

Climate Governance in a Fast-Changing World: Evolving Patterns and Contestation around Finance and Action

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Abstract

Using the latest (2023) data, this paper analyses correlation between jurisdictional risk and climate finance, and challenges for climate finance outside typical, well controlled channels, especially given the increasing importance of private finance. Our analysis shows that the top recipients of climate finance remain among the riskiest places in the world for integrity, a situation that is intensifying as a result of changes rapidly occurring in the climate domain. First, the influx and influence of private finance risks overwhelming government and multilateral priorities and agendas. Second, despite greater global acceptance of the need for a just transition, there are ongoing governance challenges given integrity weaknesses in countries where a just transition is most needed. Third, there are deepening integrity challenges for a just transition caused by the US, EU and Japan's efforts to realign global supply chains for critical minerals to reduce their reliance on China. Fourth, the Global South's increasing policy confidence is generating contestation in both multilateral and bilateral negotiations around investment priorities. The paper highlights key evolving areas for integrity action, especially around private finance, producers of critical minerals, and transparency gaps in both recipients and providers of climate finance.

Introduction

Climate finance (CF)¹ reached \$1.27 trillion in 2021-2022 and is set to grow exponentially if donor commitments are fulfilled and if anticipated opportunities for private investment are created. CF is now evenly split between public sources (\$638bn) and private sources (\$626bn), although private sources are expected to grow much faster than public sources—and need to if climate action can contain global warming to 1.5° Celsius above pre-industrial levels.²

But climate finance has a corruption problem: major destinations for CF are some of the riskiest places on earth from an integrity perspective. This paper analyses evolving patterns of CF based on the latest global data published by the Climate Policy Initiative (Buchner *et al.* 2023a) and the subset of climate-related development finance (CRDF) distributed as overseas development assistance (ODA; OECD 2021), which was \$97.5bn in 2021 (7.7% of global CF). This paper analyses new sources of capital and directions for investments, to identify known and emergent integrity risks. Three case studies highlight how unmanaged risks for corruption can cause CF-funded initiatives to fail to achieve their objectives. New political and economic developments are also analysed to understand how they are driving changing patterns of CF and associated integrity risks. The conclusion suggests priority areas for integrity action in the climate domain.

Current Patterns of Climate Finance

The integrity profile of recipients and donors in this section comprises scores from three integrity-related indices: the World Bank's Control of Corruption index (COC); the European Research Centre for Anti-Corruption and State-Building's transparency in governance index (T-Index), as developed by Alina Mungiu-Pippidi; and Transparency International's Corruption Perceptions Index (CPI). Scores for vulnerability to climate change are those from the ND-GAIN index.³

Destination by recipient

As shown by Table 1, the top recipients of CRDF are risky places for corruption, and therefore risky places for climate-related investments (whether public or private). Colombia, Indonesia, and Argentina, all do well for transparency in government (T-Index), which may assist policymaking and progress towards a just transition. However, the country that scores highest for anti-corruption efforts as measured by either the COC or CPI is China, and its T-Index score marks it as only moderately transparent relative to other countries. All other countries have moderate to low scores for the COC and CPI indices. The top recipient of CRDF, India, receives more than double the next largest (Türkiye; \$3.5b), but India scores only in the moderate range across all three integrity indices.

The countries in Table 1 are all also moderately to significantly vulnerable to climate change, with Türkiye being the least vulnerable of the group, and Bangladesh and Pakistan being most the vulnerable.

Table 1: Top 10 recipients of CRDF, climate vulnerability and score for three integrity indices

All Recipients (LDC, LMIC, UMIC)	CRDF, millions (2021)	% of Total CRDF	Vulnerability, 2021 (0=not vulnerable, 1=very vulnerable)	COC, 2022 (-2.5=highly corrupt, 2.5=very clean)	T-Index, 2021 (0=not trans., 100=very trans.)	CPI score, 2023 (0=highly corrupt, 100=very clean)
1. India	7,942.7	8.1	0.498	-0.32	60	39
2. Türkiye	3,505.3	3.6	0.353	-0.47	60	34
3. Bangladesh	3,325.3	3.4	0.531	-1.08	53	24
4. Colombia	2,757.4	2.8	0.414	-0.36	88	40
5. Egypt	2,714.2	2.8	0.420	-0.68	38	35
6. Indonesia	2,506.7	2.6	0.440	-0.43	78	34
7. Pakistan	2,301.4	2.4	0.521	-0.80	70	29
8. China	2,117.6	2.2	0.387	0.02	63	42
9. Argentina	1,762.3	1.8	0.384	-0.45	85	37
10. Philippines	1,759.6	1.8	0.463	-0.54	70	34
Total	30,692.5	31.5%				

Sources: CRDF (OECD 2021); Vulnerability to climate change (Chen et al. 2023); COC: (World Bank 2023); T-Index (Mungiu-Pippidi et al. 2023); and CPI (Transparency International, 2023).

Compared to the largest top 10 CF recipients, Least Developed Country (LDC) recipients are poorer, with smaller economies and more corruption. They are also highly vulnerable to climate change, with only Tanzania and Mozambique being outside the ND-GAIN index's bottom quintile. LDC recipients also score poorly on the COC, T-Index and CPI. Senegal and Burkina Faso do best across all three indices, but their scores are merely moderate. Bangladesh, D.R. Congo, Mozambique and Mali, score poorly.

Table 2: Top 10 LCD recipients of CRDF, climate vulnerability and score for three integrity indices

Least Developed Country	CRDF, millions (2021)	% of Total CRDF	Vulnerability, 2021 (0=not vulnerable, 1=very vulnerable)	COC, 2022 (-2.5=highly corrupt, 2.5=very clean)	T-Index, 2021 (0=not trans., 100=very trans.)	CPI score, 2023 (0=highly corrupt, 100=very clean)
1. Bangladesh	3,325.3	3.4	0.531	-1.08	53	39
2. Niger	1,222.7	1.3	0.632	-0.59	n/a	32
3. Ethiopia	1,143.4	1.2	0.547	-0.44	38	37
4. Tanzania	1,086.0	1.1	0.504	-0.34	55	40
5. D.R. Congo	1,055.9	1.1	0.564	-1.54	48	20
6. Mozambique	1,027.0	1.1	0.493	-0.84	43	25
7. Senegal	848.8	0.9	0.520	-0.03	58	43
8. Burkina Faso	841.0	0.9	0.537	-0.08	60	41
9. Mali	651.0	0.7	0.596	-0.88	40	28
10. Madagascar	598.5	0.6	0.557	-1.01	40	25
Total	11,799.6	12.1%				

Sources: CRDF (OECD 2021); Vulnerability to climate change (Chen et al. 2023); COC: (World Bank 2023); T-Index (Mungiu-Pippidi et al. 2023); and CPI (Transparency International, 2023).

Statistical tests on the relationship between vulnerability to climate change and the three integrity indices, found a significant, negative, correlation. That is, vulnerability to climate change is highly likely to correlate to weaker integrity. Annex 1 has scatterplots of vulnerability to climate change and the three integrity indices.⁴ The scope, scale and nature of potential integrity needs in the climate domain, becomes more complicated when climate finance is viewed more broadly—beyond CRDF. Table 3 details global patterns of CF by geographic region (Buchner *et al.* 2023a do not disaggregate their data by country).

