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Climate financing needs in the land sector under the Paris Agreement: An assessment of developing country perspectives

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ABSTRACT

This paper explores the potential of climate finance to support developing country efforts to shift away from unsustainable land use patterns in the context of the 2015 Paris Climate Agreement. We pursue two research objectives here. Through a meta-analysis of 40 developing country Nationally Determined Contributions (NDCs), we provide, first, a comprehensive qualitative overview of developing country perspectives on climate financing needs for mitigation and adaptation activities in the land use, land-use change and forestry sectors (LULUCF). Second, we examine whether countries acknowledge a role for domestic financing and international and domestic fiscal policy reform within these NDCs, as a way to address drivers of land use conversion. We supplement our meta-analysis of NDCs with a brief assessment of climate financing in two forest-rich countries, Brazil and Indonesia. Our analysis of NDCs reveals that only 14 of the 40 countries provide clear cost estimates for proposed climate-related forest activities, with most activities being conditional on provision of international climate finance. While some discuss domestic sources, few note the need for (international or national) fiscal policy reform to counteract direct and underlying drivers of land use conversion. The challenges inherent in doing so are also highlighted in our discussion of Brazil and Indonesia. Our findings suggest that, while much attention is directed to inadequate quantities of international climate finance, a lack of fiscal reform remains a key hurdle to realizing transformative change in the land use sector.

1. Introduction

Climate finance is widely assumed to have an important role to play in helping to shift unsustainable land use patterns towards more climate-friendly outcomes. It is seen as crucial for countries seeking to meet their land sector goals as laid out in Nationally Determined Contributions (NDCs) under the Paris Agreement, agreed to by Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris in 2015.

In this paper, we explore developing country perspectives on their climate financing needs in realizing land-sector goals under the Paris Agreement. We have a two-fold objective in doing so: first, although there is widespread discussion in policy debates and scientific literature alike on (inadequate) quantities and sources of international climate finance, there is as yet no comprehensive assessment of how developing countries see the role of such financing in meeting their forest-sector NDCs goals. Second, there is little understanding of developing countries perspectives on the role of (international and domestic) fiscal policy reform in addressing drivers of unsustainable land use, and the lack of alignment between fiscal policies that might stimulate land conversation, versus sustainable land use initiatives supported by climate finance.

Through undertaking a meta-analysis of 40 developing country Nationally Determined Contributions (NDCs), our analysis aims, first, to provide a comprehensive qualitative overview of developing country perspectives on climate financing needs for mitigation and adaptation activities in the land use, land-use change and forestry sectors (LULUCF), as articulated in their NDCs. Second, we examine whether developing countries address the role for domestic and international fiscal policy reform in realizing their forest-sector climate goals within their NDCs. We supplement this meta-analysis of NDCs with a brief assessment of climate financing dynamics (international and domestic)

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and links to fiscal reform in two forest-rich countries, Brazil and Indonesia.

We proceed as follows: Section 2 advances an analytical focus and hypotheses for our assessment of developing country perspectives on forest-sector climate finance. We derive these hypotheses from a brief review of key scholarly debates and policy developments in the area of climate finance. We then outline in Section 3 the methodology we employ for our meta-analysis, before undertaking our qualitative meta-assessment of climate finance needs as articulated in developing country NDCs in Section 4. Section 5 discusses climate finance dynamics in the land use sector in Brazil and Indonesia. In concluding, we draw out implications of our findings for (the challenges inherent in) realizing the transformative potential of climate finance in furthering forest-sector climate goals in developing countries.

2. Climate finance: Evolving trends and research gaps

Advanced economies have formally agreed to jointly mobilize US$ 100 billion per year by 2020, from a variety of sources, for climate mitigation and adaptation priorities in all sectors. The literature on climate finance has focused much attention on the obligations of developed countries (whose growth contributed overwhelmingly to climate change) to provide necessary finance to developing countries who now suffer a disproportionate burden of the consequences. Climate finance is intended to be *new* and *additional* (UNFCCC, 1992), to official development assistance (ODA), which was first intended to be 0.7% of a developed country's gross national income (UN General Assembly, 1970). Though most developed countries contribute less than that (OECD, 2018) there has been concern raised by developing countries that ODA and climate finance should not be confounded (Nakhooda and Norman, 2014). However, an estimated 80% of the fast start financing reported by countries to the UNFCCC for period of 2010–2012 was from ODA (Kharas, 2016).

Drawing upon ODA was found to be more politically feasible for developed countries, who could delay divisive inter-agency debates in redirecting or increasing domestic expenditure to meet growing global commitments (Pickering et al., 2013). These existing aid commitments flow through a largely decentralized system dominated by a large number of bilateral aid agencies and a series of multilateral funds (UNFCCC Standing Committee on Climate Finance, 2016; OECD, 2015). Recognizing this, Multilateral Development Banks pledged in 2015 to foster wider adoption of mitigation and adaptation climate finance tracking principles, and develop joint principles for measuring the quantities of public and private finance they leverage in the future (AfDB et al., 2015). The OECD has called for increased clarity on how the international community counts both public and private financial flows towards the $100 billion commitment, and how to track these flows (Clapp et al., 2012).

Roberts and Weikmans (2017) raise concern that the lack of a functional definition and accounting system for climate finance and lack of modalities to account for climate finance impedes the effective functioning of the bottom-up approach that now prevails under the UNFCCC. As an example of this disconnect, the Government of India (2015) criticized the OECD and CPI (2015) estimate of $61.8 billion in climate finance flowing to developing countries in 2014. The Government of India found that after weeding out pledges from actual flows, and applying more stringent accounting and tagging to identify 'new and additional' funds, only USD 2.2 billion should be considered as cross-border flows from 17 special climate funds. Clearly there is a need for developed countries to meet their obligations for new and additional climate finance and improve finance accounting and tracking.

Less is known about developing country demand for climate finance. One review of 160 NDCs in 2016 identified that if the current mitigation commitments of developing country Parties be used as benchmark, the total amount of financial demand for both mitigation and adaptation needs of developing countries would reach US$474 billion in the year 2030 (Zhang and Pan, 2016). Further, very little exists in the literature to help developing countries assess options to harmonize disparate sources of international climate funds (e.g. bi-lateral, multi-lateral, and private sector) with domestic sources (e.g. national budget allocations, mobilized domestic private sector). A clear knowledge gap that our research seeks to fill, therefore, is to analyse developing country perspectives, if any, as expressed in NDCs, on strategic use of domestic finance sources (including reforming fiscal incentives that may currently undercut climate goals), encouraging coherence in climate financing at the national level, and strategies to combine multiple climate finance sources and aligned policies and measures to enable climate mitigation and adaptation outcomes.

The UNFCCC (2016) identified that most climate finance in the aggregate is mobilized and deployed domestically, both in developed and developing countries. In the limited number of developing countries for which information on domestic public climate finance was available, the data suggested that domestic public finance significantly exceeds the inflows of international public climate finance from bi-lateral and multilateral sources (*ibid*). Ha et al. (2016) similarly identify the rise of climate finance within and among developing countries ('South-South Climate Finance') as an opportunity to help unlock much needed additional climate finance, including through multilateral development banks. They suggested that these sources be better tracked by the UNFCCC to more effectively align it with 'traditional' climate finance that flows from developed to developing countries. Hannam et al. (2015) reinforce this point, based on their identification of substantial financial and technological support provided by Chinese firms to developing countries, often with policy backing from China's state banks and particularly for investments in power generation, which is not recognized by the UNFCCC. However, recent publications (UNFCCC, 2016) reveal an awareness of this issue, with findings suggesting that South–South cooperation is significant in this area – in the range USD 5.9–9.1 billion in 2013 and USD 7.2–11.7 billion in 2014.

However, discussions about quantities and flows of climate finance miss other key aspects that are equally crucial to achieving climate goals. In 2008, the UNFCCC framed a more holistic approach to climate finance (UNFCCC, 2008), though the strategies have not been greatly expanded upon in the literature over the last ten years. The three strategies identified were: (a) shift investments and financial flows to more climate-friendly and climate–resilient alternatives; (b) scale-up international private and public investments and financial flows; and (c) optimize the allocation of the funds available. The report identified four broad means to be considered in this context: private finance, public finance, national policies, and UNFCCC-related initiatives.

Most notably, the report identified the potential of national policies to send the right signals, in both developed and developing countries. The key message was that if markets failed to attract private investors into lower-carbon, more climate-proof alternatives, then government policies or incentives were necessary, which could occur through regulations and standards, taxes and charges to make polluters pay, and subsidies and incentives to pay the innovator. Multilateral climate funds have struggled to bring climate finance into the mainstream of economic and development decision-making, however, and the capacity of countries to formulate creative and transformational ideas about how to maximize the impact of available finance has varied greatly (Nakhooda and Norman, 2014). In addition to focusing on sources and flows of climate financing, other emerging insights emphasize that national-level systems for policy, planning and budgeting can be just as important (Rai et al., 2015). Our analysis responds to these claims in the literature by assessing developing country perspectives on such options, as expressed in NDCs.

