CLIMATE POLICY INITIATIVE

Supporting the Momentum of Paris: A Systems Approach to Accelerating Climate Finance

Exploring Methods and Approaches to Systems Thinking in Climate Finance

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Working Paper

Descriptors

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Related CPI Reports	Supporting the Momentum of Paris: A Systems Approach to Accelerating Climate Finance (Synthesis Paper)
	A Systems Approach to Accelerating Climate Finance: Needs and Actor Analysis
	A Systems Approach to Accelerating Climate Finance: Exploring Methods and Approaches to Systems Thinking in Climate Finance (this paper)
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About CPI

With deep expertise in policy and finance, CPI works to improve the most important energy and land use practices around the world. Our mission is to help governments, businesses, and financial institutions drive growth while addressing climate risk. CPI works in places that provide the most potential for policy impact including Brazil, Europe, India, Indonesia, and the United States.

1. Introduction

1.1 Background

This report is one of two working papers under the project: Supporting the Momentum of Paris: A Systems Approach to Accelerating Climate Finance.

Systems thinking approaches provide the potential to identify and measure how international public climate finance actors can interact:

- With each other, given their own perspectives and constraints on what they can do, their future direction of travel as well as the constraints and direction of their peers.
- With developing country financial systems, given emerging trends in green finance across the developing world, potentially unlocking new sources of finance.

The goals of the project are therefore to:

- Identify developing country needs and accompanying gaps in climate finance offerings that could be filled by public actors. An in-depth understanding of the taxonomy of investment needs across developing countries.
- Understand current offerings and comparative advantages of major international public actors in supporting climate finance needs such as donors, bilateral agencies, export credit agencies, multilateral and bilateral development bank.
- Develop a systemic framework to analyze how international public climate finance flows can interact with each other and link up with developing country domestic financial systems.
- Provide recommendations for how to use systems approaches to identify opportunities to coordinate and collaborate

This paper focuses on the third and fourth goals developing a systemic framework on climate finance flows and providing recommendations on how to apply system approaches in climate finance analysis.

1.2 Building on the Global Landscape of Climate Finance

Since 2011, CPI, with support from public and private financial institutions, has published the annual Global Landscape of Climate Finance (GLCF) tracking flows of project-level finance to climate mitigation and adaptation. The data is aggregated from public and private sources and intermediaries and tracks their use of different financial instruments and channels to finance projects and programs in both developing and developed countries.

The data produced by this work is referenced by donors and policymakers in the context of the UNFCCC negotiations as well as in national development finance plans and strategies.

But the Landscape represents more than a linear data flow. **It also catalogues the key actors in climate finance and their actions.** In maintaining momentum after Paris and NDC implementation, more onus will be placed on actors scaling up impact quantitatively and qualitatively, increasing their own flows, broadening mandates, as well as leveraging others' flows; coordinating approaches and avoiding duplication; as well as reconciling climate finance delivery with other mandates on poverty alleviation and SDGs.

1.3 Benefits and limitation of systems thinking

Systems thinking methods are best applied with regard to complex problems that include establishing a goal, key actors and a systems boundary. Systems thinking examines the linkages and interactions between components that compare the entirety of a defined system. Different techniques of systems mapping include:

- **Actor mapping** visualizes key organizations that influence a system as well as their relationship to one another
- Systems analysis **casual loop** diagramming and **stock/flow** dynamics make explicit the negative and positive feedback loops that may drive institutional behavior.
- **Social network analysis** can measure the relative influence or connectedness of different actors in a system

Capturing **perspectives** of different actors and methods to reconcile them to achieve a goal is a key benefit of systems thinking approaches. Whereas stakeholder analysis seeks to assess a groups' ability to influence specific outcomes in order to produce a prioritized action plan, actor mapping explores the relationships and connections among actors and to a given intended outcome in order to identify ways to improve a systems performance.

Further, the exercise of mapping the system interactions may also provide value in solving complex problems that involve helping many actors see the 'big picture rather than their immediate concerns. This can set a more nuanced framework for dialogue and for identifying priorities and leverage points to meet future needs.

The limitations to systems thinking include the need to make interactions and inter-relationships responsive over time. The exercise is iterative in order to reflect new changes and trends as they develop. (Gopal & Clarke 2015; Aronson 1998)

2. Capturing Systemic Trends related to climate finance flows

We identify four key trends within developing country financial markets that may affect scaling up of climate finance flows.

Developing countries financial systems are dominated by banks that have short-term lending outlooks and growing systemic risks. It is estimated that banks hold 85-90% of financial assets across developing countries emphasizing the dominating role they play (UNEP Inquiry 2016a). Short-termism is also prevalent: from 2010-2012, 49% of loans had tenor of less than one year. Only 19% of loans in developing countries are over 5 years duration, compared to 33% in high income countries (World Bank 2015).

Banks remain prone to sector concentration risk in many countries. Non-performing loans have spiked sharply in some countries since the commodity crash (EIB 2016). Banks in low income countries have seen a 44% compound annual growth rate over the 2011-2016 period (Figure 1).

Yet, new sources of capital are emerging through domestic institutional investors. The ratio of assets to GDP of institutional investors (insurance companies, mutual funds and pension funds) in developing countries grew 50% in the period 2010-2014 (from 22% to 33%) with most of the growth seen in 2014 (World Bank 2016).

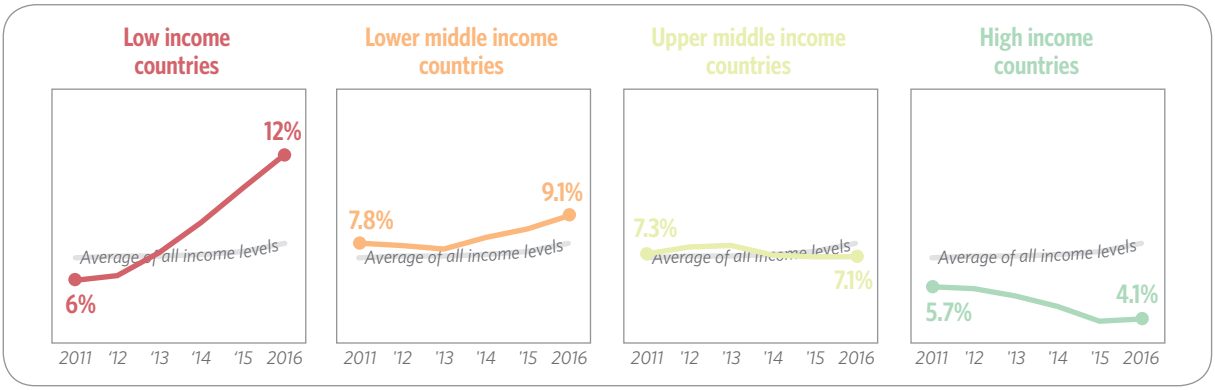
Developing countries are also prone to volatile capital flows that can destabilize currencies and negatively affect overall growth prospects. Government debt levels may increase thereby placing long-term support for climate policies or subsidies under stress as well as affecting the attractiveness of investments for private investors (UNDP 2012).

Developing country governments were particularly affected by the Asian financial crisis between 1997-1998 due to a build-up of debt denominated in foreign currency. This risk has since decreased with 70% of total government debt and 50% of corporate debt now in local currency across developing countries (IMF 2016b).

However, volatility of capital flows remains a key concern in 90% of developing countries due to the effect it has on the exchange rate among other factors (IMF 2016c). In recent years, the commodities crisis and lower growth prospects resulted in significant outflows since 2010 (see Emerging Markets in Figure 2). Low income countries, particularly 'frontier countries'[1] continued to grow until 2014 before retracting sharply (IMF 2016c).

Since 2011, engagement of financial system enablers and services providers on climate change has steadily increased. Between 120-160% growth has been measured in new sustainable financial policy and regulatory measures, and in the number of service providers such as investment consultants and

Figure 1: Growth of Non-performing loans against total assets by income group (IMF 2016a)



1 Closes to EM in terms of financial depth, access to international markets and institutional strength include Bangladesh, Bolivia, Cote d'Ivoire, Ghana, Kenya, Mongolia, Mozambique, Nigeria, Papua New Guinea, Senegal, Tanzania, Uganda, Vietnam, and Zambia.

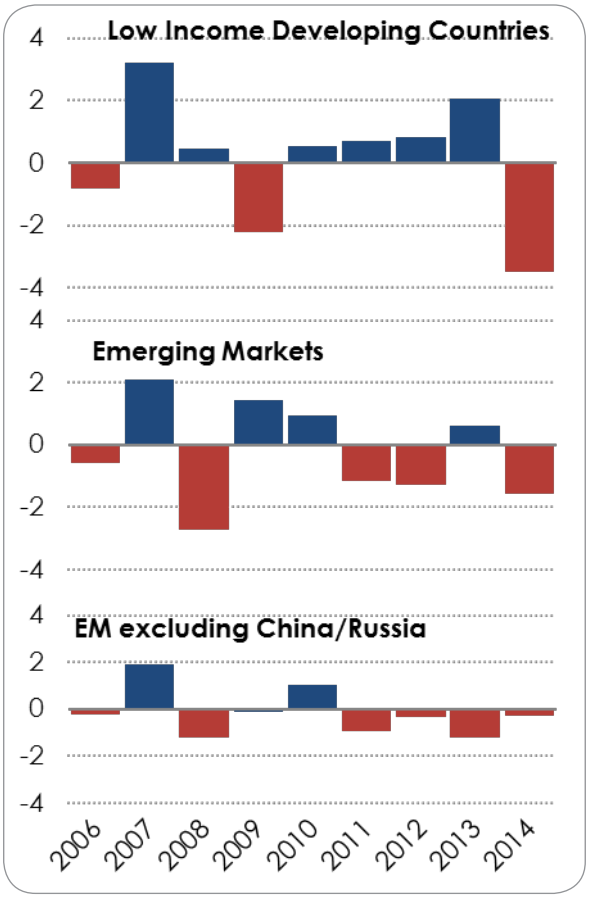
investment managers becoming signatories to the UN PRI (Figure 3).

