inquiry. Generalizing claims based on large global datasets may even hurt local sustainability, and local people by foregoing specific ecosystems, socio-economic conditions, and cultural values.

The investigation and assessment of CCIs require a broader inquiry that incorporates multiple epistemologies and research across various levels. This approach should combine both qualitative and quantitative methods to comprehensively assess the integrity of CCIs. The ACHIEVE project, therefore, situates the current mapping of voluntary climate action within a broader research program aimed at understanding the credibility and integrity of such actions. It employs diverse research approaches on closely related topics, focusing on the integrity of voluntary climate action. For example, the ACHIEVE project will examine both cooperative climate initiatives and individual voluntary climate actions, such as corporate and city pledges. It will co-create improved frameworks for assessing the integrity of voluntary climate action, and will explore the design, governance, and key features of these initiatives, as well as the policies and institutions needed to enhance their credibility, robustness, and impact.

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3 Mapping the Intersection of Cooperative and Subnational Actors' Individual Commitments Towards Climate Mitigation and Net-Zero Goals

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3.1 Introduction

Subnational actors are increasingly taking a lead in the tackling climate change by committing to voluntary climate actions. As hubs of human activity, urban municipalities contribute significantly to pollution and environmental challenges (Elmqvist et al., 2019). While cities are a major source of these problems, they are also seen as an effective level for implementing environmental policies, by bridging global and local impacts (Jon, 2020). Many cities are spearheading individual efforts by proposing ambitious net-zero and emission reduction targets. Much of the subnational climate action is organised through diverse climate cooperative initiatives, which are increasing in size and mobilizing increasing amounts of funding (Acuto et al., 2024). Climate mitigation policies, whether pursued cooperatively or independently, aim to curb greenhouse gas emissions and mitigate the risks of severe climate impacts. Despite growing scholarly attention to the effectiveness of transnational governance (Castán Broto & Westman, 2020), there remains a gap in understanding the overlap between cooperative initiatives and individual city efforts, particularly regarding climate mitigation targets. Furthermore, there is a lack of empirical evidence of the benefits of climate policy networks for city climate action (Heikkinen et al., 2020). Specifically, this study focuses on public climate change mitigation policy targets set up by climate cooperative initiatives that are expected to influence cities' individual climate targets.

In addressing climate change mitigation, municipalities are unlikely to craft their climate policies in complete isolation. Instead, local governments often look to the actions of networks and other communities, which leads to a process known as policy diffusion (Kuhlmann, 2021). This occurs when the mitigation strategies of one jurisdiction are shaped by those of others. At the heart of policy diffusion is interdependence, where subnational actors observe and adjust their own actions based on what others are doing, whether they act pre-emptively, concurrently, or in response to those developments (Berry & Berry, 2018). Policy diffusion within networks can take place through various mechanisms. First, initiatives can transfer knowledge and experiences to member cities, and inspire experimentation in urban climate action (Cortes et al., 2022a; Kern et al., 2023). Second, initiatives can provide services to city members, such as capacity building and the recognition or certification of climate actions (Bellinson, 2018). Studies have so far studied city pledges either individually or as part of cooperative climate initiatives separately. Researchers have already investigated the influence of city networks (Busch, 2015; Domorenok et al., 2020; Hughes et al., 2018) and global climate governance (Bansard et al., 2017; Gordon, 2020) over local climate policies.

Yeganeh et al. (2020) find that membership in policy networks, among other predictors such as public support and government capacity, has been found to be a strong predictor of urban climate policies. Pitt (2010), based on a survey of US municipalities, finds that community environmental activism and internal institutional factors best explain climate mitigation policy adoption. Although previous studies have

investigated the role of city networks, our analysis goes beyond purely city-oriented transnational networks and focuses on climate cooperative initiatives that also include several non-city actors, such as businesses, international organizations, investors, regions, and national governments.
The primary objective of this study is to elucidate the relationships between cooperative initiatives and the individual climate commitments of major cities. This chapter poses the following questions: What are the interconnections between cooperative and individual climate commitments? Do urban climate networks drive the strengthening of cities' individual climate targets? To answer these questions, we employ social network analysis and statistical methods and map relationships between individual and voluntary climate initiatives, identifying central players, analysing overlaps between cooperative initiatives, and assessing their relationship to policy and potential impacts. This research sheds light on the evolving landscape of subnational climate action and informs strategies for enhanced collaboration towards achieving collective climate goals.

Many studies on the role of policy networks have focused on a single or limited number of networks. We combine information from two large-scale databases on subnational climate action. Our analysis focuses on 1180 major cities and 61 cooperative climate initiatives. The main goals of collaboration arrangements, such as climate cooperative initiatives (CCIs) (in particular urban climate networks) are to disseminate information, support collaboration and promote climate action. The main goals of collaboration arrangements, such as climate cooperative initiatives (CCIs) (in particular climate networks) are to disseminate information, support collaboration and promote climate action. For instance, C40, the global network of nearly 100 cities helps its members but also obligates them to develop their own climate action plans (CAPs) (C40 2024). CCIs aim to transform urban climate action by helping urban municipalities to develop policies and tackle new challenges, as urban CO2 emissions make up around 70% of global emissions (Intergovernmental Panel on Climate Change (IPCC) 2023). This, however, sets up the expectation that initiatives would be able to catalyse further climate action through learning and collaboration and bring it in line with the 1.5 C goal of the Paris Agreement (Chan et al., 2021; Dubash, 2020; Haupt et al., 2020). Prior studies have also shown that transnational networks tend to stimulate the development of cities' climate action plans (Heikkinen, 2022), although their impact on emission reductions is considerably less clear (Bansard et al., 2017).

We compare climate action organized within cooperative initiatives and individually on the level of urban municipalities. We hypothesize that cities that are more connected with other cities, but also cities that are more central within cooperative city initiatives are more likely to propose more ambitious individual climate targets. We expect this to be the case since CCIs are intended to help local governments develop mitigation action plans, policies, and targets. We explore the dynamics of climate commitments through a network analysis of cooperative and individual initiatives using data from the Cooperative Initiatives Database (C-CID) and the Net-zero Tracker database. The main goals are to identify key players and understand the relationships between climate commitments and different types of climate cooperative initiatives. The methods we use include social network analysis (SNA), but also regression analysis comparing cooperative initiatives (C-CID) with individual efforts (Net Zero Tracker), focusing on climate change mitigation targets. First, we map are the relationships between cooperative and individual commitments and measure the degree centrality, and structural and substantial diversity of CCIs. Second, we analyse the key characteristics of cities with individual pledges and the climate cooperative initiatives that they participate in.

3.2 Analytical Framework

Climate cooperative initiatives have three key characteristics (Rashidi & Patt, 2018). First, membership in CCIs is voluntary as participants, including cities, can join or leave an initiative when they want. Second, CCIs are self-governing and do not derive their governance top-down from other institutions but are rather part of a web of polycentric governance. Third, the results of discussions are implemented by city members in their policies and targets. We limit our study to CCIs that are either primarily or partly focused on climate change mitigation. Some of the largest CCIs in the world are the Global Covenant of Mayors for Climate & Energy with over 12,500 cities as members, ICLEI with over 2500 local governments, and the Milan Urban Food Policy Pact with over 250 members across the world.

In this study, we analyse whether climate cooperative initiatives drive subnational climate action. We investigate four conjectures based on current advances in the literature. First, we examine whether initiatives propel more ambitious urban climate mitigation target-setting. Research on subnational climate action has investigated the different roles of networks in catalysing cities' climate policies (Lee, 2018; Mokhles & Davidson, 2021). Studies tend to show that networks play an important role in catalysing climate action (van der Heijden, 2019). Participation in networks unlocks financial, informational, and other resources for local governments (Betsill and Bulkeley 2004; 2021). Hsu et al. (2017) and Andonova et al. (2009) argue that network support climate policy diffusion, which takes place primarily through information sharing, capacity building, and rule-setting. International climate networks can also play different mutually compatible roles, acting as platforms for action, consultation, as commitment brokers and advocates (Busch, 2015). Gordon's (2016, p. 542) study on Partners for Climate Protection and Canadian cities argues that networks can improve the "quality of information flow, increase perceived value, extent, or quality of services offered by the network, and augment the capacity to employ "soft" coercive measures to increase adherence to network rules and standards". Participation in climate initiatives has also been shown to have a positive effect on policy outcomes, such as utility-scale solar energy investments (Steffen et al., 2019). Bassett and Shandas (2010) also show that networks drive climate action planning. Not all studies, however, find that initiatives matter for subnational climate policy. Other studies, such as by Bery and Haddad (2023), however, do not find a link between membership in international climate networks and ambition in urban climate action plans. Krause (2012), focusing on a single network – ICLEI – find a weak link between membership and climate mitigation policy adoption (Krause, 2012).

Second, the role of climate cooperative initiatives in influencing cities to adopt more ambitious climate targets can take on different forms. Most importantly, many initiatives require participants to take on greenhouse gas emission targets (Busch et al., 2018). Some initiatives act as facilitators of climate target-setting by requiring members—typically upon joining—to commit to specific climate change policy goals. This process often involves formalizing goals through resolutions or declarations (Busch, 2015). Members are then expected to report their progress, which the network shares with other members and/or the public. For example, the Covenant of Mayors website provides a platform for tracking the progress of its members toward their pledged targets. Hence, we also analyse whether initiatives with clear targets and requirements are more likely to bring about target-setting by individual cities.

Third, are cities that are more central in climate cooperative initiatives, i.e. proactive pioneers instead of passive members of networks, are more likely to take on ambitious climate targets. Not all types of participation may have the same level of impact on subnational climate action. Kern and Bulkeley (2009)

find that not all member cities play an equal role, as some cities can be categorised as 'hard core of pioneers', while there is a periphery consists of relatively 'passive cities' or even 'laggards' within networks. Deeper participation in several initiatives may also capitalise on collaboration between different initiatives and further amplify the network effect of multiple initiatives.

Fourth, cities that are part of more climate cooperative initiatives, are more likely to adopt ambitious climate targets. Being a participant in several initiatives, compared to one may matter for several reasons (Woodruff, 2018). Participation in multiple initiatives can also provide access to a wider range of expertise and solutions, but also allow cities to tap into a broader range of funding sources and technical support. Furthermore, a single network might have specific requirements for reporting progress, but multiple memberships increase the frequency and variety of accountability measures. This means cities are held accountable in different forums, pushing them to maintain or improve their climate performance consistently. As a result, the chances of neglecting or delaying actions are lower.

Finally, climate cooperative initiatives focus on several key functions, such as producing or disseminating information, organizing events, lobby governments, and campaign for climate action, among others. The prospect of influencing cities' climate policies may vary greatly depending on the main function of initiative (Cortes et al., 2022b). For instance, initiatives that are focused on setting enhanced climate standards and norms may be expected to have a more direct influence on climate mitigation targets on the city-level than other initiatives. Learning and the exchange of knowledge and best practices, is frequently brought up as the key value of networks (Bansard et al., 2017). Cities have also emphasised the benefits of gaining personal relationships with other city officials as a crucial benefit of initiatives (Heikkinen, 2022).

