Institutional Considerations in the Practice of Natural Climate Solutions

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Section 1: Overview and Research Method

We investigate institutional considerations of nature-based climate solution projects, to better understand the challenges in scaling them up. Nature-based climate solutions (NCS, also natural climate solutions) are a sub-set of 'nature-based solutions' that focus on climate. Nature-based solutions are "actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits. They are underpinned by benefits that flow from healthy ecosystems and target major challenges like climate change, disaster risk reduction, food and water security, health and are critical to economic development." (IUCN 2020) Our primary focus are practical efforts that are explicitly designed to respond to the vulnerabilities and risks of climate change (i.e., climate adaptation) as well as to imperatives of reducing and or sequestering Green House Gas (GHG) emissions (i.e., climate mitigation).[1]

Building on the findings of the IPCC Working Group III, a comprehensive review undertaken by The Nature Conservancy and fifteen organizations found natural climate solutions capable of providing "over one-third of the cost-effective climate mitigation needed between now and 2030 to stabilize warming to below 2 °C. Alongside aggressive fossil fuel emissions reductions, [natural climate solutions] offer a powerful set of options for nations to deliver on the Paris Climate Agreement while improving soil productivity, cleaning our air and water, and maintaining biodiversity." (Griscom et al 2017) In 2019, China and New Zealand co-launched the Nature-Based Solutions for Climate Manifesto with the support of over 70 governments, private sector, civil society and international organizations at the UN Climate Action Summit convened by the UN Secretary General. In June 2021, the US Senate passed the Growing Climate Solutions Act to help connect farmers, ranchers and private forest landowners with carbon markets. Examining the financial and technical aspects, a 2021 report declares that "NCS are fundamental to delivering a net-zero pathway alongside rapid decarbonization, by enabling avoidance/reduction of emissions, and removal/sequestration of carbon dioxide from the atmosphere" (WEF 2021). More recently, a resolution adopted by UNEP's UN Environment Assembly declares that nature-based solutions:

[1]We do not purview solutions that are technology based (such as carbon capture and storage from fossil fuel-based power plants), or geo-engineering solutions (such as artificially enhancing planetary albedo or other large-scale interventions in the Earth's climate system).

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> "Are one of the actions that play an essential role in the overall global effort to achieve the Sustainable Development Goals, including by effectively and efficiently addressing major social, economic and environmental challenges, such as biodiversity loss, climate change, land degradation, desertification, food security, disaster risks, urban development, water availability, poverty eradication, inequality and unemployment, as well as social development, sustainable economic development, human health and a broad range of ecosystem services; and (…)
>
> Recognizes that nature-based solutions may contribute significantly to climate action, while recognizing the need for analysis of their effects, including in the long term, and acknowledging that they do not replace the need for rapid, deep and sustained reductions in greenhouse gas emissions, but can improve action for adaptation and resilience to and mitigation of climate change and its impact;" (UNEA 2022)

There is a high level of awareness amongst governments and companies of the importance of advancing NCS efforts. The 2021 World Economic Forum consultation captures the global excitement regarding natural solutions to the climate challenge: "fundamental to delivering a net-zero pathway…. with a practical potential of close to 7Gt CO2 per year…. sufficient to deliver around one-third of that target and to achieve carbon removal in the near term and at lower cost than technological solutions." (WEF 2021) Further, delivering "significant co-benefits to nature and humanity" natural climate solutions can be expected to generate "private capital flows to countries that offer the highest potential…, typically forest-rich countries in the Global South" (*ibid*). A recent review of nature-based solutions for climate change highlights their importance to address "the twin crises of climate change and biodiversity loss… while supporting a wide range of sustainable development goals…" (Seddon et al 2021). Following the Warsaw Framework for REDD+ (2013), thousands of pilot projects around the world have endeavored to realize the promise of NCS. Involving a range of state, private and civil society institutions, they have accelerated in the years following adoption of the Paris Climate Agreement (2015). The challenge, however, has been to scale up the pilot efforts in order to meet the enormous challenges of climate mitigation and adaptation.

Despite global recognition of their value and effectiveness within national and global policy communities (European Union First NDC (Updated submission) 2020, China First NDC (Updated submission) 2021, Paris Climate Agreement 2015, and the European Green Deal 2019), amongst researchers, and headlining by several corporations (exemplified by the focus on 'Natural climate solutions' of the WBCSD in Nature4Climate centers, and a recent briefing by the European Environment Agency on the integral links between climate neutrality and natural capital [EEA 2022]), efforts to scale them to the level needed (to meet the challenges of climate change) are proving elusive. Global carbon sequestration estimates are derived from the biological characteristics of the natural environment (Zomer at el 2017, Lal et al 2018)[2]. Scores of efforts to "projectize climate promise" of natural solutions (to adaptation and mitigation), we maintain, ignore social and political dynamics, as well as the implications of development ideas and stakeholder aspirations. Instead, NCS projects routinely valorize carbon, paying scant attention to the role of institutions.

The projects we examine are place-based and practical, with real-world interests expressed through the interactions of a diverse array of institutions. The efforts are designed to deliver nature-based mitigation and/or adaptation benefits for several decades. We do not include efforts that currently are mostly on paper, such as ones listed in the climate action plan of countries in Nationally Determined Contributions (NDCs) or the promise of companies. The web-based compilation we formulated, Atlas of Climate Solutions, locates the NCS efforts we reviewed in fifteen countries: Australia, Bangladesh, Brazil, Canada, China, Democratic Republic of the Congo, France, India, Indonesia, Mexico, Poland, Republic of the Congo, South Africa, United Kingdom, and United States of America.

Institutions are central to public and private action. Two well-known definitions of institutions are of D. North - "formal and informal rules that organise social, political and economic relations (North 1990), and of E. Ostrom - "the rules that humans use when interacting within a wide variety of repetitive and structured situations at multiple levels of analysis" (Ostrom 2008).

[2] McKinsey's grouping of resource base for NCS includes four types: forests (reforestation and avoided deforestation), coast (restoration and avoided degradation), peatland (restoration and avoided degradation) and crop land (trees and cover crops). See McKinsey 2021.

Both are omnibus definitions, inclusive of the private, public and in-between realms and are indifferent about the origins of 'rules.' For the purposes of analyzing interactions on nature-based solutions, we adopt a pared down meaning of institutions as being 'established rules that structure interactions in the public realm.' By 'established' we invoke state authority, while being inclusive of multiple levels of its expression (the local, municipal, provincial, national and the supranational). To be clear, the rules of interactions governing access and use of environmental resources (that are of relevance to natural climate solutions) could be rooted in cultural practices or a mythic social past, prior to their encoding by the state. Irrespective of the origins of the rules, we privilege a state-centric standpoint since it is the state that is the guarantor of all climate solutions (to the end of 21st century) following the Paris Climate Agreement. We consciously remove from our consideration interactions in the private realm (such as within families, households and companies, for example).

The financial, ecological and technical aspects of nature-based climate solution projects have received copious global attention from diverse stakeholders - UNFCCC Secretariat, IUCN, WBCSD, World Bank, IADB, EIB, HSBC, WEF, China Dialogue, Standard Chartered, The US White House, Indonesia, UNEP, CIFOR and ICRAF. Institutional considerations, however, have received inadequate attention. By that we mean attention to questions such as:

- Who are considered to have explicit stake in the effort and in what manner are their interests structured (community, and organizations such as NGOs/CSOs, companies, and government agencies/department)?
- What are the identified interests of the stakeholders (whether quantitively or qualitatively expressed, and including financial, jobs, livelihood, aesthetic, moral, or some combination thereof)?
- Are local, administrative and supra-local interests considered?
- What key assumptions are made in legitimating interests of stakeholders (such as 'local livelihood', 'national development', 'global importance', etc.)?
- What are the arrangements to explicitly safeguard uninterrupted 'solution' delivery over decades (in the face of likely changes in the social, political, economic and environmental dimensions)?

Another issue of critical institutional importance we probe is the recognition and organizing of trade-offs between stakeholders. Rather than the 'win-wins' littering the literature on the promise of natural climate solutions, in keeping with development reality, it's the 'win-lose' that dominates on the ground experience. The recognition of losses by some groups / institutions / interests and gains by others (as well of indifference of yet other stakeholders) is fundamental. How the balance will be maintained actively (incentive flows, penalties), rather than being assumed to exist in a passive sense, is critical for the institution to continue help provide natural climate benefits over decades. All types of natural climate solutions, whether they are about continuing a stream of benefits or creating a new stream of benefits, are about interfering with site-contextual processes. The processes may be sociological, cultural, political, economic, or environmental in their origin. In some sites, the interference may be considered as 'slight' (such as allowing local communities to continue their 'historic' agropastoral practices) while in others they may be substantial (such as in putting an end to active timber or biomass extraction by local populations and/or companies). In light of the importance of natural climate solutions, their longevity and the uncertainty in future valuation of the captured carbon, the default should be to carefully consider the benefit-loss flows and their tradeoffs. We interlocute the projects on the issue of trade-offs with the following questions:

- What changes to the benefit-loss value stream are expected of stakeholder groups as a result of the project (finance, aesthetic, social/political influence)?
- In what ways are current institutional arrangements being changed, in order to deliver on the trade-offs over the long term?
- What changes in the meta narratives (of state-led socio-economic development, value of nature {from local and distant players}, aspirations for well-being by local communities) are expected in order for the trade-offs to work?
- What key supportive elements of the current management arrangement (political party in power, government programs/subsidies, grants from foundations, project funds, local leadership, local police/military, companies, etc.) are assumed to change to allow for the trade-offs to work?

A lack of understanding of institutional issues means flying blind to the impact of changes wrought in the new efforts to derive long term benefits, including carbon sequestration and storage and

managing climate risks. It would mean being oblivious to the anxiety and anger from changes that may result from the project. Caught unawares by forces of resistance, revolt, and power play amongst stakeholders, it could seriously compromise the ability of project institutions to deliver.