Developing countries themselves are the location of most proactive and prescriptive actions by systemic actors that support new potential climate finance flows. The work of the UNEP Inquiry into a Sustainable Financial System in particular has catalogued these trends, measures and initiatives by different financial system actors across developed and developing countries. Approximately 50% of financial policy and regulatory measures in green financing are found in developing countries (UNEP Inquiry 2016b).[2]

Approximately 50% of green financial policy and regulatory measures are found in developing countries.

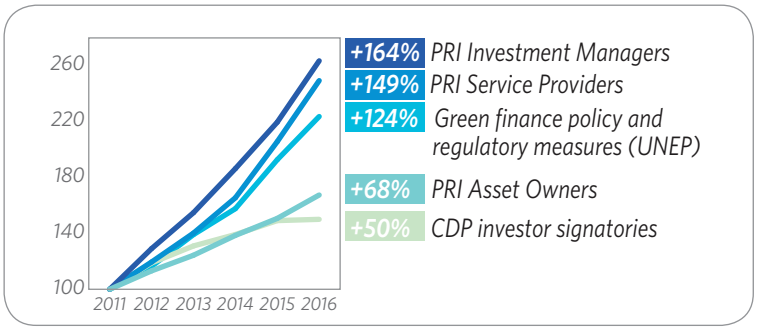
This underlines the need to understand how these policies and measures may have a direct or indirect effect on quantitative, annual climate finance flows as captured under the GLCF and how international public actors need to take the impact and influence of these actions into account.

Figure 2: Net capital flows to % GDP in Low income developing countries and Emerging markets



Source: IMF 2016c)

Figure 3: Growth in engagement of investors, service providers and policy/ regulatory actors (indexed 2011=100)



2 These include Brazil, China, Indonesia, Mongolia, Bangladesh, Colombia, Kenya, Morocco, Nigeria, Vietnam, Peru, Philippines, Egypt, Mauritius

3. Developing a Systems Approach to connect the dots for International Public Climate Finance

The following section proposes a systems framework for international public climate finance providers to 'connect the dots' and optimize coordination and collaboration on two levels:

- within developing country financial systems, given emerging trends in green finance adopted by domestic actors, and how new international public finance interventions may take account of them.
- within the international public climate finance system, between international public actors, the main channels and influencers.

This approach can lead to better and more climate finance, ensuring that resources are used most effectively.

3.1 A Climate Finance Actor Systems Framework

3.1.1 CATALOGUING PUBLIC AND PRIVATE FINANCE ACTORS

CPI's Global Landscape of Climate Finance (GLCF) series captures public and private finance flows as defined by the nature of the actors undertaking the transaction (Bucher et al 2015).

Public finance flows are those carried out by central, state or local governments and their agencies at their own risk and responsibility. These actors include:

- **Governments** through their ministries, departments and aid **agencies**. They typically provide grant finance or concessional loans to DFIs, funds and other governments.
- **Development finance institutions** – either national or multilateral; development bank or export-credit agency. They typically provide loans or risk mitigation products such as guarantees to governments, banks, and corporations.
- **Climate funds** – predominantly multilateral climate funds established under international environmental agreements. They typically provide grants, or concessional loans to DFIs, and private actors such as funds, banks and corporations.

Private finance flows captured in the landscape are categorized in the following actors:

- **Commercial financial institutions** i.e. commercial and investment banks who are providers of debt capital to corporations and projects.
- **Private equity, venture capital and infrastructure funds** (debt or equity), provide equity or debt flows to small companies, corporations and project companies.
- **Institutional investors** such as insurance companies, pension funds, foundations and endowments are large asset owners across the financial system. In the landscape, focusing on primary transactions, flows that are direct investments i.e. equity or debt flows to projects are captured.
- **Project developers** i.e. entities designing, commissioning, operating, and maintaining emission reductions projects (e.g. utilities and energy companies). Project level equity and on-balance sheet financing are captured.
- **Corporate actors** i.e. non-energy sector corporations investing in climate solutions.
- **Households** i.e. family-level economic entities, high net-worth individuals (HNWI) and their intermediaries e.g. family offices investing on their behalf.

Partially or fully-owned state owned enterprises (SOEs) are treated as private actors in the landscape due to limitations on data and that the flows typically operate on commercial terms.

3.1.2 BRINGING IN BROADER ACTORS AND THEIR IMPACT ON CLIMATE FINANCE FLOWS

Many of the sources of climate finance flows for public and private finance actors captured in the GLCF are, in itself, an output of financial markets – funds raised by governments, DFIs, banks, corporations through bonds, initial public offerings (IPOs), institutional investments and banking.

These financial markets, in turn, are affected by

- **systemic enablers –** actors responsible for the financial system enabling environment – such as

central banks, regulatory agencies, exchanges and supervisory organizations.

- **service providers** such as investment advisors, consultants, credit rating agencies, and professional associations.

A Climate Finance Systems Framework, as illustrated in the actor map in Figure 4, extends the public and private finance actors, responsible for financial flows captured in the Global Landscape of Climate Finance, to also account for the actions of financial system enablers and service providers – thereby capturing the effect of rules, mandates and information flows – across the system.

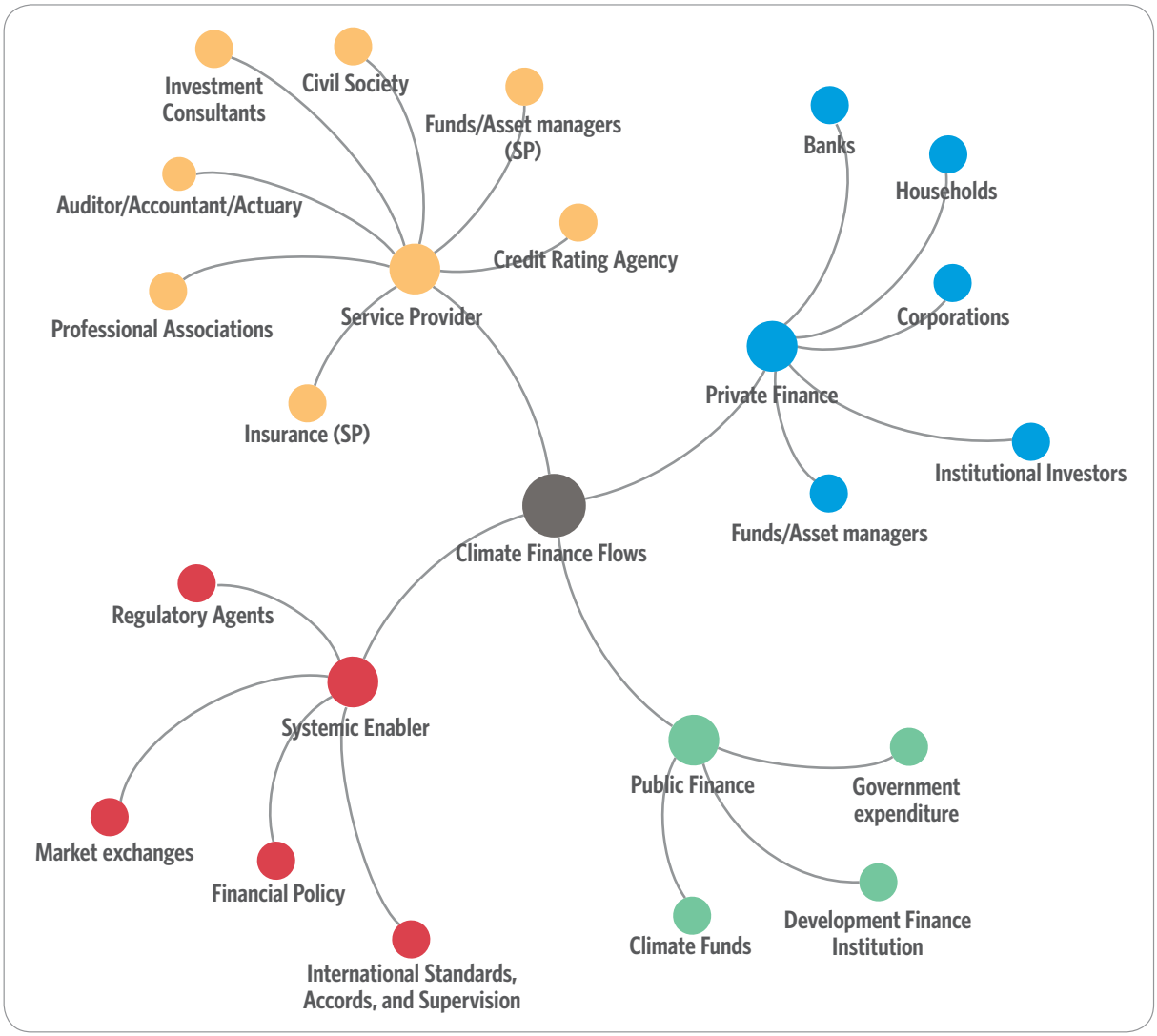
Based on an extensive literature review, we have catalogued the mandates, tools and effect on climate finance flows of both public and private finance actors traditionally captured in the GLCF as well as systemic enablers and service providers in the financial system (see Appendix for a more extensive actor map and catalogue of direct effects of each actor on climate finance flows).

Cataloguing the actions by each actor-type across the system reveals 3 types of action –

- action that follows an actor's own perspective or focus area in the financial system;
- actions that represent a deployment of a new mandate, method or tool; and,
- actions that represent the use of new financial instruments**.**

First, actions that follow the perspective of actors in the system are responding to their conventional mandate and responsibility, but incorporating climate-related risks and opportunities. These actions reflect how the actor remains in their 'comfort zone' given their existing mandates.

Figure 4: Actor mapping within the Climate Finance System Framework



For example, recent actions that reflect this area include:

- central banks, regulatory agents and international supervisory bodies commission research or request disclosure on climate exposure in order to uncover systemic risks to financial system stability.
- Investment managers and service providers respond to client needs to incorporate environment, social and governance (ESG) metrics into fundamental analysis in order to better account for risk across investment decisions.
- Credit rating agencies incorporating climate considerations into ratings methodologies.
- Investors with a responsible investment mandate or responsibility to beneficiaries, have gone further than risk management approaches and adopted capital allocation targets to green or climate finance.