As aforementioned, the role of climate cooperative initiatives has gained a lot of attention in recent scholarship. We draw inspiration from research on clubs, which suggests that climate cooperative initiatives constitute clubs, which provide benefits for their members, while also setting entry and participation criteria (Green, 2017; van der Heijden, 2019). Nevertheless, the meta-review by Yeganeh et al. (2020) finds that membership in policy networks, among other predictors such as public support and government capacity, has been found to be a strong predictor of urban climate policies. While some studies find that cities' participation in networks is not well explained by democracy or income (Lee, 2013), cities in the Global South may be less connected to wider policy networks on climate change (Koch, 2021).

3.3 Methods

In this analysis, we will investigate all major cities in the world based on a large database of climate cooperative initiatives. We develop a dataset comprising 1180 major cities from all regions of the world that are members of 61 unique initiatives. First, we employ 2024 Net Zero Tracker's city-level data on all cities with populations greater than 500,000 (Lang et al., 2024), which also includes data on net-zero targets, but also other city-level climate target types, population and geographical regions. We recode all city-level climate targets into a single category of quantitative climate mitigation targets. Second, we merge this data with the Climate Cooperative Initiatives Database (CCID), which includes 2024 information on initiative-level characteristics (Chan et al., 2024). Beside information on types of initiative-level target-setting, CCID also comprises data on the 12 primary functions that the initiatives serve: knowledge production, knowledge dissemination, technical implementation, institutional capacity building, standards norms, campaigning, lobbying, participatory management, training, funding, product service development, and

policy planning. We recoded initiatives according to their focus, assigning them to a specific function if it was among their three most important functions.

We employ a combination of ClimActor (Hsu et al., 2020) along with manual coding to merge cities around the world based on name, country and type of local government. We create a dictionary of standardized city names to merge contextual information on cities in CCID and Net Zero Tracker. This includes text preprocessing techniques, such as purging trailing and leading white space and removing references to the type of municipality (e.g. "City of") from city names. We create a dictionary of city names that accounts for country ISO codes and in the case of the US and Canada for also state IDs.

We focus on the main climate targets of the CCIs and code them as either "net-zero" if there is the presence of a net-zero target as a quantitative emissions target, as an "emissions reductions target" if the quantitative emissions target makes references to reductions in either CO2 or GHG emissions, or as an "renewable energy target" if the initiative formulates a goal to increase renewable energy production. We also account for other types of targets if the target makes references to other types of mitigation goals. For instance, the CCI Action towards Climate-Friendly Transport establishes the target "[…] a multi-region platform for e-bus deployment in 500 cities by 2025, particularly in the Global South […]", which we define as "other". The rest of the CCIs that lack a discernible climate target are coded as "no target". We do the same for cities' own targets based on their end targets based on the coding done by Net Zero Tracker.

In terms of methods, we first employ social network analysis (SNA) to identify linkages between cities and CCIs. We focus mainly on degree centrality of the cities and the CCIs. Degree centrality refers to the number of nodes an actor is connected to, i.e. in the case of cities, the most central cities are connected to the most cities through memberships in climate initiatives (Hafner-Burton et al., 2009). Hence, cities with higher levels of degree centrality are connected to more cities through initiatives and thus more involved in different initiatives through information sharing and policy diffusion. We conduct the SNA for 62 unique initiatives that the 1180 major cities are participants in. We use the degree centrality data for correlational tests in the second part of the analysis.

Second, we employ logistic regression to answer the question whether cities part of CCIs with strong cooperative commitments are more likely to make ambitious individual commitments. The dependent variable is dichotomous: cities either have adopted a quantitative climate mitigation target (1) or have not (0). The analysis includes the testing of independent variables on CCI membership, participating in a CCI with a target, city degree centrality through initiatives, and participating in several initiatives. We also investigate the role of the main function of the climate cooperative initiative among cities that participate in initiatives. The models employ several control variables, such geographical regions to control for potential neighbourhood effects, in case proximity geographically or culturally may affect the results. Although we already limit our dataset to larger global cities with a population over 500,000, we also control for population as well, since city size has shown to predict participation in climate networks and may influence the willingness to announce climate targets (Woodruff, 2018).

3.4 Analysis

We identify 452 major cities (38%) that are members of at least one CCI. The average city in our dataset

has a population of 1.78 million people and altogether our sample of cities covers 2.1 billion inhabitants. This corresponds to more than a quarter of world population. On average, major cities part of initiatives have 2.4 million inhabitants, while cities not part of initiatives have a mean population of 1.5 million inhabitants, which seems to suggest that larger cities are more likely to participate in initiatives. Overall, 774 major cities (65.6%) – that is most cities in our dataset – are not part of a single initiative, while 194 are participants in a single initiative (16.4%). Many cities, however, are members of several initiatives. 212 cities are participants in more than 2 initiatives. Paris (20), Vancouver (19), and Copenhagen (18) are participants in the most initiatives.

In total, we find that the major cities in our database are participants of 61 individual CCIs. Cities are most commonly members of the Covenant of Mayors for Climate & Energy (268 cities), followed by ICLEI (145 cities), Milan Urban Food Policy Pact (104), and C40 Cities Climate Leadership Group (83). Cities that are part of initiatives are on average more concentrated in specific regions and tend to be larger. While Eastern Asian cities make up the largest portion of major cities in our dataset, a vast majority of them are not participants in initiatives (Figure 23). However, this is different for regions, such as Australia and New Zealand, Europe, Latin America, and North America, where most cities are members of initiatives. Participation in initiatives tends to be lower in Africa, Western, Southern, Central and Eastern Asia. Participation in several initiatives is more common in some geographical regions. Membership in a higher number of CCIs tends to be more common among cities in Australia and New Zealand, Europe, and Northern America (Figure 24). The secretariats of the four largest initiatives for our sample of major cities, Global Covenant of Mayors for Climate & Energy (Brussels, Belgium), ICLEI (Bonn, Germany), Milan Urban Food Policy Pact (Milan, Italy), and C40 Cities Climate Leadership Group (London, the UK), are all based in Europe.

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Figure 23. Total number of CCI members vs. non-members per region

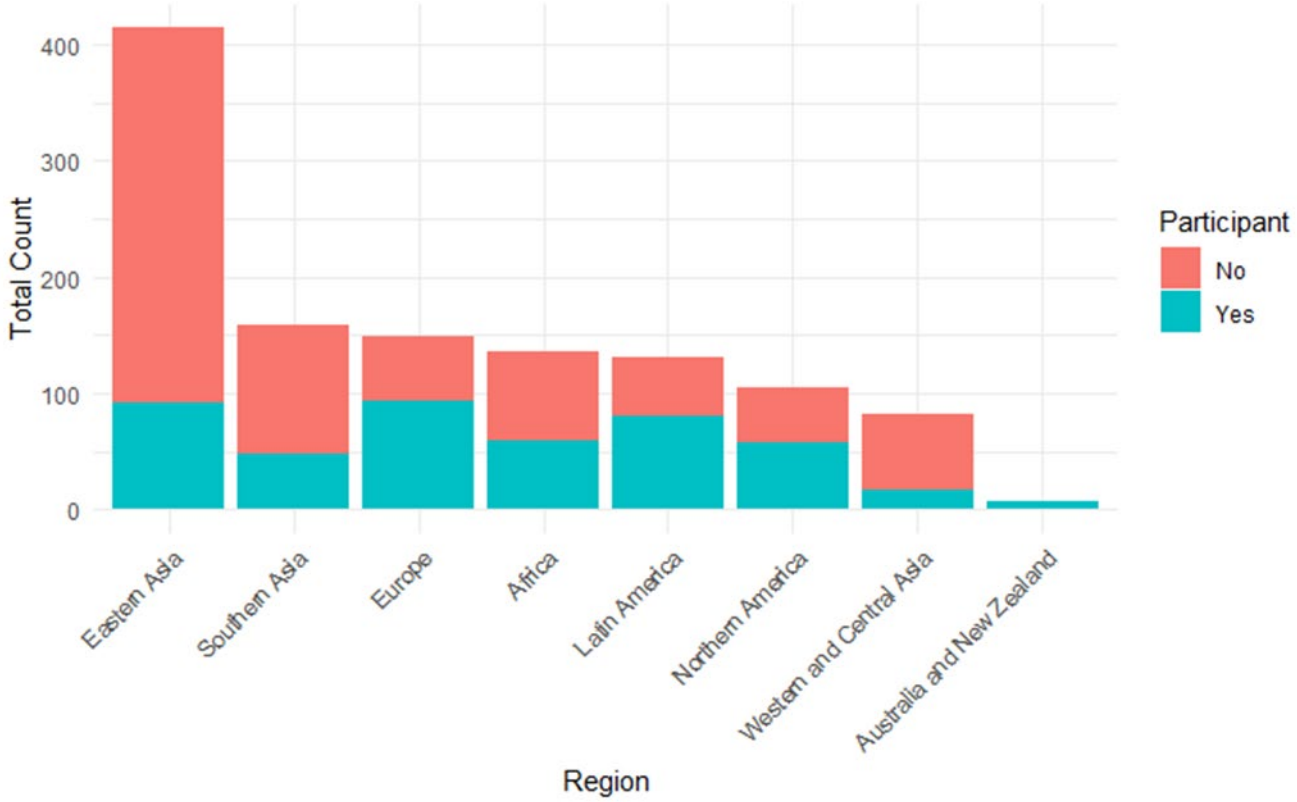
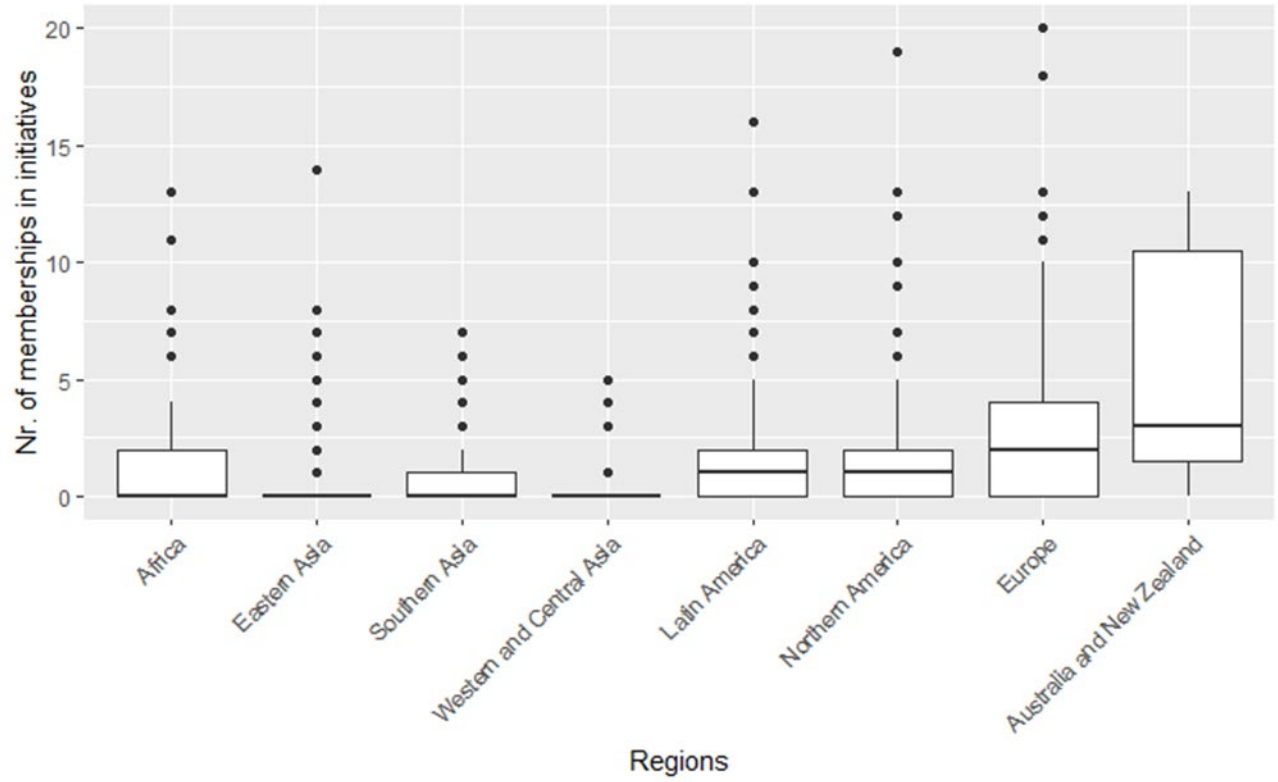


Figure 24. Number of memberships of cities in initiatives per region



Note: The regions are ordered by median value from right to left.

