Policy brief
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AMAZONIA SECURITY AGENDA

Assessing policy coherence in Brazil, Colombia and Peru using a Water-Energy-Food Nexus approach

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Key points

- National development policies will need to recognise and account for the strategic importance of the Amazon biome and its environmental services - particularly water - in future energy and food security agendas.
- The reliance on water resources for biofuel production and hydropower generation, coupled with increasing demands by industry and urban centres, is a unifying factor across sectoral policies and highlights the need to strengthen integrated water management agendas in Amazonia.
- Amazonia contains particular sub-regional dynamics and realities - in terms of infrastructure, access to technical assistance, credit and human capital - that require differentiated development models and tailored policy instruments.
- Granular zoning and land use plans can support policy implementation and direct opportunities towards sustainable agricultural production, forest restoration and resource management in accordance to socio-ecological capacity.
- Improving supply chain transparency and monitoring systems is a critical step for identifying interdependencies among actors who have shared interest and impact on productive landscapes in the region.
- Recent public-private commitments and financial pledges to tackle deforestation offer an opportunity for aligning current national development and climate plans, and fund the implementation of these key policy instruments.
- In this context, efforts are needed to strengthen the inclusion of socio-environmental safeguards in public-private financing mechanisms to incentivise the transition to more sustainable practises and supply chains.
- Regional cooperation is necessary to reduce and reverse environmental degradation and address leakage across the Andean-Amazon-Cerrado ecosystems, and to support transnational watershed management.
- Building on and strengthening existing platforms (for example, CIAM, GCF, ACTO) that bring together key actors including national and sub-national governments and the private sector to improve coordination and integrate water-energy-food nexus thinking will be fundamental.

Introduction

Amazonia is an expanse of tropical forest spread over 550 million hectares (ha) and shared by eight countries. Its abundant natural resources and ecosystem services underpin water, energy and food security, as well as economic prosperity across the region.[1] In particular, this biome is fundamental in guaranteeing climate mitigation and for securing water resources, by recycling rainfall, and purifying and regulating water flows, that are essential for agricultural production, industry, energy generation[2] and human wellbeing.[3]

Yet, the accelerated growth of the agriculture and extractive sectors, infrastructure developments, migratory flows and urbanization, coupled with weak governance and land tenure conflicts, have put greater demands on Amazonia's natural resources. This has resulted in significant forest loss, estimated at over 75 million ha since 1978.[4] These dynamics, exacerbated by climate extremes such as El Niño and climate change, are undermining the region's long-term capacity to deliver key ecosystem services necessary for water, energy and food security.[5]

While annual rates of deforestation in Amazonia have decreased since 2004 - largely attributed to reductions in Brazil, agricultural frontiers continue to expand and shift across ecosystems; evidenced by peaks in deforestation across the Peruvian Andean-Amazon region, and a shift in deforestation between the Amazon and Cerrado in Brazil.

Efforts to address these dynamics have been strengthened by recent high profile international pledges[6] and Nationally Determined Contributions (NDCs) under the United National Framework Convention on Climate Change (UNFCCC).

At the forefront of climate commitments are Brazil, Colombia and Peru, who share over 80% of Amazonia and cumulatively have lost an estimated 3 million ha of forest per year between 2001 and 2014.[7] These countries are implementing a number of cross-sectoral policy reforms to achieve notable GHG emissions reductions[8] over the next decades, with strong emphasis on preserving forest ecosystems. Colombia and Peru have pledged to achieve zero net deforestation by 2020 and 2021 respectively, and Brazil to end illegal deforestation by 2030.

However, balancing commitments to reduce agriculture, forestry and other land use (AFOLU) emissions, which account for 58% of total emissions in Brazil[9] and Colombia[10], and 61% in Peru[11], with ambitious national development plans[12]; infrastructure investments; and renewable energy objectives, particularly biofuels and hydroelectricity, will be extremely challenging - further compounded by climate change and climate extremes.

Reconciling these potentially competing demands will require a better understanding of resource-use trade-offs, more effective cross-sectoral and multi-scale coordination, and a new security agenda that considers Amazonia's central role in generating and maintaining vital ecosystem services.[13]

In an effort to inform this agenda in Amazonia, a policy coherence analysis[14] was undertaken for Brazil, Colombia and Peru using a water-energy-food (WEF) nexus framework (see Box 1). National development, conservation and climate (adaptation and mitigation) policies (see Appendix 1 on page 9), and their key objectives and targets across land-based and energy sectors relevant to Amazonia's natural resources were initially mapped and then screened to identify policy synergies and conflicts related to water, energy and food security. Government consultations and multi-stakeholder discussions were also undertaken to deepen this analysis.[15]

This brief discusses policy coherence across:

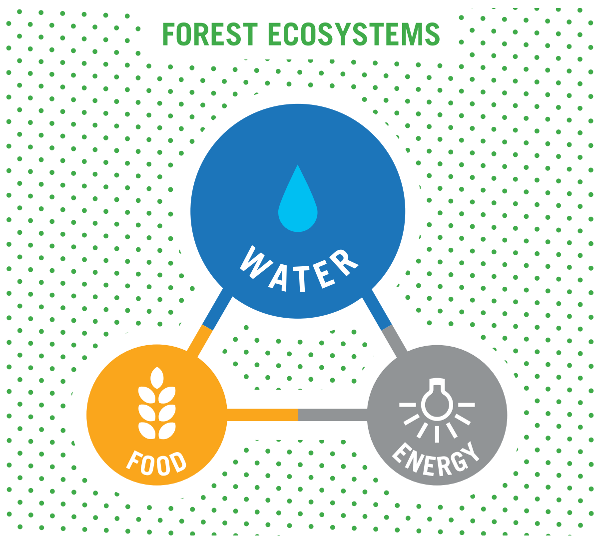
1. National sectors (horizontal analysis);
2. Scales of governance, in particular between national and Amazonian department/state governments (vertical analysis);
3. Public-private-civil society actors and initiatives (stakeholder analysis).