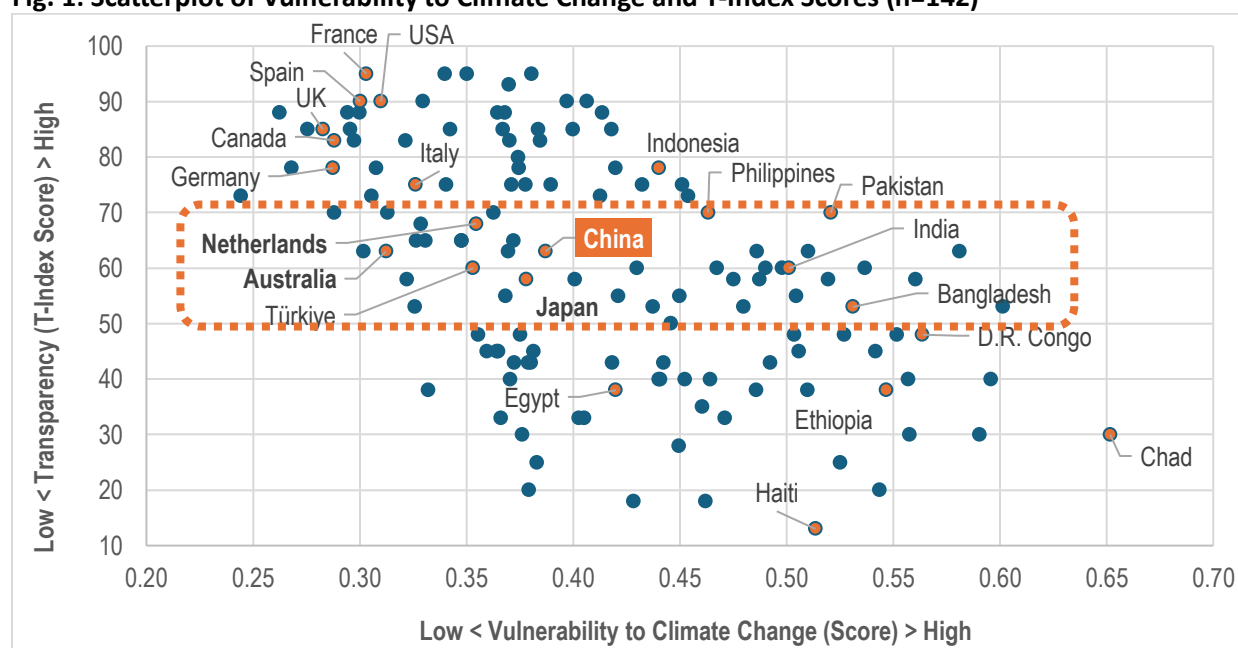
Table 3: Global climate finance by region of destination (domestic and international)

Region	CF, millions (2022)	% of Total CF (2022)
East Asia and Pacific (includes China, Japan, Indonesia, Philippines)	660	46.7
Western Europe (includes Netherlands)	338	23.9
US and Canada	190	13.4
Latin America and the Caribbean	59	4.2
South Asia (includes India, Pakistan, Bangladesh)	50	3.5
Central Asia and Eastern Europe (includes Türkiye)	36	2.5
Sub-Saharan Africa	34	2.4
Middle East and North Africa	20	1.4
Other Oceania (includes Australia)	15	1.1
Transregional	12	0.8
Total	1414⁵	99.9

Source: Table A.10, Buchner *et al.* 2023a: 47.

Fig. 1 is a scatterplot of 142 countries and their scores for vulnerability to climate change and transparency in governance, with selected countries shown for reference.

Fig. 1: Scatterplot of Vulnerability to Climate Change and T-Index Scores (n=142)⁶



Sources: ND-GAIN 2023 and Climate Policy Initiative, 2023.

Fig. 1 shows the least transparent (Haiti); the most climate vulnerable (Chad); LDC recipients with large populations (D.R. Congo and Ethiopia); large Western European economies (France, Spain, UK, Germany, and Italy); US and Canada; and large CRDF recipients (India, Türkiye, Bangladesh, Indonesia, Pakistan, and

Philippines)—although in global terms these countries are not significant for CF as can be deduced from Table 3. It also shows, within the orange rectangle, are China, Japan, Australia, and Netherlands.

Buchner *et al.* highlights that China’s domestic CF mobilization accounts for 51% of all domestic CF globally, approx. \$542bn (2023a: 6). This means that China’s share of ‘East Asia and Pacific’ in Table 3 is a minimum of 82%, which makes China the destination for more global CF than any other country—at least 38.3%—even before international flows are taken into account. Japan must be relatively significant as a destination and origin of CF given the size of its economy; Australia is the world’s 12th largest economy and the 16th largest GHG emitter; and the Netherlands is the world’s 18th largest economy and a significant global financial hub (World Bank 2023b; Climate Watch 2024). Yet, China, Japan, Australia and Netherlands all score only moderately for transparency.

Transparency is critical for good governance around climate activities: for understanding and controlling undue influence; for access to and understanding how climate policy is made; and for ensuring a just transition (for which engagement of multiple stakeholders, open discussion and clear decision-making processes are critical). The relatively poor transparency of China, Japan, Australia, and Netherlands, indicates there is scope for integrity action in providers of CF, not just recipients. In particular, China’s lack of transparency in policymaking, financial management, and legal processes and decisions, creates a ‘black box’ of unknowns. This should not necessarily be interpreted as ‘corruption’; China has corruption controls in place, including for the climate domain.⁷ However, these unknowns reduce the ability to understand fully GHG emissions, progress on climate action, investment flows into new technology, the nature of new technology, and application of integrity controls.

Destination by sector

Table 4 and Table 5 show the sectoral distribution of CF, focused on global distribution and CRDF distribution respectively. Table 4 highlights that CF is focused on three key sectors for mitigation purposes: Energy Systems (39.5% of global CF), Transport (28.8%) and Buildings & Infrastructure (18%). Combined, these sectors account for 86.8% of global CF. Given these sectors are all well-known for corruption risks (Nest *et al.* 2020), the importance of integrity controls specifically designed for them, and targeting them, is clear. Data on adaptation-related CF have a different pattern: Water and Wastewater accounts for 53.6% of all expenditure, following by Agriculture, Forestry, Other land uses, and Fisheries (AFOLU) at 9.6%.

Table 4: Global CF by sector, 2022

Sector	Mitigation		Adaptation		Dual Purpose		Combined CF	
	US\$bn	%	US\$bn	%	US\$bn	%	US\$bn	%
Energy Systems	559.0	43.2	0.1	0.1	6.0	11.9	565.1	39.8
Transport	407.0	31.4	1.0	1.4	1.0	2.0	409.2	28.8
Buildings & Infrastructure	255.0	19.7	0.2	0.3	0.1	0.2	255.3	18.0
Water & Wastewater	10.0	0.8	39.0	53.4	3.0	5.9	52.0	3.7
AFOLU	7.0	0.5	7.0	9.6	27.0	53.3	41.0	2.9
Others & Cross-Sectoral ⁸	57.0	4.4	25.7	35.2	13.5	26.7	96.2	6.8
Total USD billions	1292.0		73.0		50.6		1418.8	
% of all CF		91.3		5.2		3.6		100.0

Source: Buchner *et al.* (2023: 1).

The sectoral categories in Table 5 for CRDF do not exactly Buchner *et al.*’s in Table 4. However, Energy (16.6% of total CRDF) and Transport & Storage (15.1%) are clearly the stand-out sectors within CRDF. If ‘Industry, Mining & Construction’ is added (2.1% of CRDF) to approximate the three top global CF categories, this means that Energy, Transport & Storage, and Industry, Mining and Construction, receive

33.8% of all CRDF. Given these sectors are notorious for corruption, the proportion of CRDF directed to them is an area of concentrated risk.