Within our dataset, 419 cities have proposed an individual climate mitigation target, while 761 cities have not made any specific commitments. Moreover, of those 419 cities with an individual climate pledge 101 are not a member of a CCI. Furthermore, of the total 419 cities with an individual target, 143 have pledged to become net zero, 72 have proposed a "carbon neutrality", 62 emissions reduction targets, 16 "climate neutrality" targets, 9 zero carbon, five have made a zero emissions pledge, five have made reduction targets against BAU, two cities emission intensity targets, three cities have made 1.5C degree targets, while nine have made a zero carbon and five a zero emissions target.

Among the CCIs in our new dataset, 18 initiatives have made a quantitative climate mitigation target: 13 initiatives have set an emissions reduction target, while three have a renewable energy target, and two have a net-zero emissions target. We find that 43 initiatives have not proposed a discernible climate mitigation target.

3.4.1 SNA analysis

First, we perform a Social Network Analysis (SNA) to uncover which cities and CCIs are more central or influential within their networks. Centrality or connectedness is important to many actors because it can signify a greater capacity to connect with different information networks (Papin & Fortier, 2024). Central cities may also be better socialized into climate action and more likely to take climate action on the city-level. Recent case studies show that cities tend to align their climate targets with the targets of climate cooperative initiatives, but implementation may be hampered by lack of monitoring capacity and requirements to report to too many initiatives at the same time (Taveirne & Derudder, 2024).

Figure 25 presents the results of the SNA. We find that the city with the most direct connections (i.e. degree centrality) is Seoul, which is connected to 402 cities through a membership in 14 different initiatives. Seoul is followed by Nairobi (401), Copenhagen (399) and Buenos Aires (399) (Table 8). The average city in our dataset is connected to 80 other cities through CCI networks. However, in terms of Eigenvector Centrality, in terms of whether a city is connected to other well-connected nodes, the cities with the highest level of connections are Copenhagen (1), Vancouver (0.986) and Paris (0.954).

Table 8. Top 10 major cities with the highest level of degree centrality

City name	Country	Degree	Betweenness	Eigenvector	Coreness
Seoul	South Korea	402	572.7224	0.8861428	266
Nairobi	Nigeria	401	414.5912	0.8189109	266
Buenos Aires	Argentina	399	417.3439	0.8940460	266
Copenhagen	Denmark	399	366.0185	1.0000000	266
Rome	Italy	394	312.2768	0.8473405	266
Rotterdam	The Netherlands	394	310.7527	0.8640758	266
Vancouver	Canada	391	321.5962	0.9859853	266
Toronto	Canada	386	333.5137	0.8067292	266
Warsaw	Poland	386	251.6032	0.8442981	266
Stockholm	Sweden	382	364.3131	0.7665661	266

Note: The top 10 major cities are sorted by degree centrality, but the table also presents information on betweenness, eigenvector and coreness centrality.

The top three best connected CCIs (through city members) are the Global Covenant of Mayors for Climate & Energy (268 major cities), ICLEI (145), Milan Urban Food Policy Pact (104), and C40 Cities Climate Leadership Group (83). The least connected CCIs in our dataset are the Chamber Climate Coalition, the International Zero-Emission Vehicle Alliance, and the International Carbon Action Partnership (ICAP), which only have a single major city member. The mean number of major city participants in a climate cooperative initiative for our dataset is 34.5. All initiatives under analysis focus either mainly on mitigation (35) or equally on both mitigation and adaptation (20), and mainly adaptation (4).

Figure 25. Social Network Analysis of CCIs with quantitative target types

Note: Includes all CCIs that cities in our dataset are part of, except two that only had one major city as member. The size of the node shows the level of degree centrality by initiative. The colour of the node refers to the quantitative mitigation target of the initiative. CCIs with a net-zero target are coded green and CCIs with emissions reduction targets are coded as blue, while other types of targets are coded black and initiatives without a target are coded as red.

3.4.2 Regression analysis

Since only 35.5% of cities have pledged individual climate targets and only 29.2% are part of CCIs that have a clearly defined climate mitigation target, we first compare differences between being part of CCIs with targets vs. CCIs without targets. We present the results in Table 9, where all models control for population and the geographic region of the city. As expected by prior studies, we find a statistically significant and strong relationship between being member of a CCI with a target and pledging an individual climate target. European, North American, and Western and Central Asian cities are more likely to commit to individual climate pledges, all other factor equal. We present the regression results in Table 9.

Table 9. Main logistic regression results

	Model 1	Model 2	Model 3	Model 4
CCI participation (Yes/no)	2.633***			
	(0.176)			
CCI with quantitative target (Yes/no)		2.058***		
		(0.172)		
City degree centrality			0.009***	
			(0.001)	
Initiative participation (count)				1.176***
				(0.099)
Population	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Region controls	Yes	Yes	Yes	Yes
Num.Obs.	1180	1180	1180	1180
AIC	1034.3	1148.0	1067.6	1061.0
BIC	1085.0	1198.8	1118.3	1111.8

Note: The dependent variable in all models is the adoption of individual quantitative climate mitigation targets on the city-level (yes – 1, no – 0); *p<0.05; **p<0.01; ***p<0.001

In Table 9, first, we find that CCI members are overall more likely to pledge climate targets, notwithstanding whether they are net zero, emissions reductions or other types of targets. Transforming the coefficient of 2.638 (log odds) to an odds ratio of 14, this means that cities that are members of CCIs are 14 times more likely to pledge individual climate targets than cities that are not part of a CCI, holding all other factors constant.

Second, we also find that cities that are members of CCIs with clearly defined climate targets are more likely to propose their own individual city-level climate targets, even when controlling for the region and population. More specifically, cities part of a CCI with a clearly defined climate target are 10.2 times more likely to pledge an individual climate target. Hence, cities tend to align their climate mitigation efforts with the goals of the initiative, benefiting from shared knowledge and strategies.

Third, we investigate if cities that are more central in climate policy networks through CCIs are more likely

to pledge clearly defined climate targets. We find that cities that are more central in their networks through initiatives are more likely to pledge climate mitigation targets. However, while the odds ratio for more central cities is positive and statistically significant, the coefficient is relatively small (0.009). In effect, being connected with an additional city through city networks increases the odds of having an individual climate pledge by 0.9%. Hence, the most well-connected cities are 1.61 times more likely to pledge an individual climate pledge. Due to their centrality, these cities may play a crucial role in coordinating regional climate efforts, which often requires them to adopt targets that can align with the broader goals of the network.

Finally, model 4 in Table 9 shows that cities that are members in more initiatives, are also more likely to pledge individual city-level targets. In effect, cities that are participants in one more initiative, they are about 3.24 times more likely to pledge an individual climate mitigation targets, holding other factors constant.

The coefficients for all the independent variables are statistically significant at the 99.9% confidence level. By comparing the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) of the models, which all include the same control variables and are based on the same observations, we can see that model 1 has the lowest values. This indicates that model 1, which employs the independent variable on dichotomous CCI participation, provides the best fit and explains city-level target-setting most meaningfully of the four models. While the effect of city population on the models is statistically significant and positive, its coefficient is negligible.

In Table 10 we also investigate the role of the main function of the initiative for city-level target-setting. Here we zoom in on the 452 large cities that are participants in initiatives. We find that participation in almost all types of initiatives is associated with the adoption of quantitative climate mitigation targets on the city-level. The exception are initiatives focused on lobbying and the link is weaker also for initiatives that function mainly for the goal of training. Initiatives that are involved in standards and norm-setting are most strongly associated with cities' quantitative climate targets but there is still large variation between initiatives. In effect, cities part of initiatives that mainly serve the function of enhancing standards and norms are 8.6 times more likely to adopt a quantitative climate target than cities that participate in other types of initiatives. In comparison, cities that are involved in initiatives that mainly aim to further technical implementation are 1.67 times more likely to adopt an individual climate target than cities in other initiatives.

Table 10. Regression results for functions and city-level target-setting

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Main function of the CCI:									
Knowledge production	0.708***								
	(0.197)								
Knowledge dissemination		0.696***							
		(0.150)							
Technical implementation			0.510***						
			(0.133)						
Institutional capacity building				0.692***					
				(0.149)					
Standards and norms					2.153***				
					(0.530)				
Campaigning						0.846***			
						(0.203)			
Lobbying							1.324		
							(0.769)		
Participatory management								0.639***	
								(0.156)	
Training									0.795*
									(0.380)
Population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num.Obs.	452	452	452	452	452	452	452	452	452
AIC	449.9	434.6	443.6	437.0	428.7	444.1	459.7	444.3	459.3
BIC	491.0	475.8	484.7	478.1	469.8	485.2	500.8	485.5	500.4

Note: The dependent variable in all models is the adoption of individual quantitative climate mitigation targets on the city-level (yes – 1, no – 0). The sample includes only cities that are part of CCIs. *p<0.05; **p<0.01; ***p<0.001

In Table 10 we also investigate the role of the main function of the initiative for city-level target-setting. Here we zoom in on the 452 large cities that are participants in initiatives. We find that participation in almost all types of initiatives is associated with the adoption of quantitative climate mitigation targets on the city-level. The exception are initiatives focused on lobbying and the link is weaker also for initiatives that function mainly for the goal of training. Initiatives that are involved in standards and norm-setting are most strongly associated with cities' quantitative climate targets but there is still large variation between initiatives. In effect, cities part of initiatives that mainly serve the function of enhancing standards and

norms are 8.6 times more likely to adopt a quantitative climate target than cities that participate in other types of initiatives. In comparison, cities that are involved in initiatives that mainly aim to further technical implementation are 1.67 times more likely to adopt an individual climate target than cities in other initiatives.