Insights on key policy synergies and trade-offs across the three countries, along with preliminary recommendations to improve water, energy and food security in Amazonia, are summarised in this brief.

Figure 1. The Amazon biome covering 4,196,943 km^2(49.29 %) of Brazil, 484,208 km^2 (42.4%) of Colombia and 732,804 km^2 (57.3%) of Peru.

Box 1. The Water-Energy-Food Nexus

The water-energy-food (WEF) nexus is an approach that can support decision makers in evaluating and accounting for resource trade-offs across different economic sectors, recognising the interdependencies between water, energy and food systems and natural resources.



For example, water is vital for agricultural production and power generation. However, agriculture and energy uses may compete for the resource, with significant trade-offs. Forests play a vital role in water security (and thus food and energy security) through their water regulation and purification services. Agricultural land conversions for energy (biofuels) and food can impact the availability of water resources through associated deforestation and sedimentation.

Water-energy-food policy coherence in Amazonia

Horizontal analysis: coherence across national sectoral policies

Climate and development policies in Brazil, Colombia and Peru have prioritised reforms in the agricultural sector given the economic contributions of commercial crop and cattle production[16] and its significant role in driving forest loss and associated carbon emissions in Amazonia.[17] These include, among others, measures to intensify production, recover degraded land for further expansion, introduce no-till agriculture, and improve soil/pasture management and pesticide use.

Overlaps between the agriculture and energy sectors in national low-carbon development policy are evident across the three countries given biofuel feedstock targets and the application of fuel blending (biodiesel and ethanol) mandates as part of energy efficiency and diversification efforts.[18]

As such, increases in planted forests, soy, sugar cane and palm oil production are envisaged to meet both domestic energy consumption and export demands.[19] In Brazil for example, the current contribution of biofuels is set to expand from 16% to 18% until 2030, with increases of 700,000 ha for sugar cane and 22 million ha for soy by 2023/2024.[20]

However, future biofuel expansion scenarios under climate mitigation objectives present contradictions, given their historic and ongoing expansion in Amazonia; this is evidenced most recently in Peru where 72% of the current oil palm expansion has occurred at the expense of forest ecosystems.[21] Studies[22] also point to complex links[23] between biodiesel production and indirect land use change in Amazonia as a result of the displacement of other crops/pasture into forestland.[24] These dynamics raise questions over the role of biofuels in reducing GHG emissions under current low-carbon development models in the region.

Furthermore, the expansion of agriculture under monoculture systems such as soy and sugar cane can be detrimental if it competes for water and land with, or displaces other crop varieties and farming systems that can contribute more directly to local food security and climate resilience.[25] This is particular the case in semi-dry regions comprising the state of Maranhão, Tocantins, Piauí and Bahia (MaToPiBa) in Brazil for example, where soy expansion has shifted in recent years and ground water demands are increasing, threatening longer-term agricultural sustainability.

More importantly, evidence shows that the replacement of forest for agriculture purposes, in particular where land is unsuitable for such activities, will undermine key ecosystem services related to water regulation, nutrient recycling, soil fertilisation and pest control,[26] and ultimately the availability and quality of water resources. Because both biofuel and food crops are predominately grown under rain fed conditions[27] and therefore depend on renewable water sources in the Amazon basin,[28] ongoing forest loss and climate change pose considerable food and energy security risks.

Reduced water volumes and sedimentation associated with land use change can further impact energy security linked to hydropower generation, which currently forms the backbone of electricity sources in Colombia, 64%[29], and Peru , 53%[30], and is set to expand to 86%[31] in Brazil.

In the case of Brazil and Peru, much of future renewable energy generation envisaged under energy and climate mitigation plans[32] will be sourced from hydropower dams in the Amazon region,[33] which will exacerbate local water and food security risks.[34] While at the national level the introduction of hydropower and associated road infrastructure can contribute to agricultural production by facilitating connectivity and reducing transport costs, providing energy for industry and in some cases irrigation, such plans generate significant local trade-offs that undermine current efforts to address ecosystem degradation more broadly.[35] Hydroelectric dams are linked to increased forest access and migratory labour flows[36] with concomitant pressures on forest resources; flooding can cause further biodiversity loss,[37] reduce land availability and displace communities and their livelihoods.[38] As such, the trade-offs between pursuing renewable energy sources to meet national development goals and the impact on forest ecosystems and livelihoods, highlight the importance of improving land use planning and impact assessments that account for a multi-scale WEF nexus thinking.

Importantly, land use zoning plans are being elaborated. The existence of agro-ecological zoning for sugar cane and the soy moratorium in Brazil are examples of efforts to exclude expansion in the Amazon biome. However, the effectiveness of these restrictions have been questioned given the production shifts into other biomes, as evidenced by the movement of soy and cattle supply chains into the Cerrado in Brazil, and that these plans stop short of determining the type of agricultural systems or sustainable practices that need to be employed. Furthermore, while sustainability plans for road infrastructure (e.g. Sustainable Regional Development Plan for key BR-163 Cuiabá-Santarém highway) as well as alternative infrastructure (e.g. railroads, fluvial networks) are being contemplated in efforts to mitigate the strong links between increased access and deforestation, current zoning does not limit the expansion of infrastructure.