Section 2: Projects Reviewed

We assess projects that are self-declared climate solution efforts utilizing natural means. As noted before, we exclude from our review projects that sequester GHGs by artificial means (for useful reviews see IPCC 2005, Keleman et al 2019, IPCC 2022). Projects to capture methane in dairy farming are not included, while we include land management efforts in peat forests. This review is first and foremost a desk-study, and did not involve field-based research. Further, it is based on records available in the public domain on the web. To enable a sampling of the thousands of 'nature-based climate solutions' we have focused on 15 countries, in the Global South and North that are amongst key climate transition ones for the Paris Climate Agreement to have a chance to succeed. The initial review considered over 150 projects from around the world, ostensibly to advance 'nature-based solutions' for adaptation and or mitigation of climate change. For the 127 projects selected for their data availability, Annex I provides key information such as location, resource base of solution, year initiated, and the project extent/cost.

Section 3: Research Findings

A. Typology of NCS efforts:

The review covers a wide range of NCS efforts. The most frequent were forestry-related projects at over 59% of the total with a further breakdown of 36% being forest management (including avoided deforestation and community forestry), 18% being afforestation and plantation activities and agroforestry efforts at 5% (Chart 1).

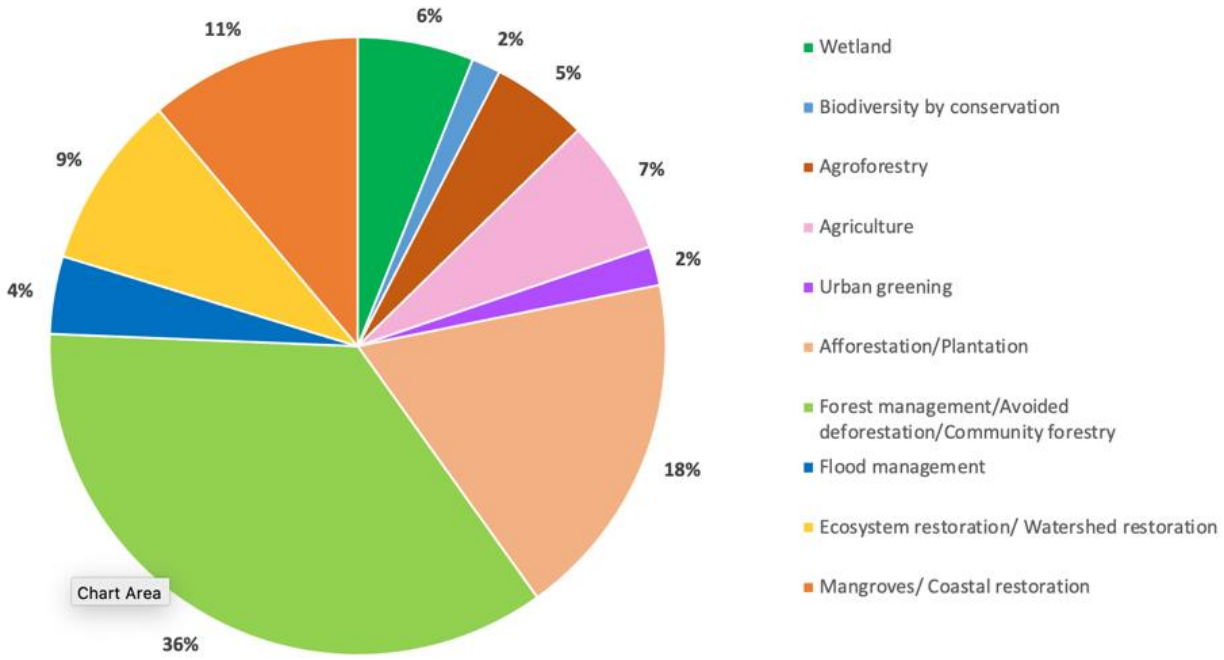

Chart 1. Types of NCS efforts

Mangroves /Coastal restoration account for 11% of the efforts, with watershed management and ecosystem restoration at 9%. The other types of NCS efforts were less frequent: agriculture (7%), wetland management (6%), flood management (4%) and urban greening and biodiversity conservation at 2% each. The dominance of forestry-related efforts is in keeping with the promises of countries in the their NDCs as well as being the most frequent off-set mechanism for companies. The value of forests as sinks for carbon cannot be overstated (Nabuurs et al 2007, IPCC 2019, Pugh et al 2019, Waring et al 2020). However, the promise of NCS in the case of forestry is dependent on the net increase each year in the amount of carbon stored, as distinct from business as usual. Several of the forestry-related projects reviewed are not about the permanent storage as carbon stock. Rather, they aim to harvest biomass on a regular basis (for timber and for fuelwood for example), creating challenges to carbon stock accounting.

B. Stakeholder representation:

An examination of publicly available project documents reveals involvement of a range of institutions in design and implementation activities, indicating the representation of diverse stakeholder interests (Chart 2).

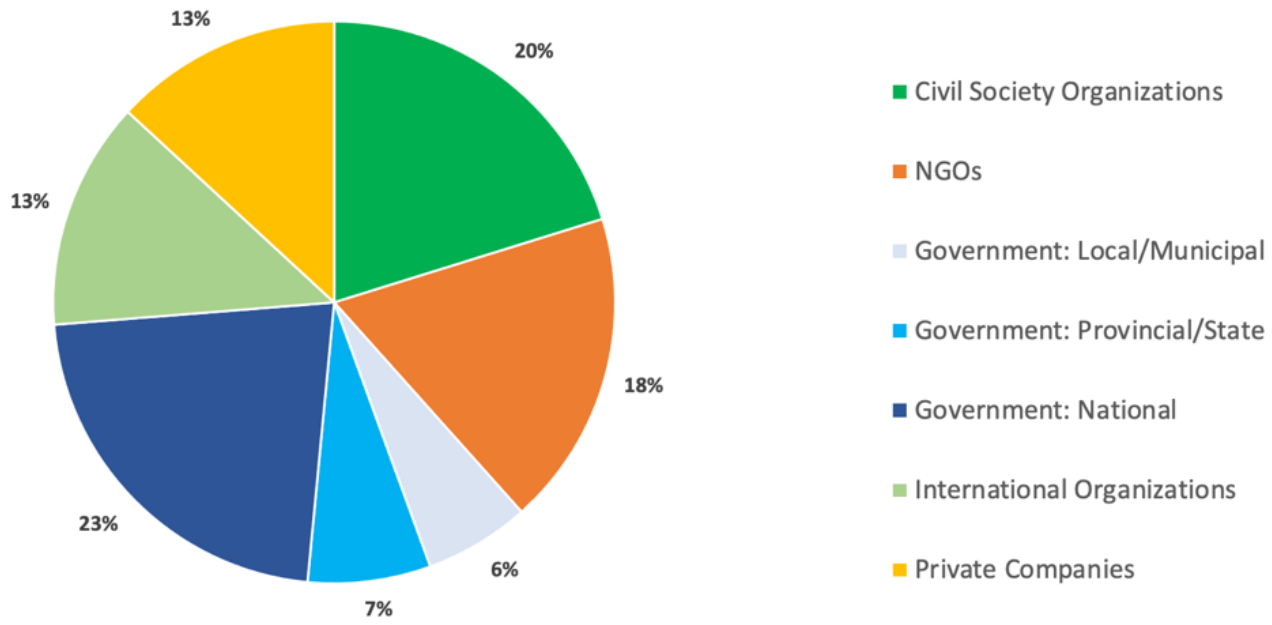

Chart 2. Stakeholder representation in NCS efforts

Civil society organizations (of farmers and villagers) and non-governmental organizations combined were the most frequent, in over 38% of the projects. CSOs were at 20%. Government agencies, across administrative levels, were the next most frequent, accounting for a total of 36% of institution types. However, national government institutions were by themselves the most active in 23% of the projects, with provincial/state level and local level governmental institutions at low levels of 7% and 6% respectively. International organizations (such as UN agencies and multilateral development banks) and private companies (both local and non-local, involved along different points of supply chain involving extraction and management of natural resources and a growing number of companies seeking to off-set emissions) were involved at 13% each. The relatively low levels of NCS projects involving private companies could well be an artefact of selection, given the paucity of public information on such efforts. The representation of stakeholder interests, as noted before, are according to project documents. Their veracity and extent would require detailed surveys.

C. Stakeholder partnerships:

In the 127 NCS projects reviewed, the seven stakeholder types come together in 40 unique ways (Chart 3)[3]! That's relatively a large number, especially since the diversity of institutional arrangements was not a criterion in project selection. Further, the typology (of seven) is of a coarse resolution. By that we mean, for example, all NGOs, whether they are The Nature Conservancy and World Wildlife Fund or a 'two-person' NGO in Belem or Bogor are categorized as such in the review. If the stakeholders are mapped with a finer resolution, allowing for location, specialization, scope of work etc., the diversity of stakeholder partnerships would be overwhelmingly more.

National governments and international organizations come together most frequently, in 17% of the cases. The next most frequent partnerships involve CSOs and NGOs (at 13%) and companies and national government at 6.6%. Partnerships between CSOs, companies, provincial and national governments and international organizations are next, at just under 5%, followed by partnerships between NGOs and international organizations and partnerships of CSOs, NGOs, national government and international organizations at 3.8% each. Annex II provides details of the frequency of partnerships.

Chart 3 in the following page.

[3] In a small number of cases, the documents are silent on partnerships between stakeholder types. They are 7% of projects involving national governments, under 5% for CSOs, 2.4% for NGOs and under 2% for private companies. They have not been included in calculating the frequency of partnership types.