Table 5: Top sectoral recipients of CRDF, 2021

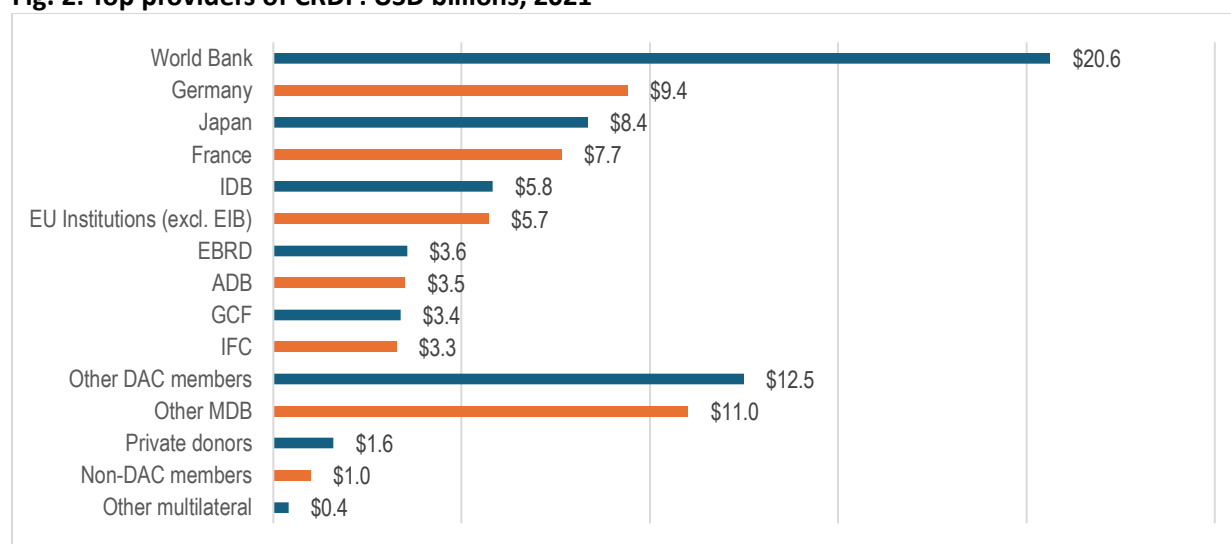
Sector	Mitigation		Adaptation		Dual Purpose		Combined CF	
	US\$mn	%	US\$mn	%	US\$mn	%	US\$mn	%
Energy	13,876	27.8	753	2.2	1,523	11.3	16,152	16.6
Transport & Storage	11,993	24.0	2,627	7.7	143	1.1	14,762	15.1
Water Supply & Sanitation	2,606	5.2	5,481	16.1	967	7.2	9,054	9.3
Agriculture, Forestry, Fishing	1,389	2.8	5,328	15.7	1,730	12.8	8,448	8.7
Other Multisector	1,949	3.9	3,739	11.0	1,099	8.1	6,787	7.0
Government & Civil Society	1,588	3.2	2,457	7.2	1,603	11.9	5,648	5.8
General Environment Protection	1,685	3.4	1,565	4.6	2,371	17.6	5,621	5.8
Banking & Financial Services	2,381	4.8	1,023	3.0	708	5.2	4,112	4.2
Other Social Infrastructure & Services	391	0.8	2,653	7.8	350	2.6	3,394	3.5
Industry, Mining & Construction	1,483	1.5	434	0.4	137	0.1	2,054	2.1
Other Sectors ⁹	10,636	22.7	7,958	24.3	2,872	22.2	21,465	22.0
Total USD billions	49,977		34,018		13,503		97,497	
% of all CRDF		51.3		34.9		13.8		100.1

Source: OECD, 2021.

Providers of climate finance

Fig. 2 shows the top 10 providers of CRDF plus five other provider types. The top 10 providers contribute 73.2% of all CRDF, with other providers (bundled into the five ‘types’) contributing the remaining 26.8%.

Fig. 2: Top providers of CRDF: USD billions, 2021



Source: OECD, 2021.

The World Bank is the stand-out provider in Fig. 2, contributing 21.1% of all CRDF. The data in Fig. 2 are encouraging from an integrity perspective, because although their programmes can always be strengthened, MFIs (including the World Bank) and most OECD members have in place integrity control programmes, are accountable to member states and/or subject to scrutiny by civil society organisations (CSOs). Of concern from a broader CF perspective, is the lack of transparency around integrity controls on domestic CF (whether public or private) and private CF generally, as a source of CF. See Table 6 for a breakdown of global CF by public sources and private sources.

Table 6: Sources of Climate Finance, 2021/2022

Source	Value (millions)	% (of Subtotal)	% (of Total)
PUBLIC SOURCES	639.8	100.0	50.6
National DFIs	238.4	37.3	18.9
State-owned enterprises	110.3	17.2	8.7
Governments	99.6	15.6	7.9
Multilateral DFIs	93.1	14.6	7.4
State-owned financial institutions	60.9	9.5	4.8
Bilateral DFIs	32.6	5.1	2.6
Multilateral climate funds	2.9	0.5	0.2
Export credit agencies	1.8	0.3	0.1
Public funds	0.2	0.0	0.0
PRIVATE SOURCES	624.2	100.0	49.4
Commercial financial institutions	235.0	37.6	18.6
Corporations	192.2	30.8	15.2
Households/individuals	184.5	29.6	14.6
Institutional investors	6.3	1.0	0.5
Funds	6.2	1.0	0.5
TOTAL	1,264.0		

Source: Buchner et al., 2023.

Funds from public and private sources are frequently jointly invested into climate activities in ‘blended finance’ arrangements. One example is the Santa Rita hydroelectric dam project in Guatemala (discussed below). Another is the Lake Turkana Wind Power Project in Kenya, which was funded by Danish and Finnish government development funds and a private Danish wind energy firm (Nyambura 2024).

Public sources corresponding to providers of CRDF—such as multilateral DFIs, bilateral DFIs, and multilateral climate funds, which account for a combined total of 10.2% of global CF—will most likely have integrity controls. Similarly, private sources such as commercial financial institutions (e.g., banks) and corporations (which together account for 33.8% of all CF), are likely to have integrity controls in place where these entities operate in countries with strong financial regulatory frameworks, such as in North America, Western Europe and some Asian countries. This means that perhaps 44% of all CF is subject to some sort of regulation targeting corruption.

Notwithstanding the probable existence of corruption controls for *public sources* of CF in certain countries, these same countries can suffer from secrecy around *private sources* of CF. Furthermore, even if a country is relatively non-secretive it may still be a destination for offshore wealth, making it a significant ‘supplier of secrecy’ to private institutions and individuals. For example, the following jurisdictions feature in the bottom 10 of Tax Justice Network’s Financial Secrecy Index (FSI) largely because they are significant suppliers of secrecy: US (worst ranked at no.141), Japan (no.136), Germany (no.135), China (no.133), Netherlands (no.132), and UK (no.131).¹⁰ In fact, the US, Japan, China, and Netherlands have relatively moderate scores for how much financial secrecy their laws allow, but these scores when coupled with the fact they are significant destinations for offshore wealth, give them their very low overall index ranking. In the case of the UK and Germany, their laws score well because they are *not* very secretive, but because both receive so much offshore wealth their overall ranking on the FSI is low.