Efforts to improve planning and regulation in key production and deforestation hotspots in Amazonia are further undermined by the lack of comprehensive soil classification and environmental impact studies needed to determine the capacity to sustain certain agricultural practices and meet long-term renewable energy targets in forest landscapes.[39] Such mechanisms are being developed across the region but will need to be prioritised and fast-tracked to manage land-use trade-offs and support climate mitigation efforts.

Current sustainable agriculture plans and mitigation policies across Brazil, Colombia and Peru that promote improved soil management practices, the restoration of degraded land as productive forests, agroforestry or high-yield systems,[40] can if adequately planned and regulated, complement multiple environmental and development objectives. They do so by reducing pressure on primary forests and slowing the advance of the agricultural frontier, helping maintain key ecosystem services; increasing energy and water use efficiency; improving agricultural productivity; and strengthening climate resilience by diversifying livelihood opportunities.

There are also clear opportunities for synergies between water, energy and -food supply and forest-dependent livelihoods in existing conservation agendas that preserve forests as 'natural infrastructure' and account for the important role of forest communities in managing natural resources. In Colombia protected areas are expected to increase by 2.5 million ha; similarly, in Brazil they are set to cover 60 million ha by 2020 (30% of the Amazon). These policies also seek to protect key watersheds and moorlands, at times in conflict with existing energy development plans as is the case of Colombia mining permits in protected areas.[41]

Yet the poor implementation of environmental safeguards under Peru's forest law or their potential removal through PEC 65 in Brazil for example,[42] as well as and weakening of regulation (like Brazil's New Forest Code which has reduced the area to be reforested from 50 million ha to 21 million ha), undermine progress toward WEF security.

Vertical analysis[43]: policy coherence across scales of governance (regional- national - subnational)

Coordination between sectors and actors across different scales is a critical step towards ensuring that national development and climate targets are effectively implemented.

Decentralisation efforts across the region are an ongoing process; many enforcement and governance functions have been transferred to state/departmental governments, albeit with remaining challenges related to the lack of technical and financial capacity.[44]

In terms of climate and conservation, national and subnational policy objectives are relatively coherent, largely because the ministries and working groups in each respective country have undertaken strong top-down coordination with the subnational governments. An analysis of subnational policies in the state of Acre and department of Ucayali vis a vis national/federal policies show strong coherence in watershed management, climate mitigation and adaptation plans, land use zoning and monitoring mechanisms.

However, some subnational governments in Amazonia have been pursuing development agendas that are contradictory to national climate change commitments, although they align with overall national development goals. This is the case of departments of Loreto and Ucayali in the Peru Amazon which has seen an intensification of agribusinesses (in particular palm oil), incentivised by a number of national and subnational agricultural policies further influenced by national renewable energy targets. This has been largely at the expense of primary forests and thus incoherent with national zero deforestation objectives.[45]

Nonetheless, there are examples of progressive sustainable landscape reforms being pursued by subnational governments in Amazonia that have played a key role in curbing deforestation and provide important lessons.[46] For example, the Municipios Verdes program in Para, Brazil, where the government is promoting sustainable development linked to reductions in deforestation at the municipality level.[47]

Most notably in Brazil and Peru, subnational governments have also taken significant steps alongside broader sustainable development agendas in developing REDD+ frameworks, at times outpacing national processes. The case of the state of Acre in Brazil highlights, however, the challenges of vertical coordination. On the one hand, the state government has established ambitious targets to reduce deforestation,[48] strengthened protected areas,[49] and promoted watershed conservation and resilience to climate change in line with national objectives.[50] They have also received performance-based payments from KfW REDD Early Movers programme through the ISA carbon programme,[51] which have been key in strengthening institutions, safeguards and forest monitoring systems, as well as for incentivising a regional forest-based economy.[52] Yet, these advances are not clearly embedded within the federal framework, which could mean that carbon credits and existing market mechanisms created sub-nationally in Acre, may not be considered in a final Brazil's national REDD+ policy.

The analysis also points to capacity and financial resource gaps that could undermine progress towards coherent multi-scale governance. This is especially evident in the Colombian Amazon, historically a conflict zone, with ineffective implementation and articulation of sustainability policies. In a post-conflict development scenario, effective implementation will require strengthened national enforcement and monitoring institutions, and effective multi-stakeholder participation.

Regional and Pan-Amazonian platforms can help coordinate policy and transnational cooperation to build momentum behind common agendas such as watershed management and to address leakage across the shared biome, as well as share knowledge and technical expertise. Examples include the partnership of subnational jurisdictions of the Governors Climate Taskforce (GCF), and Peru's National Inter-Amazonian Council (CIAM); as well the Amazon Cooperation Treaty Organization (ACTO) at the intergovernmental level, which promotes interregional deforestation monitoring for example.

Stakeholder analysis: coherence across public-private-civil society actors

It is increasingly understood that the private sector is a significant user of natural resources and therefore, alongside governments, has an important role in managing resource risks and trade-offs.