In undertaking the meta-analysis of NDCs, we draw on our brief overview of key debates above to derive and assess two hypotheses: first, the supply of international climate finance will be insufficient to meet the (expressed) demand from developing countries, as discerned from NDCs; and second, in the absence of strategic use of domestic

financing and reform of fiscal incentives that undercut climate goals in conjunction with international climate finance, countries will not achieve their land use and forestry sector NDC goals under the Paris Agreement.

These hypotheses are derived from findings in the literature that (a) current trends indicate that international climate finance will fall far short of developing country needs; and (b) in some countries, even if international climate finance for mitigation and adaptation were to be delivered at the scale necessary to achieve targets, the quantities of public and private finance supporting unsustainable activities in the land sector will greatly dilute the effectiveness of such finance. In other words, climate finance is only effective if it helps to redirect and scale up public (and private) finance flowing to climate-friendly land use, yet the prospects of realizing this are highly uncertain.[1]

3. Methodology

In addressing our two-fold research objective, we undertook, first, a literature review of secondary and primary literature on mitigation and adaptation climate finance[2] for land use and the forest sector focused on key decision-processes at national and international-levels (including the UNFCCC, Green Climate Fund, and multi-lateral and bi-lateral levels). Country NDCs were then reviewed to identify national-level decisions or intentions with regard to forest and land-use sector financing. NDC selection was based on two criteria: first, a country has submitted a NDC to the UNFCCC Interim NDC Registry by April 2017, and second, it includes within its NDC efforts to reduce emissions from deforestation and forest degradation via support from the UN-REDD Programme and/or World Bank Forest Carbon Partnership Facility (FCPF).[3] Based on these two selection criteria, 40 countries were identified and their NDCs reviewed to determine: (a) mitigation and adaptation goals and objectives for LULUCF; (b) how land use goals were seen to relate to overall mitigation and adaptation goals; and (c) the degree to which GHG emissions reduction goals (across all sectors in most cases) were conditional on international assistance versus achievable with domestic resources (i.e. unconditional). Country plans for LULUCF financing were further evaluated based on the following questions:

(a) If a significant portion of national emissions come from the forestry and land use sector, do countries identify interventions to reduce emissions?
(b) If forestry and land use sector interventions are identified, to what extent do countries identify estimates of costs of implementation?
(c) To what extent do countries consider reform of fiscal policies[4] (such as subsidies) as part of the financing strategy?
(d) Do countries identify finance innovations to achieve NDC goals (such as details on aligned private sector investment, creation of new sources of domestic finance, or other measures such as climate expenditure review for clearer budgetary tracking)?
(e) Are there other findings of note relevant to finance in the country NDCs?

Methodologies relied upon in the assessment of climate finance dynamics in the land sector in two leading REDD+ countries, Brazil and Indonesia, included review of secondary and primary literature (including government publications) on this topic to discern Brazil and Indonesia's land use emission reduction programmes, and how achievements and financing were correlated.

Key questions guiding the assessment in the case studies included:

(a) how existing public policies and expenditures and investment were altered to reduce pressure on forests in order to further climate goals;
(b) what the role was of domestic and international finance in achieving forest sector climate objectives; and
(c) how linkages between policies and investment decisions influenced policy and land use outcomes.

Annex 1 contains a list of all the 40 countries reviewed and a concise overview of relevant information reported in NDCs. We turn next to our meta-analysis of developing country perspectives on climate finance needs, as expressed in these NDCs.

4. Land use and climate finance in developing country NDCs: A meta-analysis

In this section, we organize the findings of our meta-analysis of 40 NDCs according to three components: first, Section 4.1 discusses the scope and nature of forest and land-use goals included in national mitigation and adaptation ambition, as expressed in developing country NDCs. Section 4.2 discusses the extent to which cost estimates to realize these goals are included. Section 4.3 then discusses whether NDCs outline strategies to address domestic financing or fiscal policy reform, including policies and financing that works at cross-purposes to emission reduction and adaptation goals. Section 4.4 discusses finance innovations mentioned in the NDCs to achieve forestry and land use sector emission reductions, and finally, Section 4.5 lists other aspects of land use sector finance mentioned in country NDCs.

4.1. Inclusion of forestry and land use in national mitigation and adaptation ambition

Of the forty countries participating in either the UN-REDD Programme or World Bank FCPF that have submitted NDCs to the UNFCCC, all include land use mitigation and adaptation priorities or actions in the agriculture and forestry sectors. This is logical given the importance of the land use sectors in all of these countries. However, 8 of the 40 countries reviewed chose not to include LULUCF in their NDC mitigation targets due to a lack of reliable data or confidence in LULUCF emissions estimates (including Bangladesh, Cameroon, Côte d'Ivoire, Honduras, Mongolia and Papua New Guinea). Chile separated LULUCF from its NDC mitigation 'intensity target' due to high annual variability in sequestration levels. However, all of these 8 countries identify priority mitigation and adaptation actions in the land use sectors. Fiji's NDC focuses on the energy sector but notes that the mitigation potential from the forestry sector (via Fiji's REDD+ activities) must be accounted for and defines mitigation activities in the energy sector that are relevant to the forest sector, including reducing biomass/wood for cooking in rural areas and power co-generation in the wood and sugar industries.

Countries reviewed tend to identify the share of LULUCF or Agriculture, Forestry and other Land Use (AFOLU)[5] in their national emissions profile (see Table 1). For most countries, a high share of land

[1] Although unlocking and (re)directing *private* finance towards sustainable land use is key to achieving the Paris climate agreement, it is beyond the scope of this paper to assess means by which to promote and leverage private finance. This is a key topic for future research.

[2] The UNFCCC defines climate finance as, "refer(ring) to local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change."

[3] REDD+ refers to efforts to reduce emissions from deforestation and forest degradation, and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries.

[4] Our definition of fiscal policies starts with Friedman and Heller's (1969) definition: "The use of changes in the level of taxes and expenditures (either transfer payments or other budget expenditures) to serve national economic goals." Our definition is further expanded to include subsidies, direct and indirect financial transfers, regulation, lack of intervention, and market price support, as per WTO, FAO and Global Subsidies Initiative definitions, detailed in Kissinger et al. (2015).

Table 1
Percentage of LULUCF emissions[a] compared to total emissions among countries reviewed.
Source: Country NDCs.

Burkina Faso	Will be 87.4% of emissions in 2030
Central African Republic	89.46% of total, though development patterns indicates energy and agriculture will increase their share of emissions in the future, and due to increased rainfall due to climate change, the sequestration capacity of the forests will increase
Ethiopia	88% in 2010 (includes agriculture with 51% and forest sector with 37%)
Gabon	63% (in 2000)
Indonesia	Share of LULUCF (including peat fires) has dropped from 63% of emissions in 2010 to 47.8% by 2016, while energy has grown and now accounts for 35% of emissions
Kenya	75% (including agriculture)
Perú	Roughly 50%
Uganda	Largest mitigation potential
Zambia	Roughly 75%

[a] Percentage figures represent % of emissions under the business as usual scenario. If no year is given, the percentage figure refers to the present time (or the base year determined by the country).

use emissions indicates the relative proportion of their mitigation effort.

The forest sector mitigation and adaptation priorities, targets and activities are identified and detailed for all countries, except Argentina. Argentina does mention the forest sector, however, in both the adaptation and mitigation section, so while details are not clear in the NDC, these might well be defined within subsequent submissions.

4.2. Cost estimates of forestry and land use interventions

Despite the clarity expressed by 39 of 40 countries regarding the targets and activities planned for the forestry sector, only 14 provide clear cost estimates (see Table 2). Mitigation cost estimates for the 14 countries total US$ 20.6 billion, while the adaptation cost estimates total US$ 10.5 billion. The timelines for these investment needs for most countries is either from roughly the present to 2030 or 2020–2030. However, Panama's investment need is defined for up to 2050. Those countries that identify an overall NDC finance requirement, but do not specify forest sector activities and costs specifically, are omitted from Table 2. While Burkina Faso's cost estimates indicated a scaling range for mitigation and adaptation between 2020 and increasing to 2030, we chose to evenly distribute the estimate between mitigation and adaptation for illustrative purposes. These cost estimates are thus indicative of the scale of financing, investment, technology and capacity building that countries with forestry sector mitigation and adaptation priorities will require. Agriculture sector estimates were not included in this analysis. However, for Côte D'Ivoire, some agriculture sector costs are reflected in their forest sector estimates.