Financial secrecy is an established risk for anti-money laundering controls, but it is also relevant to integrity and action in CF because it helps to obscure the origin and destination of private sources of CF. Like transparency in governance, which is important for public sources of CF, financial secrecy can stymie a *just* transition. Red flags become evident from Table 6 when integrity risks around private CF are taken into account:

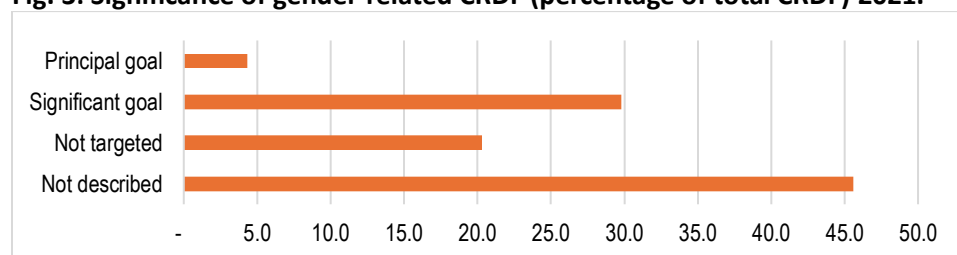
- China, which has moderate transparency, receives at least 38.3% of all CF (51% of all domestic CF).

- The category ‘Households/individuals’, which accounts for 14.6% of all CF, includes “high-net-worth individuals and their intermediaries (e.g., family offices investing on their behalf). An industry of financial service providers, offshore financial centres and investment vehicles (such as Trusts) exist to facilitate secrecy for rich investors.
- Private sources (‘institutional investors’ and ‘funds’) account for only 1% of CF, but these are frequently touted as key to mobilising the billions in additional capital required to manage global warming. Due to varying transparency around funds’ beneficial owners and secrecy around offshore investments, who benefits (or loses) from such investments may remain unknown.
- Controls around undue influence are poorly understood or weak for countries such as China, but also for Russia, India and Türkiye (all regionally, if not globally, significant for CF). Even in OECD countries with some controls in place, undue influence remains a concern because these countries are large GHG emitters and home to global fossil fuel producers (Nest & Mullard 2021).

Climate-related development finance by gender

The OECD’s CRDF data is categorised by whether gender is a ‘principal’ or ‘significant’ goal—see Fig. 3.

Fig. 3: Significance of gender-related CRDF (percentage of total CRDF) 2021.



Source: OECD 2021

Fig. 3 highlights a gap in the data, in that the gender-related goals of 45.6% of CRDF (\$44.4bn) is not described. Given that climate-related activities need to include and address gender inequality for there to be a just transition, the fact that only 34.1% of CRDF (\$33.2bn) has gender as a Principal or Significant goal seems low—although this may be more an issue of accurate data classification.

Table 7 shows the top 10 recipients of CRDF explicitly focused on gender and the top 10 LDC recipients.

Table 7: Top 10 countries for which gender is a ‘Principal’ or ‘Significant’ goal of CRDF, 2021¹¹

All Recipients	CRDF, millions.	% of their CRDF	Vuln. to CC (0=not vuln. 1=very vuln.)	LDC Recipients	CRDF, millions	% of their CRDF	Vuln. to CC (0=not vuln. 1=very vuln.)
1. India	3,993	50.3	0.498	1. Bangladesh	2,329	70.0	0.531
2. Bangladesh	2,329	70.0	0.531	2. Mali	435	66.8	0.596
3. Türkiye	1,287	36.7	0.353	3. Ethiopia	389	34.0	0.547
4. Indonesia	1,041	41.5	0.440	4. Burkina Faso	370	44.0	0.537
5. Mexico	1,022	63.6	0.385	5. Tanzania	302	27.8	0.504
6. Pakistan	722	31.4	0.521	6. Senegal	276	32.5	0.520
7. Egypt	542	20.0	0.420	7. Rwanda	271	53.0	0.527
8. Uzbekistan	527	43.3	0.364	8. Niger	266	21.8	0.632
9. China	522	24.7	0.387	9. D.R. Congo	246	23.3	0.564
10. Costa Rica	476	69.0	0.372	10. Nepal	218	72.7	0.490
Total	12,461	37.5		Total	5,102	15.4	

Source: OECD, 2021; Chen et al., 2023.

Table 7 shows that the countries receiving the most gender-targeted CRDF are not those most vulnerable to climate change as only Bangladesh and Pakistan are in the ‘most vulnerable’ to climate change category. Table 7 also shows that CRDF to upper and lower middle income countries is more focused on gender equity outcomes than CRDF to LDCs (with some exceptions like Bangladesh, Mali and Nepal), even though LDCs are more vulnerable to climate change. This heightened vulnerability has not translated into more gender-targeted activities for LDCs, even though the climate crisis affects women more than men.

Case studies of corrupted climate finance

The following case studies demonstrate how climate action can be corrupted and highlight lessons for climate initiatives, including risks around CF that need to be managed and the consequences of poor integrity.

The Santa Rita Project was a 23-megawatt hydro-electric dam authorised by the Guatemalan government in 2010. Investment capital came from the private Latin Renewables Infrastructure Fund (LRIF), backed by the IFC and German, Dutch, Spanish, and Swiss development institutions. The project required flooding that would displace Indigenous Mayans, a community that has suffered centuries of abuse and marginalisation.

The contractor arranged community consultations and social programs, but communities alleged participation was conditional on acceptance of the project. Despite free, prior, informed, consent (FPIC) not being given, construction continued. In 2013, protestors occupied a site and damaged equipment. Police sent to quell protests and to evict residents for construction work, fired tear-gas and stole from villagers’ homes. Seven people were killed.

Mayan organisations, international CSOs, members of the European Parliament, and the UNHCR, criticized the project. The IFC Ombudsman’s compliance appraisal found the IFC paid inadequate attention to environmental and social risks and other contextual factors associated with the project, and did not ensure IFC staff authorising the project were adhering to required standards. Funders withdrew and the project was cancelled (Climate Diplomacy 2014, Neslen 2017, Filzmoser 2017, and Compliance Advisor Ombudsman 2019). The key lessons for integrity are:

- When community complaints are ignored, this can result in harm and project failure.
- Private investors need better understanding of environmental and social risks, including (a) how to manage them, and (b) if unmanaged, how they can jeopardise their investments. Development institutions, some of which have a sophisticated understanding of such risks, could transfer knowledge about such risk management.
- Public development institutions need to be more wary of, and do due diligence on, private investors before providing them with public equity.

The Four Major Rivers Restoration Project (FMRRP) was a \$20bn river diversion and restoration project (2009-2012), funded by the South Korean government and K-Water Co, a state-owned enterprise. Its primary objective was to mitigate flooding, which was becoming more frequent and serious due to elevated rainfall linked to climate change (Shin & Chung 2011).

The project had risk factors that were poorly managed. It was a ‘pet project’ of then President Lee Myung-bak, who made it clear he wanted the project finished before his term ended, creating pressures for rapid tendering and construction. The 15 contracts were to be awarded to the lowest

cost bidder (rather than the best quality, or a mix of quality and cost), who was required to submit designs as part of their bid, the costs of which would not be compensated (Lah *et al.* 2015). Engineering designs are expensive, so a company that lost a bid would lose its design costs. The companies bidding for the project decided to collude, agreeing who would 'win' each of the contracts by agreeing who would submit the lowest bid. Once the tenders were 'won', companies lacked incentives to deliver quality projects. Because officials were pressured to finish the project before President Lee's term ended, project management and monitoring was substandard.