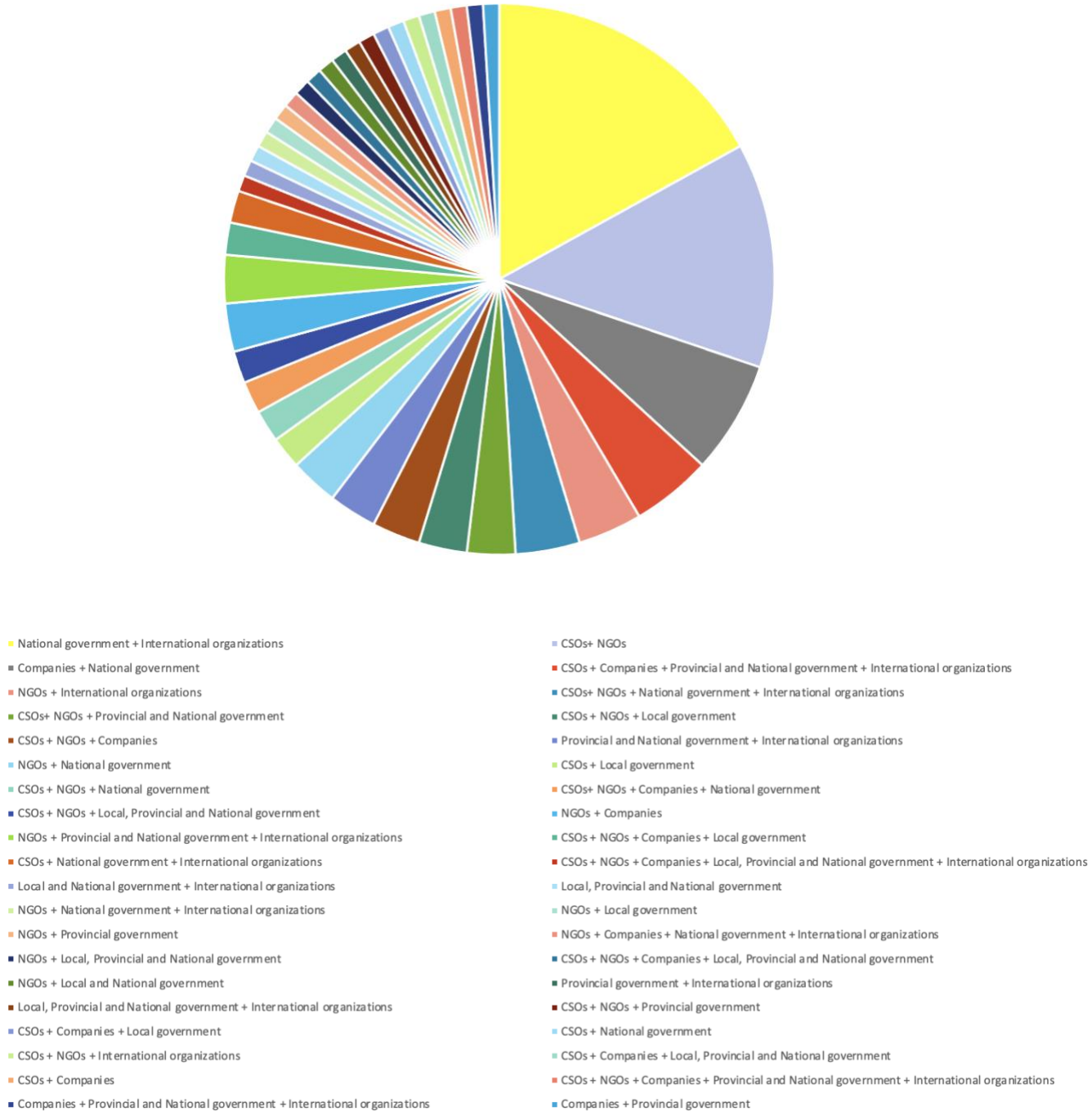

Chart 3. Stakeholder partnerships in NCS efforts

The need for enlisting support of local populations for the success of NCS effort on the one hand, and the attention of national governments to reducing their GHG emission footprints on the other, makes reasonable the relatively high levels of CSO and national government involvement. Two important caveats need to be considered: One, the finding of a wide range of stakeholder

involvement is from a review of publicly available project documents. The reality of involvement in design and implementation (as well as to their extent/depth) can only be fathomed by an onsite survey; Two, the mere involvement of institutions in the formal processes of a project does not in and of itself guarantee the actual representation of stakeholder interests in the project. The findings Chambers and Gaventa, as well as of a growing body of climate governance literature, on the central role of power is highly instructive in this regard (Chambers 2017, Gaventa 1982, Stoddard et al 2021, Hultman and Anshelm 2017). An empirical 'on the ground' investigation of the social and political dynamics of the projects would yield verifiable information on this score.

D. Emergent typology of aspirational interest:

The review reveals the channeling of distinctive and different 'aspirations' in their design. While projects were selected because of their professed interest in advancing carbon capture and storage using natural methods and or for enhancing disaster risk, the sub-text of aspirations is revealing in its diversity. The review yielded four broad categories of aspirations, found across a majority of the projects. They are:

- **People Connect** - *Privileging local social and environmental relations*
- **Development Disconnect** – *Disengaged from local economic processes*
- **Climate Discourse** – *Engaged on global climate discourse, and*
- **Climate Uncontested** – *Engaged on climate action*

Chart 4 in the following page.

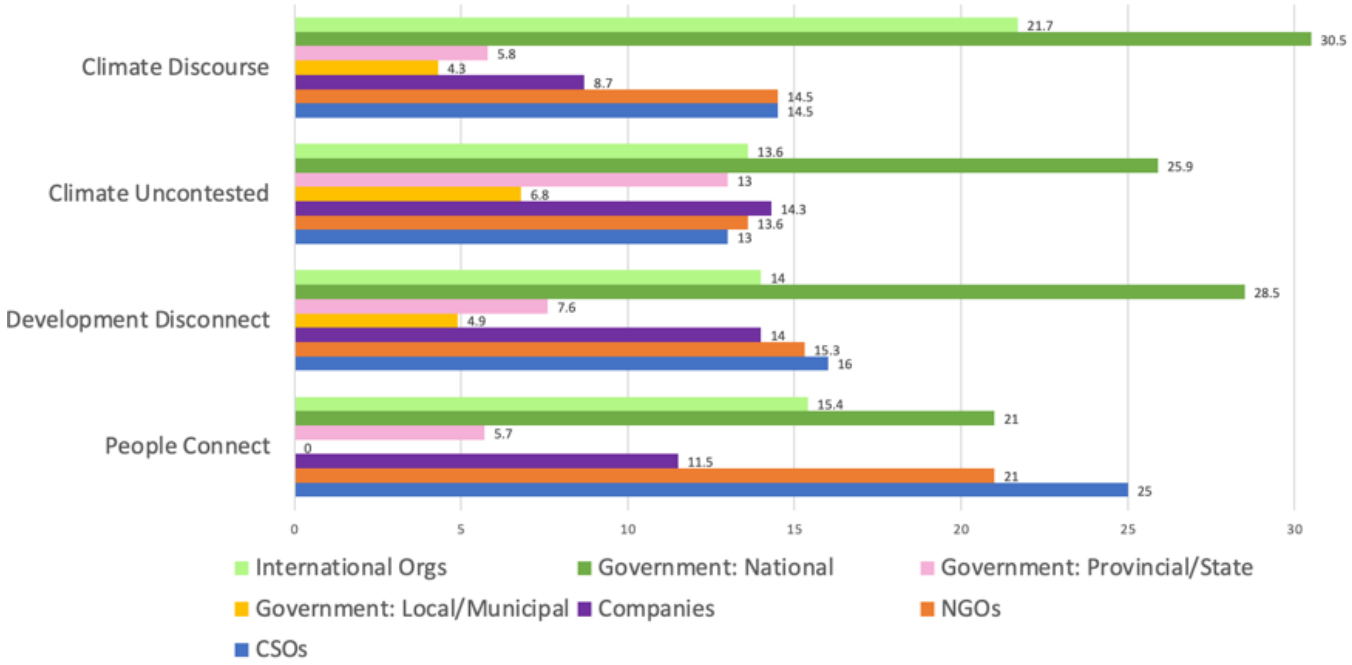

Chart 4. Typology of aspirational interests amongst stakeholders

Aspiration of *People Connect*', i.e., considerations of local knowledge and livelihood generation, are dominant in projects involving CSOs (at 25%), NGOs (21%) and national governments (21%). 'Being one with nature' and valuing local ways of life is a common aspiration in project documents. It is far less in projects involving other stakeholder categories (at slightly over 15% for international organizations, 11.5% for companies and under 6% for provincial governments). In addition to the lesser involvement of local governments across all projects, as noted earlier, the relative definition of 'local' governance institutions (tribe, village, district/county, and municipality, for example) could well be the reason. 'Indigenous' and 'local' are terms frequently used in an interchangeable manner, doing disservice to both the relevant Constitutional as well as historic ways of social delineation. Populations that have historically been poor (for example, using dirty fuels such as coal and firewood for cooking), are expected to continue living unchanged decades into the future in some of the projects. Absent are considerations of clandestine economies at the local level and their impacts on the work of project institutions.

'*Development Disconnect*' finds a broader representation across categories of stakeholders. It is maximum in projects involving national governments (at 28.5%), almost double the value of the rest. An explanation could be the framing of NCS projects as 'climate action' efforts by national

governments, consciously siloed from economic and social development programs and projects, often to fulfill the directive of funders and donors. The aspiration is lowest in projects involving local governments (at 4.9%), indicating an interest in economic development on their part (since 'Development Disconnect' is suggestive of the lack of development aspiration). In contrast, the relatively high levels amongst CSOs and NGOs (at 16% and 15.3%) is surprising. The design of NCS projects, perhaps, is a reason. Robust supply chains connecting communities to regional (and even global) markets of products such as palm oil, beef, gold, tendu leaf, rosewood, etc., are mostly absent. Awareness of market linkages of a site, whether forests, peat, mangroves or wetlands, are low. It is not clear from the reports examined if the absence is due to insufficient contextual knowledge or from an assumption based on indifference. As a result, the impacts of robust demand chains on the project site - for land (for farming, ranching, plantations, city growth), for timber, and for non-timber forest produce, mediated by local communities, companies and government agencies – are muted, if not ignored. While the aspiration may make sense for sites located in high Human Development Index (HDI) geographies, it calls into question the sustainability of projects in low-HDI context. The lack of contextual considerations has a profound impact on the institutional architecture of the projects. It relieves them of the need to put in place robust institutional safeguards for the better management of resources, thereby putting at risk their ability to assure a steady stream of benefits from the project.

Reducing emissions to achieve net zero or enhancing climate adaptation over decades, aka '*Climate Uncontested*', is found in most project documents. It is at a high in almost 26% of projects involving national governments, and ranges between 13% and 14.5% for international organizations, provincial level government, companies, NGOs and CSOs. The prevalence of this aspiration is not a surprise, given the nature of the projects selected for this review. The lead of national government agencies and ministries in the design of NCS projects may account for their high level of association with the aspiration. The lead agency, often the environmental ministry or department, side lines conflicting policies of industrial growth and infrastructure development (that are the concern of other ministries/agencies), relieving the necessity of having to imbricate climate action in the development context. Realizing the aspiration is another matter altogether. The project documents are replete with promises that are vague or are simplistic progression, with seemingly little concern for the underlying risks. 'Climate action' is the dominant motif.