3.5 Discussion and Conclusion

This analysis contributes to the literature on subnational climate action by providing empirical evidence on the relationship between the targets of cooperative climate initiatives and subnational actors. We conducted a quantitative study that involves both social network analysis and regression analysis on climate mitigation pledges for both initiatives and major cities with large populations. The empirical analysis presents the importance of cooperative networks on subnational-level climate action. Based on an analysis of 1180 major global cities, we show that participation in climate cooperative initiatives is robustly associated with quantitative climate target-setting on the city-level. We also find that cities do not participate equally in initiatives across all regions. Although the models account for the region that the city is part of, most major cities with a population above 500,000 are situated in East Asia, where participation in climate cooperative initiatives is comparatively low. Participation in initiatives is highest among cities in Australia and New Zealand, Europe and Northern America, which also are more likely to pledge city-level climate targets. Hence, we also control for the role of geographic region in the regression models.

Our results based on the social network analysis and regression models suggests that cities that are part of climate cooperative initiatives are more likely to pledge individual targets for climate change mitigation. Cities which are participants in a climate cooperative initiative are close to ~14 times more likely to pledge their own city-level climate mitigation targets than cities that do not participate in an initiative. Furthermore, we also analysed several aspects of participation in initiatives: participation in initiatives with clear quantitative targets and centrality in those initiatives, and the count of participation in different initiatives. Although the other aspects of participation were significantly associated with the adoption of city-level targets, straightforward participation in initiatives explains city-level target-setting better than more specific characteristics. This means that despite centrality in initiatives and cooperative target-setting, sheer participation itself already explains the greatest portion of city-level targets.

These key findings suggest that initiatives have the potential to create a supportive environment and culture that encourages participants to adopt climate mitigation targets, regardless of whether the initiative explicitly requires targets or if the city is centrally placed in initiative networks. Being part of an initiative may signal a city’s willingness to align with broader climate goals, due to the sense of collective identity and purpose that membership fosters. Thus, the social, informational, and normative influence of the network may drive cities to set ambitious targets, highlighting the importance of the initiative's broader role rather than its specific directives or the city's position within it. Our findings also align with recent studies (Busch et al., 2018; Heikkinen, 2022) that argue that initiatives serve different roles, such as awareness-raising, project support, institutionalisation of climate trajectories and direct exchanges, which may have implications for participants. This finding also implies that the climate targets of subnational actors that are sometimes described as passive participants in less active initiatives are still positively impacted by their participation in the initiative. Finally, we show that initiatives differ by the primary function that they serve. Participants in initiatives that initiatives that aim to enhance standards and norms are more likely to adopt quantitative climate mitigation targets. While almost initiatives of all function types

are associated with an increase in target-setting at the city-level, the influence of lobbying initiatives is ambiguous. In essence, this suggest that initiatives that focus mainly on lobbying are less likely to sway their participants to establish quantitative climate targets.

The strength of the analysis is its large-n character, which allows it to overcome issues of generalisability. Nevertheless, we acknowledge that the study is not able to show causality as we do not have temporal information on membership in CCIs and climate targets. Nevertheless, membership in CCIs tends to be a long-term than the more recent cities' climate target pledges, for which data has been mostly updated by Net Zero Tracker between 2021 and 2023. Furthermore, this analysis focuses on policy outputs in the form of pledged climate mitigation targets and does not present results for climate policy outcomes, in case climate targets do not necessarily translate into concrete action (Jordan & Huitema, 2014). The aim of this analysis is to reveal the relationship between the policies of cooperative climate initiatives and major cities. Furthermore, the analysis does not tackle the issue of the implementation of urban climate policies, which will be left for future studies. We recommend future studies to test the relationship between participation in climate cooperative initiatives and greenhouse gas emission outcomes.

While previous research has focused primarily on the role of cooperative climate initiatives, transnational municipal or urban policy networks (Rashidi & Patt, 2018), less is still understood about the effect of climate initiatives' cooperative targets on city-level climate commitments. Furthermore, we do not know enough about unilateral climate action, when cities propose climate targets without being part of any networks. Future studies could turn their attention towards cities that make ambitious climate targets, while not participants of climate cooperative initiatives. This study's novel comparison provides insights into how network structures impact the ambition and effectiveness of climate targets, contributing significantly to the understanding of climate action dynamics.

4 Mapping initiatives in the voluntary carbon market

Authors
Isabel Haase, Lambert Schneider (OEKO Institut)

Carbon credits and their use for climate-related claims, particularly offsetting claims, are increasingly being scrutinised by academia, civil society and the media. There is growing evidence that many of the carbon credits for which climate claims are made do not represent real additional emission reductions (Haya et al. 2023b; Gill-Wiehl et al. 2024; Bailis et al. 2015; Cames et al. 2016; West et al. 2023). Moreover, there are concerns that carbon credit buyers might use carbon credits as an alternative to in-value-chain mitigation. Consequently, claims are oftentimes considered misleading to consumers, particularly if they imply that a product or organisation does not have a net negative impact on the atmosphere. This criticism has recently been validated by several court rulings in cases in which offsetting claims were used. There have been several successful lawsuits against the use of offsetting claims. Courts determined that "climate-neutral" claims used by companies were too ambiguous, and that companies could not guarantee that emissions are truly offset (Trouwloon et al. 2023; DW 2024; Sabin Center for Climate Change Law 2021).

In this context, a diverse array of initiatives has emerged which aim to set standards or make recommendations with the aim of raising the integrity of carbon credits and their use, mainly targeting the voluntary carbon market. We refer to these as "integrity initiatives". They either address the supply side, i.e. the quality of carbon credits, or the integrity of the demand side, i.e. the integrity of how carbon credits are used, particularly in the context of climate-related claims, or both. Analysing these initiatives helps gain a better understanding of what integrity means in the context of the voluntary carbon market and what the characteristics of the relevant initiatives are.

To this end, this chapter presents a comprehensive mapping of integrity initiatives. The analysis covers their key characteristics and examines what topics they consider when addressing integrity in the voluntary carbon market. We refer to the latter as "elements" of environmental integrity. The initiatives are mapped across several key features, including basic information, general scope, supply-side elements, demand-side elements, and potential strengths and weaknesses.

With this mapping, we strive to answer the following research questions:

- What characterises integrity initiatives in the voluntary carbon market?
- What are the strengths and weaknesses of these initiatives?
- What aspects and elements related to integrity in the voluntary carbon market do the initiatives address?

By answering these questions, this mapping aims to facilitate a better understanding of the current landscape of integrity initiatives and of the elements and aspects that they tend to address. This research serves as a first step for further analysis on integrity in the voluntary carbon market, which has as its overarching aim the development of a clear, well-founded understanding of what constitutes integrity on the demand side and the supply side and what role the voluntary carbon market should play in the future.

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Furthermore, it provides guidance for policy makers navigating this complex field by providing an introduction to, and an overview of, what standard-setting initiatives there are, and what elements and aspects they consider relevant for environmental integrity. Furthermore, it provides guidance for policy makers navigating this complex field by providing an introduction to, and an overview of, which integrity initiatives exist, and what elements and aspects they consider that are relevant for environmental integrity.

The chapter is structured as follows: Firstly, we describe our methodological approach to identifying the initiatives and our criteria for mapping them (see section 4.1). Secondly, we present the results, differentiated by the general characteristics of initiatives, specific results for demand-side initiatives, specific results for supply side initiatives, and discuss the limitations (see section 4.2). Finally, we draw conclusions from the analysis (see section 4.3).

4.1 Methodological approach

4.1.1 Identification of initiatives

In a first step, we compile a list of initiatives that aim to address the integrity in the voluntary carbon market, particularly those that relate to the quality and use of carbon credits.

As the aim of the research is to develop a better understanding of what standards or recommendations the initiatives establish for the environmental integrity, the definition of initiatives in the context of this mapping is broader than the mapping of cooperative climate initiatives (see chapter 2 and 3). In the analysis, we consider all activities as initiatives that set out requirements or recommendations to enhance the environmental integrity in the supply or demand of carbon credits. Therefore, a broad range of activities falls under this definition, including organisations set up to enhance the integrity of carbon credits, multilateral approaches, important documents or guidance documents produced by a single organisation, and important laws and norms.

It should be noted that the initiatives we include set standards or provide recommendations but are not directly part of the market. This means we exclude those actors that are directly involved in the generation, trading or selling of carbon credits as they would be subject to the requirements or recommendations set out by the integrity initiatives. This includes project developers, carbon credit buyers, marketplaces/traders, carbon crediting programs, accreditation bodies or validation and verification entities.

To identify these initiatives, we consult relevant experts and conducted desk research using the snowball sampling method, i.e. inferring from one initiative the existence of others. We include initiatives whose core documentation was published before 1 March 2024. From a preliminary assessment, we identify 50 initiatives. 7 of these are excluded from further analysis because they are deemed irrelevant, do not cover quality criteria or are not publicly available as of 1 March 2024. We then incorporate 43 initiatives in the mapping exercise based on their coverage of quality criteria, relevance for integrity in the voluntary carbon market and climate-related claims.

In a second step, we collect information on the main features of each initiative. In addition to examining the basic descriptive information of each initiative, we consider what elements and aspects of environmental integrity each initiative addresses, both on the demand side and the supply side. The identified initiatives may address different aspects of climate-related claims. We cluster the initiatives according to the following two broad areas:

We also consider initiatives addressing trading integrity, which refers to initiatives that aim to address the integrity in how carbon credits may be traded. However, as very few initiatives address trading integrity, we do not evaluate specific elements and aspects for these initiatives. However, as very few initiatives address trading integrity, we do not evaluate specific elements and aspects for these initiatives.

Basic information

We collect the following basic information on each initiative:

- Basic data to describe the initiative, such as the name, abbreviation, a short description and a hyperlink to the website.
- Type of organisation, which refers to the organisational form of the initiative. In the case where the initiative is not an organisation but some form of document, such as a legislation or a guidance document, this refers to the organisational form of the entity publishing the document. We distinguish between the following types of organisations:
    - Environmental non-governmental organisation (NGO), i.e. an NGO mainly dedicated to advancing environmental protection and/or climate action; [8]
    - Business NGO, i.e. an NGO that mainly advocates for business interests;
    - Research organisation, i.e. an organisation focused on conducting research, including universities as well as extramural institutes;
    - Norming organisation, i.e. an organisation that develops norms;
    - Subnational government;
    - National government;
    - Carbon crediting program, such as the Gold Standard or Verra;
    - Multilateral organisation, i.e. an organisation formed by three or more countries with a common purpose and based on an international agreement;
    - Intergovernmental forum, i.e. an institutionalised gathering of state actors, such as the Group of Seven (G7);
    - Multi-stakeholder initiative, i.e. an organisation that was founded by different stakeholders (e.g. state or non-state) for a common purpose; and
    - For-profit organisation, such as companies.
- Type of initiative, which refers to the way in which the initiative addresses climate-related integrity claims. We distinguish between:
    - Labelling schemes, e.g. schemes that establish criteria for the quality or use of carbon credits that must be fulfilled to obtain a label;
    - Good practice guidance, which are not legally binding;
    - Regulations, i.e. a legally binding document from one or a group of state actors that sets out legally binding requirements;
    - Ratings, e.g. assessments of individual mitigation activities or types of carbon credits on the voluntary carbon market;
    - Norm, i.e. standards to improve the quality of goods, services or processes; and

[8] The categories ‘environmental NGO‘, ‘business NGO‘ and ‘research NGO’ are based on the constituencies of the UNFCCC.