A number of public-private partnerships and corporate schemes,[53] supported by civil society, currently bridge diverse industry actors in establishing commitments on sustainable production, finance and procurement policies that ultimately seek to decouple supply chains from deforestation impacts.[54] These include the Consumer Goods Forum and New York Declaration on Forests.[55]

Recognising the operational, reputational and legal risks of unsustainable practices for companies has been a push factor behind industry-led policy commitments and certification schemes across different supply chains (for soy, palm oil, sugarcane and cattle) in Amazonia.[56] Such initiatives are also increasingly directed toward addressing deforestation as part of sustainable development models at the subnational level.[57]

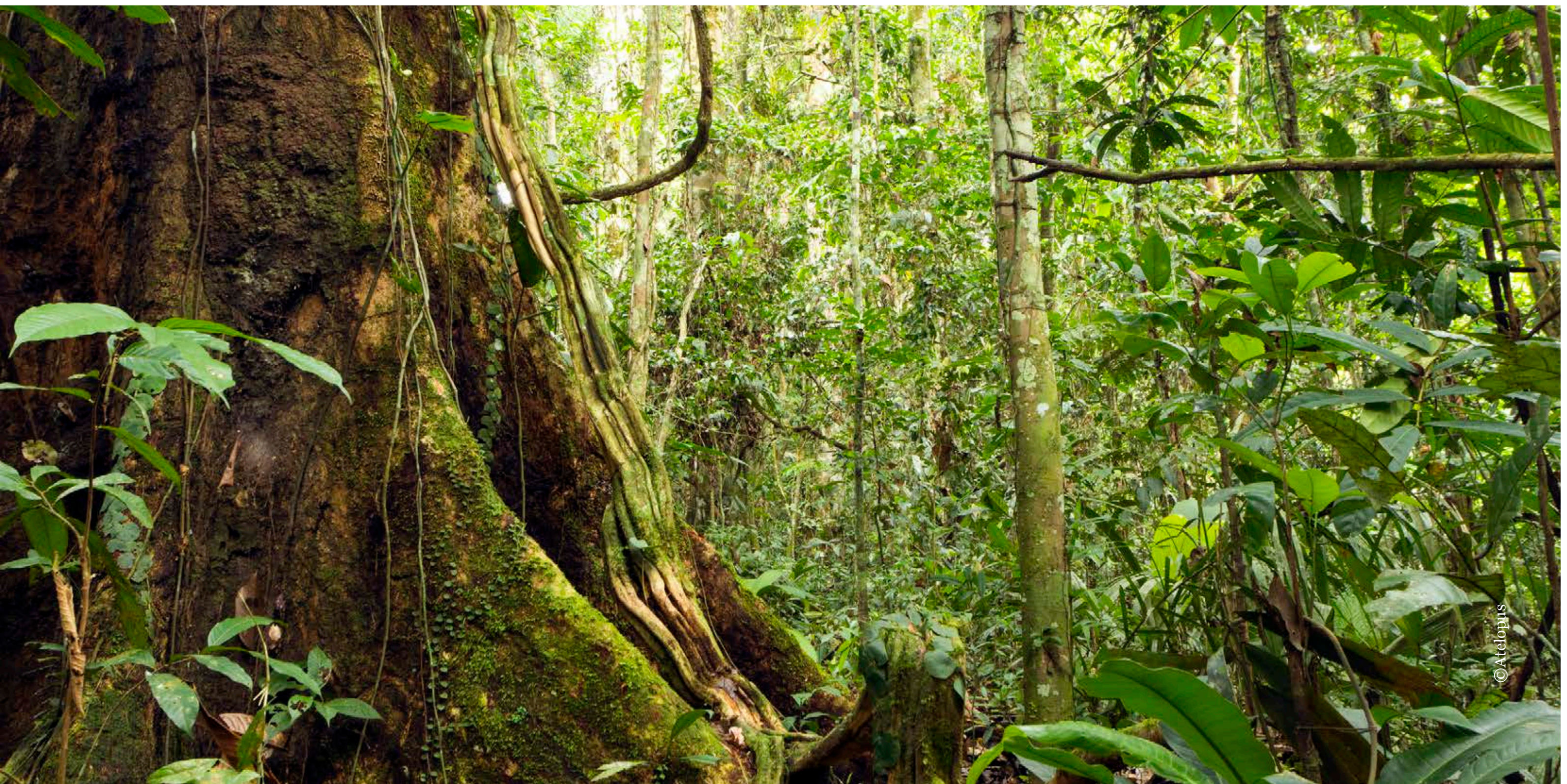
The most significant and arguably effective of these examples has been the soy moratorium in Brazil that was first implemented in 2006.[58] Under this commitment, soybean producer groups and traders, with support from civil society and government, banned the purchase and finance of soybeans produced in newly deforested areas of the Brazilian Amazon.[59] The dominance of a handful of traders and pressure from international export markets, who are willing to cover greater sustainable production costs, has supported the success of the soy moratorium. Since its implementation, it is estimated that deforestation directly caused by soy cultivation in the Amazon is less than 1% of total deforestation.[60]

Whilst these complement national and subnational deforestation and climate goals, supply chain initiatives in the region tend to be fragmented across jurisdictions and actors; for example, in Colombia, public-private cattle sustainability initiatives that seek to intensify production through silvopastoral systems[61] are not active in the Amazon, and have had limited engagement with small and medium producers in the region.

Costs remain a significant barrier for the production of sustainable commodities particularly for smallholders, who lack access to finance and technical support, and for products destined for domestic markets, where consumers are less willing to cover higher costs. Accessing credit to finance transitions to sustainable production is largely determined by land tenure certificates and farm size, which excludes smallholders. Addressing these barriers through more favourable finance criteria and alternative economic signals will be critical in incentivising sustainable agricultural practices.

Alongside this is the need to understand and address local land use dynamics by strengthening enforcement and monitoring capacity in the region. Command and control measures, in particular the rural environmental registry (CAR) in Brazil, and improved monitoring systems (e.g. INPE DETER[62]), are effective instruments to track large-scale agriculture practices, but are still not sufficient to regulate the majority of smallholders across the region.