Second, actions can represent a deployment of a new mandate, method or tool by actors. These reflect actors edging out of their 'comfort zone' to explore *new* ways to take account of climate risks or respond to demands. They include:

- Regulators altering mandates of pension funds to take sustainability into account.
- Investors adopting investment or divestment mandates with refined understanding of fiduciary duty
- Corporations and investors adopting harmonized disclosure requirements as proposed by regulatory bodies such as the FSB.

Third, actions may also be characterized as those that follow through on the above mandates and methods by investing in new financial instruments. These actions reflect the extent of effect on climate finance flows due to their result in new flows throughout the system. These may include:

- Investment in green finance across asset classes such as issuing or investing in green bonds, listing on sustainable stock exchanges, direct investing in green real estate and infrastructure.
- By deploying benchmark tools, with low carbon or green indices offering performance based comparisons to the market norm.

3.2 A domestic system framework to identify optimal climate finance interventions at the country level

We have developed a contextualized Climate Finance Systems Framework in a domestic setting for a developing country in Figure 5.

As a system goal, the framework sets climate finance into new projects as its main objectives (centre, white dot), emphasizing the placement of public and private, domestic and international finance actors, as providers of direct finance flows, in close proximity. Systemic enablers and service providers are on the outer boundary of the system, however, they can impact key financial actors directly through actions related to rule or mandate setting and providing information flows that can affect particularly private finance actors.

The framework provides a basis to analyze new public climate finance interventions, taking into account the direction of travel of other actors across the system. The connections chart inter-relationships between actors based on

- financial flows (Figure 5),
- provision of rules or mandates (Figure 6), and
- information in the form of disclosure or advisory services (Figure 7).

Mapping at country level against the framework that combines all these inter-relationships can help situate new systemic actions that affect availability of finance flows and anticipate their effects.

Based on the actor framework and the inter-related connections established between actors, we map the system dynamics of typical public climate finance *actions* (baseline) and see the effect of three separate 'systemic' actions that correspond to those identified from the catalogue of public, private finance actors, systemic enablers and service providers (see section 4.2.2).

- action that follows their own perspective or focus area in the financial system;
- actions that represent a deployment of a new mandate, method or tool; and,
- actions that represent the use of new financial instruments.

Figure 5: Financial flows inter-relationships mapped against a domestic country system framework

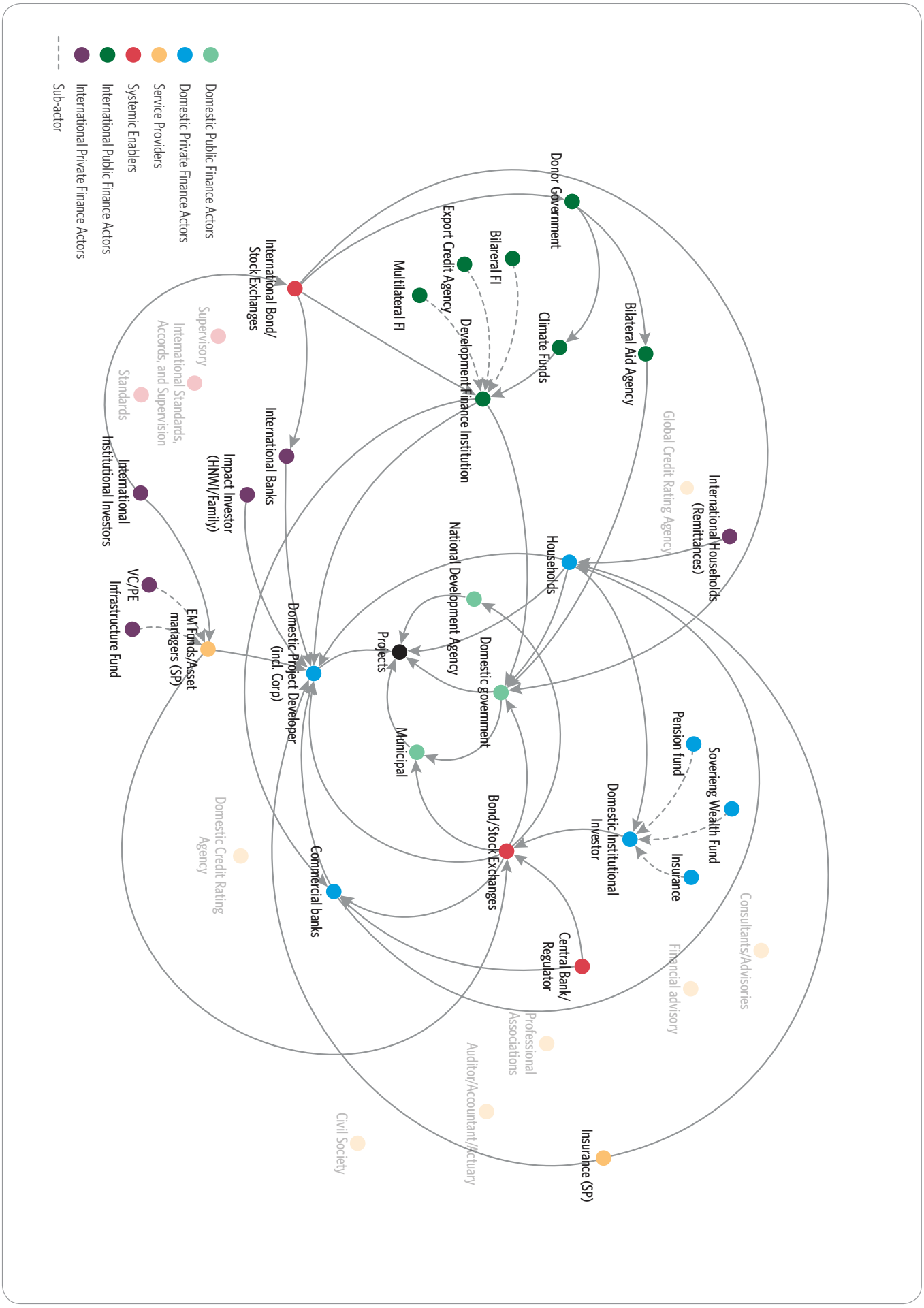


Figure 6: Rule and/or mandate inter-relationships mapped against a domestic country system framework