  - Other.

- Geographic scope refers to the geographic area an initiative covers. We distinguish between:
  - Global;
  - Group of countries (e.g. Africa);
  - National (e.g. France); and
  - Sub-national (e.g. California).

- Last update, which refers to the date of the last time the initiative published documents or articles. In the case of regulations, it refers to the year in which they came into force.

- Target groups, which refers to the main groups of actors that an initiative aims to address. The initiative may address actors through involving them directly through their activities, or indirectly, e.g. through labelling schemes. We distinguish between (multiple selection possible):
  - Carbon credit buyers, such as companies, public entities, or individuals;
  - Consumers, i.e. people purchasing products that may contain climate-related claims;
  - Carbon crediting programs;
  - Mitigation activity proponents, i.e. individuals or entities developing and implementing mitigation activities to generate carbon credits;
  - Other integrity initiatives;
  - Public authorities, including sub-national, national and supranational governments;
  - International processes, such as the United Nations Framework Convention on Climate Change (UNFCCC) and International Civil Aviation Organization (ICAO); and
  - Others.

- Number of mitigation activity types covered, which refers to the number of different types of carbon crediting mitigation activities that the initiative addresses. This criterion is only relevant for initiatives addressing supply-side integrity. We distinguish between:
  - (Nearly) all, i.e. initiatives that aim to address the majority of the carbon credit supply. This means that initiatives that consider at least 15 different types of mitigation activities, approximately representing at least 80% of the carbon credit market (Haya et al. 2023a). This also includes initiatives that do not explicitly address specific types of mitigation activities but address the overall market.
  - Multiple, i.e. initiatives that address several kinds of mitigation activities, i.e. 6 to 14 different types of mitigation activities; and
  - A few or only one, i.e. initiatives that are specialised on one or a few mitigation activities. This includes initiatives that address up to 5 different types of mitigation activities and initiatives focussing on one broader category of mitigation activities (e.g. an initiative only focussing on 'nature-based solutions').

- Reference to other integrity initiatives. We distinguish between:
  - Explicit use of other initiatives, i.e. the initiative builds on the work of another initiative (e.g. the Voluntary Carbon Markets Integrity Initiative (VCMI) requiring the use of carbon credits that are approved by the Integrity Council for the Voluntary Carbon Market (ICVCM)); and
  - Mentioning of other initiatives, i.e. an initiative mentions or voices their support for another initiative in their website or document.

Elements covered by initiatives addressing supply-side integrity

In this section, we describe the elements and aspects that we evaluate for initiatives addressing supply-side. The elements of carbon credit integrity that we evaluate for each initiative are determined in an iterative process. We assess what areas the initiatives address and cluster these elements in a coherent structure, which is presented below.

For each identified element (e.g. quantification), we only assess *whether* the initiative addresses the element; we do not evaluate how well the initiative functions or achieves its objectives. For each element, we identify several aspects that may be addressed (e.g. baseline emissions). These 'aspects' are exemplary and not exhaustive but cover the main areas we identify in the initiatives. If an initiative only addresses *one* aspect (e.g. only baseline emissions but not leakage emissions), we consider that the initiative addresses the element (e.g. quantification).

It is important to note that in some cases initiatives do not directly address an element but rather broadly refer to other initiatives that do so. In these cases, we do not consider that the initiative addresses this element, because the initiative does not set out a requirement or a recommendation itself. For example, if an initiative endorses the standard set by the ICVCM, which addresses additionality, we do not consider that this initiative addresses additionality. However, we note that the initiative refers to another initiative under "Reference to other integrity initiative".

We assess whether the initiatives address the following elements:

- Additionality, which refers to whether the emission reductions or removals from a mitigation activity would not have taken place in the absence of the added incentive created by revenues from carbon credits. This may include the following aspects:
    - Consideration of legal requirements;
    - Consideration of carbon credits before deciding to proceed with the mitigation activity or restrictions for registering existing mitigation activities;
    - Financial analysis;
    - Barrier analysis;
    - Common practice or market penetration analysis; and
    - Performance-based approaches, such as emission benchmarks.

    Note: we are aware that there are different definitions of additionality, including ones that consider the alignment with the Paris Agreement and host country strategies, or the avoidance of lock in. Note There are different definitions of additionality, including ones that consider alignment with the Paris Agreement and host country strategies, or the avoidance of lock in. To get a better picture which aspects are addressed, we use here a "classical" definition of additionality and assess separately below whether these other issues are addressed.

- Quantification, which refers to the principles, provisions and methodologies governing the quantification of emission reductions or removals. Robust quantification generally aims to avoid overestimating emission reductions or reversals. Quantification may include:
    - Crediting period length and renewal;
    - Selection of emission sources for calculating emission reductions or removals; and
    - Determination of baseline, mitigation activity and leakage emissions.

- Double counting, which refers to a situation in which a single emission reduction or removal is counted more than once towards achieving mitigation targets or goals. This may include the following aspects:

  - Double issuance, including due to double registration or indirect overlaps between mitigation activities;
  - Double use, i.e. a carbon credit cancellation must not be used for more than one claim; and
  - Double claiming (e.g. double claiming with nationally determined contributions (NDCs) or mandatory domestic mitigation schemes).

- Non-permanence, which refers to a situation wherein the emission reductions or removals generated by a mitigation activity are later reversed. Mitigation activity types that increase or preserve stocks in carbon reservoirs are subject to a non-permanence risk. Non-permanence can occur due to natural disturbances (e.g. wildfires) or anthropogenic interventions (e.g. harvesting). Addressing non-permanence is important to achieve the temperature goals of the Paris Agreement, as cumulative emissions are decisive for the long-term temperature increase. Addressing non-permanence may include the following aspects:

  - Assessing and reducing non-permanence risk (e.g. excluding high-risk activities or setting management incentives to avoid reversals); and
  - Monitoring and compensating for reversals (e.g. buffer pool reserves, temporary carbon credits, discounting).

- Transition to net-zero, which refers to whether a mitigation activity facilitates, rather than delays or impedes, a transition towards achieving global net zero emissions, e.g. by avoiding the lock-in in carbon intensive technologies or practices.

- Carbon credit program governance, which refers to how the program is governed to effectively support its mission. This may include the program's governance structure, conflict of interest provisions, code of conduct, or transparent internal procedures.

- Transparency on mitigation activities and carbon credits, which refers to how much information on mitigation activities (e.g. mitigation activity design documents, validation and verification reports) and carbon credits (e.g. information on carbon credit issuance, holdings, transfers and cancellations) is made publicly available by carbon crediting programs.

- Third-party auditing, which refers to validation and verification of mitigation activity information by accredited third-party entities.

- Environmental and social impacts, which refers to avoiding that mitigation activities have adverse environmental or social impacts and promoting that they generate benefits beyond reducing GHG emissions or enhancing removals. This may include the following aspects:

  - Environmental impact assessments;
  - Environmental and social management plans;
  - Compliance of mitigation activities with legal requirements;
  - Safeguards frameworks that may address, inter alia, cultural heritage, health, safety, security, labour rights; environmental issues, non-native invasive species, gender issues, physical or economic displacement, human rights;
  - Stakeholder consultations;
  - Free, prior and informed consent from indigenous, tribals or traditional people;
  - Benefit sharing mechanism with local stakeholders;
  - Grievance mechanism for local stakeholders;
  - Gender policies; and

  - Identification and/or quantification of Sustainable Development Goal (SGD) impacts and/or the ability to enhance adaptation and resilience.

- Facilitating host country participation and ambition, which refers to measures to enable host countries to participate in carbon credit markets (e.g. Article 6 of the Paris Agreement) and ensure that their participation promotes ambition. This may include the following aspects:

  - National arrangements for Article 6 participation (e.g. establishing national processes for granting authorisations);
  - National strategies and arrangements for the prioritisation of mitigation activities (e.g. prioritising mitigation activities that are not easily achievable by the host country, aligning approval of mitigation activities with relevant policies and sustainable development priorities);
  - Sharing of mitigation outcomes between the host country and the buyer, which may be achieved by direct sharing the carbon credits or by using ambitious baselines or shorter crediting, such that only part of the emission reductions or removals achieved in the host country are issued as carbon credits; and
  - Charging fees on carbon credit issuance to support host country climate action.

Elements covered by initiatives addressing demand-side integrity

We apply the same approach we use for the supply side to the demand side. For the demand side, we assess whether the initiatives address the following elements:

- Emissions quantification, which refers to the procedures and methodological approaches for quantifying emissions. Robust quantification of emission for an organisation, sub-national entity or product is the basis for setting emission reduction targets and monitoring progress. This may include the following aspects:

  - Emissions quantification at sub-national (e.g. cities), organisational (e.g. companies) or product level;
  - For sub-national and organisational levels: the scopes of emissions within the value chain that are covered (only scope 1, scope 1 and 2, or all scopes according to the GHG Protocol (Ranganathan et al. 2011); and

  - Transparency on emissions information (e.g. requirements for public disclosure of emissions data and underlying methodological approaches).

- Climate target setting, which refers to the process and ambition in setting climate mitigation targets at organisational or sub-national level.

- Prioritisation of own emission reductions over using carbon credits, which refers to giving priority to actions that avoid or reduce emissions within the accounting boundary of the organisation or sub-national authorities overusing carbon credits. This may include the following aspects:

  - Establishing a mitigation hierarchy[9];

[9] The term 'mitigation hierarchy' refers to the order in which actors should prioritise different mitigation actions. The order is (from most to least preferable) commonly defined as: avoiding emissions, reducing emissions and offsetting emissions.

  - Establishing separate targets for own emission reductions and emission reductions achieved through offsetting; and
  - Establishing internal carbon prices, including through 'climate responsibility' approaches.[10]

- Types of carbon credits used, which refers to the question of whether carbon credits used for voluntary purposes should be:
  - authorised under Article 6 of the Paris Agreement (and thus subject to 'corresponding adjustments') or whether non-authorised carbon credits may be used (e.g. mitigation contribution Article 6.4 emission reductions);
  - from emission reductions or removals (or possibly 'emissions avoidance'); and
  - of a specific vintage of emission reductions/removals.

- Transparency on the use of carbon credits, which refers to the information on the use of carbon credits that organisation or sub-national authorities make publicly available (e.g. amounts, mitigation activities, prices).

- Climate-related claims, which refers to the claims that organisations or sub-national authorities may make in relation to their emissions, products, and/or use of carbon credits (e.g. climate neutral, net zero, contributions, climate responsibility).

- Use of specific criteria for different claims, which refers to whether the use of certain climate claims is underpinned by specific requirements regarding the quality or use of carbon credits (e.g. VCMI claims can only be obtained by purchasing carbon credits that are approved by the ICVCM).

Potential strengths and weaknesses

We evaluate the potential strengths and weaknesses of an initiative based on expert judgement, which is partially informed by the analysis of the previous criteria. We consider the following criteria:

- Relevance in the voluntary carbon market, which refers to the level of engagement the initiative has with other carbon market actors. This includes:
  - The direct involvement of market actors in the activities of the initiative (e.g. through consultation processes, sales, etc.); and
  - The influence the initiative has on the behaviour of other actors or processes on the voluntary carbon market. We infer this from, inter alia, the number of times other initiatives reference the initiative.