Ambitions of climate neutrality, net zero or climate resiliency, i.e., '*Climate Discourse*' jargon, are most often found in documents of projects involving national governments (at over 30%) and international organizations (at just under 22%). Perhaps they reflect a 'repurposing' of projects, such as large-scale plantations and 'wasteland' programs, to suit the emergent 'climate change' interest of funders and donors. While repurposing could be seen in a positive light (flexibility on the part of the technocracy), lack of information on changes undertaken to advance the new goal makes them suspect. The framing of success, whether in China or Brazil, is one of large (geographic) scale, rather than attention to the varied social and environmental context. They are cookie cutter applications to advance grand state ambitions, rather than NCS efforts designed to work in the diversity of eco-system and social contexts that the efforts straddle. Further, several projects place their faith in 'carbon market', conjuring a carbon price to aid their financial viability. Several of the adaptation projects seem designed to only manage current climate risks, making little or no allowance for social, economic or environmental dynamic. Scaling up such pilots may end up enhancing, rather than reducing, vulnerabilities of population and ecosystems to other risks.

Tracking aspirational interest within institutional categories yields another pattern (Chart 5).

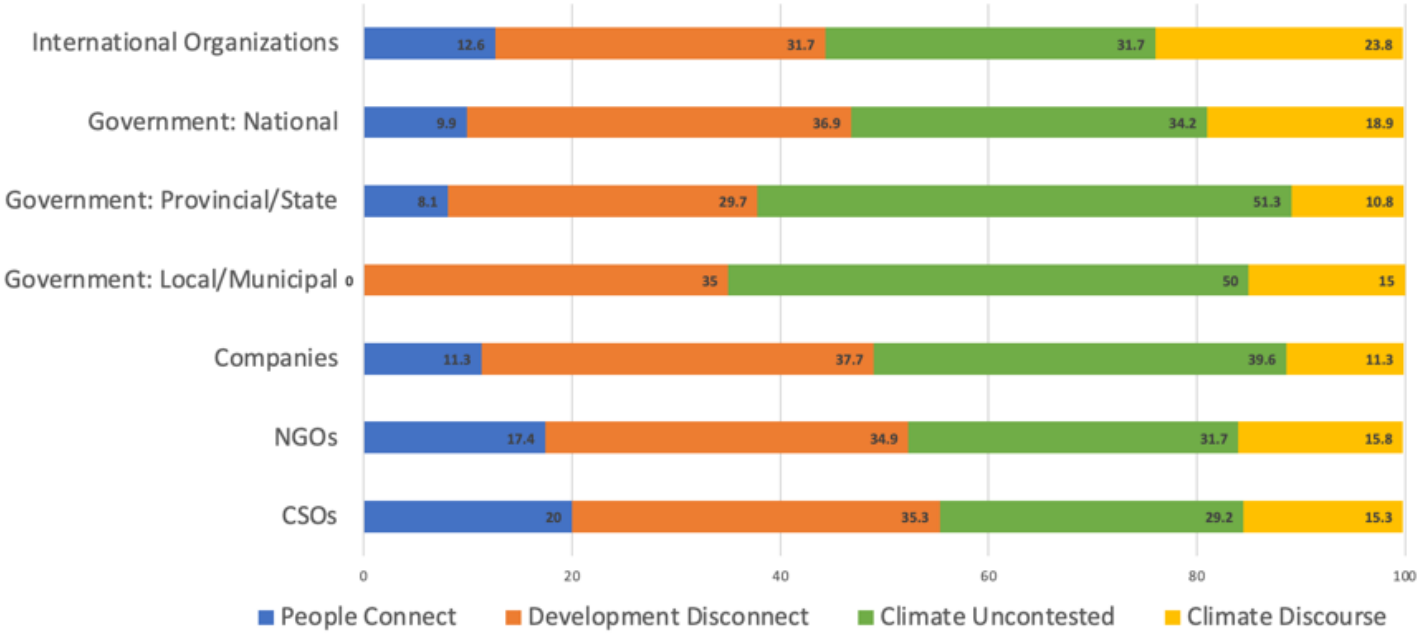

Chart 5. Spread of aspirational interests within stakeholders

Development Disconnect, Climate Uncontested and Climate Discourse are the leading aspirations found in projects involving national, provincial and local governments. They are to a lesser extent in those of other institutional categories. *People Connect* aspiration is expressed most frequently in projects involving CSOs and NGOs. Unexpected is the prevalence of '*Development Disconnect*' aspiration in projects involving CSOs, NGOs and companies. An in-depth survey of the project institutions may illuminate reasons for the patterns observed here.

E. Institutions managing change over decades

The projects are expected to deliver results over decades, with several of them through 2050. Whether capturing carbon or advancing climate risk management, institutional arrangements of the projects are purportedly designed to deliver in the face of changes and shocks. NCS projects are distinctly different from development efforts such as building roads, schools or hydro power plants, in at least two ways. One, they are continuous, long-term cooperative efforts over several decades. Two, the involvement of several distinct institutional types. The latter is clear when we peruse the range of institutions the projects involve – CSOs, NGOs, companies, governments, across spatial scales and administrative boundaries and international organizations. Each of the categories in turn are made up of diverse members, with their own rules, expectations, responsibilities and forms of behavior. The institutional structure of NCS is akin to an orchestra, requiring close and continuing coordination. Merely assembling the institutions will not do. They have to work cooperatively on a continuous basis over a long-time horizon. Their work becomes all the more important when critical issues change over time. For example, in several of the projects, economic viability depends on payment for carbon (that is being sequestered). In none of the projects is there a discussion of how to handle a situation if the price stays below the critical threshold for a considerable period. Declaring default and shuttering the project cannot be an option for NCS efforts, given their importance in nationals NDCs and the promise of companies to investors and customers.

Changes impacting the project could be on several fronts – demographic (decline or gain), financial returns (price of biomass or carbon, for example), political (changes in power relations leading to modifications in administrative structures), climatic (enhanced frequency and or magnitude of droughts and floods) or environmental (changes in hydrology or forest infestation). Some of the

changes could trigger responses in others, leading to deviation from the design 'normal'. Several of the projects on climate adaptation, for example, are intended to anticipate likely changes in the behavior of climate (drought return periods, frequency of wet spells, amplitude of hurricanes making landfall etc.). To be 'climate smart' the institutions 'utilize uncertain and time ahead climate and environmental information in order to put anticipatory programs in place.' (Someshwar 2008) In a number of projects involving growing carbon stock (as in mangroves, shelter belts, agroforestry and forestry), however, designers take climate as the only dynamic, implying a constancy on economic and social issues (such as market penetration, availability of labor, contestations over land tenure, production technologies, etc.). The relations of production between natural resources and societies are considered changeless, while the latest available projections are used to map climate change. Such a disciplinary bias precludes an honest appraisal of the likely success of the effort in continuing to store carbon or to manage climate risks, decade after decade.

In a very high number of projects (almost 65%), the design of projects does not involve changes to institutions (Chart 6). Government departments/agencies, NGOs, and CSOs, for example, are expected to continue as before the project came into being. A 'coordinating entity', in some projects, is expected to harmonize the work of institutions, albeit with no authority.

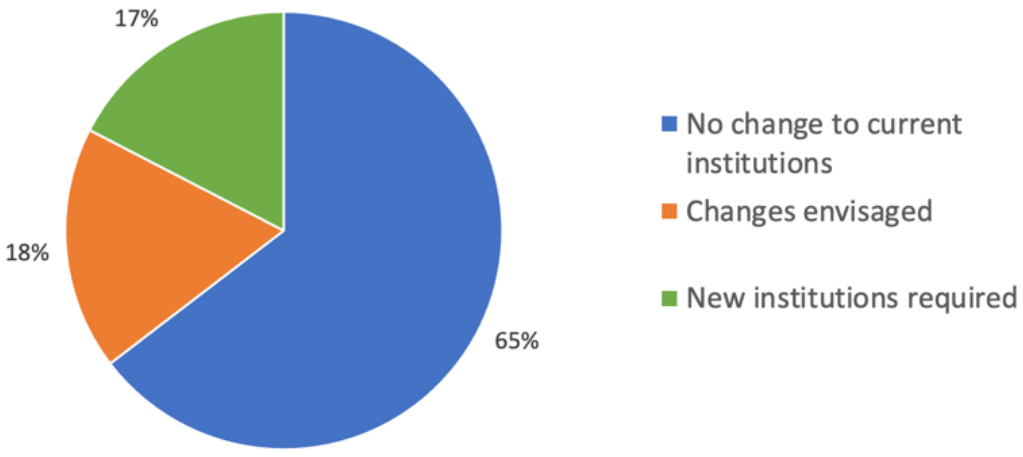

Chart 6. Structuring of institutions in NCS efforts

The project designs do not seem to pay sufficient importance on ways for institutional processes to be responsive to changes that may occur in the 'external' world. The design focus is intensively on the 'now'. The only change it appears the projects are geared for is on the climate front. And there too the climate futures (more often than not) lack scientific rigor. Changes in the functioning of institutions (such as making them more representative or more amenable to the use of scientific evidence) are found in less than a fifth of the projects. New institutions are part of the remaining projects, such as to advance public-private exchanges or to systematize gender parity in implementation. In the projects reviewed there seems to be a lack of awareness of the critical need for institutional flexibility and responsiveness in the face of change. The changes could as well be from the human/social side of issues – on the economic and political front, for example. NCS solutions should not take as their design norm current social, environmental and economic conditions. Since future conditions are unknowable, institutions involved in the project should have a built-in system of periodic checks and independent Delphi simulations, for example, so as to be alert to potential changing conditions and impacts. In our survey of publicly available documents, it has not been possible to determine if institutional processes are designed to do so, and further if they have the flexibility to respond in ways to continue advancing the project goals.