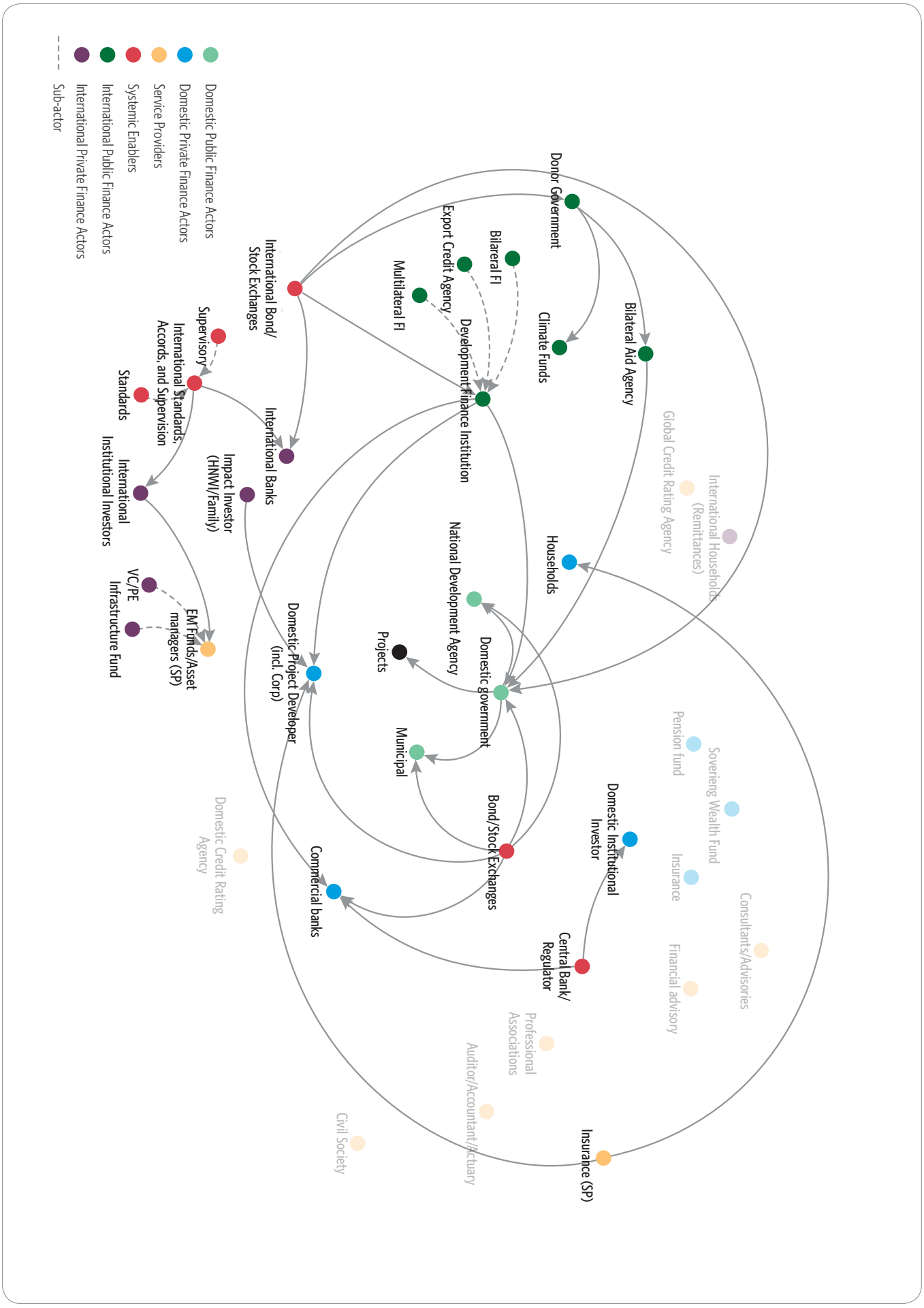
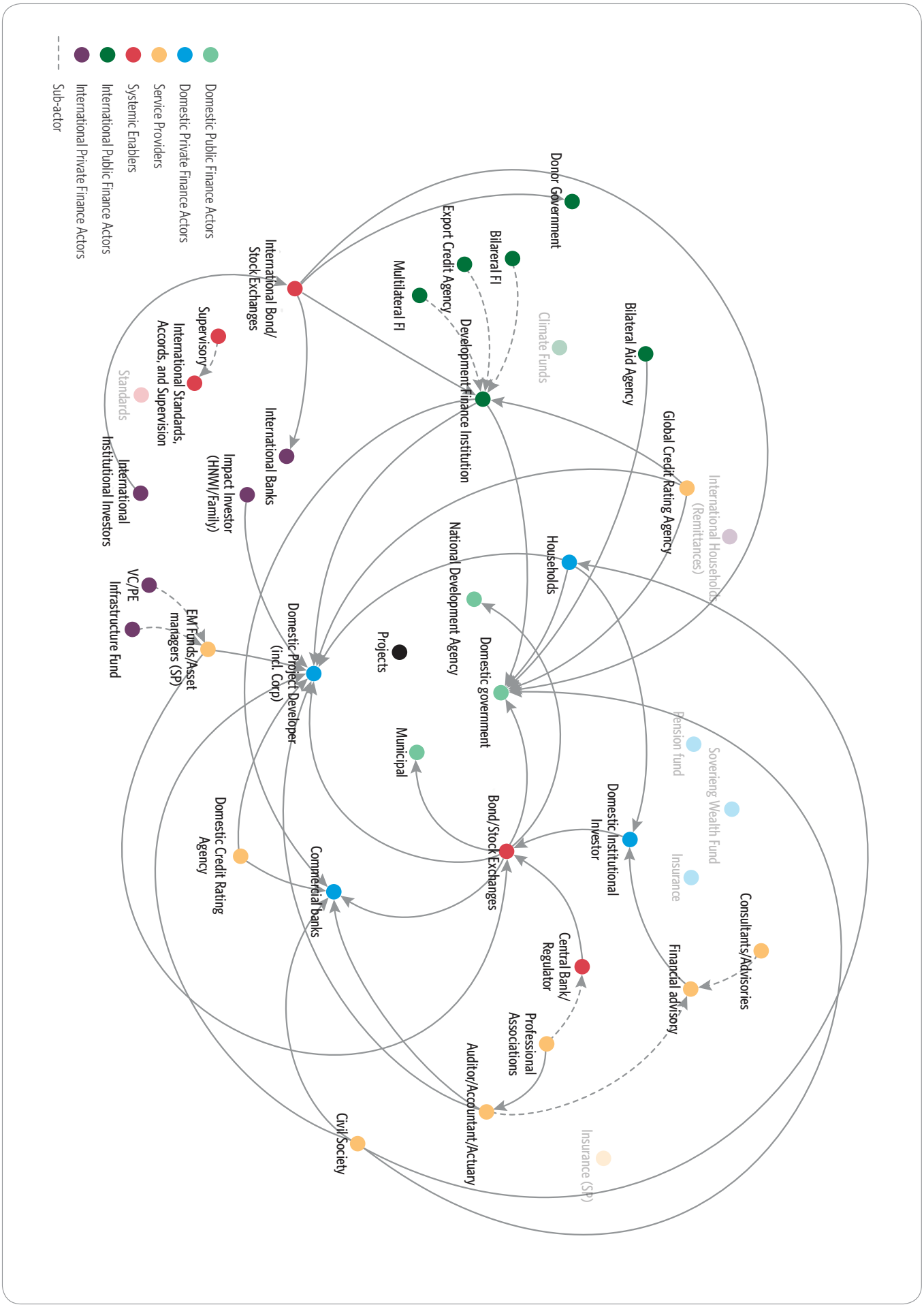


Figure 7: Information flow inter-relationships mapped against a domestic country system framework



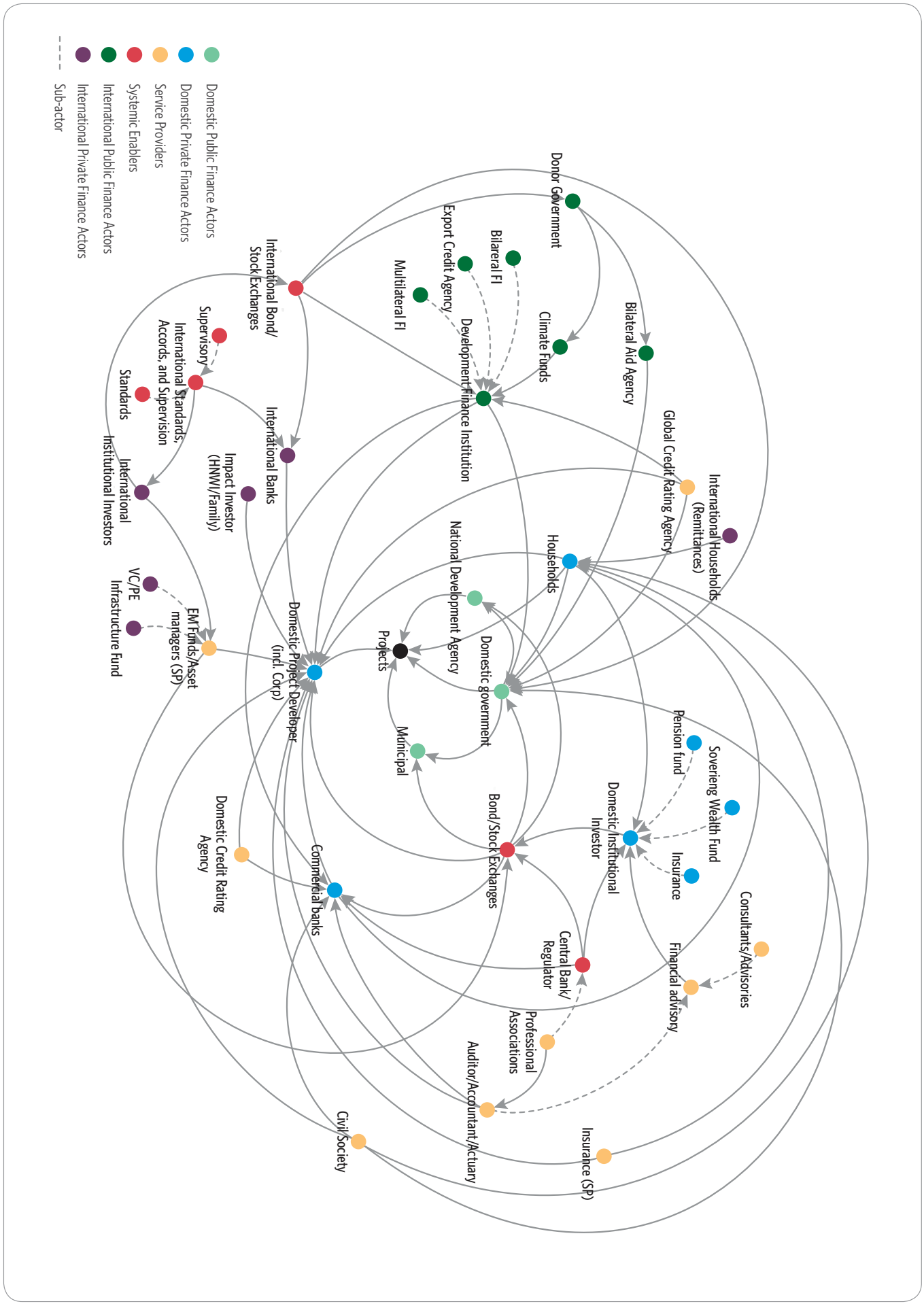
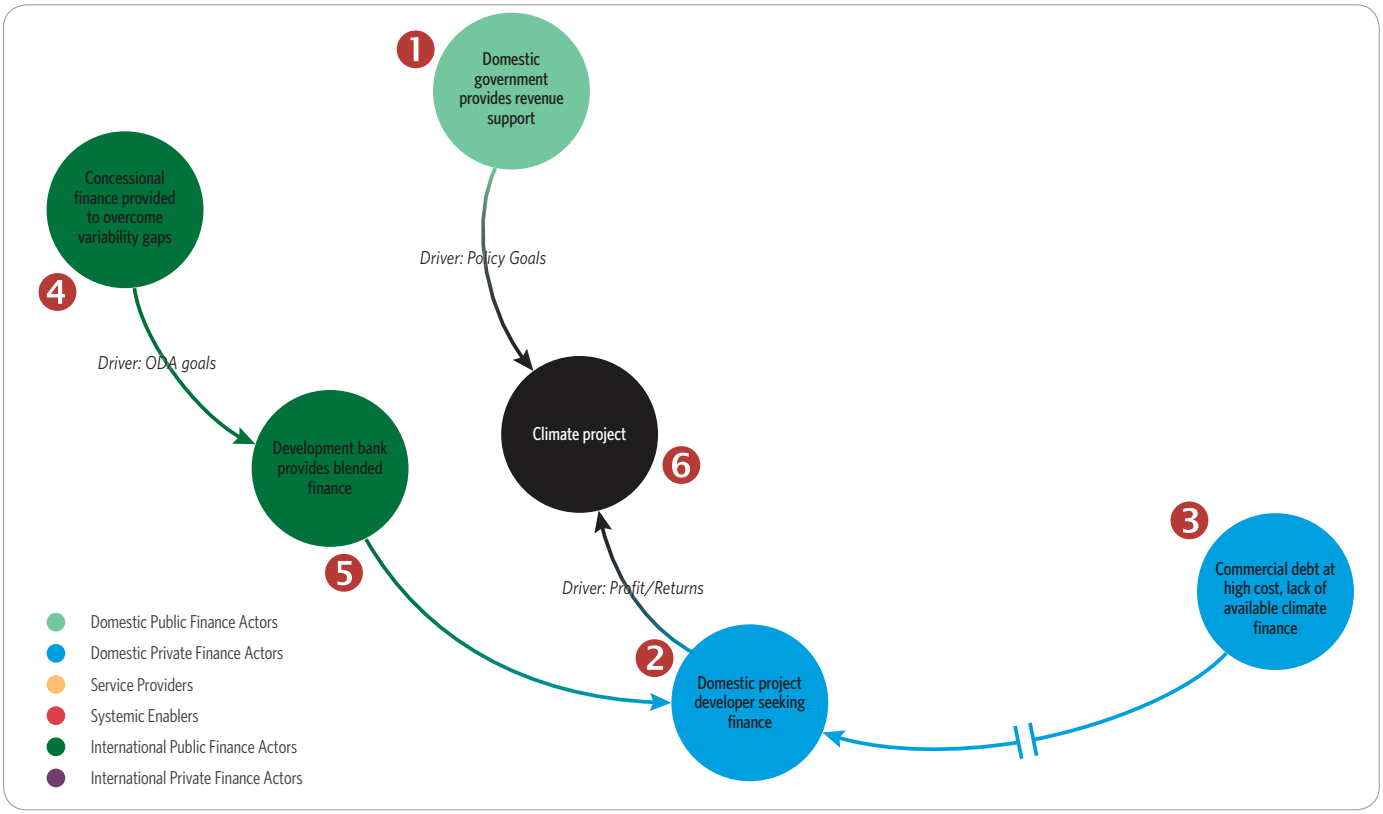