Improving supply chain transparency tools[63] will be a critical step for implementing public-private policy commitments, by increasing accountability, improving actors' understanding of their exposure to resource risks, and addressing coordination gaps through identifying coalitions of actors who have a shared interest in production landscapes.



Towards improved water-energy-food coherence in Amazonia

Despite examples of synergies across sectors and policy, the analysis undertaken here highlights that overall policy coherence falls short of what is needed to transition to more sustainable and integrated management of natural resource trade-offs in Amazonia.

In particular, this analysis points to WEF conflicts between the national and subnational scale in Amazonia, particularly between agricultural development plans (expansion of energy, food and export crops) and climate mitigation and forest conservation objectives.

These realities evidence the need for increased policy coordination and aligned incentives across sectors at scale. This can be addressed by building on and strengthening existing platforms (for example, CIAM, GCF, ACTO) that bring together national and subnational governments and private sector actors to negotiate land use planning, informed by socio-ecological criteria, and discuss policy interactions to help minimise water, energy and food trade-offs.

The reliance and growing demands for water in renewable energy production (both for biofuel and hydroelectricity), as well as industrial and urban uses, demands greater recognition of the role of Amazonia's ecosystem services in underpinning regional water security and the need to strengthen integrated water management agendas. Water resource conservation and management can thus be a unifying factor under multi-sector engagement.

To facilitate coordination and decision-making processes, improved information and monitoring systems - including supply chain transparency tools, will be critical. These can highlight independencies and impacts across different actors and productive landscapes at the scale of jurisdictions or watersheds; and help enforce and thus effectively implement existing policies in Amazonia. In parallel, further efforts are needed to understand the WEF trade-offs between replacing high-earning commodity export crops with subsidence crops or with other biofuel crops. As such, current public-private policy commitments and climate finance can help build capacity and fund such governance instruments.

The inclusion of social and environmental criteria in public and private financing decisions, that is based on WEF nexus thinking, can further promote sustainable use of resources and orient business opportunities towards forest restoration and integrated production systems that maximise benefits.

Critically, such governance instruments need to recognise the particular sub-regional dynamics and realities in Amazonia, in terms of infrastructure, access to technical assistance, credit, and human capital, to effectively incentivise such activities further.

Lastly, in the face of economic deceleration, political instability and post-conflict scenarios - in the case of Colombia, efforts are needed to strengthen existing climate policy commitments and mitigate the risks of politicising negotiations in the wake of perceived environment-development trade-offs.

Conclusions & next steps

Brazil, Colombia and Peru, among other countries that share Amazonia, face a difficult challenge in pursuing development agendas and meeting growing demands for food, water, and energy, while balancing conservation and climate objectives.

Building a WEF nexus understanding across a coalition of actors that are exposed to common resource risks and have a shared interest in the long-term sustainability of Amazonia's forest landscapes, will be critical in mobilising the resources and efforts required to better manage these competing objectives.

Yet, while this brief demonstrates the value of a WEF nexus approach in analysing policy coherence and gaps, and highlighting particular trade-offs, there is a need to recognise the complexity of interdependencies across water, energy, food, forests and climate systems, and the limitations in understanding likely WEF trade-offs.

A solid evidence base on the role of Amazonia and its sub-basins in underpinning WEF security, is required to deepen and expand such an analysis. This needs to be accompanied by the quantification and aggregation of resource demands across different users, as well as modelling of trade-off costs and benefits under different development and climate scenarios. Further analysis on the distribution of risks and opportunities across multiple stakeholders will be critical in developing incentives to encourage aligned action around WEF objectives. Lastly, it is also important to acknowledge the temporality of any coherence and WEF nexus assessment given the changes in the economic, political and environmental landscapes of the region over time.

Nevertheless, the momentum shift from recent international climate change agreements and financial pledges at the Paris climate summit, as well as the explicit recognition of the need for forest conservation and water security in the Sustainable Development Goals (Goal 15 and Goal 6, target 6.6), and the increasing engagement of the private sector, offers an opportunity for countries like Brazil, Colombia and Peru to strengthen institutions and policy frameworks. Such efforts can complement work towards a common WEF security agenda in Amazonia.

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The Amazonia Security Agenda

The Amazonia Security Agenda calls for a new security agenda for Amazonia. Not one focused only on national security in a traditional sense, but rather one that acts to strengthen the fundamental underpinnings of a flourishing society – sustained access to water, energy, food and good health for all. These 'securities' are under increasing threat, both individually and in combination, creating significant risks for people, governments and industry.

For more information click here or email: info@globalcanopy.org

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Appendix 1: Summary of key national environmental and sectoral development policy objectives in Brazil, Colombia and Peru[a]