While it would be useful to assess the extent of mitigation ambition dependent on international finance (i.e. conditional ambition), versus that which is to be supported through domestic finance sources (unconditional), this level of detail is not yet available in the NDC of the majority of countries reviewed. Most countries express their national-level emission reduction goals across all sectors, such as reduction of overall emissions by a certain percentage, as compared to business as usual, and then note the conditional and unconditional finance required to meet the goal. Twenty-one of the 40 countries reviewed provide details on the conditional versus unconditional components. Ghana provides a useful example of detailing specific policy and emission reduction actions by sector, with sub-activities and investment needs identified, along with indication of the status (conditional or unconditional). Despite the lack of specific details, the large majority of both adaptation and mitigation actions identified by countries in the forestry sector and all other sectors rely on international climate finance (see Annex 1 for a summary of country indication of ambition).

[5] AFOLU category was adopted in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories as an accounting method to combine two previously distinct sectors: LULUCF and Agriculture.

Table 2
Forest sector mitigation and adaptation finance needs (of those that reported finance estimates in their NDC).
Source: NDCs for each country.

Country	Forest sector mitigation cost estimates (US$ million)	Forest sector adaptation estimates (US$ million)
Bangladesh		$2500
Belize	$2.5	$2.6
Burkina Faso	$3950	$3950
Cameroon	$388	$150
Central African Republic	$80	$113
Chad	$1736	
Cote d'Ivoire	$2.5	$29.1
Ghana	$5003	$1279
Guyana		$1600
Lao PDR	$180	$40.5
Mongolia		$31
Morocco	$7040	$833.3
Panama	$2225	
Uganda	$36	
Total (US$):	**$20,643**	**$10,528.5**

Note: Timescales for finance are usually from 2015 to 2030 or 2020 to 2030.

4.3. Strategies to address finance that works at cross-purposes to climate goals

None of the countries reviewed mention fiscal policy reform of existing finance flows to agricultural commodity production or other publicly supported programmes that affect the drivers of land use conversion. None of the countries articulate the possibility of reviewing existing fiscal incentives that may work against NDC goals. Costa Rica mentions interest in developing market incentives and commercialization of agricultural products with a smaller carbon footprint, and although these are not explicitly linked to maintaining forest cover (such as a commitment to deforestation-free agricultural commodity production), Costa Rica has created a Joint Commission for agriculture and forestry to coordinate inter-sectorial implementation. Côte d'Ivoire mentions the need to review the low carbon orientation of future plans in the land use sectors, in the section on cost estimates for NDC interventions, which may indicate finance and fiscal incentives should be included, but this is not explicitly stated. Another three countries identify fiscal policy reform in the energy sector, but only one may have implications for the land use sector. Ethiopia removed fossil fuel subsidies, to promote clean and renewable energy, yet 76.7% of the population currently lacks access to modern energy sources, relying on wood fuel. Ethiopia indicates that rural energy access is a priority but does not define how rescinded fossil fuel subsidies are being used to support activities. Morocco seeks to substantially reduce public fossil fuel subsidies, and while this may have no effect on land use emissions,

it does indicate willingness to review public spending and support programmes. Malaysia introduced three significant fiscal tools in its Tenth Malaysia Plan (2011–2015) to promote sustainable growth and GHG reduction, but these were not in the land use sectors.

4.4. Finance innovations to achieve forestry and land use sector emission reductions

The climate finance literature notes a range of finance innovations already in use by countries to address climate change finance needs, ranging from new sources of domestic finance (e.g. carbon taxes, payments for ecosystem services), leveraging compatible investments (e.g. private sector investment and public-private partnerships), to clearer budgetary tracking (e.g. climate expenditure review and budget coding) to determine the quantity of public expenditure supporting climate goals, and in some cases to also check effectiveness in expenditure. The inclusion of finance innovations in NDC financing strategies is an indication of how interested countries are in achieving emission reduction outcomes, and country capacity to undertake interventions.

Seven of the 40 countries identify the potential for new sources of domestic budget finance for climate in their NDCs. Cameroon does not specify where this will come from but does intend to increase budgetary funding related to climate, either via direct budgetary expenditure or other funds from the State budget. Chad established a Special Fund for the Environment in 2013, in order to mobilize its own resources through the establishment of specific taxes. Both Mexico and Chile passed carbon tax laws in 2014. Chile's Law 20.780, came into effect January 2017, taxing carbon at US$5/tCO$_2$. Mexico's law taxes carbon up to US $3.50 tCO$_2$, which could generate roughly US$ 870 million yearly (Carl and Fedor, 2016). Costa Rica's National Forestry Financing Fund's (FONAFIFO) Payments for Environmental Services currently maintains one million ha of forest cover outside protected areas (26% of the country). As noted in its NDC, since 2007, Costa Rica has sought to compensate its emissions through offsetting by the forest sector, seeking to achieve Carbon Neutrality by 2021 with total net emissions comparable to total emissions in 2005. Paraguay's NDC indicates interest to increase national revenues from the sale of environmental services, perhaps similar to Costa Rica's programme, while Côte d'Ivoire's NDC seeks a payment for environmental service programme to assist small rural producers to adopt sustainable production practices. Côte d'Ivoire notes interest to explore generating a price signal on the social cost of carbon through a carbon tax or market, thereby internalizing these externalities.

Climate-related public expenditure review allows countries to identify what public spending supports unconditional climate goals, across multiple ministries, and climate budget tagging enables tracking of climate-related expenditures in national budget systems. Climate public expenditure review can be a useful tool to scrutinize current spending and incentives that work against climate objectives, if it is designed to do so (UNDP, 2015). Seven of the 40 countries reviewed identify interventions in this area, including Bangladesh, Chile, Côte d'Ivoire, Guatemala, Honduras, Nepal and Sri Lanka. Bangladesh plans to develop and integrate a Climate Fiscal Framework in the national planning and budgeting process. In 2018, Chile will report a cross-sectional National Finance Strategy for Climate Change, identifying the structure of financial flows according to their origin, differentiating between national versus international and public versus private spending, and eventually according to its performance, allowing to track expenditure against both conditional and unconditional NDC targets. Côte d'Ivoire will track income and expenses on climate in the national budget. Nepal is pursuing climate budget coding in its fiscal planning and budgeting processes. Nepal's Climate Change Policy mandates over 80% of the total climate finance be directed to grassroots level activities. Sri Lanka seeks a methodology at the national level to identify financing needs for each sector and the divisions of relative contribution at the national-level. Vanuatu's Climate Public Expenditure and Institutional Review identified donor assistance for adaptation to be below that of its Pacific island neighbours.

Mainstreaming NDC climate objectives into existing development plans or low-carbon development plans is often assumed, in the secondary and primary literature, to be an important means of achieving intended outcomes (UNDP-UNEP, 2011). Five countries define mainstreaming climate into national development plans as the means to direct domestic (unconditional) finance, such as Bangladesh, El Salvador, Paraguay, Côte d'Ivoire, and Indonesia. Other countries define their domestic contributions occurring through low-carbon growth strategies such as Ethiopia, Nepal, and Rwanda. Guyana has funded REDD + activities in the Low Carbon Development Strategy through the national budget or through the bi-laterally-supported Guyana REDD + Investment Fund, earned under the Guyana Norway Agreement. Some countries identify their unconditional finance commitments as being the domestic resources intended to carry out national climate change policies, as is the case with Uganda, Kenya and Gabon. Uganda expects that 30% of the cost to implement their National Climate Change Policy will come from domestic sources.

Only 3 countries out of 40 define expected contributions and investments from the private sector that are, or could be, related to the forest sector. Burkina Faso anticipates almost 50% of the financing for the NDC should come from the private sector, on condition that the commercial banks are made aware, but does not specify further detail. Côte d'Ivoire will seek to work with domestic banks, and strengthen financial markets for NDC-aligned activities, and attract foreign direct investment (which Viet Nam also seeks, but is clear that international cooperation will be necessary to facilitate it). Morocco calls for action by its financial sector, which has the ability to influence investment flows and also international finance actors. Ghana identifies a large unconditional adaptation priority for the forest sector (US$ 767 million) for the utilization of forest resources for sustainable energy use and biodiversity businesses, though the emphasis is on governance reform, and it is unclear what the expected investment from the private sector would be. Perú identifies one key cross-cutting goal for adaptation is to evaluate innovative mechanisms to encourage private investment that increase the resilience of vulnerable systems, but notes that this is conditional on international climate finance. Eight countries mention interest to engage the private sector but provide no further detail on key sectors.

4.5. Other insights related to land use sector finance in the NDCs

Many countries stress that developed countries, which are historically the largest GHG emitters, must contribute financially, and with technology and capacity-building, to address the impacts of climate change, based on the principle of common but differentiated responsibilities of each country within a global climate agreement.