The FMRRP achieved some objectives, including reducing flooding in some areas, minimizing water scarcity, improving water quality, and some revitalization of local economies. However, six of 16 dam walls had cracks and leaks and there was erosion in reservoir levees, requiring expensive remediation. The quality of water used for human consumption and agriculture worsened in some areas (Yooh 2014). Pressure to complete the project curbed public debate and criticism, with some people becoming afraid to speak out (Khairinissa 2017). The companies were fined a total of \$100 million and were banned for a period from bidding for government contracts. These reputational impacts caused challenges for them winning new foreign contracts, with two subsequently having their involvement in the FMRRP scandal queried by clients in Kuwait and the U.A.E. (Korea JoongAng Daily 2014). The key lessons for integrity are:

- Tender processes that are designed without attention to integrity risks, create opportunities for corrupt behaviour by unscrupulous tenderers and result in flawed infrastructure.
- When stakeholder engagement is inadequate, project design and monitoring will suffer, creating opportunities for suboptimal construction.
- The burgeoning market for CF-funded contracts will attract private actors, but reputational damage for those firms if they engage in corruption has implications beyond the climate domain.

A billion-dollar solar power fraud was committed in California from 2011 to 2018, by Jeff Carpo (an entrepreneur and former drug dealer) and co-conspirators. Carpo attached solar panels to a trailer that could be towed by a car, to create a mobile generator that produced energy from solar panels. The invention was touted as a green alternative to diesel generators. Carpo started DC Solar to sell his generators. An early client bought 192 for \$29 million and the invention attracted other investors.

While the generators worked, they were prone to malfunction and were not well-made. Their value became linked to a US Treasury scheme that gave commercial investors a 30% credit they could claim as a tax write-off on the cost of the generators they bought. The US Treasury classified these tax credits as investments in renewable energy. DC Solar realised they could sell generators to investors and then lease them to users, allowing investors to claim the tax credit and receive lease income. Because most investors did not visually inspect their generators, DC Solar realised it did not need to actually manufacture them—it just needed to provide lease income to keep investors happy. If a customer insisted on visual inspection, vehicle identification number stickers were taken from some units and applied to other units and the customer was told they were theirs; fake lease contracts were given to investors as 'proof' of leasing agreements; and "to dupe buyers who wanted real-time data on their units' whereabouts, [DC Solar] workers buried GPS transponders in out-of-the-way locations, minus the generators they were billed as being attached to" (Sabar 2023).

Profits from selling generators that never existed were distributed to early investors as lease income. Carpo also returned to drug dealing to obtain more cash to pay lease income. Between 2011 and 2018, DC Solar engaged in an accounting and lease revenue fraud using Ponzi-like circular payments. It sold more than 17,000 generators, but at least half never existed (US Attorney's Office 2022). Generator sales of \$2.5bn to private investors allowed them to claim \$750 million in tax write-offs and the government to

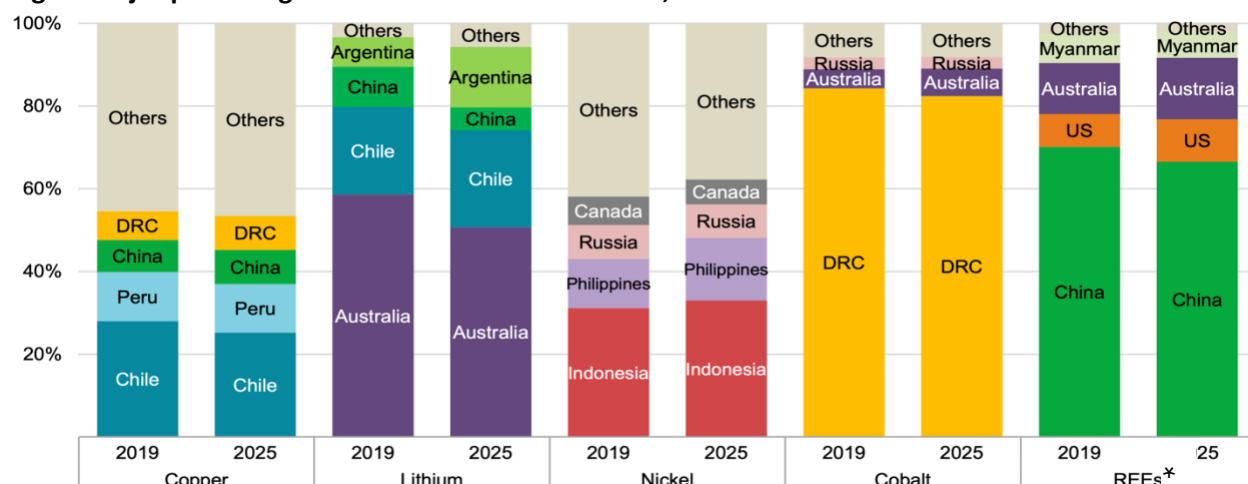
claim it invested this amount in solar energy. The fraud was sustained by a financial services ‘ecosystem’: professional advisors who greenlighted the deals, and brokers who got six-figure commissions for finding investors and who vetted the transactions with teams of experts—and returned to DC Solar for repeated multimillion-dollar deals (Sabar 2023). The key lessons for integrity are:

- As private capital becomes more prevalent in CF, the climate domain will increasingly be exposed to similar fraudulent, unquestioning and unethical practices, as exist in the private sector.
- Fraud involving tax write-offs can only exist when private sources of CF are involved (because public sources do not get tax breaks). Tax write-offs and government subsidies are a red flag.
- Investors failed to do due diligence on Carpoft and DC Solar. Investors must do due diligence on investment targets.

Political-economic developments and their implications for integrity

If the UNFCCC’s climate goals are to be met, more critical minerals used in renewable technologies are required. The International Energy Agency (IEA) estimates that to reach net-zero globally by 2050, six times more critical minerals will be required in 2040 than today (IEA 2022: 8). But production and refining of these minerals are concentrated in countries with major integrity gaps—see Fig. 4.

Fig. 4: Major producing countries of selected minerals, 2019 and 2025



* Rare earth elements (REEs) here include only neodymium, praseodymium, terbium, and dysprosium.
Source: IEA 2022: 121.

One change not captured by Fig. 4 relates to nickel and cobalt: Chinese processors recently invented technology to more efficiently extract nickel from less concentrated deposits. This technology saw Indonesia’s share of nickel production increase 54% from 2021 to 2022, and global nickel production increase 21% (USGS 2024: 125). Cobalt is a by-product of this type of nickel production, so the technology also caused Indonesia’s cobalt production to increase 77% from 2022 to 2023 and global cobalt production to increase 17% over this period (USGS 2023: 63). In sum, Indonesia is now even more important for nickel and cobalt than before.

Globally, refining of many minerals shown in Fig. 4 is concentrated in China: 80% of lithium, 70% of cobalt, 40% of copper, 35% of nickel, and as much as 90% of some REEs (USGS 2023: 32, 133; Castillo & Caitlin 2022, for copper). The US, Japan and EU, motivated by economic and security strategic concerns, have

adopted programmes to realign supply chains in order to bypass China and Chinese-owned enterprises (White House 2022; Velez 2023; Teer & Miller 2023; Lu 2023; European Commission 2023). These policies are likely to result in more investment in the same producer countries, with the exception of Russia. Notwithstanding the West's desire to restructure supply chains, production of critical minerals will remain concentrated in current source countries due to an absence of commercially viable new deposits, signalling that integrity challenges around the energy transition will intensify and increase in scope.

Integrity risks around critical minerals production and processing

Increased production and processing of critical minerals will generate integrity risks. First, there can only be a *just* transition if benefits are shared and communities least able to cope with negative consequences are protected. Specific risks related to a just transition, which may or may not include behaviour legally defined as corrupt, include forced resettlement; violence by project implementing partners; and loss of jobs and destruction of livelihoods. When a community becomes worse off due to a climate-related investment, it is frequently the most marginalised members who suffer the worst effects, e.g., women (who occasionally end up doing sex work due to lack of alternatives), people with disabilities (whose support networks and livelihoods may be destroyed due to relocation), or ethnic minorities (who may miss out on compensation, especially if they lack legal title to land being appropriated for projects).