	BRAZIL[b]	COLOMBIA[c]	PERU[d]
Climate adaptation/mitigation, forest conservation policy objectives	• 80% deforestation reduction in the Amazon biome by 2020 (40% in the Cerrado biome), against 1996-2005 baseline • End illegal deforestation by 2030 • 37% GHG emissions reductions by 2025, against 2005 baseline • Restore and reforest 12 million ha by 2030 • Watershed restoration, conservation and management • Create and strengthen protected areas (60 million ha protected areas by 2020, 30% of the Amazon) • Increase environmental regulation of permanent forest protection, and registries (CAR)	• Net zero deforestation by 2020 • Promote sustainable forest management in 110 million ha of the Amazon • Increase of 2.5 million ha of new protected areas • 20-30% GHG emissions reduction by 2030 (depending on international cooperation) • Improve climate change resilience through adaptation activities • Watershed and wetland conservation • Establish forest protection zones • Reforestation • Promote payments for ecosystem services • 100% of country covered with climate change plans	• Zero deforestation by 2021 in 54 million ha of primary forests • 30% GHG emissions reductions by 2030 • 75% of production forests under management systems by 2021 against 38% baseline • Forest recovery and reforestation (investment in agroforestry, forest plantations) • Improve forest resilience to climate change • Update land zoning plans • Preserve genetic diversity • Promote payments for ecosystem services • By 2021, all timber sourced from legal origins
Key sectoral development policy objectives	• Improve agricultural commercialisation, access to infrastructure, and irrigation • Biofuel expansion (palm oil; sugar cane by 4.8 million ha by 2024) and domestic fuel blending mandates • Pasture restoration (15 million ha by 2030) • Hydroelectricity expansion • Bioenergy production (reforestation) • 5 million ha of systems that integrate crops, livestock and forests (iLPF) by 2030 • Reduce climate change risks • Small-scale family agriculture • Agricultural finance (rural credit) • Technology improvement (biological nitrogen fixation system in 5.5 million ha, farm waste management in 4.4 million ha, 8 million ha with direct planting system (SPD).	• Low-emission palm oil, sugarcane and biofuels supply chains • Land use conversion - reduce cattle pasture from 38.6 to 28 million ha by 2019 • Renewable energy from agriculture by-products • Financing sustainable agricultural practices, technical assistance/ technology transfers • Rural access and irrigation infrastructure • Increased agroindustry and export • Expand 1 million ha of agricultural plantations by 2018 • Hydrocarbon infrastructure development	• Expand agriculture according to zoning plans • Increase competition through improved sanitation, irrigation and crop technology and infrastructure development • Access to finance and investment • Promote agroindustry (cacao, coffee, palm oil) and biofuels exports and commerce (trade agreements) • Climate-resilient agriculture and agricultural genetic diversity preservation • Recover degraded land (3.2 million ha by 2020) • Improve water use efficiency and integrated watershed management • Energy efficiency and diversification (develop gas industry and renewable sources such as hydroelectricity (6,000 MW); reach 56% of renewables by 2021 in energy matrix. • Formalise and improve environmental stewardship in mining

[a] For a complete list of analysed policies please see national country reports available here.

[b] Intended Nationally Determined Contribution (iNDC); Programa Áreas Protegidas da Amazônia (ARPA); Plano Estratégico Nacional de Áreas Protegidas (PNAP); Metas Nacionais de Biodiversidade 2011-2020; "Novo Código Florestal"; Plano Nacional de Recursos Hídricos (PNRH); Programa de Consolidação do Pacto Nacional pela Gestão das Águas (Progestão); Plano Nacional de Recuperação da Vegetação Nativa (PLANAVEG - proposta); Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal (PPCDAm); Política Nacional sobre Mudança do Clima (PNMC); Estratégia Nacional de REDD+ (ENREDD); Plano Setorial de Redução de Emissões da Siderurgia a carvão vegetal (Plano Siderurgia); Plano Nacional de Adaptação (PNA); Plano Estratégico De Recursos Hídricos da Bacia Amazônica: Afluentes da Margem Direita (PERH-MDA); Plano Decenal de Expansão de Energia 2024 (PDE 2024); Macrozoneamento Ecológico-Econômico – Macro ZEE da Amazônia; Plano Nacional de Logística e Transportes (PNLT); Fundo de Desenvolvimento da Amazônia (FDA); Plano Agrícola e Pecuário (2015/2016); Política Nacional de Irrigação; Declaração Conjunta Brasil-Alemanha sobre Mudança do Clima; Zoneamento Agroecológico da Cana-de-açúcar para a produção de etanol e açúcar (ZAE-Cana); Zoneamento agroecológico da cultura da palma de óleo; Política Nacional sobre Mudança do Clima; Plano de Agricultura de Baixa Emissão de Carbono (Plano ABC).

[c] Contribución Prevista y Determinada a nivel nacional (INDC); Plan Nacional de Desarrollo (PND); Zonas de interés de Desarrollo Rural Económico y Social (Zidres); Reactivación del sector agropecuario, pesquero, acuícola, forestal y agroindustrial; Programa Agro Ingreso Seguro (AIS); Colombia Siembra; Ganadería Colombia Sostenible; Programa Nacional de Reconversión Pecuaria Sostenible; Región Administrativa de Planeación para la Amazonía; Plan Estrategico de la Ganaderia Colombiana 2019 (FEDEGAN 2012). CONPES, 3150 Lineamentos de Política para Promover la Producción Sostenible de Biocombustibles en Colombia. Bogotá, Colombia March 31, 2008

[d] Plan Bicentenario; Agenda Nacional de Competitividad (Agroideas); Plan Nacional de Diversificación Productiva; PlanNacional de Palma Aceitera; Plan Estratégico Sectorial Multianual del Ministerio de Agricultura 2012 - 2016 ; Ley de promoción de las inversiones en el sector agrario; Programa de Compensaciones para la Competitividad (AGROIDEAS); Estrategia Nacional sobre Bosques y Cambio Climático; Contribución Prevista y Determinada a nivel nacional (INDC); Estrategia Nacional de Conservación de Bosques y Cambio Climático; Plan Nacional de Acción Ambiental (PLANAA 2011 – 2021); Ley de Promoción de la Inversión Privada en Reforestación y Agroforestería; Plan Nacional de Reforestacion; Ley Forestal e Fauna Silvestre; Programa Nacional de Innovación Agraria en Cultivos Agroindustriales; Ley de Promoción del mercado de Biocombustibles (Decreto Legislativo Nº 653); Política Nacional Agraria 2012-2016; Plan de Gestión de risgo y adaptacion al CC em el sector agrario (2012-2021 PLANGRACC-A .Plan de Energías Renovables (PER) 2011-2020; Ley de Promoción de la Inversión para la Generación de Electricidad; Pacto Nacional por la Madera Legal; Iniciativa 20x20.