Most indications of sources of international climate finance are the Green Climate Fund, other sources of funding such as the Adaptation Fund, Least Developed Country Fund (LDCF), multi-lateral and bi-lateral assistance. Peru's NDC makes clear that the conditional portion of its mitigation ambition that is reliant on international financing is necessary, but also cautions that commitments that might result in public debt are not suitable.

It is also striking that thirty-two countries mention interest to participate in an international market mechanism and other existing sources of investment, such as the Clean Development Mechanism and other mechanisms under the UNFCCC, except Bolivia, Chad and Malaysia. Most countries express interest in international guidance on market governance, oversight and clear accounting rules. Though El Salvador does not specifically indicate disinterest to participate in market mechanisms under the UNFCCC, the country indicates strong interest in technology transfer, for example, through the Climate Technology Centre and Network. Guatemala and Nepal's NDC is silent on participating in a market mechanism under the UNFCCC, although

Nepal indicates a goal to create a domestic market. Peru notes interest in participation in international market mechanisms. Gabon indicates it has established a market mechanism under its Law on the Orientation of Sustainable Development. Indonesia indicates it is ready for REDD + results-based payments.

Though most countries identify participation in international market mechanisms as a means to achieve their NDC goals, selling emission reduction credits would likely only occur *ex post* (after emission reductions), hence the viability of this as a source of funds to pay for measures to achieve emission reductions is questionable. However, a number of countries reviewed appear to identify the sales of emission reductions as a means to pay for the measures to achieve the emission reductions.

Before synthesizing and discussing the implications of these findings in the discussion and conclusion section, we briefly review below evolving experiences in Brazil and Indonesia with regard to land sector goals and climate financing.

5. Brazil and Indonesia: Land use and climate financing

This section discusses experiences with climate financing to promote sustainable land use practices in Brazil and Indonesia, and the role for domestic sources and fiscal reform herein.

5.1. Brazil

Until the mid-1990s, forests were viewed as an obstacle to Brazil's development. National development policies and incentives had sought to develop the forest frontier and integrate the remote Amazon into the national economy for many decades (Government of Brazil, 1974). Brazil's Constitution of 1988 provided strong incentives for smallholders and large-holders to clear land, simply to solidify land claims by demonstrating 'productive use of land.' Credit and tax incentives for activities responsible for clearing forests were enabled through development plans. Charcoal production and iron extraction, mutually dependent on each other, had a substantial impact on the Amazon in these early phases of forest clearance. The access to and extraction of iron ore, later transformed into pig iron, was heavily subsidized by the governments Fundo de Investimentos da Amazônia (FINAM) (Hecht, 1985; Aldrich et al., 2012).

Brazil faced strong internal civil society and international pressure to control Amazon deforestation. The Pilot Program to Conserve the Brazilian Rainforest (PPG-7) was endorsed, beginning Brazil's interventions to address deforestation, while Brazil hosted the United Nation's Conference on Environment and Development in Rio de Janeiro in 1992. Besides the PPG-7, Brazil established the Action Plan to Prevent and Control Deforestation in the Amazon (PPCDAM) in 2004 and of the Cerrado in 2010, to control illegal activities, and identify solutions for regulation and monitoring. Brazil's Forest Code (in existence since 1965, but most recently revised in 2012) established reserves and permanent protection areas, and required a minimum level of forest cover on each parcel.

Brazil recognized that the complexity of the problem required a mix of changes in incentives, disincentives and enabling conditions through policy reform to reshape forest use (Duchelle et al., 2014). The country took steps in the 2000s to reverse perverse incentives that drove Amazon clearing. Brazil's Environmental Crimes Act of 1998 described crimes against the environment, including deforestation, and held that a legal entity found in violation could be held criminally liable (Government of Brazil, 1998). Brazil also linked the ability to access rural credit to demonstration of legal compliance with environmental legislation. The ability to demonstrate compliance improved with satellite imagery and monitoring, better enforcement, and later, creation of the Cadastro Ambiental Rural, a nation-wide electronic land registration system. In 2006, a voluntary ban on the commercialization of soy grown in the Amazon was set by private market players (to expire in 2013 but since renewed), and the Bank of Brazil agreed to veto of agricultural credit for soy farmers who want to plant in newly cleared forest. The Amazon Fund, which is managed by the Brazilian Development Bank, was created in 2008 to channel donations to address deforestation and sustainable use of the forest. Norway's contribution to Brazil's Amazon Fund has since totalled US$ 1.09 billion to date (Amazon Fund, 2017). Also in 2008, the Brazilian National Monetary Council resolved that the granting of rural credit in the Amazon Biome must be based upon proof of compliance with legal and environmental regulations (Brazil Central Bank, 2008). This resulted in US $1.4 billion not being loaned between 2008 through 2011 due to restrictions imposed by the resolution, and one analysis estimates this may have resulted in a 15 per cent decrease in deforestation in the Amazon during the period (Assunção et al., 2013). A decree was passed to evaluate municipalities on environmental compliance, with producers in blacklisted municipalities being denied access to agricultural credit and subjected to product supply embargoes, until the municipality has registered 80 per cent of its properties in the Cadastro Ambiental Rural and lowered deforestation rates (Duchelle et al., 2014).

In 2011, Brazil also adopted a Low Emissions Agriculture Plan and a Credit Program (known as "ABC Program and Plan" for its acronym in Portuguese language), which since then has provided rural credit through official public banks, like Banco do Brasil, for activities that help farmers to adapt to climate change and to reduce emissions from soil use and land use change. The ABC has enabled farmers to directly participate in emissions reduction activities. It has also encouraged a public perception that there is no need to clear forested lands for agricultural production since productivity gains can outpace the expansion of farming lands (Newton et al., 2016).

These policy and fiscal reform changes were adopted, and deforestation rates shifted, long before international climate finance was brought to the table. This indicates Brazil's strong domestic commitments to address deforestation challenges. Norway's historic US$1 billion commitment was pledged in 2008, four years after Brazil's highest deforestation rates, which dropped by half between 2004 and 2008. Deforestation rates in the Amazon region reached a high point in 2004, and then decreased significantly every year after that, stabilizing around 6000 km^2/yr by 2010 (Aguiar et al., 2016). Between 2004 and 2010, Brazil managed to reduce deforestation by 75%, which translates to about 84,400 km^2 of forest saved and 3.2 billion tonnes of carbon dioxide kept out of the atmosphere. Norway's support endorsed the Brazilian government's ongoing efforts to reduce deforestation in a way that improved the domestic legitimacy of these policies (Birdsall et al., 2014). Norway made its first payment (US$110 million) towards the US $1 billion pledge in 2010. In 2015, Brazil's NDC pledged to eliminate illegal deforestation by 2030.

While deforestation rates dropped dramatically after 2004, Brazil's agricultural production increased. Brazil's grain production increased 99% between 1996 and 2010 (Government of Brazil IPEADATA) and soybean production increased 196% between 1990 and 2008 (Zanon and Saes, 2010).

Less attention has been paid to mechanisms for attracting investors into the Amazon region to sustainably develop its forests, fisheries, and agricultural potential. Efforts made by sub-national governments in the Amazon are important to recognize, as the state governments of Acre, Amazonas, Amapá, Pará and Mato Grosso have partnered with investors and other sub-national jurisdictions with the aim of securing new financing to sustainably develop their forest-based economy (Burkhart et al., 2017).

Brazil's experience illustrates how the veto of agricultural credit for soy farmers in newly cleared forest and the National Monetary Council's strict stipulations on granting rural credit in the Amazon shifted deforestation patterns long before international climate finance was brought to the table. This highlights the role fiscal policy and reform can play, along with increased law enforcement. Challenges remain, however, in reversing economic pressures on Brazil's forests.

Government agricultural production subsidies for beef and soy still vastly exceed investments in forest protection. Only a small percentage of all rural development spending is dedicated to low emissions agricultural techniques (i.e. integration of forests, agriculture and cattle ranching activities at farm-level) through the ABC, in comparison to the total rural credit available.

Subsidies to activities driving forest loss were US$14 billion yearly based on annual averages up to 2012, while investments in forest protection were US$580 million yearly between 2006 and 2014 (McFarland et al., 2015). A recent increase in deforestation of 13.7% between July 2017 and July 2018 (Government of Brazil INPE, 2018) and President Jair Bolsonaro's decision to shift authority on determining federal protected status for Amazon lands from the Ministry of Indigenous Affairs to the Ministry of Agriculture, Livestock, and Supply (Reuters, 2019) signal the Brazilian government's change in commitment to the Amazon. Norway has recently voiced concern about revision of the environmental licensing criteria, roll back of protection of significant areas in the Amazon, and increasing deforestation rates, putting at risk the agreement between the two countries for REDD+ results-based payments (Government of Norway, 2017).