Critical minerals producers have a mixed record for integrity, raising questions about their ability to apply good governance in their mining sectors or to implement policies conducive to a just transition. D.R. Congo does poorly on all governance indices; Argentina, Chile, Peru, Brazil, Indonesia, Philippines, and South Africa do relatively well on transparency but do poorly on corruption controls (except for Chile); Australia, Canada, US, Japan, and EU countries do well on corruption controls, but Australia, Japan and Netherlands score only moderately for transparency.

Of the countries mentioned, the following are members of the EITI and therefore subject to its standards around the extractive industry supply chain: Argentina, D.R. Congo, Indonesia, Mozambique, Netherlands, and Philippines (all of which have made moderate or meaningful progress against standards), as well as Peru (currently suspended due to lack of progress). More notably, the following countries are *not* members of the EITI and not subject to its standards: Australia, Canada, Chile, China, Brazil, Japan, Russia, and USA.

Policy contestation by the Global South

Distribution of CF is being shaped by greater policy assertiveness by the Global South. A recent example is the Loss and Damage Finance Facility (LDFF), established at COP27 in 2022 and with agreement to operationalise it at COP28 in 2023. The purpose of the LDFF is to help the poorest developing countries already affected by loss or damage from climate change (countries that have contributed the least to the climate crisis). The LDFF will provide grants, not loans, to rebuild physical and social infrastructure (Bhandari 2024). Contestation continues over whether the LDFF will be managed by the World Bank (rich countries' preference) or located elsewhere (developing countries' preference). Developing countries also point out the World Bank's has high administrative overheads (reducing total available LDFF), whereas donors emphasise the World Bank's financial and integrity controls compared to an unknown alternate host (Harvey 2023). Controls will be needed for the LDFF, as for all other CF. If a completely new host governs the LDFF this would be an opportunity to put in place best practice systems from the start.

Another policy initiative shaped by the Global South are Just Energy Transition Partnerships (JETP), which are funded by low-cost loans and help coal-dependent developing economies make a just transition.¹² JETPs embrace a for-profit model of energy generation, but they will hasten the replacement of coal-fired power stations with renewable energy. Even though JETPs satisfy rich governments' desire for market-led

solutions involving private capital and avoiding grants, they are also a policy success for developing countries. JETPs give them a larger piece of the 'CF pie' than otherwise may have been provided, while reducing GHG emissions, allowing them to grow their emerging economies, establish a domestic renewable energy sector that creates jobs, and obtain capital to do this.

Corruption risks and knowledge gaps

The distribution of CF as shown by data from Buchner et al (2023) and OECD (2021), and the case studies described in the previous section, highlight some known corruption risks:

- Large amounts of money
- Unclear and evolving rules
- Complex institutions and disbursement mechanisms
- Inadequate monitoring
- Highly technical science that is not well understood by others
- Endemic corruption in key sectors, e.g., construction, energy, and forestry
- Multiple actors with varying anti-corruption controls
- A spending imperative due to urgency (the climate crisis) that can detract from illegal behaviour.¹³

Some of these risks are now better controlled. For example, standards and regulations are being introduced to establish rules; expenditure of CF and implementation of climate activities are monitored externally by an increasing number of CSOs and, in the case of public CF, subject to internal monitoring by MFIs and governments; risks in key sectors (such as construction, energy and forestry) have been repeatedly flagged, partly through publicity about corruption in climate action¹⁴; and science around GHG emissions and climate targets is better explained and better understood. Other risks for corruption are increasing in scope and/or remain inadequately managed. For example, the volume of CF is larger than ever before and will grow exponentially if emissions targets are to be met, and the spending imperative is likely to only heighten. The burgeoning participation of private actors is also creating institutional and disbursement complexity, and bringing actors with varying integrity controls into CF activities.

The cases from Guatemala, South Korea and USA, indicate additional integrity risks, some of which are already known but which have not been explicitly linked to the climate domain:

- Project design processes that pay insufficient attention to the concerns of affected stakeholders.
- Tender processes that facilitate corrupt behaviour.
- Inadequate due diligence on private sector partners.
- Political spending imperatives that cause inadequate monitoring and community consultation.

The benefits of a global public good, such as reducing GHG emissions, are independent of the locality or jurisdiction of project implementation (Hoffmann 2011; Keohane 2011). This is because "No matter where a ton of CO₂ is reduced, a vulnerable country ... will benefit from these emission reductions in exactly the same way" (Michaelowa *et al.*: 2011). From this perspective, the current distribution of much CF to the Global North and China is encouraging, because they generate 46.9% of all GHG emissions: China (25.9%), USA (11.1%), EU (6.2%), Japan (2.2%), and Canada (1.5%) (Climate Watch 2024).

However, because the effectiveness of funding to reduce GHG emissions depends on how well integrity risks are managed, *where* mitigation initiatives are implemented matter greatly. CF invested in less corrupt polluting countries, is likely to reduce GHG more than CF invested more corrupt polluting countries. With

the exception of US, EU, and Canada, much CF is not invested in major GHG emitters with high standards of integrity: India, Russia, Indonesia, Brazil, and Iran all do poorly for control of corruption (but account for 18.5% of all GHG emissions); Japan accounts for 2.2% of GHG emissions, but has only moderate transparency; and although China, which produces 25.9% of GHG emissions, attracts at least 38.3% of GHG emissions, it also has only moderate transparency and control of corruption.

Emergent challenges

The latest (2023) data from Buchner *et al.*, the three case studies, and new political-economic developments in the climate domain, highlight some emergent knowledge gaps requiring further research to fully understand both the integrity risks involved and the controls that could be used to manage them. Knowledge gaps around private investment are a key theme:

- Understanding how to implement minimum standards and to improve consistency of integrity across private CF will be a key challenge.
- Research and analysis of gaps in controls, standards and practices between the public and private sectors, would help to understand strengths, weaknesses and areas of potential coordination.
- How complexity around tax write-offs and subsidies could be manipulated by private and other non-government actors is unclear, but is likely to become prominent issue given recent ‘green growth’ initiatives in the US, EU and Japan (Buchner *et al.* 2023a: 18).

A second cross-cutting theme across all sources of CF, is integrity risks relating to the *location* of new renewable energy infrastructure, such as windfarms, hydroelectric dams, or solar panel or tidal energy installations. Emergent knowledge gaps relate to the ability of project and programme planners to:

- Identify contextual factors around certain locations, e.g., political pressure, nepotistic pressure by local officials, interest from crime networks, or the presence of marginalised stakeholders perceived as being easy to suppress.
- Understand technical claims about why infrastructure should be in a certain location when, in fact, other sites may be available or better.
- Manage integrity risks associated with such pressures to locate infrastructure in a certain location, including for initiatives funded by either public or private capital.

Another emergent knowledge gap relates to the infiltration into the climate domain of organised crime networks (OCNs). OCNs’ role in environmental crime is already documented, including around waste, logging, emissions trading schemes, and wind power.¹⁵ The current extent of OCN involvement in the climate domain and how to respond effectively is poorly understood. More education is needed for public and private investors regarding the risks posed by OCNs and what to do when it is identified. Professional policing organisations, such as Interpol or federal crime agencies, will most likely be required to ensure comprehensive data collection about OCNs, and subsequent successful investigation and prosecution.