References & comments

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[5] See: http://www.theguardian.com/environment/2015/oct/16/rainforests-hold-key-to-taming-el-ninos-destruction

[6] At the Paris COP, the global community reiterated its pledge to provide $100 billion/year in climate finance by 2020.

[7] Smith, J. 2015. Three Amazon nations, three approaches to reducing deforestation. Mongabay. Available at: https://news.mongabay.com/2015/10/three-amazon-nations-three-approaches-to-reducing-deforestation/

[8] From business-as-usual scenario: 30% emissions reductions by 2030 in Peru; between 20-30% GHG emissions reduction by 2030 in Colombia - depending on international cooperation; and 37% in Brazil by 2025.

[9] Ministério da Ciência, Tecnologia e Inovação. Estimativas anuais de emissões de gases de efeito estufa - 2a edição 17. See: http://www.mct.gov.br/upd_blob/0235/235580.pdf or http://plataforma.seeg.eco.br/total_emission

[10] Ministry of Agriculture and Sustainable Development. El ABC de los compromisos de Colombia para la COP21. See: https://www.minambiente.gov.co/images/cambioclimatico/pdf/colombia_hacia_la_COP21/ABC_de_los_Compromisos_de_Colombia_para_la_COP21_VF_definitiva.pdf

[11] See: https://www-cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/peru_fip_fact_sheet_01-28-14_0.pdf

[12] For example, by 2021, Peru has set a target of US$ 8000 -US$ 10 000 per capita income; double its gross domestic product between 2010-2021; quadruple its exports in the same 10 year period; maintain a 6% annual growth rate; reduce poverty by 10% in the country. (Plan Bicentenario 2021)

[13] Mardas et al. 2013. Amazon Security Agenda: Summary of conclusions and recommendations. Global Canopy Programme: Oxford.

[14] The methodology is based on Nilsson, M. T. Zmaparutti, J.E. Petersen, B. Nykvistt, P. Rudberg, J. McGuinn. 2012. Understanding Policy Coherence: Analytical Framework and Examples of Sector-Environment Policy interactions in the EU. Environmental Policy and Governance. Env. Pol. Gov. 22, 395-423.

[15] Detailed policy coherence findings for each country were presented and discussed with the governments of Brazil, Colombia and Peru, including civil society stakeholders. Individual country reports are available here.

[16] For example, in the case of cattle production in Colombia pastures cover 35 million ha, 33% of the country, and was linked to 90% of forest loss in Amazonia between 2005 and 2010.

[17] Commercial agriculture is linked to around 2/3 of total deforestation area in Latina America. See: Kissinger, G., M. Herold, V. De Sy. Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Lexeme Consulting, Vancouver, Canada, August 2012.

[18] Brazil mandates a minimum ethanol content of 25 percent, and 5% on biodiesel. Similarly, in Peru the Ley de Promoción del Mercado de Biocombustibles esatblished 5% biodiésel con diésel mixing madates. Biofuel blending mandates are at B10 (a blend of 10 percent palm ethyl esters in diesel) and a range of E8 to E10 (a blend of anhydrous ethanol from eight to 10 percent in gasoline) in Colombia. See: http://www.biofuelsdigest.com/bdigest/2016/01/03/biofuels-mandates-around-the-world-2016/

[19] China and the EU, the two largest importers of Brazilian soy products, both have regulations that require a certain proportion of transport fuels to be made from biofuels.

[20] Plano Decenal de Expansão de Energia (PDE) – 2024 and Brazil's NDC.

[21] Gutierrez-Velez, V. H., R. DeFries, M. Pinedo-Vasquez, M. Uriarte, C. Padoch, W. Baethgen, K. Fernandes, and Y. Lim. 2011. High-yield oil palm expansion spares land at the expense of forests in the Peruvian Amazon. Environmental Research Letters 6. Availalbe at: http://www.columbia.edu/cu/amazonfires/pubs/gutierrez-velez_etal_2011.pdf

[22] Arima, E. Y., Richards, P., Walker, R., & Caldas, M. M. (2011). Statistical confirmation of indirect land use change in the Brazilian Amazon. Environmental Research Letters, 6(2), 024010.

[23] Gao, Y. M. Skutsch, O. Masera, P. Pacheco A global analysis of deforestation due to biofuel development. Working paper 68. CIFOR.

[24] In Brazil for example, growing sugar cane for ethanol replaces other crops or pastures, which in turn are displaced to other areas of Brazil, the new area required for the displaced pastures is likely to be forest. See: Pacheco, P. 2012. Soybean and oil palm expansion in South America: A review of main trends and implications. Working paper 90. CIFOR or FoE. 2010. Sugar cane and land use change in Brazil: Biofuel crops, indirect land use change and emissions. Briefing. Friends of the Earth Europe. Available at: https://www.foe.co.uk/sites/default/files/downloads/sugar_cane_and_land_use_ch.pdf

[25] Turning food into fuel also has the unintended consequence of driving up food prices, reducing the access of the neediest populations to grains and meat. http://www.scientificamerican.com/article/biofuels-bad-for-people-and-climate/

[26] Nepstad DC, Carvalho GO, Barros AC, Alencar A, Capobianco JP, Bishop J, Moutinho P,. Lefebvre P A, Silva UL and E. Prins. (2001) .Road paving, fire regime feedbacks, and the future of Amazon forests. Forest Ecology and Management 154:395–407