5.2. Indonesia

Under the Soeharto regime in Indonesia between 1966 and 1998, the consolidation of forest resources for the state, granting of concessions, and use of forest resources to raise foreign exchange and revenue drove forest exploitation (Gunawan, 2004). Indonesia recognized the impact forest and peat land loss had on national GHG emissions, culminating in commitment to pursue REDD+ in 2009. Indonesia's REDD + Readiness Plan was submitted in 2010 and its REDD+ National Strategy was finalized in 2012. Indonesia's Presidential Instruction No. 10 of 2011 established a two-year moratorium on issuing new licenses and concessions in primary forests and peatlands, which has been renewed since, although the moratorium's effectiveness in limiting oil palm expansion into carbon-rich forests and peatlands is debated (Margono et al., 2014; USDA, 2013).

Norway made a critical US $1 billion bilateral commitment to support Indonesia's efforts to reduce GHG emissions from deforestation and degradation of forests and peat in 2010 (Government of the Kingdom of Norway and the Government of the Republic of Indonesia, 2010). Indonesia's NDC pledges an unconditional emissions reduction target of 29% and a conditional emissions reduction target up to 41% of the business as usual scenario by 2030. While Indonesia's land use change and peat and forest fires contributed 63% of emissions in 2010, a 2016 review found land use change and forestry, including peat fires, amounted to 47.8% of emissions and energy contributed 34.9% (Government of Indonesia, 2016). With the development of Indonesia's economy, energy sector emissions have increased, and thus LULUCF emissions are a smaller portion of national emissions. The NDC notes that 60% of the conditional emission reduction is in the area of forestry and peat fire emissions and requires international support.

The main driver of deforestation and peat degradation has been oil palm expansion. Indonesia produces 60% of the global supply of palm oil and has also prioritized palm oil as a key commodity to support a national biofuel plan. The National Medium Term Development Plan (RPJMN) of 2015–2019 seeks national economic growth acceleration through increased production of value added products, and competitiveness of agricultural commodities, including oil palm. The RPJMN also identifies forestry/peatlands and agriculture as two of the five sectors that are key to meeting Indonesia's GHG emission reduction target, as they contribute to the majority of Indonesia's overall GHG emissions (Government of Indonesia, 2015a).

Yet, a significant amount of Indonesia's agricultural subsidies promote palm oil production. The amount (roughly US$27 billion per year) dwarfs the amount of REDD+ finance (roughly US$660 million per year) galvanized to counteract these pressures (McFarland et al., 2015). Indonesia's REDD+ National Strategy of 2012 actually identified the need to address perverse incentives and promote a shift in commodity production, including better alignment of incentive systems to support REDD+ outcomes (Indonesian REDD+ Task Force, 2012).

Activities to address these subsidies have not yet been engaged by government, despite very important regulatory steps being taken. In April 2016, President Joko Widodo announced a moratorium on the issuance of new permits for oil palm plantations and mining operations, urging producers to improve yields and practices on existing plantations (Cabinet Secretary of the Republic of Indonesia, 2016). This commitment followed Presidential Instruction No. 8 of 2015 postponing issuance of new permits and tighter governance of primary forests and peatlands (Government of Indonesia, 2015b). In 2016, the President also announced creation of the Peatland Restoration Agency (BRG) to restore 2.5 million hectares of peatlands in seven Provinces by 2020. As over half of restoration priority areas are on company concessions, the private sector must play a key role in funding and implementing restoration, while development partners have also made significant commitments for financing (Government of Indonesia, 2017).

These new regulations came after significant public risk and loss. The peat fires of 2015 were devastating, with 19 deaths reported, 550,000 people were hospitalized with acute respiratory infections, and at least 43 million people were affected by haze impacts in Southeast Asia. Greenhouse gas emissions increased dramatically from 2.6 million hectares burned. The World Bank estimated the peat fires cost Indonesia's economy US$16.1 billion (IDR 221 trillion), based on impacts on agriculture, forestry, trade, tourism and transportation (World Bank, 2015).

Indonesia's NDC identifies that it will allocate a total of US$ 55 billion in domestic public funding across all sectors for the period of 2015–2019 for climate-related expenditure, and will carry a strong domestic commitment through to the 2020–2030 timeframe. However, Indonesia has not yet prioritized the fiscal policy reforms that it could put in place to rectify public incentives that are currently misdirected.

6. Discussion

As we outlined in Section 3, our meta-analysis results reveal that only 14 countries (out of 40 reviewed) outline mitigation and adaptation financing needs, which amounts to US$ 31.2 billion just for their forestry and land use sectors (for the period through 2030 or from 2020 to 2030, depending on the country). Burkina Faso, Ghana and Morocco account for 77% of the mitigation costs, and Bangladesh, Burkina Faso and Guyana account for 76% of adaptation costs identified by the 14 countries. This provides a strong indication that once other countries have costed their NDCs, the demand for (public and private) finance to support NDC implementation is likely to be orders of magnitude larger than the availability or supply of funds from bilateral and multilateral sources of climate funding. This validates the first hypothesis that international climate finance will fall far short of expressed developing country needs. Other countries must still define NDC financing needs, and a significant number plan to do so in the coming year or two. This is a clear call for developed countries (Annex 1 countries under the Convention) to fulfil intended pledges and commitments, and to increase the quantity of international support to achieve Paris Agreement goals.

The large majority of forestry and land use sector adaptation and mitigation actions identified by countries in their NDCs are noted to be conditional on international climate finance, suggesting that ambition is largely dependent upon external sources of funding. However, it is unclear whether mitigation and adaptation goals can be met simply by delivering the quantity of international climate finance requested, without considering the role of public (and private) finance that currently supports unsustainable land-use activities in conflict with climate goals. This is directly relevant to testing the second hypothesis that climate finance alone cannot compete with public and private finance

supporting unsustainable activities.

The Brazilian and Indonesian case studies provide insights into how domestic fiscal policies and goals can be reformed and brought into greater alignment with climate objectives, thereby increasing the impact of both domestic and international climate finance. Both countries have also negotiated bilateral agreements with Norway for results-based financing, which means that their forest sector emission reduction efforts are being positively rewarded.

Findings from the NDC review also indicate that none of the countries reviewed mention fiscal policy reform of existing finance flows to agricultural commodity production or other publicly supported programmes that affect the direct and underlying drivers of land use conversion. Costa Rica and Côte d'Ivoire indicate reviewing financial aspects of related programmes, which could lead them in the direction of reviewing and amending or defining new fiscal incentives, but this is not explicit. One possible explanation for the lack of information on these issues across NDCs is an assumption on the part of countries that the NDC outlines an international commitment rather than presenting a detailed implementation strategy. Another could be that countries differ in the quantities of direct or indirect subsidies going to activities promoting land use conversion, with more subsidized producers in countries such as Indonesia, Colombia, Costa Rica, and Mexico, as per OECD (2017) data.

The Brazilian and Indonesian cases also demonstrate that even if international climate finance for mitigation and adaptation were delivered at the scale necessary to achieve targets, the quantity of public and private finance supporting unsustainable activities dilutes the effectiveness of climate finance, thus supporting the second hypothesis. In the case of Brazil, action taken in the mid-2000s to correct this imbalance had a significant effect (though this trend has reversed as Brazil's deforestation rates have recently increased). Both Brazil and Indonesia demonstrate that countries have a range of options to explore when considering how to influence existing finance flows (domestic or private) to support climate objectives. They also document the challenges inherent in adapting these to local circumstances and responding to specific pressures or opportunities.

Innovations in finance to achieve NDC goals exist but are not widely represented in NDCs. While 7 of the 40 countries identify new sources of domestic budget finance for climate in their NDCs, such as carbon taxes or payments for environmental services, they are in the minority. While developing country governments seek to promote economic growth and job creation, while also finding solutions to reduce GHG emissions and adapt to climate change, consideration can also be given to the role that public funding – including through fiscal policies – can play in making this possible.

Both the Brazil and Indonesia examples provide a basis for considering how fiscal reform options can be pursued by countries in defining NDC finance strategies (see Fig. 1). First, it is helpful to identify what incentives or subsidies already exist that *undermine* low carbon or climate resilient land use. Answering this question requires insights on what activities are driving high-emission activities, or those that weaken climate resilience. An example is Brazil's identification of agricultural credit accessed by soy farmers expanding into the Amazon forest. Depending on the causes of land use change or sectoral emissions, these may be in the forest sector or outside of it, and the scope must be wide enough to capture all relevant ones.

Only 7 of the 40 countries reviewed identify other measures such as climate expenditure review and budget coding for clearer budgetary tracking as priorities. All of these finance innovations hold potential for countries to allocate domestic resources (and leverage private sector financing) towards achieving climate objectives, and monitoring performance. This requires identifying the extent to which domestic public spending does or could in future support climate goals, across multiple ministries, yet this is challenging to implement. While expenditure review and budget tagging can help to identify how a government is funding climate-compatible activities, improving tracking, and assessing whether expenditure is effective in meeting policy objectives, this remains more a theoretical possibility still. Depending on how it is utilized, climate budget tagging can also increase accountability and transparency.