Conclusion: Areas for Integrity Action

Patterns of CF are evolving rapidly, including ever-increasing amounts of finance, new sources of capital (especially from the private sector), new forms of disbursement, and new directions for investments. Some of these changes are being shaped by non-climate-related factors, such as private actors’ interest in the profit-making potential of climate investments, strategic competition to dominate the green economy, and political skill by some states in attracting CF in certain volumes and forms. Understanding which controls

are most effective for established and emerging factors shaping CF, requires analysis of their risks and evaluation of controls:

- Continued funding for research into risks and into evaluations of anticorruption controls, is critical to maintain and expand knowledge regarding integrity relevant to CF as it evolves.
- Peer-to-peer learning mechanisms can ensure lessons about risks and controls are propagated. The Peer-to-Peer Learning Alliance on Climate Finance Integrity is an example, but the private sector must be included. Private investors will be less familiar with how to manage social and environmental risks.
- Institutions such as MFIs, which are driven by a quasi-private sector ethos around profit-making, but which also have an understanding of development objectives, are well-placed to be intermediaries between public and private actors and to play a key role in initiating conversations and peer-to-peer learning across the public and private sectors.
- Recalling the DC Solar Ponzi scheme, such a scam would be unlikely where a programme of ODA-style M&E exists. Frameworks and practices for the latter have been built by donors to detect actions that are not contributing to development goals. Better M&E controls would make similar such schemes difficult to execute.
- Some integrity controls may be better done by the private sector, such as identifying ultimate beneficial owners of investment capital. Businesses assessing the risks of a potential investor or of a potential merger and acquisition, are motivated to do good due diligence to identify who is behind the money. Organisations such as the Financial Action Task Force (FATF) and Association of Certified Anti-Money Laundering Specialists have valuable knowledge about money laundering practices and anti-money laundering controls that could be useful for public sources of CF.
- Industry standards can play an important role in incorporating integrity concerns across sectors critical to the energy transition. The Global Reporting Initiative's new 2024 standard for companies operating within the extractives value chain, *GRI 14: Mining Sector 2024*, advances norms of disclosure relevant to integrity and CF, including mine-site reporting of GHG emissions; how changes in operations in response to climate change contribute to a just transition; and disclosures around contracts, beneficial ownership and payments to governments. The EITI Standard can also be used by anticorruption practitioners focused on the energy transition.¹⁶
- The climate domain is increasingly attractive for criminal networks due to the sums involved, incomplete controls, and inconsistent knowledge and response when corruption is detected, all of which create opportunities for illegal behaviour. There is an opportunity to start a conversation about threats to CF from OCNs, between police organisations, investors, donors, and recipients.

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Annex 1: Scatterplots of vulnerability to climate change and governance indices

Fig. A.1: Vulnerability to Climate Change (ND-GAIN) and Control of Corruption (2022; World Bank); n = 185; p-value = <.001. COC has a significant effect on vulnerability to climate change).

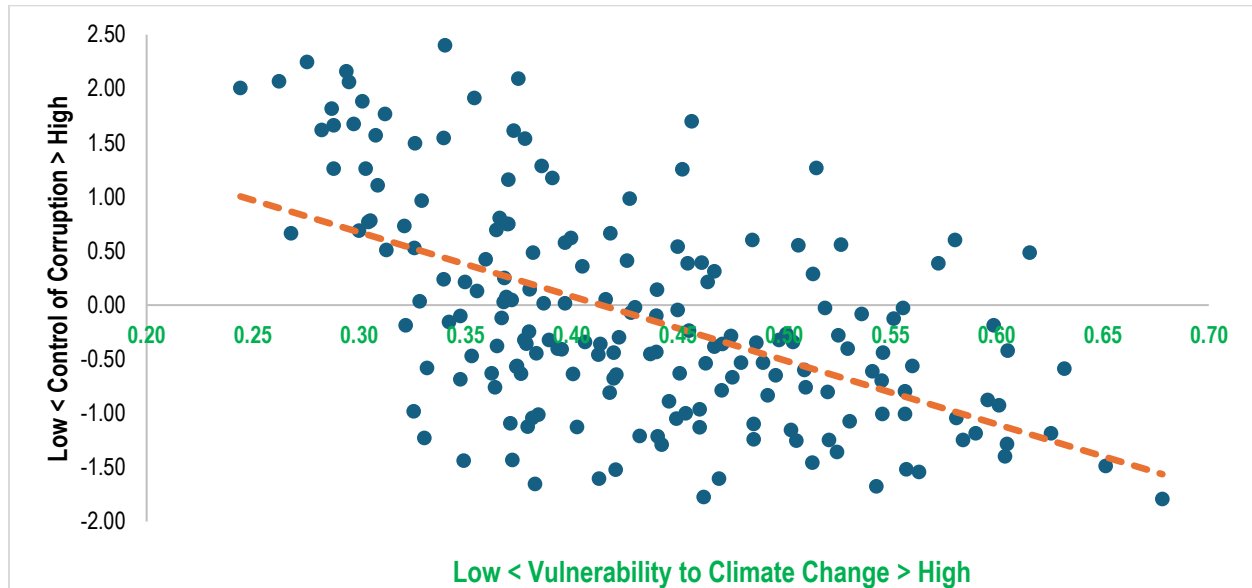


Fig. A.2: Vulnerability to Climate Change (ND-GAIN) and Perceived Corruption (2023; Transparency International); n=175; p-value = <.001. CPI has a significant effect on vulnerability to climate change).