F. Managing tradeoffs

A majority of the projects document a mix of benefits, a combination of issues including jobs, finance, wildlife conservation, ecosystem services, biomass, carbon stock and reduced disaster risks. A small number (less than 2%) are cognizant of aesthetic gains. The issue is quite different when the documents are perused for apparent 'losses' due to the project. The vast majority do not ascribe any. The framing is seemingly one of 'win-win' – in line with the literature that cheerleads climate action (World Bank 2021 and 2022, WRI nd, EESI 2021). But that's a troublesome framing for efforts that are fundamentally altering economic relations or initiating large scale environmental change, for example. Project resulting in a 'loss' is noted in less than 10% of the efforts. They include 'loss of traditional livelihoods', 'livestock proofing to exclude grazing', 'preventing timber harvesting', 'preventing change of land use to agriculture as in neighboring properties', 'reduction of harvest cycles and loss of forests previously available for logging', 'loss of plantations', etc. However, the awareness of 'loss' does not always lead to a response in the project.

It is not that the losses are to be avoided. Rather, their recognition should be followed up by the question, "*How will losses impact ability of institutions to deliver on the project outcomes?*" If the project design does not recognize the occurrence of a tradeoff, there is no possibility of mitigating likely impacts. The 'loss of traditional livelihoods' needs to be probed for likely impacts on jobs, well-being, community structure and social impacts. Livelihoods are more than just jobs. They give people a sense of belonging, of being part of a larger community. Too often, NCS project designers forget the other attributes of livelihoods, and are content in equating 'livelihood' to 'a job', thereby failing to ask important questions: Who is losing jobs? What alternate jobs are available on site? Are new skills required? What are the effective ways of imparting new skills? Will the job loss impact a vital aspect of social belonging that the project is depending upon (such as patrolling the site to prevent illegal felling, sand mining, or non-timber forest produce extraction)? Project with a design of 'livestock proofing to exclude grazing' should be mindful of likely response from those excluded. How and where will grazing be displaced to, with what impacts? If the former grazers are expected to pay for biomass, how likely are they to do so? Do they have the financial capacity? What would happen if a financial shock impacts their ability to pay? In what ways can illegal grazing be contained such that the project continues to deliver on its intended outcomes? What happens in situations of failing states whereby criminal gangs govern large tracts of the project site? In projects that actively seek to preventing change of land use, what could be likely impacts? Would families leave the area, resulting in higher labor costs for the project? How likely will encroachments be? How to prevent them? What forms of social awareness campaigns need to be undertaken? Recognizing trade-offs resulting from project considerations is a critical first step in ensuring long term sustainability of NCS projects.

Section 4: Illuminating NCS efforts[4]:

A. Project in Chinatu ejido, Mexico[5]

The CONAFOR-GEF-UNDP Project "Biodiversity in Production Forests and Certified Markets" is located in the forest basin in the state of Chihuahua. The effort is for better forestry management

[4] Descriptions of the efforts in quotes are from the project documents that are referenced. Absence of proper referencing, if any, are entirely inadvertent and regretted.
[5] Quotes are translated from the original in Spanish.

for the conservation of biodiversity in 50,185 hectares, by the *raramuri* communities. The *raramuri* are expected to advance sustainable production because they "safeguard the equilibrium of biodiversity by creating real functional units that protect natural services. They do this because of their protection of natural capital, the time they dedicate to the development of their culture and the respect of their traditions." (Equator Initiative 2017) The role of both government institutions (SEMARNAT, PROFEPA, CONAFOR, CONANP) and non-governmental organizations is to obtain technological and financial support for applying conservation practices for endangered species and environmental services. As a result of the project, the Chinatu *ejido* was the first *ejido* to obtain certification of the National Strategy for Sustainable Forest Management to Increase Production and Productivity (ENAIPROS). Learning from the CONAFOR-GEF-UNDP project is being applied to 1,200 forest properties across Mexico in order to incorporate biodiversity conservation criteria.

The project is revealing in consigning the raramuri, an indigenous people, as guardians of nature who are inherently imbued with sustainability ideals. How the participation of the raramuri people in local and regional markets (for selling their labor and natural resources and for securing household goods), interacting with state institutions (in development programs and security apparatus) and with CSOs and NGOs, as well as with other communities impacts their perception of their relation to nature as well as the nature of forestry management practices are ignored. Instead, the raramuri are cast in ontological isolation, considered as existing in an ahistorical time, and with no subjective agency. They are portrayed as being unconnected to larger social and economic forces in the state of Chihuahua and across Mexico, without aspiration for 'progress.'

Further, the application of state plans for scaling up in 1200 forestry sites across Mexico, would require paying close attention to the contextual specificities of economic and social relations with nature. The expectation, however, seems to be that cultural, economic and social particularities of the communities and the variability of the lived situation and ecosystem functions matter less than the state drawn plans on conservation and protection. If that is indeed the case, biodiversity conservation and carbon capture in these efforts are likely to be modest, if not minimal.

B. Creation of a buffer zone in the Kahuzi-Biega National Park, DRC

A major tree planting effort was initiated in 1992 by the Pole Pole Foundation (POPOF), a non-profit organization (Equator Initiative 2017b). According to the publicly available material, "The organisation grows saplings in tree nurseries and then distributes them among community members, with support provided to plant and look after the trees as they grow. Once the trees reach maturity, some of them are harvested to provide sustainable sources of charcoal and building materials, and new saplings are distributed to replace trees that have been cut down." (*Ibid*) The aim is to prevent deforestation for charcoal production, since "80% of the population in the DRC depend on charcoal as a source of fuel. This leads to significant deforestation around population centres such as Bukavu, and the charcoal trade provides a revenue stream for a number of rebel groups in the country. Finding a sustainable, peaceful way to provide the charcoal – and other timber products that people use – is vital not only for conservation but to help establish peace in the region." "The trees also help to improve soil stability and fertility, and the fight against climate change by absorbing carbon emissions as they grow, and protecting the existing carbon sinks in the Kahuzi-Biega National Park by preventing deforestation." (*Ibid*)

Further, the project material notes that "programme could very easily be expanded to a national scale – it uses simple inputs to grow and distribute the saplings in a very cost-effective way. The project has also created an opportunity to gain revenue from Carbon Offset programmes. Two pilot projects are currently being developed, working with UK-based holiday letting agents to offset the annual emissions from their properties by supporting POPOF, as well as a project at King's College London to offset aeroplane travel by staff at the university by funding POPOF projects. (…) This offers a new approach to mobilising revenue to fight climate change – putting 'a face on a tonne of carbon' to create emotional, positive stories of how carbon offset the lives of people and wildlife." (*Ibid*)

The project considers trees as carbon stock, and to be a revenue stream. The method of assessing the net carbon (between trees harvested for charcoal, emissions from the use of the charcoal and trees left unharvested (if any) on the ground) is not explained. Attracted by potential funding from climate neutrality projects, it is one of scores of efforts around the world to tack on 'carbon capture' considerations to projects designed for forestry production, irrespective of local

stakeholder interests. In this case, while seemingly laudable in ensuring supply of cooking fuel to the poor, it is at the same time questionable, in attempting to ensure that the population continues its dependency on charcoal. The impact of using charcoal as fuel on women's morbidity is well known, and should not be acceptable as a long-term proposition. Charcoal should be seen as a transitional fuel, rather than being considered for scaling up, thereby condemning the population to 19th century technology along with its attendant social and health costs. A fuller stakeholder consultation, including the aspirations of local communities, may have alerted the project initiators to this dilemma.

C. Community-based reforestation project, India

"Wastelands in India are a significant resource" notes the report, "on which many rural people depend for food, fodder, and fuel wood." (Verra *nd*) "Indian Farm Forestry Co-operative Limited has implemented the project in the districts of Allahabad, Sultanpur, Pratapgarh, Unnao and Lucknow of Uttar Pradesh from July 15, 2008 covering an area of about 222 hectares. The project has assisted farmers, especially women, to promote plantation on wastelands and marginally productive lands by organizing primary farm forestry cooperatives and thus making it a people's participative program. The project activities will help in improving soil and water conservation and bringing about ecological balance, and to generate consistent employment for the rural poor and thus help them in their socio-economic development." (*Ibid*) The project is also listed in the International Database on REDD+ projects and programs: Linking Economics, Carbon and Community (ID-RECCO) hosted by CIFOR. The estimate annual emission reduction per Verra is 5651 carbon credits, however with the current status indicating 'project withdrawn.'

The project listed in Verra appears to be part of a larger effort by the Indian Farm Forestry Development Cooperative Limited (IFFDC), initiated in 1993. "[W]ith the objective to conserve environment and mitigate climate changes through sustainable natural resource management for enhancing socio- economic status of rural poor, tribal community and women in particular." Around 30,000 hectares of wasteland have been developed the states of in Uttar Pradesh, Madhya Pradesh, Rajasthan and Uttarakhand. "These forests are catering to needs of Community and sequestrating about 1.41 lakh ton [141,000 ton] atmospheric carbon annually, helping in mitigating the climate change." (Verra nd) The forests are managed by 152 village level Primary Farm

Forestry Cooperative Societies having close to 20,000 members, of whom "about 38 per cent are landless, 51 per cent are small/marginal farmers. Women constitute 32 percent of total membership." (*Ibid*) IFFDC is the lead organization providing technology, financial and managerial inputs. The project's economic returns to farmers have since been widened beyond the sale of timber, grasses and Minor Forest Produce to include trading of carbon credits generated through afforestation. "It has started the process for trading the carbon credit achieved from the plantation developed by PFFCS under Wasteland development projects in 3 States since 1995. IFFDC is planning to extend its arms to provide carbon trading services to small scale producers under its umbrella service mechanism with collaboration of the consulting firms." The project document notes "29,420 ha wasteland is converted into multipurpose forests having 480 trees/ha, net carbon stock of 176 million tones (*sic*)…" (Verra nd)

The work of the Indian Farm Forestry Development Cooperative Limited on eco-restoration and wasteland development through farm forestry is outstanding. The recipient of several awards for social impacts, improving livelihoods and for environmental contributions, it is a fine example of a natural resource management project. However, extending into carbon sequestration efforts without a retooling of the basic approach could be a mistake.

Several aspects with regard to carbon credit are unclear, despite the many years the project has been in progress. The methodology for calculating the carbon stock is not explicit, other than possibly an average number of trees per hectare calculation. How the net carbon sequestered is also not clear (net being the difference between trees left on site from those planted) given that the primary economic benefit of the project is from sale of timber and biomass. The institutional aspects of maintaining net carbon stock on the site, year after year for decades long is immensely challenging and has not been described in the reports, suggesting that such considerations may not have weighed heavy in project design. It is also not clear how many of the theoretically derived carbon credits have actually been realized.