It also reveals challenges inherent in calls to assess the climate-compatibility of development finance flows. The OECD (2016) identifies that substantial potential exists to further mainstream climate change considerations into development finance portfolios, which would provide scope for activities to be made low-emission and/or climate-resilient. Yet this requires considering how to increase the quantity of compatible expenditure in key sectors and for aligned activities. Innovative revenue sources can include carbon taxes or even working with banks (public and private) and lenders to identify sources of climate-aligned investment, yet the political challenges are significant. Trade tariffs can also be reviewed to identify new sources of funding (such as Argentina's soybean export tax).

Given the quantities of amount of private sector finance currently flowing to high-emission land uses, decision-makers are faced with the challenge of how to send the right signals to the private sector (Government of Norway, 2015; Government of Netherlands, 2015). However, the review of NDCs indicates that this is not yet a priority for most countries, as only 3 out of the 40 countries mention private sector actors in the land use sector, and details are scarce. Findings from the Indonesia case suggest that fiscal policy reforms could send stronger signals to the palm oil sector, if these were to be adopted. This would require redirecting the current focus on subsidized inputs and providing smallholders with land tenure clarification. For larger concession holders, limiting access to credit subsidies and government guarantees through state banks and tax concessions would become necessary (UN Environment, 2017).

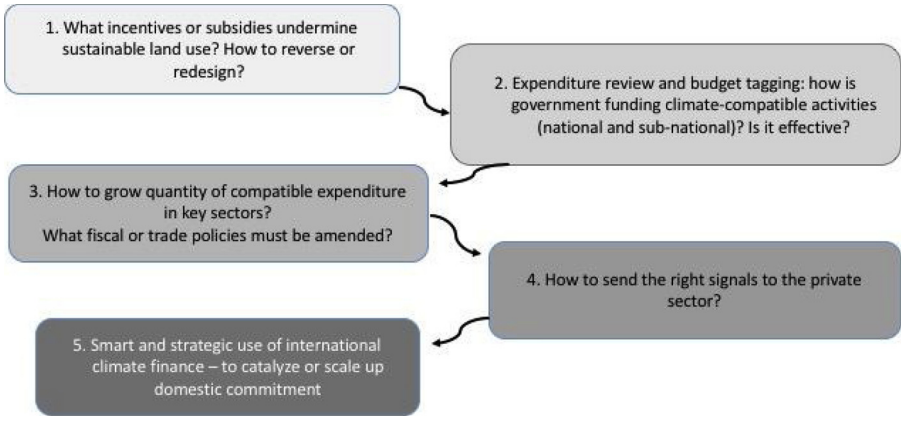

Fig. 1. Options to align finance and incentives to promote forest and land use climate goals.

7. Conclusions

Based on our NDC meta-analysis, we find that very few countries at present have estimated the costs associated with realizing forest and land use sector climate goals. However, for those countries that have provided estimates of the scale of funding needed, it is clear that demand for international climate finance is likely to substantially exceed supply. The dependence on international climate finance leaves NDC ambitions in the forest and land use sector in a precarious position, unless more diversified options are pursued to reach climate goals. Brazil and Indonesia provide examples of how forest-rich countries have struggled to use policy and investment options to align finance and incentives to promote forest and land use climate goals. These experiences reveal the challenges inherent in aligning domestic fiscal policies and other economic and regulatory incentives, as well as private sector investment, with international climate finance objectives. Our analysis thus highlights this as a central dilemma facing developing countries in achieving their conditional and unconditional climate goals.

Disclosure

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Appendix A. Annex 1

Country	Finance for land use sector PAMs identified?	Domestic portion*	Int'l portion**	Is overall GHG emissions reduction ambition dependent on international climate finance?
Argentina	No	Not mentioned	Not mentioned	Total reduction of 37% from BAU by 2030, of which 19% of goal is conditional, and 18% is unconditional.
Bangladesh	Adaptation: US$40 billion from 2015 to 2030. Ecosystem based adaptation (incl. forestry co-management) to cost US$2.5 billion between 2015 and 2030.	Will develop and integrate the Climate Fiscal Framework (CFF) in the national planning and budgeting process, complete more costing for NDC implementation roadmap (relates to implementing BCCSAP, NAP Roadmap and the 7th Five Year Plan).	TBD	Yes, 15% of the 20% reduction from BAU by 2030 goals for power, transport, and industry sectors is conditional.
Belize	Forest sector activities defined under 'Integrating Climate Change in Revised National Plan:' USD $5,158,000. Agriculture activities defined in the National Agriculture Sector Adaptation Strategy: US $15,960,000	Identifies that enabling actions through existing policies, laws and projects, staff time and integration of development and climate change activities are unconditional.	Identifies that activities listed in the NDC are conditional upon external (financial) support.	Yes, reducing deforestation and sustainable forest management depends on level of financial support, whereas fuel wood goal success depends more on the technology (could also relate to financial support).
Bolivia	No	Domestic activities identified, such as increase of forest cover by 1.5 million ha, improved environmental function on 29 million ha, implement integrated and sustainable community management on 13.8 ha, but no corresponding budget	Goals requiring international cooperation (by 2030): Community forest management increase sevenfold; timber and non-timber production to increase by 40%; double food production from the integrated management of forest and agricultural systems; reforestation of 6 million hectares by 2030.	Yes, as per goals in previous cell.
Brazil				Implementation of NDC is not contingent upon international support, yet it welcomes support from developed countries with a view to generate global benefits. Forest sector: implementation of REDD+ activities and the permanence of results achieved require the provision, on a continuous basis, of adequate and predictable results-based payments in accordance with the relevant COP decisions.'
Burkina Faso	Yes	Not identified. Already seeking to fund Strategic Framework for Investment in Sustainable Land Management (SFI-SLM), with a budget of 869 billion CFA francs for five years. Adaptation measures can build on that.	Agric and water mgmt sector: US$385 million in 2020, rising to US$1.15 billion by 2030. Forestry and land use change sector: $345 million in 2020, rising to $903 million by 2030. Subtotal for AFOLU sectors: $954 million in 2020, and $2.7 billion in 2030. Bilateral, multilateral and GCF will be key sources.	Yes. (1) Unconditional scenario: GHG emissions reductions of 7808 Gg per year in 2030, i.e. 6% when compared to BAU, for US $1.25 billion. Includes mitigation: REDD+/FIP, NAMA initiative and potential CDM projects in the growth sectors such as mining. (2) Conditional scenario reduces GHG emission by an additional 5%, for an additional $756 million. (3) Third scenario leans heavily on adaptation measures, reducing GHGs by 36.95% from BAU, for US$5.8 billion.
Cambodia		Will identify domestic sources as part of updating Climate Change Financing Framework to reflect NDC. In 2012, expenditure on climate related policies and actions was 6.5% of public expenditure, or 1.31% of national GDP	US$1.28 billion for mitigation and adaptation in all sectors, but anticipate int'l portion is 40% of total climate related investment. REDD+ investment already being made.	40% of total climate related investment
Cameroon	PNIA costs to implement: US $ 25 billion) over the period 2014–2020. Forest and wildlife strategy	NAP identifies need to evaluate the costs, financing, and concrete measures, new incentives created to	Not clear %, but likely the majority.	CPDN seeks 32% reduction from BAU in 2035, most of which will need to come from int'l donors and multi-laterals.