Figure 8: Climate Finance Systems Actor framework (combined)in the domestic country context

The baseline of action in the climate finance context is illustrated below where concessional or public finance flows respond to a lack of access to finance or high costs of capital for climate projects (center, black dot).

Both the drivers, actions and therefore perspectives of recipient country actors domestically are reflected as well as the drivers, actions and perspectives of international provider perspectives.

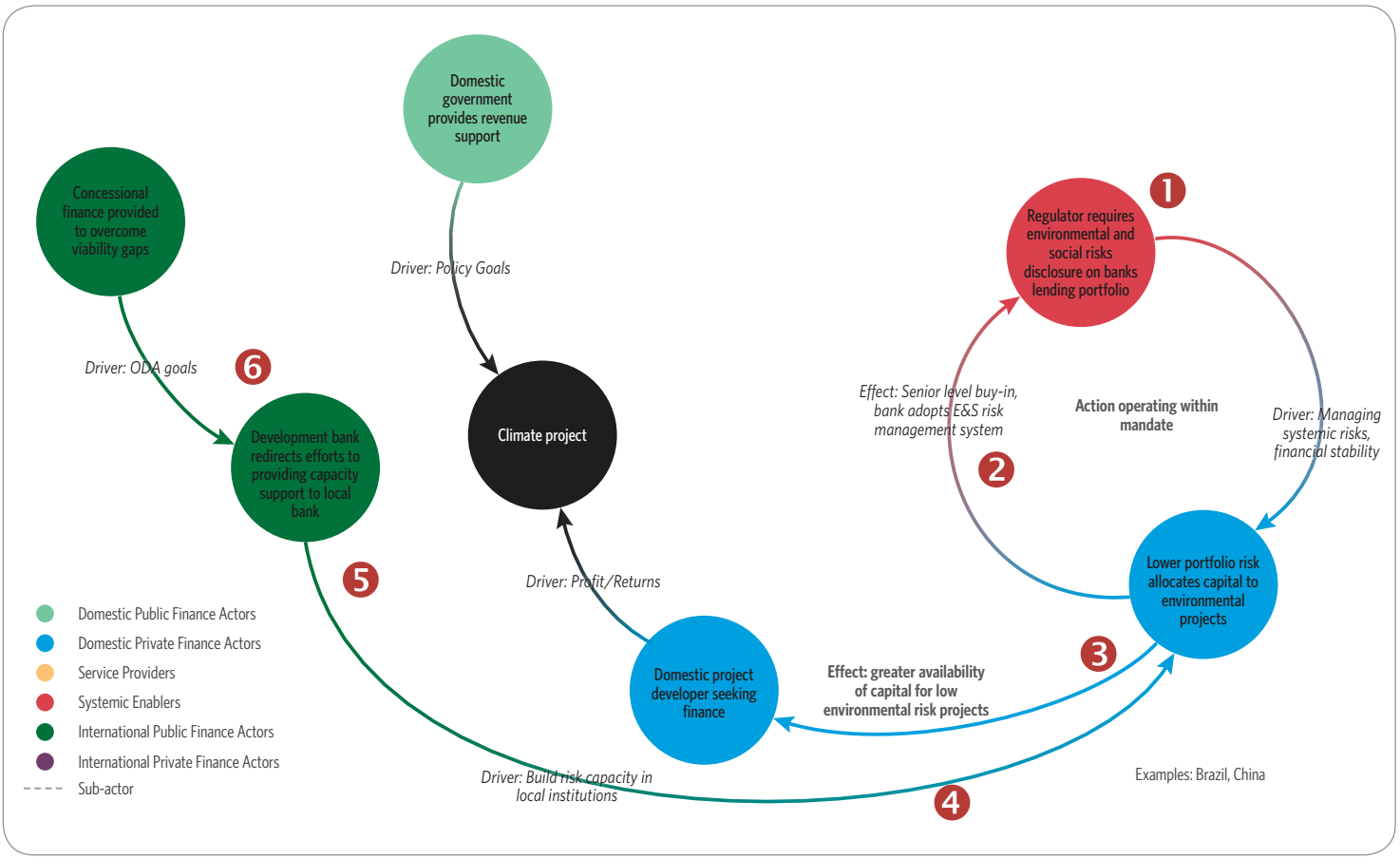
Figure 9: System dynamic map of baseline or typical climate finance contexts.



DOMESTIC RECIPIENT PERSPECITVE	INTERNATIONAL PROVIDER PERSPECTIVE
1 Driven by policy goals, domestic government provides revenue or fiscal support for the deployment of projects.	4 Provision of concessional finance to overcome viability gaps in project funding, driven by ODA goals.
2 Domestic project developers seek financing for project, driven by profit/return incentive	5 Finance deployed in use with development bank loans directly to projects or through local commercial banks to projects in order to provide capacity building.
3 Bank finance remains high cost or short-term due to lack of awareness, capacity on risk assessment or project finance.	6 Projects complete funding with/without local financing. Building local capacity over long term depends on drivers and incentives.

When an action by a systemic actor operating within their mandate is taken into account, the following dynamic may be mapped. In this case the banking regulator mandates banks to disclose environmental and social (E&S) risks within their lending portfolio. Regulators in both Brazil and China have introduced guidelines to make the assessment of E&S factors routine part of financial risk management (UNEP Inquiry 2016b). **The increased awareness in the local banking sector may reveal the potential availability of private flows and lead to public finance providers prioritizing the reinforcing of capacity over direct loans in the domestic system.**

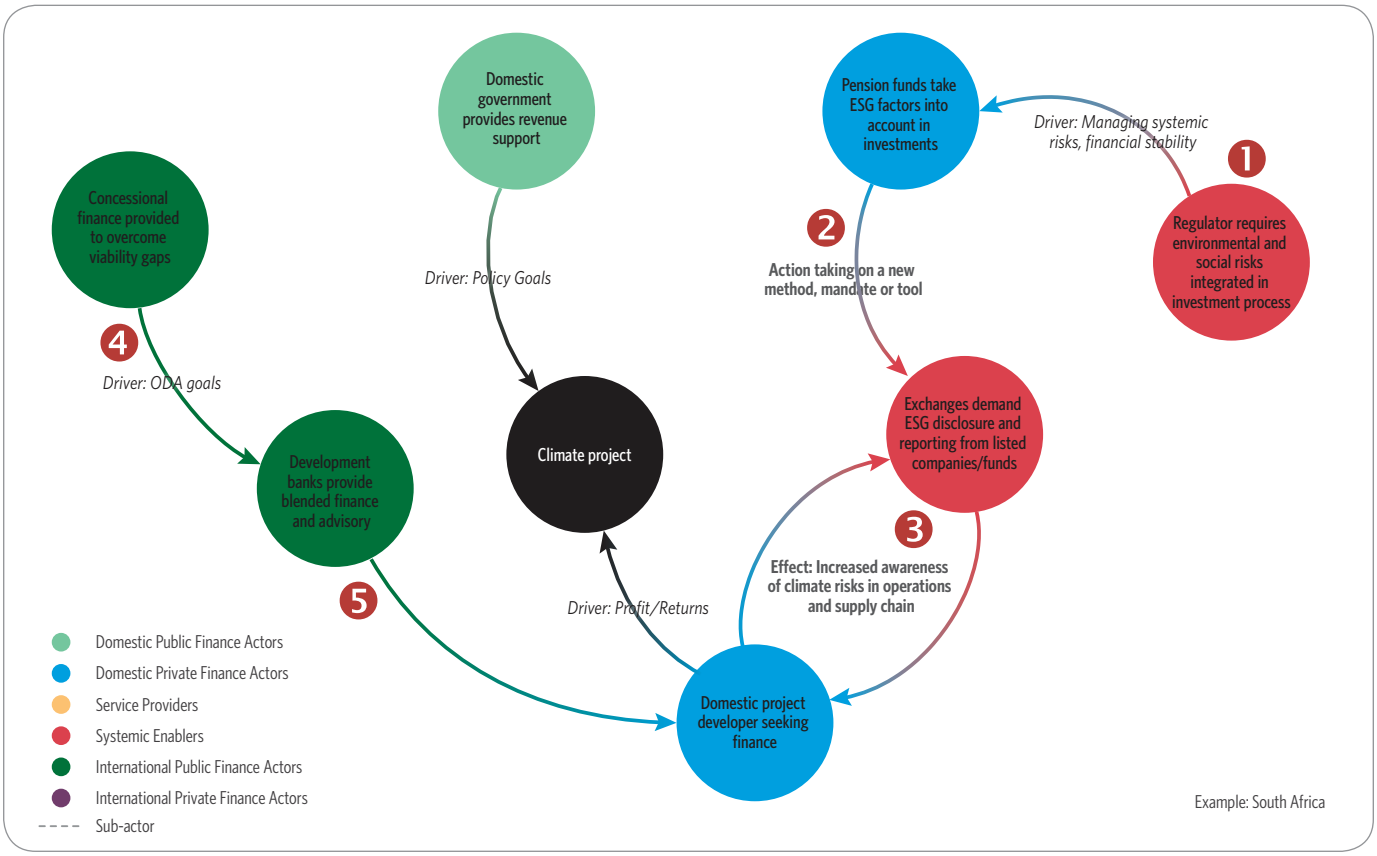
Figure 10: System dynamic map of an action operating within the actor mandates.