D. Mangrove Rehabilitation, Indonesia

To stem the ecological and livelihood impacts of mangrove conversion into fish ponds and firewood collection for domestic use by local villagers, *Kelompok Sadar Lingkungan (KSL)*

Paddakauang, a CSO, undertook mangrove rehabilitation activities in Torosiaje Jaya village in North Sulawesi in 2009 (Mangroves for the Future, nd) . 20 villagers, of the local Bajo indigenous community, were instructed by the CSO to plant mangrove in ten hectares in the intertidal zone. They were also provided with financing to take up reef fish culture (for fish cage, nets and fish seeds). The CSO was awarded mangrove seedling certification due to their high survival rate (over 85%), raising the prospect of replication in other areas. The project has been lauded as an effective community-based effort to reduce climate change disaster risks while at the same time generating livelihood income for the villagers. "The positive response from stakeholders and possibility of funding from government projects indicate the strong potential for replicating activities in other areas." (Equator Initiative 2017c)

Neither mangrove rehabilitation nor reef fish culture seems to have been part of the indigenous knowledge system of the villagers. The technique was brought from the outside by the CSO, opening up the possibility of similar efforts being carried out in other areas requiring rehabilitation of degraded mangroves. However, three issues need further consideration and would provide important data for planned replication elsewhere: (a) Data on livelihood income and its variability (as a function of local market prices) and the effectiveness of the planted mangroves in reducing disaster risk (given the importance of contextual geographic factors); (b) Ecological specificity of success (relation to intertidal zone and exposure to brackish water); and (c) Role played by the CSO and the local government in the project effort.

While laudable in its setting, the effort is an example that is all too often seen in the literature, of pushing local climate solutions for large-scale replication. A micro boutique project (20 people and 10ha in this case), unique in its social-environmental-carbon dynamics makes scaling up across Indonesia a challenging proposition. Rather than the traditional approach in development of scaling by replication, such NCS efforts call for a different approach – that focus on how local challenges were identified and overcome, the nature of institutional relationships between local communities, CSO and local/provincial administrations that made the effort a success, how knowledge and technologies that suited local ecological and livelihood issues were transposed from the outside.

E. PSA Peugeot Citroën's carbon sink in the Amazon, Brazil

In cooperation with France's Office National des Forêts, the project's goals are to reforest degraded land thereby improving carbon sequestration and restoration of biodiversity in the state of Mato Grosso in Brazil (FAO 2015). Public information on the project is scarce. More than 2 million trees of around 50 species are reported to have been reintroduced over 2,000 ha. An estimated 53,000 tonnes of CO2 have been purportedly sequestered in the first ten years of the project. The key project promoter, PSA Peugeot Citroen, is noted to have initiated carbon trading of the carbon credits produced in the project. The authors are approving of the effort as an example of 'green philanthropy.' (*Ibid*)

PSA Peugeot Citroën's Carbon Sink project is a striking example of large (manufacturing) companies advancing their green credentials while offsetting their carbon emission in projects that are decoupled from their core business. The institutional structure of the project is unclear, with limited project material in the public domain. The tradeoffs, if considered, vis a vis local government and communities in the Mato Grosso region are unknown. From a company and investor perspectives, the project is viewed as a 'win-win' – being able to burnish green credentials of advancing the global climate agenda, while also helping drive down (in accounting terms) their carbon emission. Increasingly, however, such efforts have been besieged by contentious negotiations over 'ownership' of carbon credit (do they belong to the company or the country?). The companies run the risk of efforts being labelled as 'green washing' if the projects are seen as being substitutes for the actual lowering of carbon emissions within their operations and products/services. Sited in distant and often unfamiliar locations, in the absence of clear stakeholder involvement, the companies run the risk of being viewed as advancing their interest at the expense of those of the local communities.

F. To reduce greenhouse gas emissions in five departments, Republic of Congo

"[D]espite a relatively low historical deforestation rate estimated at 0.05% (2000–2012), Congo's forests are now subject to increasing anthropic pressure to overcome the agricultural production deficit and meet the energy needs of its increasing local population. Slash-and-burn farming for agricultural expansion and fuelwood collection are the main interlinked, direct drivers of deforestation and forest degradation in Congo (Congo's REDD+ Strategy, 2017)." (GCF 2021) In

the project location, in the southern part of the country, "the large majority of the rural population practices subsistence farming as their principal economic activity, and more than 80% of the Congolese population depends on fuelwood as their main source of energy for cooking." (*Ibid*) The project consists securing land access for small producers, establishing fast-growing plantations (to produce coal) and agro-forestry to diversify farmers portfolio and helping farmers access to micro-finance. The project is expected to "directly contribute to reducing carbon emissions by 0.84 million tonnes of CO2 equivalent (tCO2 eq) per year, … or 16.77 million tonnes of CO2 eq over the 20-year project lifespan. … adaptation co-benefits [include] … increasing the adaptive capacity of approximately 41,373 direct beneficiaries (35% women) and 870,649 indirect beneficiaries (35% women) from the most vulnerable segment of Congolese society (i.e. small farmers including women, young people and indigenous populations)" (*Ibid*).

Of interest to our review, the project is well-designed, paying attention to structures of the state across administrative levels, articulating plausible linages to the private sector and involving local people in project design. However, two issues stand out: One, concerns socio-economic changes likely over the course of the project (the next 20 years). Assuming that coal would remain the dominant fuel for cooking is questionable. Across the world, increasing incomes leads to changes in household fuel consumption, especially in urban areas, to cleaner fuels such as gas or electricity (Our World in Data, nd). If a similar change occurs in the Congo in the coming decade, it throws into doubt the financial viability of tree-growing by small farmers. Two, the project considers beneficiaries as an undifferentiated amorphous mass, lacking social or ethnic differentiation. Further, representing the interests of beneficiaries seems to be the prerogative of state institutions (given the absence of local social institutions in the project document). In most developing societies, upward mobility is often seen as occurring through channels of informal affiliation - kinship, community, ethnicity, and tribe and far less because of citizenship. Hence consideration of social articulation along those lines is a critical need for the social sustainability over the long-time horizon of the project.

G. National Mission for Green India, India

The Green India Mission (GIM) is one of the eight missions launched under the National Action Plan on Climate Change (Ministry of Environment, Forest and Climate Change, GOI 2022).

Launched in 2014 for a period of 10 years, with an outlay of around USD 10 billion, it aims to protect, restore and enhance India's forest cover, and involves both climate change adaptation and mitigation measures. "The objective of the mission is to increase green cover to the extent of 5 million hectares (mha) and improve quality of existing green cover on another 5 mha, improve eco-system services like carbon sequestration, hydrological services and biodiversity and provisioning services like fuel, fodder, and timber and non-timber forest produces (NTFPs). It also has to increase forest-based livelihood income for about 3 million households." (Kukreti 2019) A key objective is to enhance annual Carbon sequestration by 50 to 60 million tonnes in the year 2020. Project activities are across 15 states, encompassing diverse ecosystems and social-environmental biomes.

Lacking a central repository, project information is scarce on the implementation efforts being undertaken a cross the 15 states. The project is a top-down effort, flowing from the central government to the state governments, and on to the district and village-level agencies. The language of the Mission Report makes clear the primary directive of the effort - to enhance tree growth for their carbon stock. It is not clear how local communities have participated in designing benefit flows. The role of local governments in managing tradeoffs is also not well articulated. State level agencies are expected lead implementation of the project. In the absence of fuller social participation, the project runs the risk of yielding plantations and not forests.

H. Women-led Climate resilient farming, India

The project of the Swayam Shikshan Prayog (SSP), an NGO, seeks to reposition "women as farmers and bearers of the knowledge, enabling them to take informed decisions related to what to grow, what to consume and how much to sell and where and promotes food, nutrition, income and water security." (SSP *nd*) The project aims to "to empower and recognize rural women as farmers and change makers to promote food secure agriculture model." (Equator Initiative 2017d) In contrast to mainstream agriculture projects of governments that focus on a single crop, the SSP framework is mindful of the need to diversify income portfolio of small farmers. This approach is even more critical in the mainly semi-arid and drought prone region of India, where the vast majority of farmers are limited to rainfed farming. "There is a great focus on managing water

resources through recharging, construction of farm ponds, de-silting of canals and building farm bunds and trenches, use of water efficient irrigation techniques such as drip irrigation and use of sprinklers. Also, the initiatives focus on promoting organic and low input farming method such as use of own seeds, vermi compost, bio compost etc to restore the soil fertility, protected trees, water resources and the environment in the face of multiple years of drought." (*Ibid*)

The SSP solution promotes sustainable farming techniques, increasing livestock and allied businesses, increasing consumption and marketing of nutritious locally grown foods and water management techniques. The efforts are now being implemented in 160 villages of drought-prone districts in the state of Maharashtra, India, with the participation of around 20,000 women. There are several noteworthy features including addressing reducing crop failures due to multi-cropping, lowering the cost of cultivation, enhancing income security by sale of surplus food, and improving quality of crops due to organic inputs.

Several features of the project, noted above, makes the effort laudable, from a gender, leadership, and diversified income portfolio points of view. However, a climate-risk management point of view should give pause. The institutions potentially overlook the impact of heightened climate variability. By building social and economic buffers to climate shocks (such as droughts) in the short term, the system may actually heighten the risk to the larger climate variations that are expected due to impacts of climate change on Indian summer monsoon system. Hand in hand with building resilience to shorter term variations, the project should seek to expand the livelihood linkages across a larger geographic area. The expansion goals should be to encompass a diversity of landscapes, socio-ecosystems and their stakeholders to leverage asynchronous climate impacts.

Another feature that requires reflection is the partnership role of provincial and national governments. They should progressively help to diversify the regional economy, to enable a substantial shift away from a dependency on a single sector such as agriculture, fisheries or forestry. Projects that are based on 'people's power' are, however, often disdainful of 'state help.' Their framing, often encouraged by their funders, is to be in opposition to the bureaucracy. Such an ideology-based stance misses the enormous potential of scale-appropriate interventions that can come about working with responsive and responsible governments.