	(2013–2017) is estimated at US $ 388 million (some from REDD + ??). Adaptation: agric is $385 million (21% of budget), forestry is 150 million (8%) of budget for 2016–2020.	adaptation resilience (Strategic focus #3). Will increase budgetary funding – either of direct budgetary expenditure or other funds from the State budget.		Cameroon will increase its budgetary funding for actions of this CPDN that fall within the competence of the State and that international assistance could not be financed.
Central African Republic	Mitigation: US $2.248 billion (2015–2030) Adaptation: US $1.554 billion (2015–2030). Based on detailed budget, forest sector activities identified and costed total US$80,000,000 for mitigation activities and US $118,000,000 for adaptation.	10% is envisaged as domestic contribution. Awareness programme for the cessation of slash-and-burn agriculture (US$2.5 million) and National programme for reforestation and rehabilitation of post-exploitation areas (US$ 20.75 million) are unconditional.	Mitigation: US $2.022 billion is conditional (89%). Adaptation: US $1.441 is conditional (93% of budget). Programme for the advanced conversion of wood, cookstoves and biofuels programme requires int'l support	Yes, 89% of mitigation and 93% of adaptation costs are dependent on int'l finance
Chad	Yes, both conditional and unconditional.	US $ 523 million for mitigation; US $2.79 billion for adaptation. Established a Special Fund for the Environment (FSE) in 2013, in order to mobilize its own resources through the establishment of specific taxes.	US $ 6.540 billion out of US$7.063 billion for mitigation; US$11.380 out of US$14.170 billion for adaptation	Unconditional emission reduction of 18.2%, and 71% conditional, of the country's emissions compared to the reference scenario by 2030. Total implementation cost of the NDC: 21.233 billion USD, of which 17.920 will be used to achieve the conditional objectives
Chile	Will be identified in 2018.	Chile passed a tax law in 2014: US$5/$tCO_2$ (Law 20.780, came into effect Jan 2017). In 2018, Chile will report a cross-sectional National Finance Strategy for Climate Change, and intends to identify structure the financial flows according to their origin, differentiating between national vs. international and public vs. private spending; and eventually, according to its performance.	Not yet identified	Not yet clear, and Chile has already taken solid steps on its own.
Costa Rica	Not yet	Defining National Adaptation Plan in 2018, will do costing then.	Not yet identified	Costa Rica proposed since 2007 to compensate its emissions through the removal or offsetting by the forest sector. The goal proposed is to achieve Carbon Neutrality by 2021 with total net emissions comparable to total emissions in 2005.
Cote d'Ivoire	The overall cost of the 2010–2015 NIP is estimated at CFAF 2040 billion (US $3.2 billion)(expect same for PNIA 2016–2020). The low carbon orientation of future plans should be distilled on all components, and National Agricultural Investment Plans (NIPs) with strategies to limit deforestation (REDD + process). US$29.1 million for forest sector adaptation activities.	Will play its part in financing the actions that fall within the state budget. Can take the form of direct fiscal spending channelled through specific funds including funded from the state budget. Identifies need to track income and expenses on climate in the national budget. Expected to begin integrating activities into National Development Plan (PND) 2016–2020	Not clearly defined in this draft, but would likely occur after defining operational plans as part of integrating into National Development Plan (2016–2020). Will seek support from donors and TFP (grants, loans and technical assistance) for the financing and access sovereign loans from Development Finance Institutions (DFIs)	28% reduction in low-carbon scenario emissions compared to a baseline scenario (BAU) represents a significant effort for a country with a world-wide 148th (2014, PPP) GDP per capita.
El Salvador	Financing for key agriculture, forestry and "Landscapes sustainable and resilient to climate change" effort are outside the scope of national finances.	Will consider how to support activities with national finances, but do not quantify amount. Will look into resource management modalities such as Debt Swaps for Adaptation to Climate Change to support national priorities.	Largest portion must come from int'l community. Amount not quantified.	NDC emphasizes that ability to reach ambitions will depend on how the developed country Parties commit financial resources and transfer of technology. Parties must also take fully into account that economic and social development and the eradication of poverty are the first and overriding priorities of developing countries.
Ethiopia	As cornerstone of NDC is the CRGE Strategy, overall financing needs have been identified (are not listed in NDC)	Ethiopia has already removed fossil fuel subsidies, to promote clean and renewable energy, yet 76.7% of the population currently lacks access to modern energy sources, relying on wood fuel (rural energy access a priority).	Appears most funding will need to come from bilateral and multilateral channels. Climate Resilient Green Economy Facility (CRGE Facility) has been set up as a mechanism to mobilize finance from various sources.	Ethiopia has an overall goal of 64% reduction from the BAU scenario in 2030 + adaptation, and does not differentiate levels of ambition based on % of int'l support (likely due to its heavy reliance on the int'l community to help achieve its national goals).
Fiji		10% of the 30% emission reduction target is unconditional (achieved with domestic resources).	20% of the 30% emission reduction target is conditional (US$500 million from int'l sources). Looking to improve access to global financing facilities such as GCF.	From the 30% emission reduction target, 10% will be achieved through the implementation of the Green Growth Framework, utilizing resources available in country (unconditional) whereas the remaining target can only be met with the availability of external funding amounting to US$500 million (conditional).
Gabon	As most land use sector interventions have been implemented as regulatory steps, finance needs are directed more to the energy and other sectors that can contribute to sustainable development.	Already have committed funds from the state budget to achieve 2002 and 2012 reforms on land use change though more may be necessary (and not identified in NDC).	Amount not specified, but likely a high % of the cost, and intention is for GCF funds	65% reduction between 2010 and 2025, compared to the trend (BAU) scenario. Gabon's commitments relate exclusively to its GHG emissions, excluding carbon

				storage by biomass (which is significant).
Ghana	For forest and agriculture sector activities, a total of USD 9.47 billion is required.	Overall, USD 6.3 billion of USD 22.6 billion (27.9% of total needed) – $2.02 billion for mitigation and $4.21 for adaptation. In agric and forest sectors, unconditional contribution is US$4.25 billion.	Overall, USD 16.3 billion of USD 22.6 billion (72.1% of total needed). In agric and forest sectors, conditional contribution sought is US$ 5.17 billion.	Unconditional emission reduction of 15% + an additional 30% with conditional support, to reach a 45% reduction from BAU expected by 2030. Adaptation is largest finance need.
Guatemala	National Action Plan for Climate Mitigation and Adaptation identifies institutional strategic plans for reducing vulnerability, adaptation and mitigation to climate change linked to national planning and the budget of the Nation.	Amount not specified. National Fund for Climate Change (FONCC) is key for the implementation of the law (Article 24), National Conservation Fund (FONACON) and the National Fund for Disaster Reduction. Also PINFOR, debt for nature swap with US, etc. All can funnel domestic and int'l funds for climate, but must go through Budget of Income and Expenditures of the State.	Amount not specified, but calls upon int'l community to support climate goals, under common but differentiated responsibility.	Yes, unconditional is 11.2% of GHG emission reduction from BAU by 2030. Conditional is 22.6% emission reduction from BAU by 2030.
Guyana	Costs TBD. Progress since 2008 has been via Low Carbon Development Strategy (LCDS), mostly financed by Guyana REDD+ Investment Fund (GRIF) resources earned under the Guyana Norway Agreement (GNA).	There are REDD+ and FLEGT activities that are funded through national budget or already supported through bi-lateral agreement (GNA).	Based on Proposed REL for REDD+, Guyana can continue to avoid emissions in the amount of 48.7 $MtCO_2e$ annually if adequate incentives are provided. Conditional US$ 1.6 billion for adaptation activities and to implement Climate Resilience Strategy and Action Plan (CRSAP).	Yes, as per previous column + focus on 100% renewable energy by 2025.
Honduras	Not yet, but Investment Plan to be completed, based on prioritized actions in a range of planning areas. Expenditure review on climate.	Afforestation/reforestation of 1 million ha of forest Before 2030. NAMA on efficient stoves. Reduce firewood consumption by 39% among households.	Not yet determined, but Investment Plan to be completed. Expenditure review on climate.	Yes, 15% emissions reduced from the BAU scenario by 2030 is dependent on Int'l climate finance.
Indonesia	Not explicit, but clearly already using domestic finance, and clearly stating additional conditional need.	Will allocate USD 55.01 billion for the period of 2015 to 2019. Will continue to set aside significant national funding for the implementation of mitigation and adaptation actions for the period of 2020–2030	60% of the conditional emission reduction is in the area of forestry and peat fire emissions (energy is much less, at 36%), and requires int'l support. Indonesia is 'ready for results-based payments,' and REDD+ should be able to support the achievement of Indonesia's emission reduction target in the forestry sector.	2010 pledge: 26% emissions reduced (41% with international support) against the BAU scenario by 2020. NDC pledge: unconditional reduction target of 29% and conditional reduction target up to 41% of the business as usual scenario by 2030.
Kenya	No details, just the overall US$40 billion by 2030 figure.	Will have domestic contribution, but portion of the US$40 billion to 2030, is not clear. Overall goal is NCCAP and low carbon, resilient development in Vision 2030 – national priorities, but mitigation potential is dependent on support.	USD $40 billion for mitigation and adaptation up to 2030, but details, and domestic portion of that not clear.	30% emission reduction by 2030 relative to the BAU scenario, mainstreaming climate change adaptation into the Medium Term Plans (MTPs). Mitigation potential dependent on support (as is adaptation). Kenya Climate Fund to be a financing mechanism for priority climate change actions.
Lao PDR	Yes, forest mitigation: USD180 million (assuming cost for forest management is approximately 10.84 US$/ha), excluding costs for plantations. ADAPTATION: Agriculture: US$ 709 million (2007–2030). Forest and land use change: US$ 40.5 million (until 2020).	NSCC is climate strategy. Allocating USD 12 million annually for disaster emergency response plans, so Lao taking steps even without int'l assistance.	Reforestation and forest maintenance, REDD+ and FLEGT, are a major challenge to finance domestically, and require int'l support.	Mitigation and adaptation policies and actions is US$ 1.4 billion and US$ 0.97 billion. Lao PDR supporting activities with USD $12 million annually. Gap must come from int'l finance. Investment needs to be further refined.
Madagascar	Yes.	In last five years, losses and damages from floods and cyclone events US$ 470–940 million/year. No estimates of adaptation costs yet. Will contribute 4% of NDC costs from domestic sources. Will create a national financial mechanism for climate finance	Adaptation cost: US$ 28.7 billion. Mitigation: US$6.3 billion. Technology, research, capacity-building is US$6.9 billion. Total for NDC: US$42 billion, 96% of which must come from int'l finance, multilateral and bilateral sources.	14% emission reduction compared to BAU by 2030, + additional increase of 32% of the absorptions of the LULUCF sector.
Malaysia	Not in NDC	Bio-diesel B7 Programme- 7% palm biodiesel, the rest fossil fuel. During the Tenth Malaysia Plan, Malaysia spent RM51 billion (US$ 11.4 billion) to enhance resilience against climate change. 35% of the 45% intensity goal is unconditional.	10% of the overall goal of reducing GHG emissions intensity of GDP by 45% by 2030 (relative to the emissions intensity of GDP in 2005) is conditional.	Reduce GHG emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005; unconditional is 35% and 10% is conditional upon receipt of climate finance, technology transfer and capacity building from developed countries
Mexico	Not in NDC	25% of GHGs and Short Lived Climate Pollutants emissions (below BAU) for the year 2030 (implies a reduction of 22% of GHG and a reduction of 51% of Black Carbon). Instituted a carbon tax in 2014.	With int'l assistance, can bring 25% goal up to 40%; meaning GHG reductions of 36%, and Black Carbon reductions of 70% in 2030. Technology transfer and finance key to achieve actions in ecosystem-based adaptation, social sector, and strategic infrastructure and productive systems	Goal is 50% of emissions reduced from 2000 levels by 2050 (mandated by LGCC). NDC: 25% of emissions reductions unconditional, while 40% emission reduction goal is conditional.
Mongolia	Mitigation TBD. Adaptation: US$ 31 million	Further refinement of domestic resource allocations TBD	80% of adaptation needs, likely a large portion of mitigation needs.	14% emission reduction from BAU by 2030, excluding LULUCF, amounting to US$ 3.5 billion. Adaptation: Up to 80% of the US$3.4 billion (between 2021 and