DOMESTIC RECIPIENT PERSPECTIVE	INTERNATIONAL PROVIDER PERSPECTIVE
1 Regulators require disclosure on E&S risks on lending portfolios. Drivers: managing system risks, increasing stability	4 Provision of concessional finance to complement available local bank finance.
2 Banks build structures for E&S risk management, adopt standards, disclose and report. Increase awareness. Drivers: Senior level buy-in.	5 Prioritization of capacity support over lending by development finance institution.
3 Bank finance better equipped to manage risk	6 Public finance reallocated to alternative gap.

When a systemic actor taking on a new mandate, method or tool, in this case, a pension fund directing asset managers to take environmental, social and governance (ESG) factors into account may reveal 2nd order effects or knock-on effects, within private sector business models and their flow of finance in the supply chain. For example, since 2011 South Africa pension funds have been required to give appropriate consideration to *any factor which may materially affect the sustainable long-term performance of a fund's assets, including factors of an ESG character* (UNEP Inquiry 2016c). The Johannesburg Stock Exchange is recognized as a global leader in terms of the quality of rules of stock exchange rules for sustainability disclosure by listed companies. **Greater awareness among corporate actors of ESG risks may ultimately result in scaled up climate finance flows across supply chains.**

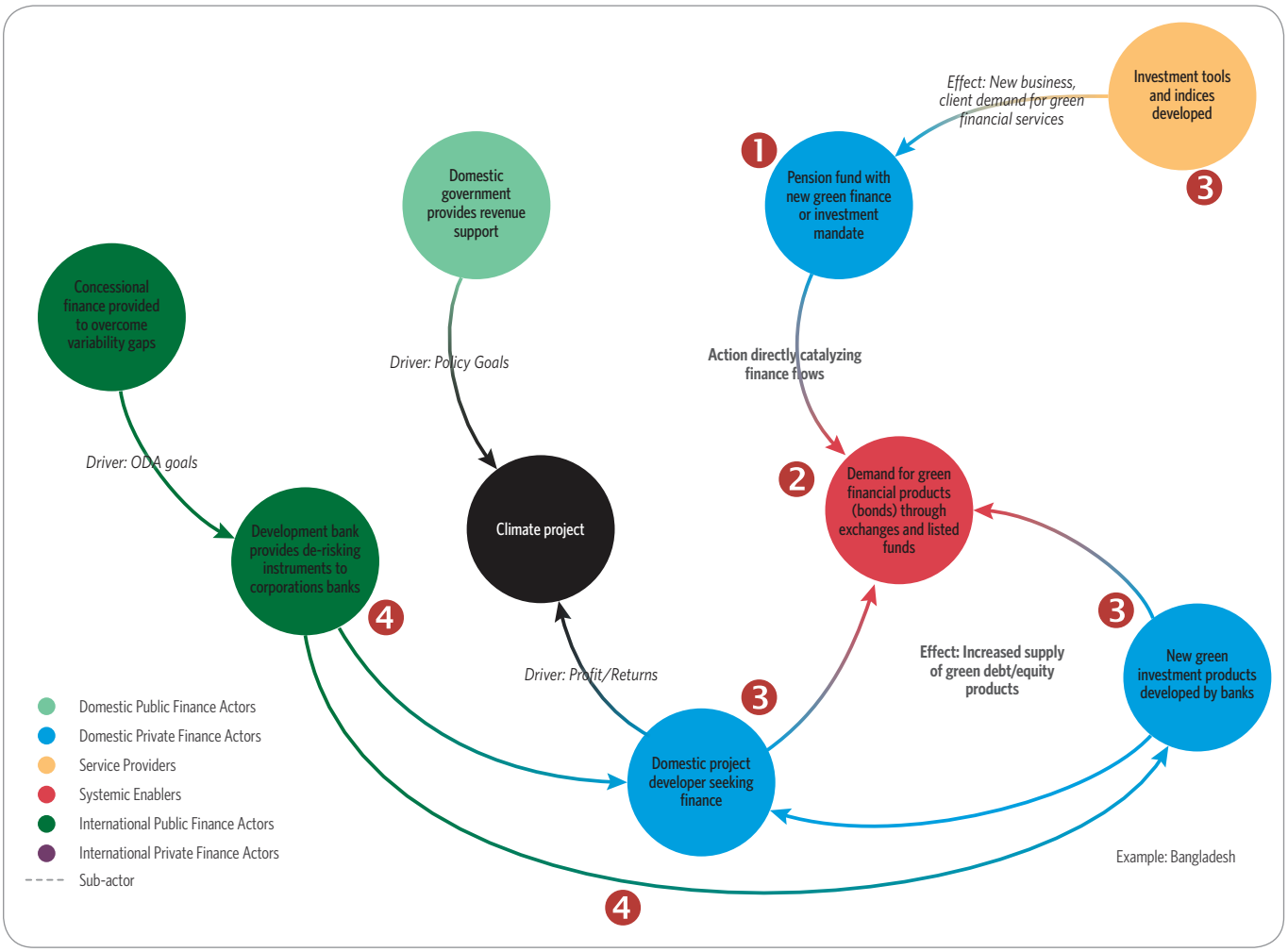
Figure 11: System dynamic map of an actor taking on a new mandate, method or tool.



DOMESTIC RECIPIENT PERSPECTIVE	INTERNATIONAL PROVIDER PERSPECTIVE
1 pension funds required to take ESG factors or investment mandates into account	4 Provision of concessional finance to cover risks among supply chain actors including SMEs.
2 Demand for ESG disclosure on listed companies	5 Prioritization of small-scale lending and supply chain expertise capacity support over lending by development finance institution.
3 Increased acknowledgement of environmental risks – operational and supply chain investments in resilience.	

When the effect of a systemic actor adopting a new use of innovative financial instruments and directly catalyzing climate finance flows such as Institutional investors or banks may adopt green finance or decarbonization targets across their portfolios, sending a demand signal to other actors to develop suitable financial products. Since 2009, the Bangladesh Central Bank has offered reducing refinancing rates to local banks for loans provided to green projects (UNEP Inquiry 2016b). The Indonesian banking regulator Sustainable Finance Roadmap includes provisions for banks to adopt non-binding portfolio lending targets for green finance with 3-5 years, similar to a 20% lending target to SMEs already in place (UNEP Inquiry 2015). **The role of international public finance providers is then to nurture nascent growth in green finance asset classes and facilitate their scale up.**

Figure 12: System dynamic map of actions using new financial instruments, directly catalyzing new financial flows.



DOMESTIC RECIPIENT PERSPECTIVE	INTERNATIONAL PROVIDER PERSPECTIVE
1 Institutional investors adopt green finance or decarbonization mandates across their portfolios	4 Provision of de-risking instruments to attract investment at required terms.
2 Demand for green financial products in debt, equity securities, funds or benchmark indices	
3 Issuance of green debt securities or launch of equity vehicles from corporations and banks or services from consultants.	

The above illustrations portray the use of the domestic system actor framework to track the cause and effect of interventions with a developing country financial system and their effect on climate finance flows.

3.3 Going broader – an international systems framework to identify opportunities for coordination and collaboration among international public climate finance actors

Within the international public finance sub-system, system mapping can help identify opportunities for coordination and collaboration, between institutions, identifying the main channels and leverage points for example, with particularly reference to flows of concessional finance.

We have used existing data on finance flows from the Global Landscape of Climate Finance 2013 and 2014 to conduct a social network analysis for the international climate finance system. The data is aligned with the flow relationships represented in the below actor framework for each agent in the database.

Adopting a social network analysis, the key *influencers* and *connectors* across the international public climate finance system may be measured to help understand leverage points.

- **Connectors** measured by number of outgoing connections may have most reach toward the goal of the system.
- **Influencers** are measured by number of incoming connections looked to by others as a source of advice, expertise, or information.

Figure 14 illustrates the number of financial flow relationships over 2013 and 2014 based on the Global Landscape of Climate Finance. Some government, bilateral aid sources of climate finance with the most reach across the system may be identified (left hand side graph). Whereas major development banks, climate funds and international agencies may have the most influence as represented by number of incoming connections.

The relative robustness of the system may be measured with its connectivity. For example, most OECD countries with over 10 outgoing financial flow connections to other actors, but among multilateral climate funds, only one such entity has more than 10 connections.

In theory, coordination among international public actors is useful to ensure lack of duplication of efforts and to help build scale of efforts. However, because institutions have different procurement processes, reporting requirements, and cultures, in practice coordinating closely at project level can be challenging, and the rationale for it needs to be justified.

Beyond the project level, coordination can also be achieved through country-level strategy development by national governments (such as Nationally Determined Contributions and their supplemental policies) that help international actors define and act upon their comparative advantages in line with the national strategy.