Section 5: Coda

The overarching nature of the review, the public nature of information base, and the diversity of projects and of institutions investigated precludes a magisterial Conclusion. We present an end piece, in the spirit of inquiry that animated the review in the first place – for a draft of ideas that inform as well as provoke, provide answers as well as lead to more questions, and through a process of exchange, help construct a raft to host better a new generation of NCS efforts.

Institutions are the very sinews that make possible NCS solutions. Hence, institutional design is critically important to meeting NCS goals. Relations within stakeholders and responses to social and environmental changes, for example, are key to their continued work, whether of increasing carbon stock or reducing vulnerability to climate risks. Unfortunately, institutions are an afterthought in many NCS efforts, with the assemblage of functions parceled out to various entities that are already burdened by their own work.

The diversity of institutions involved in NCS is a core strength, to which the mantra of 'efficiency' should take a back seat. Diversity should not be only in 'form', but contribute to the core strength in the workings of NCS. That is especially important in situations where CSOs, NGOs and even local institutions of the state have internalized a sense of being 'less powerful' (if not 'powerless) in interactions with national and international stakeholders. The inability to 'speak truth to power' undermines the capacity of institutions to deliver on NCS.

Institutions representing diverse stakeholders creates a challenge in aligning interests. Far too often, in state-dominated NCS projects it is the 'national interest' (carbon sequestration, for example) that dominates, with the other interests being considered secondary. The insufficiencies in advancing local social and environmental objectives in REDD+ efforts should serve as a warning to NCS projects. Rather than gloss over the interest bias (a common enough response), it is critical to acknowledge it. Mapping trade-offs between stakeholder interests, using participatory methods, is important as well. Rather than being a one-off exercise, regular stakeholder consultations on the progress of tradeoffs should become an integral process in all NCS efforts.

National governments, and in some cases, large companies, are now the habitual initiators of NCS. They need to be uber careful in the manner of interactions with other stakeholders, CSOs, NGOs and the like. A 'benefactor-beneficiary' framing has a lasting impact, to the detriment of the NCS goals. A similar divide can be observed in the interactions of local stakeholders with international organizations, notwithstanding their earnest efforts.

The diversity of institutions engaged in NCS efforts is a positive sign. However, beyond their form, what matters is determined by their every-day practice. The twinning of the legal with the informal, and the written with the traditional, determines the success of an NCS effort. Hence every effort should be made to understand what institutions are in their context, what they stand for, what's expected of them in their locale, and thereby craft ways of functioning to converge and advance the goals of NCS.

Beyond the success of individual projects, NCS collectively are a critical public good. Their value to society will only increase as actions falter on other climate promises. Hence it is critical that data on NCS rich in their provinciality are available and verifiable, and not stored behind the firewalls of sovereign-conscious or property right conscious entities.

The win-win framing of NCS projects needs to be critically reviewed, in order to gauge likely no-win or lose eventualities for some interests/stakeholders. Such a deliberate and systematic examination is critical to help anticipate reactions from those not benefiting, which could undermine institutional functioning and threaten project benefits in the medium and long terms.

The need for NCS institutions to deliver continuously over decades makes them vulnerable to a project design that takes current environmental, social and economic conditions to be the 'norm'. Similar to the use of 'uncertainties' in climate information, institutions need to consider other conditions as probabilities, and develop a systematic 'risk management' approach.

The diversity of stakeholders and their functions point to a need to systematize capacity building beyond routine issues taken up in trainings, to include help to anticipate changes in the environmental, social and economic fronts. The issue is even more critical in large swaths of the

tropics where all that is material is 'mined' with the future discounted at a very high rate, and where distant price signals (for rare earth, rosewood, beef, palm oil, for example) lead to large scale changes in stakeholder behavior.

An expectation of normalcy pervades the governance arrangement of NCS. That is futile. In large parts of the world, where governance increasingly is transactional, and illicit interests dominate with casual violence, it is downright dangerous.

NCSs are as much to advance climate mitigation and adaptation and conserve biodiversity as to advance development goals. They are a powerful vehicle for sustainable development, if done right. Myopic views of NCS often trap them in the climate action silos of countries and companies. Policy makers need to understand the power of NCS, to deliver on economic development while enhancing social equity and environmental sustainability.

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Annex I Projects' Key Information

#	Project Name	Location	Natural Resource	Year initiated	Extent / Cost
1	Involving Local Community in Mangrove Nursery	Sundarban, Bangladesh	Mangroves	2003	12 ha
2	Afforestation with Mangrove Plants	Chittagong, Bangladesh	Mangroves	/	100 -1000 ha
3	Coastal Community Resilience	Torosiaje, Indonesia	Mangroves	2009	10 ha
4	Building with Nature	Northern Java, Indonesia	Mangroves	2015	/
5	Ecological Mangrove Rehabilitation	Tiwoho, Indonesia	Mangroves	2004	400,000 mangrove trees planted
6	Green Coast Project	Aceh, Indonesia	Mangroves	2005	1,000 ha
7	Eden Reforestation Project Indonesia	West Papua, Indonesia	Mangroves	2017	30 million trees planted
8	Integrated Management of Mangrove, Wetlands and Coastal Forests Ecosystems	Congo	Mangroves	2012	USD 3404200
9	Sian Ka'an World Heritage Site and Biosphere Reserve	Yucatan, Mexico	Mangroves	/	Protected area covers 528,148 ha
10	Wetland Rehabilitation	Mpumalanga, South Africa	Wetlands	2010	25 ha
11	Winton Wetland Project	Murray–Darling Basin, Australia	Wetlands	2010	8,750 ha
12	Wetland Conservation Programme	China	Wetlands	2002	Goal to restore 1.4 billion ha of wetlands
13	Adaptive Management of the Camargue Saltmarshes	Camargue, France	Wetlands	2012	6527 ha
14	Alligator River Avoided Conversion	Hyde County, North Carolina, US	Wetlands	2010	1,113 ha
15	Building Coastal Resilience through Nature-Based Solutions	Bangladesh, India and Indonesia	Coastal	2020	USD 1.99 million
16	Creating Green Shelter-Belt	Chittagong, Bangladesh	Coastal	/	10-100 ha
17	LIFE Ad'Apto	Various sites, France	Coastal	2017	USD 6.3 million
18	Medmerry Coastal Realignment	West Sussex, UK	Coastal	2009	184 ha
19	GulfCorps	Gulf of Mexico, US	Coastal	/	/
20	Participatory Plant Breeding and Community Agriculture	Southwest China	Agriculture	2000	
21	Yellow River Ecological Corridor	Yellow River basin, China	Agriculture	2020	USD 800,000
22	Programme Agr'eau	Various sites, France	Agriculture	2012	

23	Women led Climate Resilient Farming	Maharashtra, India	Agriculture	1998	160 villages, 20000 women farmers
24	Climate Resilient Zero Budget Natural Farming	Andhra Pradesh, India	Agriculture	2018	Six million farmers
25	Nature-based Solutions for Catalyzing a More Resilient U.S. Food System	Upper Mississippi River Basin, US	Agriculture	/	60,703 ha
26	Araku Coffee	Andhra Pradesh, India	Agroforestry	1999	100,000 tribal people
27	Mampu	Plateaux Batéké, DRC	Agroforestry	2004	8 000 ha
28	Community Agroforestry	Bas Congo + Bateke/Kinshasa, DRC	Agroforestry	2012	3,500 ha
29	Shelterbelts for Farmland in Sandy Areas	Inner Mongolia AR, China	Agroforestry	-	50,000 ha
30	Wasteland Development: Ecological Balance / Sustainable Livelihood	India	Agroforestry	1993	29,420 ha
31	Sierra Madre Coffee Cooperatives	Chiapas, Mexico	Agroforestry	/	/
32	Gandhivan Wasteland Development	Todaladi, India	Agroforestry	1984	5000 ha
33	Transforming Degraded Community Lands into Sustainable Jobs, Incomes and Carbon Sinks	Michoacan, Mexico	Agroforestry	2020	USD 8.7 million
34	Million Tree Challenge	Ontario, Canada	Urban Greening	2011	487,195 trees planted
35	Low-Carbon Climate-Resilient Healthy City	Yanji, China	Urban Greening	2019	USD 130 million
36	Sponge City Initiative	Various cities, China	Urban Greening	2015	30 cities
37	CityAdapt: Building Climate Resilience of Urban Systems	Xalapa, Mexico	Urban Greening	2016	5.6 kms corridor
38	Ecosystem-based Adaptation in Drought-prone Area	Barind Tract and Haor Area, Bangladesh	Ecosystem	2016	1.3 million ha
39	Climate Resilient Livelihood Improvement	Chittagong Hills, Bangladesh	Ecosystem	/	USD 100 million
40	Strengthening Flood Risk Management	Various	Ecosystem	2018	USD 3.1 million
41	Disability Inclusive, Flood Resilient Cluster Village Project	Horipur Union, Sundargonj, Gaibandha District, Bangladesh	Ecosystem	2016	/
42	Floresta+ Program	Brazil	Ecosystem	2020	Goal: Across all biomes 560.1 million ha
43	Recovery and Protection of Climate and Biodiversity Services	Atlantic Forest corridor, Brazil	Ecosystem	2014	90800 ha
44	Rocky Desertification Control	China	Ecosystem	2008	/
45	Urban-Rural Eco Development	Qinghai, China	Ecosystem	2016	USD 150 million
46	Sand Dunes Shelterbelt Forests	Inner Mongolia AR, China	Ecosystem	2020	138,000 ha