  We judge this criterion as low, medium, or high.

- Level of guidance or requirements, which refers to the level of detail of the initiative's guidance or requirements. We distinguish between:
  - Principles, i.e. the initiative only establishes overarching principles (e.g. "additionality should be ensured");

[10] Climate responsibility approaches commonly refer to approaches to address an organisation's climate impact in a way that does not include offsetting emissions.

  - Detailed, i.e. the initiative includes specific guidance or criteria (e.g. detailed requirements on how additionality should be assessed); and
  - Mixed, i.e. the initiative establishes principles in one area and includes specific guidance or criteria in another (e.g. a general principle is established that additionality should be ensured but detailed guidance is provided on how emission reductions should be quantified).

- Comprehensiveness of information, which refers to the wealth of information made available by the initiative to its users. We distinguish between:
  - Very comprehensive information, i.e. the initiative has published several documents, comprising several hundred pages in total;
  - Comprehensive information, i.e. the initiative has published one long document or several documents, typically comprising more than 20 pages; and
  - Limited information, i.e. the initiative includes only one document with a length of approximate 20 pages.
- Accessibility of information refers to the degree to which information on the initiative and its activities is publicly available. We distinguish between:
  - Information publicly available;
  - Information available, but a substantial part is confidential;
  - Substantial information available upon purchase; and
  - Mixed.
- Number of elements addressed, which refers to the number of supply-side and demand-side elements that an initiative addresses.

4.2 Results

4.2.1 Overview of initiatives

Table 11 provides an overview of the basic information of the 43 initiatives. Of the 43 initiatives we assess, 13 focus on the supply-side integrity, 13 focus on the demand side integrity, and 17 address both the demand- and supply-side. Of the initiatives that focus on demand side integrity, most also include some form of supply side criteria (12 out of 13). Furthermore, two initiatives also address trading integrity.

In terms of type of organisation, most initiatives are multi-stakeholder initiatives (12), followed by national governments (7), for-profit organisations (6), research organisations (6), environmental NGOs (3), norming organisations (3), intergovernmental forums (2), a sub-national government (1), a multilateral organisation (1), a business NGO (1) and a carbon crediting program (1).

Most of the initiatives are good practice guides (24), followed by ratings (6), labelling schemes (5), regulations (3), norms (3) and others (2).

All initiatives were updated in 2024 or in the five years prior. Most were last updated in 2024 (15) or in 2023 (15), with others updated in 2022 (6) or in 2021 (2), in 2020 (1) or in 2019 (2), respectively.

Table 11. Basic information on the assessed initiatives

Abbreviation	Full name	Type of organization	Type of initiative	Geographic scope	Last update	Addresses supply side integrity	Addresses demand side integrity	Addresses trading integrity
ACMI	African Carbon Markets Initiative	Multi-stakeholder initiative	Good practice guidance	Africa	2023	X	X	
BeZero Carbon	BeZero Carbon	For-profit organisation	Rating	Global	2024	X		
California's Disclosure law	California's new disclosure law, AB 1305	Subnational government	Regulation	Subnational	2024	(X)	X	
Calyx Global	Calyx Global	For-profit organisation	Rating	Global	2024	X		
Carbone4 NZI	Carbone4 Net Zero Initiative (NZI)	For-profit organisation	Good practice guidance	Global	2024	(X)	X	
CCQI	Carbon Credit Quality Initiative	Environmental NGO	Rating	Global	2024	X		
Ceres	Ceres - Evaluating the use of carbon credits	Research organisation	Good practice guidance	Global	2022	(X)	X	
CFTC	Commodity Futures Trading Commission: Guidance Regarding the Listing of Voluntary Carbon Credit Derivative Contracts	National government	Good practice guidance	U.S. derivatives markets	2023	X		X
CMA Green Claims Code	UK Competition and Markets Authority (CMA) Green Claims Code	National government	Good practice guidance	UK	2021		X	
CMW	Carbon Market Watch: Above and Beyond Carbon Offsetting (2020)	Environmental NGO	Good practice guidance	Global	2020	(X)	X	
Compensation Foundation	Compensation Foundation: Getting the claims right (2022) + Non-offset claims: How to make a robust climate claim? (2023) + Project criteria	Research organisation	Good practice guidance	Global	2023	(X)	X	
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation	Multilateral organisation	Regulation	Global	2024	X		
ETA	The Rockefeller Foundation, Bezos Earth Fund & Climate Envoy John Kerry: Energy Transition Accelerator (launched 2023, methodologies under development)	Multi-stakeholder initiative	Other	Global	2023	X	X	
Finish Guide	Finish government's Guide to good practices for voluntary carbon markets	National government	Good practice guidance	Finland	2023	X	X	
French law	French Climate and Resilience Law (n° 2021-825)	National government	Regulation	France	2023	(X)	X	

Abbreviation	Full name	Type of organization	Type of initiative	Geographic scope	Last update	Addresses supply side integrity	Addresses demand side integrity	Addresses trading integrity
FTC Green Guides	US Federal Trade Commission's Green Guides	National government	Good practice guidance	US	2023	(X)	X	
G7 Principles	G7 Principles of High Integrity Carbon Markets	Intergovernmental forum	Good practice guidance	Global	2023	X	X	
GGPC	Greenhouse Gas Protocol Corporate	Multi-stakeholder initiative	Good practice guidance	Global	2024	X	X	
Gold Standard	Gold Standard Claims Guidelines (2022)	Carbon crediting program	Good practice guidance	Global	2022	(X)	X	
ICROA	International Carbon Reduction and Offset Alliance: Code of Best Practice and Accreditation Terms and Conditions	Business NGO	Labelling scheme	Global	2024	X	X	
ICVCM	Integrity Council for the Voluntary Carbon Market	Multi-stakeholder initiative	Labelling scheme	Global	2024	X		
IOSCO	International Organization of Securities Commissions	Multi-stakeholder initiative	Good practice guidance	Global	2023	X	(X)	X
ISO 14068	ISO 14068 Greenhouse gas management and climate change management and related activities – Carbon neutrality	Norming organisation	Norm	Global	2023	X	X	
ISO IWA 42:2022	ISO IWA 42:2022 Net Zero Guidelines	Norming organisation	Norm	Global	2022	X	X	
Joint statement	Proposed framework by Netherlands, Germany, France, Spain, Finland, the federal government of Belgium and Austria - Joint statement on Voluntary Carbon Market: The Claims Side	Intergovernmental forum	Good practice guidance	Global	2023	X	X	
Label Bas Carbone	Label Bas Carbone methodologies and related guidance by French Ministry for the Ecological Transition (launched 2018)	National government	Labelling scheme	France	2023	X		
NBSI	Nature-Based Solutions Initiative: Misuse of nature-based carbon offsets	Research organisation	Good practice guidance	Global	2021	X	(X)	
NCI - CCRM	New Climate Institute Corporate Climate Responsibility Monitor 2023	Research organisation	Good practice guidance	Global	2023	X	X	
NCI - RA	New Climate's - Our climate responsibility approach	Research organisation	Other	Global	2023	(X)	X	
NCS Alliance	The Natural Climate Solutions Alliance	Multi-stakeholder initiative	Good practice guidance	Global	2023	X	X	

Abbreviation	Full name	Type of organization	Type of initiative	Geographic scope	Last update	Addresses supply side integrity	Addresses demand side integrity	Addresses trading integrity
NewZealand guidance	Ministry of the Environment of New Zealand - Interim guidance for voluntary climate change mitigation	National government	Good practice guidance	New Zealand	2022	(X)	X	
Nordic Dialogue	Nordic Code of Best Practice for the Voluntary Use of Carbon Credits (2022)	Multi-stakeholder initiative	Good practice guidance	Global	2024	X	X	
Oxford Offsetting Principles	Oxford Net Zero - The Oxford Principles for Net Zero Aligned Carbon Offsetting	Research organisation	Good practice guidance	Global	2024	X	X	
PAS 2060	Britisch Standards Institution - Publicly Available Specification 2060 (BSI PAS 2060)	Norming organisation	Norm	Global	2014	X	X	
Renoster	Renoster	For-profit organisation	Rating	Global	2024	X		
San Jose	San Jose Principles Coalition: San José Principles for High Ambition and Integrity in International Carbon Markets	Multi-stakeholder initiative	Good practice guidance	Global	2019	X	(X)	
SBTi	Science Based Target initiative	Multi-stakeholder initiative	Good practice guidance	Global	2024	(X)	X	
Sylvera	Sylvera	For-profit organisation	Rating	Global	2024	X		
Trove Research	Trove Research (Now part of MSCI)	For-profit organisation	Rating	Global	2024	X		
UN High-Level Expert Group	UN Secretary-General's High-Level Expert Group on the Net-Zero Emissions Commitments of Non-State Entities	Multi-stakeholder initiative	Good practice guidance	Global	2022	X	X	
UNFCC Race to Zero	UNFCC Race To Zero Campaign	Multi-stakeholder initiative	Labelling scheme	Global	2022	X	X	
VCMI	Voluntary Carbon Market Integrity Initiative	Multi-stakeholder initiative	Labelling scheme	Global	2024	(X)	X	
WWF	World Wide Fund for Nature (WWF) - Position and guidance on voluntary purchases of carbon credits	Environmental NGO	Good practice guidance	Global	2019	X	X	

Source: Authors' own compilation

Note: Initiatives that focus on the supply- or demand-side integrity are labelled with an X in columns "addresses supply side integrity" and "addresses demand side integrity", respectively. Initiatives with an (X) in the respective cell also address these aspects to a limited degree but are classified as either supply- or demand-side initiative depending on the category they focus on, i.e. the category labelled as X.

4.2.2 Overview of supply-side initiatives

In total, 30 initiatives either focus on the supply side or cover both supply- and demand-side integrity. Table 12 shows which supply-side elements are addressed by the respective initiatives, while Table 15 highlights their strengths and weaknesses.

As shown in Table 12, frequently addressed elements are additionality (28), quantification (27), non-permanence (25), the risk of double counting (24), and environmental and social impacts (24). Well-established topics that are less frequently addressed include third-party auditing (20), transparency on mitigation activities and carbon credits (18) and carbon crediting program governance (13). Elements that were mainly introduced through Article 6 of the Paris Agreement are covered less frequently: 18 initiatives address how mitigation activities contribute to a transition to net zero and only ten address facilitating host country participation and ambition.

When comparing the coverage between initiatives, Table 12 shows that only four initiatives cover all ten supply-side elements. These are the CCQI, the Joint Statement, the NDC Alliance and the Nordic Dialogue. Almost as broad is the coverage of the ICVCM and Calyx Global, which address nine out of ten supply-side elements. 23 of 30 initiatives cover more than half of the elements, i.e. at least six of ten quality elements. One initiative exclusively addresses environmental and social impacts, namely the NBSI.