Figure 13: International climate finance actor framework for social network analysis

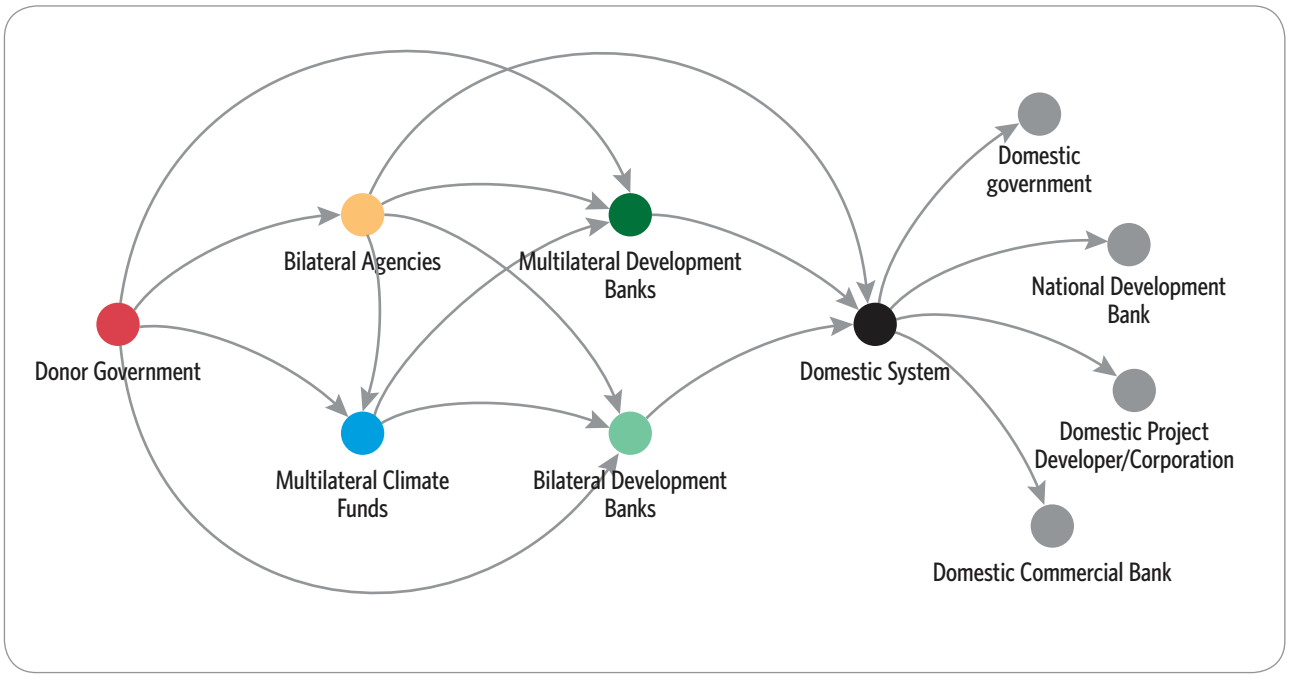
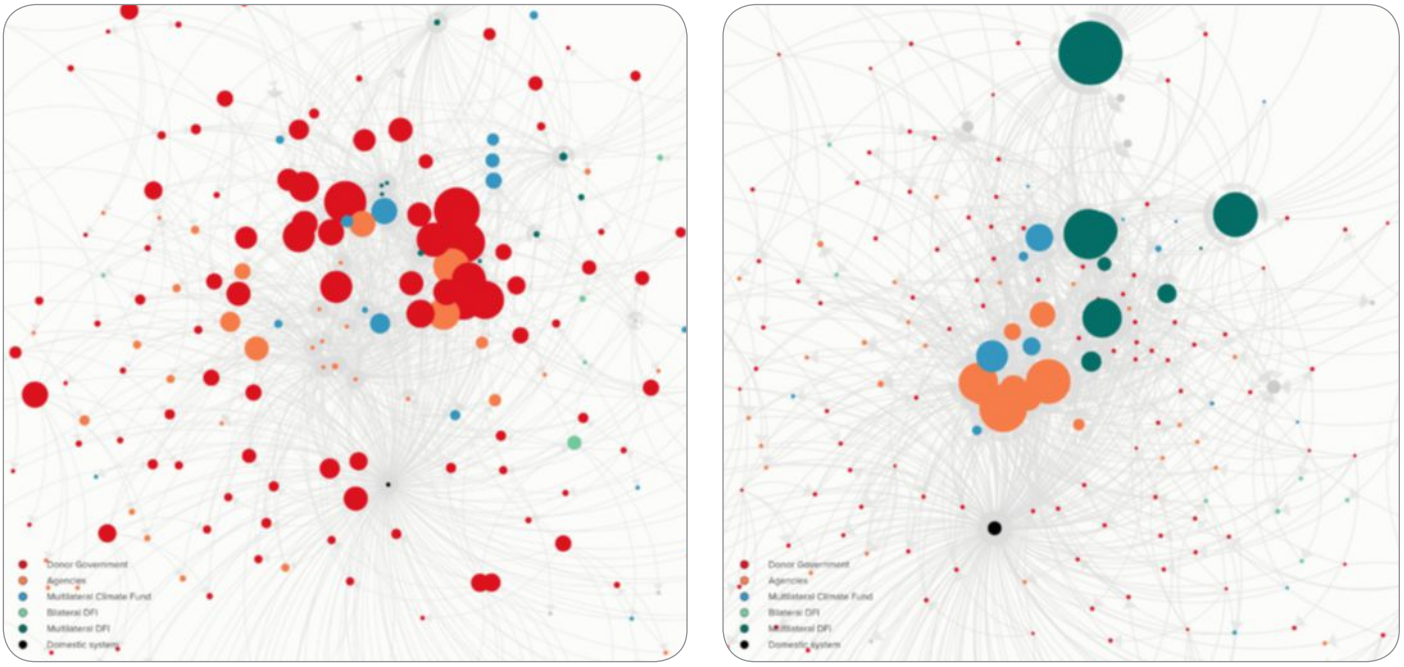


Figure 14: Social Network Analysis of climate finance landscape with actors sized by number of outgoing financial flow connections (left side) and number of incoming financial flows connections (right side)



4. Conclusions

The systems approach frameworks explored in this project offer methods to enhance coordination and collaboration among actors both within the international public climate finance system, and during design of interventions within developing country contexts.

Figure 12 overleaf provides a graphic overview of the result of both working papers. Needs and gaps drivers across developing countries are presented against the drivers of public finance actor perspectives. While specific systems and needs are best evaluated on a country by country basis; short-termism, growing risks and volatility are prevalent across developing country financial systems, impacting currency risk evaluation and potential public support for climate policies.

Figure 13: Overview of key needs and solutions in coordination and collaborating on climate finance delivery

Our analysis has shown that broader system actors may impact the effectiveness public climate finance flows through:

- new regulatory actions for banks and the domestic institutional investments,
- increased information flows through disclosure on ESG risks from service providers, and
- new mandates for green debt and equity investments by investors

In light of not only the scale of climate finance needs, but also the type of public finance instruments needed to leverage private flows, the importance of more connected coordination and collaboration by international public climate finance actors is crucial. Systems thinking approaches support the recognition of existing and new actors effects on scaling overall flows, their direction of travel, and supports the collective optimisation of public finance interventions to achieve the scale needed.

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6. Annexes

Cataloguing financial system actors across the climate finance landscape.

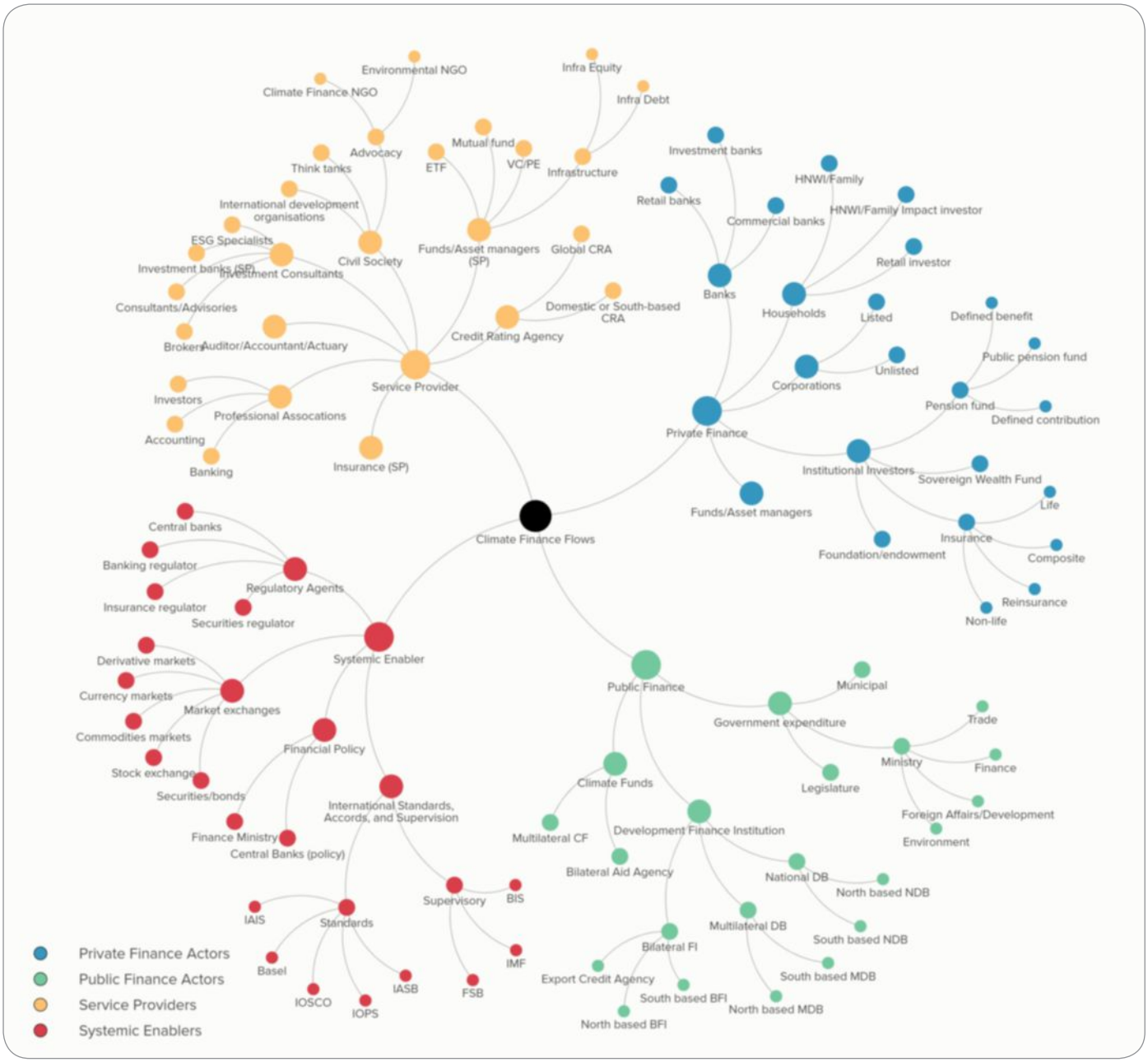

Table 3: Catalogue of financial system 'enablers' and 'service providers' in terms of their mandates, tools and effect on climate finance flows