				2030) expected to be financed from international sources and donor institutions
Morocco	Adaptation: minimum US$ 2.5 billion for the most vulnerable sectors: water, forestry and agriculture, reaching US $35 billion between 2020 and 2030. Forestry mitigation: Roughly 11–12% of US$ 50 billion. Conditional: US $4.87 billion. Unconditional: US$ 2.17 billion.	Unconditional reduction target of 17% below BAU levels by 2030, taking into account 4% reductions in AFOLU. US $26 billion unconditional	Roughly half (US$24 billion) of mitigation goal conditional on int'l support.	42% below BAU levels by 2030. Cost: USD 50 billion, of which USD 24 billion would be conditional on international support made available through new climate finance mechanisms, including the GCF.
Nepal	No amount specified.	Pursuing climate budget code in its fiscal planning and budgeting processes. The Climate Change Policy mandates over 80% of the total climate finance to grassroots level activities.	To achieve all goals, and reduce dependence on biomass, while achieving 80% electrification by 2050, and reducing fossil fuel dependence by 50%, Nepal requires international grant support from bilateral, multilateral and other sources.	Yes, int'l finance crucial for Nepal to take these steps.
Pakistan	Total cost identified, but not broken down.	Federal climate-related expenditure was 5.8 and 7.6% of the total expenditures in 2015 federal budget (mostly energy and transport).	Adaptation: U$ 7 to U$ 14 billion/annum.	Up to 20% emission reduction from BAU in 2030, cost is US$ 40 billion. Mitigation potential can only be realized through international support (grants, technical assistance, technology development and transfer and capacity building)
Panama	Require US$ 2.225 billion for LULUCF interventions, 10% of which is unconditional and the remainder to reach 80% sequestration increase by 2050 is conditional on international finance.	Donated US$ 1 million to GCF, and will provide US$ 250,000 for the operation of ICIREDD, which will be responsible for implementing innovative market mechanisms to facilitate reduction international issues. Already have US$ 20 million for Alianza por el Millón reforestry activities.	Conditional: increase absorption capacity of LULUCF sector by 80% with int'l assistance. Adaptation also requires int'l assistance.	Part of Panama's commitment is to shorten the navigation distance of 5% of world trade, thereby emissions of the int'l maritime sector. LULUCF: Increase absorption capacity of LULUCF sector by 10% from baseline, by 2050 (unconditional) and up to 80% from baseline with international support. Energy: By 2050, 30% of the installed capacity of the power matrix must come from other types of renewable energy sources.
Paraguay	National Forestry and Reforestation Plan seeks a certification scheme. Funding to the National Development Bank of US $ 40 million for the forestry plantations for energy and timber, thus placing less pressure on native forests	Not clearly identified, but presumably the US$ 40 million to the National Development Bank for the forestry plantations for energy and timber is considered as such.	Though no financing amount is identified, NDC makes clear that key sources should be Green Climate Fund, Adaptation Fund, mechanisms for market and non-market, GEF, etc. Also seeks increase in national revenues from the sale of environmental services (credit for carbon sinks)	20% emission reductions from BAU by 2030; half of which is a unilateral target, and the other half is a conditional target.
Perú		20% reduction (out of 30%) will be implemented through domestic investment and expenses, from public and private resources	10% reduction (out of 30%) based on international financing (but not commitments that might result in public debt). REDD+ finance crucial.	30% emission reduction from BAU (from 2010) by 2030. 20% reduction will be implemented through domestic investment and expenses, from public and private resources (non-conditional proposal), and the remaining 10% based on international financing (conditional proposal).
Papua New Guinea	No	Little domestic funding is available, but will be provided where possible.	REDD+ finance crucial, as PNGs focus for mitigation is LULUCF. For 100% renewable energy goal, must work with PNG Power to finalize a plan. Also, adaptation is a priority, and PNG will need financial support, capacity building and technical support.	100% renewable energy by 2030, contingent on funding being made available. Primary mitigation effort through reduced emissions from LULUCF. Effort contingent on external, adequate and predictable funding. In addition it is likely that in the near term GHG emissions will need to rise with economic growth to enable severe developmental problems to be resolved.
Rwanda	Only for agric, as part of costing of implementing the Green Growth and Climate Resilience strategy	Already supporting infrastructure and social services contributing to low carbon growth and resilience to climate change	Full implementation of NDC will require predictable, sustainable and reliable support in the form of finance, capacity building and technology transfer.	Costing of implementing the green growth and climate resilience strategy indicated that Rwanda will need US$ 24.15 Billion for water resource management, agriculture and energy up to 2030. Costing of the remaining sectors still to TBD
Sri Lanka	Financing TBD once detailed NDC plan done.	Seek a methodology at national level to identify financing needs for each sector and the divisions of contribution at the national budgetary level, and the evaluation of the feasibility and availability of international funding.	Ambition will be higher based on international support. Enhanced finance for adaptation and low carbon development necessary to achieve conditional targets.	Reduce the GHG emissions against BAU scenario by 20% in the energy sector (4% unconditionally and 16% conditionally) and by 10% in other sectors (transport, industry, forests and waste) by 3% unconditionally and 7% conditionally by 2030.
Uganda	Adaptation: US$ 2.4 billion over the next 15 years. Mitigation: total costs TBD; renewable energy installations est. US$ 5.4 billion over the next 10	30% of implementing National Climate Change Policy to come from domestic sources over next 15 years.	70% of implementation costs for National Climate Change Strategy to come from int'l sources – both climate	22% reduction of national GHGs in 2030 compared to BAU. LULUCF included.

	years, forest sector (in NCCP) costed at US$ 36 million.		finance instruments and international market mechanisms	
Vanuatu			Electricity and energy goals costed. Adaptation: US$9.5million per year, largely from int'l donors.	Seek close to 100% renewable energy in the electricity sector by 2030, and energy sector emission reduction of 30% by 2030.
Viet Nam	No cost estimates	Unconditional goal is 8% emission reduction by 2030 compared to BAU. Adaptation: Viet Nam to finance 1/3 of requirement with domestic support.	Conditional goal is emissions reduced by 25% with international support. Adaptation: 2/3 of requirement to come from int'l sources.	Yes, as per goals in previous cell.
Zambia	Goals/actions, but no costing	US $15 billion out of US$ 50 billion to be mobilized from domestic sources.	US $35 billion out of US$ 50 billion to be mobilized from external sources.	Reduce emissions by 25% by 2030, against 2010 levels, or by 47% with international support. US$ 50 billion by the year 2030 – USD 35 billion from external sources, $15 billion will be mobilized from domestic sources.

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