Table 13 shows that the ICVCM (5) is the initiative that is most frequently "explicitly used" by other supply-side initiatives, followed by the SBTi (4), CCQI (3), the VCMI (3), CORSIA (3), the G7 principles (1), the San José principles (1), and Calyx Global (1). As "explicitly used" implies that other initiatives directly build on the work of these initiatives (e.g. by requiring the use of carbon credits that are ICVCM approved), their requirements or recommendations are likely to influence the common understanding of environmental integrity in the voluntary carbon market.

The target groups addressed by the supply-side initiatives are shown in Table 14. Among the initiatives, 80% (24) address the group of "carbon credits buyers", likely aiming to enable them to make more informed purchase decisions regarding carbon credit quality. Other target groups addressed are public authorities regulating voluntary carbon markets (12), followed by carbon crediting programs (8), mitigation activity proponents (7), other integrity initiatives (6), consumers (4) and international processes (4).

With regards to the strengths and weaknesses of reviewed supply-side initiatives, Table 15 shows that only nine initiatives offer detailed guidance, whereas 14 initiatives only refer to principles, such as the Joint Statement or the San José Principles. The remaining seven initiatives provide a mixed level of guidance, meaning that they offer detailed guidance on selected elements, but only establish principles for other elements.[11]

Moreover, most initiatives offer comprehensive (9) or very comprehensive (13) information. While this means that they have published at least 20 pages, it does not necessarily imply detailed recommendations or requirements on supply side integrity. While this means that they have published at least 20 pages, it does not necessarily imply that they set out detailed recommendations or requirements on supply side

[11] A mixed level of guidelines can also mean that the level of guidance differs between supply-side and demand-side elements for those initiatives that cover both supply- and demand-side integrity equally. For instance, ISO IWA 42:2022 only provides principles for supply-side elements but offers detailed guidance on demand-side elements.

integrity. Only eight initiatives provide limited information. In addition, information on most of the initiatives is publicly available (24). A few initiatives (6) only make limited information publicly available and provide more information upon purchase. This is primarily the case for rating agencies as well as an ISO norm. This implies that while general requirements or recommendations on supply side integrity are accessible to the general public, information on the quality of individual carbon credits, which is mostly provided by rating agencies, is not.

Table 12. Coverage of supply-side initiatives

Initiative	Additionality	Quantification	Double counting	Non-permanence	Transition to net zero	Carbon credit program governance	Transparency on mitigation activities	Third-party auditing	Environmental and social impacts	Facilitating host country participation & ambition
ACMI	X	X	X	X	X		X	X	X	
BeZero Carbon	X	X	X	X			X	X		
Calyx Global	X	X	X	X	X	X	X	X	X	
CCQI	X	X	X	X	X	X	X	X	X	X
CFTC	X	X	X	X		X	X	X		
CORSIA	X	X	X	X		X	X	X	X	X
ETA	X	X			X			X	X	X
Finish Guide	X	X	X	X		X	X	X	X	
G7 Principles	X	X	X	X	X	X			X	X
GGPC	X	X	X	X						
ICROA	X		X					X	X	
ICVCM	X	X	X	X	X	X	X	X	X	
IOSCO	X	X	X	X		X	X	X	X	
ISO 14068	X	X	X	X		X	X	X	X	
ISO IWA 42:2022	X	X	X	X	X			X	X	X
Joint statement	X	X	X	X	X	X	X	X	X	X
Label Bas Carbone	X	X		X	X		X	X	X	
NBSI									X	
NCI - CCRM	X	X	X	X	X					X
NCS Alliance	X	X	X	X	X	X	X	X	X	X
Nordic Dialogue	X	X	X	X	X	X	X	X	X	X
Oxford Offsetting Principles	X	X	X	X	X				X	
PAS 2060	X	X	X	X			X	X		
Renoster	X	X		X			X		X	
San Jose		X	X		X		X			X
Sylvera	X	X	X	X	X				X	
Trove Research	X	X		X					X	
UN High-Level Expert Group	X			X	X	X			X	
UNFCC Race to Zero	X	X	X	X	X			X	X	
WWF	X	X	X	X	X		X	X	X	
Sum	**28**	**27**	**24**	**26**	**18**	**13**	**18**	**20**	**24**	**10**

Source: Authors' own compilation

Table 13. Initiatives that were explicitly used by other initiatives (supply-side)

Abbreviation	VCMI	ICVCM	CCQI	G7 principles	CORSIA	San Jose Principles	SBTi	Other
ACMI	X	X					X	
BeZero Carbon								
Calyx Global								
CCQI								
CFTC								
CORSIA								
ETA		X			X		X	
Finish Guide								
G7 Principles								
GGPC								
ICROA	X	X						
ICVCM			X		X			Calyx Global
IOSCO								
ISO 14068								
ISO IWA 42:2022								
Joint statement				X				
Label Bas Carbone								
NBSI								
NCI - CCRM								
NCS Alliance					X	X		
Nordic Dialogue		X	X					
Oxford Offsetting Principles	X							
PAS 2060								
Renoster								
San Jose								
Sylvera								
Trove Research		X	X					
UN High-Level Expert Group								
UNFCC Race to Zero							X	
WWF							X	
Sum	**3**	**5**	**3**	**1**	**3**	**1**	**4**	**1**

Source: Authors' own compilation

Table 14. Target groups of supply-side initiatives

Abbreviation	Carbon credits buyers	Consumers	Carbon crediting programs	Mitigation activity proponents	Other carbon market initiatives	Public authorities regulating carbon markets	International processes	Others
ACMI	X		X	X		X		Traders/brokers/ financial institutions
BeZero Carbon	X							
Calyx Global	X							
CCQI	X		X	X	X			
CFTC								CFTC-regulated exchanges and designated contract market
CORSIA	X							
ETA	X			X		X		
Finish Guide	X	X		X		X		
G7 Principles			X		X	X	X	
GGPC	X					X		
ICROA	X							
ICVCM	X		X	X		X		
IOSCO			X		X	X		
ISO 14068	X	X						
ISO IWA 42:2022	X	X	X		X	X	X	
Joint statement	X							
Label Bas	X	X		X				
NBSI				X		X		Other researchers
NCI - CCRM	X							
NCS Alliance	X							
Nordic Dialogue	X		X	X	X	X		General public
Oxford Offsetting Principles	X				X	X		Researchers and academic institutions
PAS 2060	X							
Renoster	X							
San Jose							X	
Sylvera	X							
Trove Research	X							
UN High-Level Expert Group	X		X		X	X	X	
UNFCC Race to Zero	X							Academia
WWF	X							
Sum	**24**	**4**	**8**	**7**	**6**	**12**	**4**	**6**

Source: Authors' own compilation

Table 15. Strengths and weaknesses of supply-side initiatives

Initiative	Level of guidance	Comprehensiveness of information	Accessibility of information	Number of supply areas addressed
ACMI	Principles	Comprehensive information	Information publicly available	8
BeZero Carbon	Detailed	Very comprehensive information	Information available upon purchase	6
Calyx Global	Detailed	Very comprehensive information	Information available upon purchase	9
CCQI	Detailed	Very comprehensive information	Information publicly available	10
CFTC	Mixed	Limited information	Information publicly available	7
CORSIA	Principles	Comprehensive information	Information publicly available	9
ETA	Mixed	Limited information	Information publicly available	6
Finish Guide	Detailed	Very comprehensive information	Information publicly available	8
G7 Principles	Principles	Limited information	Information publicly available	8
GGPC	Principles	Very comprehensive information	Information publicly available	4
ICROA	Principles	Comprehensive information	Information publicly available	4
ICVCM	Detailed	Very comprehensive information	Information publicly available	9
IOSCO	Mixed	Very comprehensive information	Information publicly available	8
ISO 14068	Principles	Comprehensive information	Information available upon purchase	8
ISO IWA 42:2022	Mixed	Comprehensive information	Information publicly available	8
Joint statement	Principles	Limited information	Information publicly available	10
Label Bas Carbone	Principles	Very comprehensive information	Information publicly available	6
NBSI	Principles	Limited information	Information publicly available	1
NCI - CCRM	Mixed	Very comprehensive information	Information publicly available	6
NCS Alliance	Mixed	Comprehensive information	Information publicly available	10
Nordic Dialogue	Detailed	Very comprehensive information	Information publicly available	10
Oxford Offsetting Principles	Mixed	Comprehensive information	Information publicly available	6
PAS 2060	Principles	Comprehensive information	Information publicly available	6
Renoster	Detailed	Very comprehensive information	Information available upon purchase	5
San Jose	Principles	Limited information	Information publicly available	5
Sylvera	Detailed	Very comprehensive information	Information available upon purchase	6
Trove Research	Detailed	Very comprehensive information	Information available upon purchase	4
UN High-Level Expert Group	Principles	Comprehensive information	Information publicly available	5
UNFCC Race to Zero	Principles	Limited information	Information publicly available	7
WWF	Principles	Limited information	Information publicly available	8

Source: Authors' own compilation

4.2.3 Overview of demand-side initiatives

In total, 30 initiatives either focus on the demand side or cover both supply- and demand-side integrity. Table 16 shows which demand-side elements are addressed by the respective initiatives, while Table 19 highlights their strengths and weaknesses.

As shown in, the most Table 16 frequently addressed elements are climate target setting (26), transparency on the use of carbon credits (25), climate-related claims (25), prioritisation of own emission reductions over using carbon credits (24), and emission quantification (23). Of those initiatives that address emission quantification, only nine initiatives address quantification at both the product and the organisational level, while another nine cover emission quantification only at the organisational level. Three initiatives address emission quantification at the organisational and sub-national level, while one initiative (French law) only addresses quantification at the product level. Almost all initiatives that cover emission quantification also address transparency on quantification (20 of 23). Many initiatives also address which emission scopes are covered (20). Whether carbon credits may be generated from emission reductions, removals or avoidance activities is addressed by 20 initiatives, which reflects the ongoing discussions on carbon credit eligibility in the market. Specific criteria for different claims (14) and the vintage of emission reductions (8) are less frequently addressed, possibly because they imply more detailed criteria. However, least frequently covered is a topic introduced through Article 6 of the Paris Agreement, namely the question of whether carbon credits should be authorised.

When comparing the coverage between initiatives, only two initiatives cover all 11 demand-side elements as shown in Table 16. These are the VCMI and the Finnish Guide. Almost as broad is the coverage of SBTi and the Compensation Foundation, which address ten out of the 11 demand-side elements. Most initiatives (23 of 30) cover more than half of the elements, i.e. at least six out of the 11 elements. One initiative exclusively addresses climate-related claims, namely CMA Green Claims Code.

Table 17 shows that the ICVCM (5) and the SBTi (5) are the initiatives most frequently "explicitly used" by demand-side initiatives, followed by the VCMI (4), CORSIA (3), the G7 principles (1), the San José principles (1) and the CCQI (1). As "explicitly used" implies that other initiatives directly build on the work of these initiatives (e.g. requiring that a SBTi target is set before a claim is made), their requirements or recommendations are likely to influence the common understanding of environmental integrity in the carbon credit market.

The target groups addressed by the demand-side initiatives are shown in Table 18. 93% of these initiatives (28) address the group of "carbon credits buyers". Other target groups addressed are public authorities regulating voluntary carbon markets (12), followed by mitigation activity proponents (7), other integrity initiatives (7), carbon crediting programs (6), consumers (4) and international processes (3).