ACTOR CATEGORY	ACTOR	SUB-ACTOR	MANDATE	TOOLS/STRATEGIES AVAILABLE	RELATION TO CLIMATE FINANCE
SYSTEMIC ENABLERS					
Financial Policy and Regulatory Agent	Government Ministry	Finance/ Treasury	Manage government finances Set budgets Implement Policy	Fiscal policy: Taxes, incentives Capital spending Regulation on financial sector	Alter tax regime to favour green transition Raise finance on markets and spend capital. Insert ESG and sustainability considerations into prudential framework for domestic pension funds and into finance sector conduct codes Reduce fossil fuel subsidies + Increase tax incentives for low carbon alternatives are under purview generally of treasuries. In some countries the treasury develops + implements policies; in other (i.e., U.S.) only implements.
Financial Policy and Regulatory Agent	Central Bank		Safeguard financial stability Control inflation, Llender of last resort/ guardian of the banking system Reduce unemployment (for some)	Monetary policy, Interest rate setting on short term lending to commercial banks and financial institutions Asset purchase programs Refinancing operations Regulation on risk disclosure, reporting and stress tests, skill requirements in directors.	Uncover climate risks that affect financial stability including misallocation of capital. Impose sustainability-related risk management and reporting requirements. Establish green finance requirements and frameworks for bank lending (China green credit; Banga; Indonesia, Mongolia). Provide refinancing at below market rates to encourage targeted lending, or to complement existing priority lending targets. Stimulate markets for specific assets – such as green bonds – through asset purchases.
Financial Policy and Regulatory Agent	Regulatory Agency	Securities	Promote confidence in competitive markets	Regulate on mandatory disclosure; insider trading; market manipulation; takeover bid regulation; and securities industry regulation.	Where climate change can pose threat to competitive markets, securities regulation can play a role. Particularly in risk disclosure requirements.
Financial Policy and Regulatory Agent	Regulatory Agency	Banking	Maintain stable, efficient, and competitive banking system; protect depositor funds; consumer protection	Transparency requirements Capital adequacy requirements Stress test requirements	Stringent liquidity and capital adequacy requirements may restrict loans available for capital-intensive climate infrastructure. Environmental risk stress testing across portfolios Green lending requirements and guidelines.
Financial Policy and Regulatory Agent	Regulatory Agency	Insurance	Consumer (policy-holder) protection; Overall market stability and development including supporting access to insurance	Licensing requirements Product regulation, Capital adequacy requirements	Climate risk disclosure requirements Effective insurance regulation facilitates access to insurance as an intervention to increase communities' resilience against climate and natural hazard risks while advancing economic growth, sustainable development and human dignity.

ACTOR CATEGORY	ACTOR	SUB-ACTOR	MANDATE	TOOLS/STRATEGIES AVAILABLE	RELATION TO CLIMATE FINANCE
Market	Market exchanges	Stock/ Bonds/ Commodities etc.	Operate a functioning, real-time stock exchange for buyers and sellers to trade.	Listing rules, Information disclosure rules.	Sustainability disclosure criteria in listing requirements. Allow for preferencing through visibility on sustainability certifications.
International Standards, Accords and Supervision	Standards/ Accords	Banking (Basel) Securities (IOSCO) Insurance (IAIS) Pension (IOPS) Accounting (IASB)	Promote international financial stability and harmonization.	Voluntary minimum requirements Promotion of norms, methods and tools.	Basel III strengthens capital requirements by demanding greater liquidity and lower leverage. The primary objective is banking sector stability, however has been noted to may have unintended consequence in making lending to long term infrastructure (i.e., clean energy) more difficult. IAIS' Insurance Core Principles (ICPs) and related standards and guidance emphasize management of systemic risk, materiality assessment and financial inclusion. Adherence supports access to reinsurance and other forms of risk transfer mechanisms, such as insurance-linked securities, including catastrophe bonds. IOSCO, IOPS and IASB principles highlight management of systemic risks, transparency and disclosure requirements of financial market actors.
International Standards, Accords and Supervison	Supervisory agent	IMF	Foster global monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world.	Research and policy dialogue Surveillance of exchange rate governance and systemic risks Lending and Technical assistance through e.g. Financial Sector Assistance Programs	Research to help promote fiscal reforms e.g. on quantifying and advocating against fossil fuel subsidies and attendant economic distortions as contributing to difficulty in deploying climate finance; carbon markets/ pricing and financial risks of climate change. Such analysis translates into policy dialogues, the provision of technical assistance and training through either Financial Sector Assessment Programs (FSAP); macroeconomic forecasts; debt sustainability analyses; and medium-term budget frameworks. Integrating natural disaster risks, adaption and preparedness strategies in macroeconomic forecasts and debt sustainability analyses.
International Standards, Accords and Supervison	Supervisory agent	FSB	Promotion of international financial stability.	Coordination of national financial authorities and international standard-setting bodies	The FSB established an industry-led Task Force to develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to lenders, insurers, investors and other stakeholders.

ACTOR CATEGORY	ACTOR	SUB-ACTOR	MANDATE	TOOLS/STRATEGIES AVAILABLE	RELATION TO CLIMATE FINANCE
International Standards, Accords and Supervison	Supervisory agent	BIS	Serve central banks in their pursuit of monetary and financial stability, to foster international cooperation in those areas and to act as a bank for central banks.	Coordination among central banks and authorities Research and policy analysis Prime counterparty for central banks in their financial transactions; or an agent or trustee in connection with international financial operations.	Tracking flows, imbalances across financial systems. Research focus on links between climate change, insurance, and financial stability
Service Providers					
Risk Management	Asset/Fund Managers		Manage capital pool within identified risk parameters and strategy	Investment strategies Mutual funds/ETFs VC/PE funds Infrastructure funds	Asset Manager or Fund Managers serve a dual role in directing investment decisions as a private finance actor as well as offering services to client investors or asset owners in allocating capital. More managers offer green, climate or sustainability themed investment strategies.
Risk Management	Insurance	Non-Life	Profit from annual premiums covering losses on casualty events.	Insurance premiums, Investments (dual role) Catastrophe bonds, Sales of insurance to reinsurance, Diversification	Offer insurance of climate-related natural catastrophes, including agricultural and property; Inbuild resilience through normal operations, given data access/availability on climate risks, catastrophe and disasters. ESG factors influence risk underwriting with varying degrees of impact across lines of insurance.
Risk Management	Insurance	Reinsurance	Provide insurance for insurers to diversify risks	Diversification to reduce the risk of an insurance portfolio. Issue catastrophe bonds to transfer portions of risk to investors and free up capital to expand portfolio.	Manage solvency risk of insurers in face of climate change Inbuild resilience of climate finance flows into new projects and insurance provision.
Risk management	Credit rating agency	International scale Domestic scale	Assess the financial strength of countries, companies and certain financial products to compare the relative risk of default.	impartial, rational analyses ('ratings') Rating methodologies and reviews. Domestic rating scales against sovereign rating.	Incorporate low carbon transition and climate risks into ratings; Accurately measure cost recovery risks of green tech and infrastructure Domestic or south-based credit rating agencies also support development of domestic capital markets.

ACTOR CATEGORY	ACTOR	SUB-ACTOR	MANDATE	TOOLS/STRATEGIES AVAILABLE	RELATION TO CLIMATE FINANCE
Financial Advisory	Investment consultants		Advise on robust investment processes to meet client needs.	Transaction/ investment strategy advice Market research Buy, Sell, hold recommendations Indexes	Significant influence on institutional investors' choice of fund manager, or investment recommendations in climate sectors e.g. utilities. Research reports are used by a range of investors but most often by professional institutional investors including hedge funds, mutual funds and others. ESG consultants advise on ESG integration and themed investing.
Financial Advisory	Index provider		Provide benchmarks for asset managers to invest against.	Indexes Ratings	Show outperformance based on different investment strategies of negative screening of fossil fuel investments vs positive screening of green or climate themed financial products (green bonds), or revenues or carbon footprints etc.
Financial Advisory	Accoundant/ Auditors/ Actuaries		Assure on annual financial statements and valuations	Certifications Assurance reports	Support valuation of climate risks and green finance accounting and tracking
Professional Association	Investor		Assist investors ro respond to climate change risks	Lobbying Research and guides, policy papers	Support investors in responding to climate change through how-to guides and tools. Lobby for strong climate policy to support investments.
Professional Association	Banking		Represent interests of banking sector to policy	Lobbying Research and guides, policy papers	Provide support for banking sector and lobby for incentives.
Professional Association	Accounting/ actuaries		Represents accounting profession and standards	Lobbying Research and guides, policy papers	Support accountants and actuaries in accurately valuing climate risks, economic effects of climate change, and material financial risks.
Non-financial	ESG or environmental auditors	Green or climate	Assure on environmental performance, ESG ratings.	Certifications Assurance reports	Support allocation to green or climate themed investments.
Non-financial	Advocacy	NGO	Advance environmental protection	Public opinion campaigning, Lobbying, Coalition building	Support and pressurize actors on climate finance, Some conservation focused NGOs may advocate against climate solutions that have other environmental impacts.