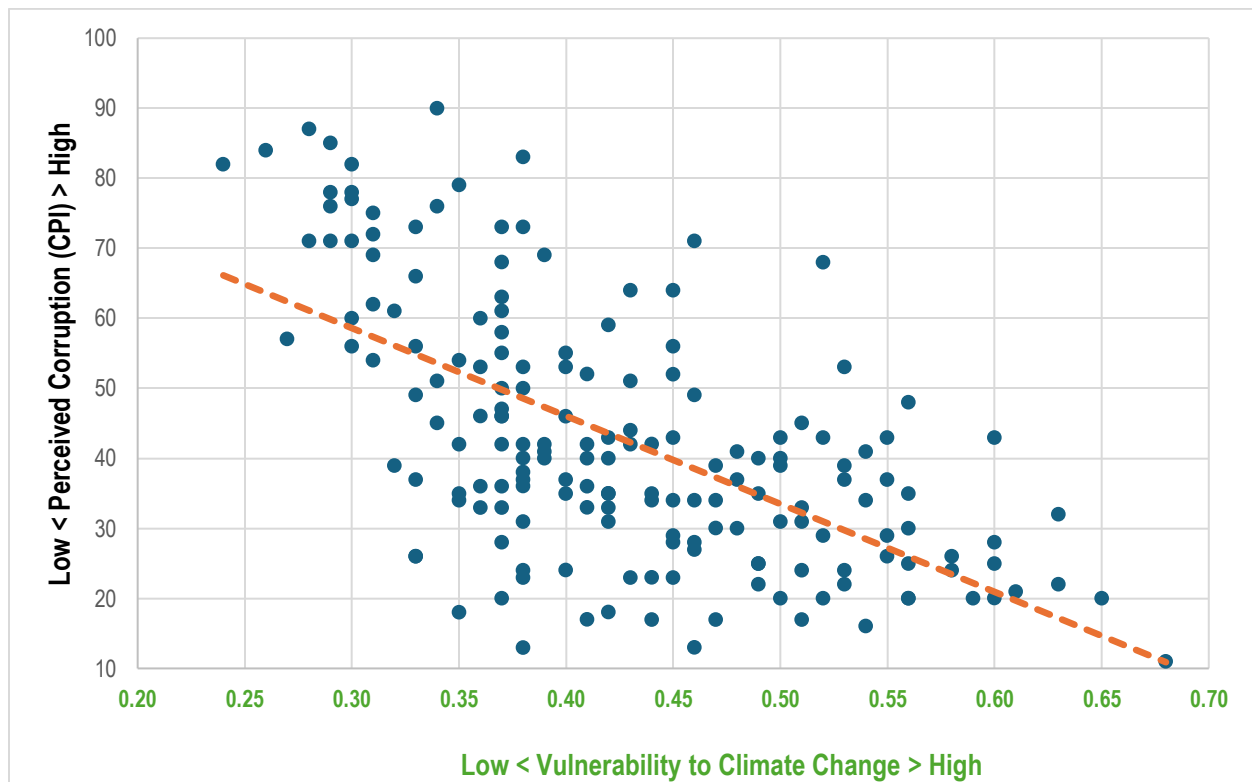
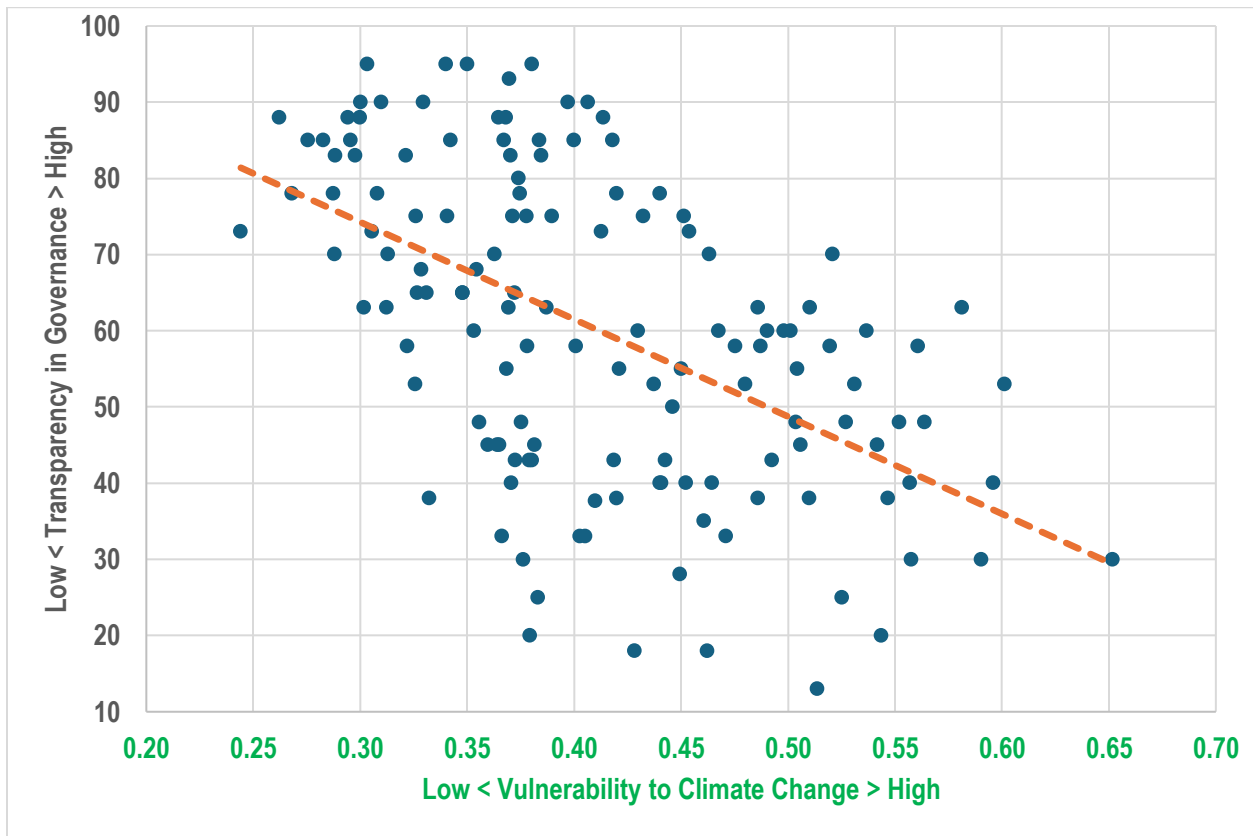


Fig. A.3: Vulnerability to Climate Change (ND-GAIN) and Transparency in Governance (2021; T-Index); n = 139; p-value = <.001. T-Index has a significant effect on vulnerability to climate change).



Endnotes

¹ The UN Framework Convention on Climate Change (UNFCCC) defines climate finance as “local, national or transnational financing – drawn from public, private and alternative sources – that seeks to support mitigation and adaptation actions that will address climate change” (UNFCCC 2024).

² Buchner *et al.* 2023a. All dollars are US dollars.

³ The ND-GAIN Index has a composite score and ranking for countries based on two factors: (1) Vulnerability to Climate Change; and (2) Readiness (to adapt). This report shows **only** vulnerability scores; not the combined Index score/ranking, nor the Readiness score/ranking.

⁴ All pairings (vulnerability to climate change with each of the three integrity indices) have a p-value of <.001.

⁵ Buchner *et al.*’s reported CF global total is \$1,265bn. Their methodology report (2023b) explains this figure is based on biennial averages (taken to ‘smooth’ the data). Buchner *et al.* also provide data annually (see Table A1 in Annex I: Data Tables, p.43). The reported total for 2022 is \$1,415bn, which is used for Table 3.

⁶ Fig. 1 is the same as Fig. A.3 in Annex 1 except the latter has a trend line and does not show selected countries.

⁷ For example, for fraud in China’s emissions trading scheme and the government’s response see Ministry of Ecology and Environment, China (2022) and Xu & Stanway (2022).

⁸ ‘Others & Cross-Sectoral’ includes ICT, Water & Wastewater, Industry, and Unknown.

⁹ ‘Other sectors’ include Business & Other Services, Communications, Development Food Assistance, Disaster Prevention & Preparedness, Donor Administration, Education, Emergency Response, General Budget Support, Health, Other Commodity Assistance, Population Policies & Reproductive Health, Reconstruction Relief & Rehabilitation, Tourism, Trade Policies & Regulations, and Unallocated/Unspecified.

¹⁰ The FSI takes into account the size of the financial services sector in determining a jurisdiction’s place on the index. This means, for example, that although Panama is more secretive than the UK, the UK is a far more important destination for offshore wealth making the UK a bigger supplier of secrecy in practice. The UK therefore is ranked more poorly than Panama on the FSI. See <https://fsi.taxjustice.net> for their method of calculating the index.

¹¹ 26% (\$8.6bn) of CRDF with gender as a principal or significant goal goes to regional programmes not listed.

¹² India, Indonesia, Kazakhstan, Pakistan, Philippines, Senegal, South Africa, and Vietnam have signed JETPs.

¹³ This list is taken from Nest *et al.*, 2020: 4.

¹⁴ A good example is research on corruption in mitigation and adaptation activities in Bangladesh. See Iftekharuzzaman *et al.* (2020) and dw.com (2017).

¹⁵ For illegal waste into Eastern Europe, see EIA (2021), EAFO (2020), Cvetkovska *et al.* (2021), and OCCRP (2021). For illegal logging in Zambia see EIA (2019) and in Namibia see Grobler (2020). For the EU’s emissions trading scheme see France24.com (2018), and RFI (2018). For corruption and mafia involvement in wind subsidies in Italian wind power see Gennaioli & Tavoni (2016).

¹⁶ See Global Sustainability Standards Board (2024) for the *GRI 14: Mining Standard 2024*, and Boyer & Salomon (2023) for [How Anticorruption Actors Can Use the EITI Standard: A Practical Guide](#).