With regards to the strengths and weaknesses of reviewed demand-side initiatives, Table 19 shows that only four initiatives offer detailed guidance, whereas 15 initiatives only refer to principles, such as the G7 Principles or the Joint Statement. The remaining 11 initiatives provide a mixed level of guidance, meaning that they offer detailed guidance on some elements, but only establish principles for other elements.[12] Concerning the level of comprehensiveness of information, most initiatives offer comprehensive (10) or

[12] A mixed level of guidelines can also mean that the level of guidance differs between supply-side and demand-side elements for those initiatives that cover both supply- and demand-side integrity equally. For instance, ISO IWA 42:2022 only provides principles for supply-side elements but offers detailed guidance on demand-side elements.

very comprehensive (8) information, while 12 initiatives only provide limited information. In contrast to the supply side, almost all initiatives make information publicly available (29). Only one initiative (ISO 14068) provides information exclusively upon purchase.

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Table 16. Coverage of demand-side initiatives

Initiative	Emission quantification addressed?	Level of emission quantification	Scopes of emission quantification	Transparency requirements for emission quantification	Climate target setting	Prioritisation of own emission reductions over using carbon credits	Types of carbon credits: authorised/ non-authorised	Types of carbon credits: emission reductions/ removals/ avoidance	Types of carbon credits: vintage of emission reductions/ removals	Transparency on the use of carbon credits	Climate-related claims	Specific criteria for different claims
ACMI					X	X				X		
California's Disclosure law	X	Organisational and product level	Not specified	X	X			X	X	X	X	X
Carbone4 NZI	X	Organisational and product level	All scopes	X	X	X		X		X	X	
Ceres	X	Organisational level	All scopes		X	X		X		X		
CMA Green Claims Code											X	
CMW						X					X	X
Compensation Foundation	X	Organisational and product level	All scopes	X	X	X	X	X		X	X	X
ETA					X	X				X	X	
Finish Guide	X	Organisational and product level	All scopes	X	X	X	X	X	X	X	X	X
French law	X	Product level	NA	X	X	X		X		X	X	X
FTC Green Guides										X	X	
G7 Principles	X	NA	All scopes	X	X	X				X		
GGPC	X	Organisational level	All scopes	X	X			X		X		
Gold Standard						X	X			X	X	X
ICROA	X	Organisational and product level	All scopes	X	X	X		X		X		
ISO 14068	X	Organizational and product	NA	X	X	X		X	X	X	X	
ISO IWA 42:2022	X	Organisational level	All scopes	X	X	X		X		X	X	X
Joint statement	X	Organisational level	All scopes	X	X	X		X		X	X	
NCI - CCRM	X	Organisational level	All scopes	X	X	X					X	
NCI - RA	X	Organisational level	All scopes	X	X		X				X	
NCS Alliance					X	X		X	X	X	X	
NewZealand guidance	X	Organisational and product level	All scopes		X	X	X	X		X	X	X
Nordic Dialogue	X	Organisational and product level	All scopes	X	X	X		X		X	X	X
Oxford Offsetting Principles	X	Organisational and sub-national	All scopes	X	X	X		X		X	X	X
PAS 2060	X	Organisational and product level	All scopes	X	X				X	X	X	X
SBTi	X	Organisational level	All scopes	X	X	X		X	X	X	X	X
UN High-Level Expert Group	X	Organisational and sub-national	All scopes	X	X	X		X		X	X	
UNFCC Race to Zero	X	Organisational and sub-national	All scopes	X	X	X		X		X	X	X
VCMI	X	Organisational level	All scopes	X	X	X	X	X	X	X	X	X
WWF	X	Organisational level	All scopes		X	X	X	X	X		X	
Sum	**23**	**-**	**-**	**20**	**26**	**24**	**7**	**20**	**8**	**25**	**25**	**14**

Source: Authors' own compilation

Table 17. Initiatives that were explicitly used by other initiatives (demand-side)

Abbreviation	VCMI	ICVCM	CCQI	G7 principles	CORSIA	San Jose Principles	SBTi	Other
ACMI	X	X					X	
California's Disclosure law								
Carbone4 NZI								
Ceres								
CMA Green Claims Code								
CMW								
Compensation Foundation								
ETA		X			X		X	
Finish Guide								
French law								
FTC Green Guides								
G7 Principles								
GGPC								
Gold Standard								
ICROA	X	X						
ISO 14068								
ISO IWA 42:2022								
Joint statement				X				
NCI - CCRM								
NCI - RA								
NCS Alliance					X	X		
NewZealand guidance								
Nordic Dialogue		X	X					
Oxford Offsetting Principles	X							
PAS 2060								
SBTi	X							
UN High-Level Expert Group								
UNFCC Race to Zero							X	
VCMI		X			X		X	
WWF							X	
Sum	**4**	**5**	**1**	**1**	**3**	**1**	**5**	**1**

Source: Authors' own compilation

Table 18. Target groups of demand-side initiatives

Abbreviation	Carbon credits buyers	Consumers	Carbon crediting programs	Mitigation activity proponents	Other carbon market initiatives	Public authorities regulating carbon markets	International processes	Others
ACMI	X		X	X		X		Traders/brokers/ financial institutions
California's Disclosure law	X			X				Carbon credit sellers/brokers
Carbone4 NZI	X							
Ceres								Investors/banks
CMA Green Claims Code	X				X	X		
CMW	X					X		
Compensation Foundation	X							
ETA	X			X		X		
Finish Guide	X	X		X		X		
French law	X							
FTC Green Guides	X							
G7 Principles			X		X	X	X	
GGPC	X					X		
Gold Standard	X			X				fund managers, investors, intermediaries, partners and supporters of the Gold Standard
ICROA	X							
ISO 14068	X	X						
ISO IWA 42:2022	X	X	X		X	X	X	
Joint statement	X							
NCI - CCRM	X							
NCI - RA	X							
NCS Alliance	X							
NewZealand guidance	X		X	X				
Nordic Dialogue	X		X	X	X	X		General public
Oxford Offsetting	X				X	X		Researchers and academic institutions
PAS 2060	X							
SBTi	X				X			
UN High-Level Expert Group	X		X		X	X	X	
UNFCC Race to Zero	X							Academia
VCMI	X	X				X		
WWF	X							
Sum	**28**	**4**	**6**	**7**	**7**	**12**	**3**	**7**

Source: Authors' own compilation

Table 19. Strengths and weakness of demand-side initiatives

Initiative	Level of guidance	Comprehensiveness of information	Accessibility of information	Number of demand areas addressed
ACMI	Principles	Comprehensive information	Information publicly available	3
California's Disclosure law	Mixed	Limited information	Information publicly available	9
Carbone4 NZI	Mixed	Very comprehensive information	Information publicly available	8
Ceres	Mixed	Limited information	Information publicly available	6
CMA Green Claims Code	Principles	Comprehensive information	Information publicly available	1
CMW	Principles	Limited information	Information publicly available	3
Compensation Foundation	Detailed	Very comprehensive information	Information publicly available	10
ETA	Mixed	Limited information	Information publicly available	4
Finish Guide	Detailed	Very comprehensive information	Information publicly available	11
French law	Mixed	Limited information	Information publicly available	8
FTC Green Guides	Principles	Limited information	Information publicly available	2
G7 Principles	Principles	Limited information	Information publicly available	5
GGPC	Principles	Very comprehensive information	Information publicly available	6
Gold Standard	Mixed	Limited information	Information publicly available	5
ICROA	Principles	Comprehensive information	Information publicly available	7
ISO 14068	Principles	Comprehensive information	Information available upon purchase	8
ISO IWA 42:2022	Mixed	Comprehensive information	Information publicly available	9
Joint statement	Principles	Limited information	Information publicly available	8
NCI - CCRM	Mixed	Very comprehensive information	Information publicly available	6
NCI - RA	Mixed	Comprehensive information	Information publicly available	6
NCS Alliance	Mixed	Comprehensive information	Information publicly available	6
NewZealand guidance	Principles	Limited information	Information publicly available	9
Nordic Dialogue	Detailed	Very comprehensive information	Information publicly available	9
Oxford Offsetting Principles	Mixed	Comprehensive information	Information publicly available	9
PAS 2060	Principles	Comprehensive information	Information publicly available	8
SBTi	Principles	Very comprehensive information	Information publicly available	10
UN High-Level Expert Group	Principles	Comprehensive information	Information publicly available	8
UNFCC Race to Zero	Principles	Limited information	Information publicly available	9
VCMI	Detailed	Very comprehensive information	Information publicly available	11
WWF	Principles	Limited information	Information publicly available	8

Source: Authors' own compilation

4.2.4 Limitations

It should be borne in mind that there are some limitations to the mapping presented in this chapter. Firstly, while we took the utmost care to identify all relevant initiatives, it is possible that we missed an initiative due to a lack of available information or our cut-off date. For example, some relevant initiatives were released after 1 March 2024, such as the U.S. government's Joint Policy Statement and Principles on Voluntary Carbon Markets. We nevertheless believe that our analysis provides a sound overview of initiatives on the voluntary carbon market.

Secondly, we considered whether an initiative addressed an element or not but did not consider how stringent their requirements or recommendations are. Secondly, we evaluate which elements an initiative addresses but do not assess how robust their requirements or recommendations are. Future research could address this in order to attain a better understanding of what "high integrity" means for each element and how well different initiatives address integrity.

4.3 Conclusion

Based on our analysis of voluntary carbon market initiatives, we conclude the following:

- Integrity initiatives come in diverse organisational forms, ranging from multi-stakeholder initiatives and initiatives by for-profit organisations to those provided by NGOs. Most of them, by a large margin, are good practice guides. In comparison, initiatives that set standards are still in the minority.
- Many integrity initiatives have been initiated or updated recently, indicating a momentum in the market as regards to enhancing environmental integrity on both the demand side and the supply side.
- Most initiatives do not contain detailed requirements or recommendations on integrity. Rather, they provide or endorse certain integrity principles and likely aim to influence the discourse with a view to directing the voluntary carbon market towards higher integrity. Examples are the Joint Statement, the G7 principles, and the San José Principles.
- A small number of initiatives stands out for addressing all or the most relevant aspects of environmental integrity, and for providing detailed guidance and comprehensive, publicly available information. These initiatives are most frequently mentioned as the basis for requirements or recommendations for other initiatives. These are the ICVCM and the CCQI on the supply side, and the VCMI and the SBTi on the demand side. The requirements or recommendations that these initiatives set are therefore likely impactful in the carbon credit market.
- On the supply side, several elements were frequently addressed: additionality, quantification, non-permanence, double counting as well as environmental and social impacts. Conversely, on the demand side, the most frequently addressed elements were climate target setting, transparency about the use of carbon credits, climate-related claims, the prioritisation of own emission reductions over the use of carbon credits, and emission quantification. This indicates that these elements are central to integrity on the voluntary carbon market. Future research may clarify the precise ways in which initiatives understand and operationalise these elements. This will provide a deeper insight into how environmental integrity is defined in the voluntary carbon market, and which initiatives set the highest integrity standards or have the most stringent recommendations.

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Chapter 2

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