47	Greening Red Earth	India	Ecosystem	1996	85 000 ha, 5 million families out of poverty
48	Banni Grassland Restoration	Kutch, India	Ecosystem	/	Several plots, 0.5-2 ha
49	Restoration Initiative	South Kivu, DRC	Ecosystem	2018	35,000 ha
50	Groundwater Recharge	Parasai-Sindh watershed, India	Ecosystem	2012	1246 ha and 3000 people
51	Disaster Risk and Environment Improvement	Pingjiang County, China	Ecosystem	2020	USD 221 million
52	Blue and Green Infrastructure	Leśna Municipality, Poland	Ecosystem	2021	USD861,000
53	Integrated Infrastructure Development	Jiangxi, China	Ecosystem	2015	USD 150 million
54	Integrated Ecological Protection and Environmental Improvement	Xichuan, China	Ecosystem	2021	USD 200 million
55	Protecting and Investing in Natural Capital	Various in Asia and Pacific	Ecosystem	2017	USD 4.9 million
56	Climate Resilient Livestock Production on Communal Lands	Kamiesberg, South Africa	Ecosystem	2011	25,000 ha
57	Creative Financing Strategies to Support Forest & Land Restoration	West Australia, Australia	Ecosystem	/	/
58	Food Security and Climate Resilience in Village Commons	Khagrachari Hills, Bangladesh	Forests	1997	/
59	Assisted Natural Regeneration, Medakacchapia	Chittagong, Bangladesh	Forests	2014	100-1000 ha
60	Espírito Santo's Reflorestar	Espírito Santo, Brazil	Forests	2008	Annually 80 000 ha by 2018
61	Carbon Sink in the Amazon	Mato Grosso, Brazil	Forests	1998	2 000 ha
62	Green Municipality	Pará, Brazil	Forests	2011	82,000 people in 102 municipalities
63	Conservation, Restoration and Sustainable Management	Caatinga, Pampa and Pantanal, Brazil	Forests	2018	USD 32.6 million
64	CC Mitigation with Community-based Forest Management	Amapá, Brazil	Forests	2013	5 rural settlements
65	Acre Sustainable Development	Acre, Brazil	Forests	2013	72,759 ha
66	REDD + Avoided Deforestation	Amapá, Brazil	Forests	2014	513,000 ha
67	Agrocortex REDD + Avoided Deforestation	Acre and Amazonas, Brazil	Forests	2014	186,219 ha
68	REDD+ Avoided Deforestation	Rondonia, Brazil	Forests	2013	74,038 ha
69	Ecomapuá Amazon REDD+ Avoided Deforestation	Pará, Brazil	Forests	2001	86, 270 ha
70	Fazenda Sao Nicolao Reforestation Project	Mato Grosso, Brazil	Forests	1999	1,900 ha

71	Atlantic Forest Restoration Pact	Various	Forests	2009	Goal: Restoring 15 million ha by 2050
72	Sustainable Cattle Ranching in the Amazon	Amazonia, Brazil	Forests	2015	million tonnes of CO2 avoided
73	Conservation of Boreal Forests	Various states of Canada	Forests	2012	55,943 ha protected
74	Darkwoods Forest Carbon	Darkwoods Conservation Area, Canada	Forests	2008	63,000 ha
75	Great Bear Forest Carbon	British Columbia, Canada	Forests	2009	5 million ha
76	Three-North Shelterbelt Development	13 provinces of China	Forests	1978	407 million ha
77	Shelterbelt Development Programmes	Various river basins, China	Forests		
78	National Tree Planting	China	Forests	1981	Goal 78 billion trees
79	Grain-for-Green	China	Forests	1991	Goal of 14.67 million ha
80	Sandstorm Source Control	Beijing-Tainjin Region, China	Forests	2001	46 million ha
81	Carbon Sequestration Afforestation in Arid Region	Inner Mongolia Autonomous Region, China	Forests	2008	35 000 ha
82	Afforestation and Bio-Energy Development	Jiangxi Province, China	Forests	2008	39,000 ha
83	Restoration Initiative	City (Bijie) and two counties (Fengning and Xinfeng), China	Forests	2019	Target of 208,919 ha
84	La Dynamique des Groupes des Peuples Autochtones	DRC	Forests	2005	60,000,000 ha of forest concessions stopped
85	Tree-Planting in Kahuzi-Biega	Kahuzi-Biega National Park, DRC	Forests	1992	Over 4 million trees
86	Securisation of Forest Peoples' Rights and Forest Preservation	North Kivu, DRC	Forests	2003	/
87	Conversion of Cropland to Forests	China	Forests	1999	Goal of 32 million ha
88	Indigenous and Community Conservation	S.Tusom, Manipur, village	Forests	2001	500 ha
89	Combating Climate Change through Social Forestry	Bihar, India	Forests	2007	/
90	WeForest	Meghalaya, India	Forests	2014	1500 ha
91	National Mission for a Green India	India	Forests	2015	Goal: 10 million ha and 3 million households
92	Joint Forest Management in Old Jalukie	Nagaland, India	Ecosystem	2012	reserve & 291 ha afforested
93	Rainforest Restoration	Valparai, Tamil Nadu, India	Forests	2001	1075 ha
94	Restoration Programme	Various	Forests	/	1,002,446 ha

95	Plantations, Tree Regeneration and Fodder Nurseries	Uttarakhand, India	Forests	/	10 ha
96	Conservation Partnership Program	Gunung Leuser National Park, Indonesia	Forests	2008	2,000 ha
97	Forest & Landscape Restoration	Sebangau National Park, Indonesia	Forests	2007	100 000 jelutung seedlings
98	Social Forestry Programme	Indonesia	Forests	2014	12.7 million ha
99	Berau Forest Carbon	East Kalimantan, Indonesia	Forests	2009	20+ villages
100	East Kalimantan Jurisdictional Emission Reductions Program	East Kalimantan, Indonesia	Forests	2020	12.7 million ha
101	One Billion Indonesian Trees for The World	Indonesia	Forests	2011	79 million trees
102	Community-Focused Investments to Address Deforestation and Forest Degradation	West Kalimantan, Indonesia	Forests	2014	USD 500,000
103	Sustainable Forest and Biodiversity Management	Kapuas Hulu, West Kalimantan Province, and Malinau, North Kalimantan Province, Indonesia	Forests	2013-18	USD 4.48 million
104	Forest Rehabilitation Project – Private Forest (Hutan Rakyat)	Gunungkidul, Yogyakarta, Indonesia	Forests	/	/
105	Biodiversity Conservation in Productive Forests of the Community Forestry Companies	Chinatu, Mexico	Forests	2012	50,185 ha
106	Voluntary Conservation Areas	Chinantla, Mexico	Forests	2010	3,691 ha
107	ATREDD+ Lacandon Jungle of Chiapas	Chiapas, Mexico	Forests	2010-2015	1,063.105 ha
108	Mexico REDD+ Alliance in Puuc	Puuc region, Yucatan, Mexico	Forests	2011	/
109	Conservation, Reforestation and Community Development	Sierra de Ahuisculco, Mexico	Forests	2016	USD 187,500
110	Ejido Forestal Los Bancos	Los Bancos, Pueblo Nuevo, Durango, Mexico	Forests	2018	3,024 ha
111	Ejido San Jerónimo Zacapex	San Jerónimo Zacapexco, Villa del Carbón, Mexico	Forests	2018	3,182 ha
112	Sierra Madre Alliance	Sierra Madre, Chiapas, Mexico	Forests	-	-
113	Poland Forestry and Environment	Poland	Forests	2011	USD 5600 million
114	Reducing Greenhouse Gas Emissions from Forests	Rural areas in the departments of Plateaux, Pool, Bouenza, Niari and Kouilou, Republic of the Congo	Forests	2021	USD 46.6 million
115	Kootznoowoo Improved Forest Management	Alaska, US	Forests	2018	8,035 ha

116	McCloud River Improved Forest Management	California, US	Forests	2009	3,723 ha
117	Pocosin Lakes Forest Project	Tyrrell County, North Carolina, US	Forests	2003	546 ha
118	Rips Redwoods Improved Forest Management	California, US	Forests	2003	576 ha
119	Yuba Project on Fire Risk	California, US	Forests	2019	5886 ha
120	Congo Basin Sustainable Landscapes Impact Program	The Congo Basin	Forests	2019	USD 57201127
121	Ecosystem Restoration in Sumatra	Riau, Sumatra, Indonesia	Peat forests	2013	150,693 ha
122	Peatland Restoration Project	Central Kalimantan, Indonesia	Peat forests	2004	300,000 ha
123	Sumatra Merang Peatland Indonesia Restoration Project	Sumatra, Indonesia	Peat forests	2016	22,934 ha
124	REDD+ Kalimantan Forests and Climate Partnership	Kapuas district, Indonesia	Peat forests	2009-2014	120000 ha
125	Community - Based Conservation of Peatlands Ecosystems and Promotion of Ecotourism in Lac Télé	Lac Tele, Republic of the Congo	Peat forests	2021	USD 48554670
126	Flows to the Future	Scotland, UK	Peat forests	2014	1813 ha
127	Pen y Cymoedd Wind Farm Habitat Management Plan	South Wales, UK	Peat forests	2021	1500 ha

Annex II Frequency of Partnerships	
Types of Partnerships	**Frequency (%)**
National government + International organizations	17.0%
CSOs+ NGOs	13.2%
Companies + National government	6.6%
CSOs + Companies + Provincial and National government + International organizations	4.7%
NGOs + International organizations	3.8%
CSOs+ NGOs + National government + International organizations	3.8%
CSOs+ NGOs + Provincial and National government	2.8%
CSOs + NGOs + Local government	2.8%
CSOs + NGOs + Companies	2.8%
Provincial and National government + International organizations	2.8%
NGOs + National government	2.8%
CSOs + Local government	1.9%
CSOs + NGOs + National government	1.9%
CSOs+ NGOs + Companies + National government	1.9%
CSOs + NGOs + Local, Provincial and National government	1.9%
NGOs + Companies	2.8%
NGOs + Provincial and National government + International organizations	2.8%
CSOs + NGOs + Companies + Local government	1.9%
CSOs + National government + International organizations	1.9%
CSOs + NGOs + Companies + Local, Provincial and National government + International organizations	0.9%
Local and National government + International organizations	0.9%
Local, Provincial and National government	0.9%
NGOs + National government + International organizations	0.9%
NGOs + Local government	0.9%
NGOs + Provincial government	0.9%
NGOs + Companies + National government + International organizations	0.9%
NGOs + Local, Provincial and National government	0.9%
CSOs + NGOs + Companies + Local, Provincial and National government	0.9%
NGOs + Local and National government	0.9%
Provincial government + International organizations	0.9%
Local, Provincial and National government + International organizations	0.9%
CSOs + NGOs + Provincial government	0.9%
CSOs + Companies + Local government	0.9%
CSOs + National government	0.9%
CSOs + NGOs + International organizations	0.9%
CSOs + Companies + Local, Provincial and National government	0.9%
CSOs + Companies	0.9%
CSOs + NGOs + Companies + Provincial and National government + International organizations	0.9%
Companies + Provincial and National government + International organizations	0.9%
Companies + Provincial government	0.9%
TOTAL	100.00%

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