[27] 95% of all water renewable water resources are consumed by agriculture sector in Latin America. Willaarts, B.A., A. Garrido, L. De Stefano, M.R. Llamas. 2014. Seguridad Hídrica y Alimentaria en América Latina y el Caribe: Implicaciones regionales y globales. Fundación Botín. Disponible en: http://www.fundacionbotin.org/89dguuytdfr276ed_uploads/Observatorio%20Tendencias/PUBLICACIONES/LIBROS%20SEM%20INTERN/seguridad%20hidrica%20y%20alimentaria/libro%20seguridad%20hidrica%20alatina.pdf

[28] Aproximadamente el 53% del agua renovable de ALC (agua 'azul' renovable procedente de ríos y acuíferos) se concentra en una sola cuenca, la del Amazonas. Ver: Willaarts, B.A., A. Garrido, L. De Stefano, M.R. Llamas. 2014. Seguridad Hídrica y Alimentaria en América Latina y el Caribe: Implicaciones regionales y globales. Fundación Botín. Disponible en: http://www.fundacionbotin.org/89dguuytdfr276ed_uploads/Observatorio%20Tendencias/PUBLICACIONES/LIBROS%20SEM%20INTERN/seguridad%20hidrica%20y%20alimentaria/libro%20seguridad%20hidrica%20alatina.pdf

[29] See: http://www.elcolombiano.com/historico/energia_de_colombia_es_una_de_las_mas_competitivas_del_mundo-DEEC_233437

[30] Plan de Energías Renovables (PER) 2011-2020

[31] Plano Decenal de Expansão de Energia - 2024

[32] Brazil for example aims to achieve a 45% share of renewables by 2030. See: http://climateactiontracker.org/countries/brazil.html

[33] According to Brazil's Plano Decenal de Expansão de Energia 2024 (PDE), 12 dams with a total of 27 thousand MW are expected to be installed in the Amazon.

[34] In Colombia, the expansion of hydroelectric dams and road infrastructure projects in the Amazon region has been restricted in current development plans in line with historical policies namely law 2 of 1959

[35] For example, the planned hydropower dams in the Tapajos Basin in the Brazilian Amazon are argued to be a key export channel for soy being produced in the State of Mato Grosso. Yet the two dams built across the Madeira River in western Brazil, have been linked to the flooding of more than 36,000 hectares of forest. See: https://news.mongabay.com/2016/05/dams-flood-36000-hectares-brazilian-rainforest/?n3wsletter

[36] Associated agricultural road infrastructure has also been linked to detrimental biological impacts, most recently highlighted by studies linked road access to rises and spread in ant populations. See: Vieira-Neto, E. H. M., Vasconcelos, H. L., Bruna, E. M. (2016), Roads increase population growth rates of a native leaf-cutter ant in Neotropical savannahs. Journal of Applied Ecology. doi:10.1111/1365-2664.12651

[37] See: https://news.mongabay.com/2016/05/tapajos-dam-puts-newly-discovered-species-indigenous-people-risk/?n3wsletter or https://news.mongabay.com/2016/06/dams-threaten-future-of-amazonian-biodiversity-major-new-study-warns/?n3wsletter

[38] In Peru, hydroelectric projects have generated very strong social movement against their implementation in particular among indigenous community due to rights infringements and inevitable negative impacts. For a case of the Asháninka: https://amazonwatch.org/assets/files/BMD2011-pakitzapango-dam.pdf

[39] See: Dourojeanni, M. A. Barandiarán y D. Dourojeanni AMAZONÍA PERUANA EN 2021 Explotación de recursos naturales e infraestructuras: ¿Qué está pasando? ¿Qué es lo que significan para el futuro? Fundación Peruana para la Conservación de la Naturaleza. http://www.amazonia-andina.org/sites/default/files/amazonia_peruana_en_2021.pdf

[40] Current land restoration/reforestation/conversion targets are 15 million ha for Brazil, 10 million ha for Colombia and 3.2.million ha for Peru as part of the 20x20 Initiative.,

[41] See: https://news.mongabay.com/2016/03/new-law-banning-mining-in-colombias-moorlands-could-draw-its-first-lawsuit/

[42] https://news.mongabay.com/2016/05/brazils-congress-moves-ahead-end-nations-environmental-safeguards/

[43] This analysis draws on the case of Acre state in Brazil, the department of Ucayali in Peru, and namely the departments of Caquetá and Putumayo in Colombia

[44] Financing is still largely centralized across countries.

[45] See Palm oil case study available at segamazonia.org

[46] Fabiano, Toni. 2011. Decentralization and REDD+ in Brazil. Forests 2011, 2, 66-85. doi:10.3390/f2010066

[47] Another example is the Green ICMS, a system to redistribute state tax revenue favouring municipalities with higher percentage of protected areas.

[48] Plano de Prevenção e Controle do Desmatamento do Acre, Compromisso do Acre pelo Desmatamento Ilegal Zero.

[49] Sistema Estadual de Áreas Naturais.

[50] Política e Plano Estadual de Recursos Hídricos

[51] Under Acre's System for Enviornmental Services Incentives (Sistema Estadual de Incentivos a Serviços Ambientais- SISA).

[52] Programa Estadual de Incentivo à Produção Florestal e Agroflorestal Familiar

[53] Groupe Danone, Kao Corp., Nestlé S.A., Procter & Gamble, Reckitt Benckiser Group, and Unilever are some of the leading companies addressing deforestation risk in their supply chains (see Forest500.org)

[54] In Peru these private and civil society initiatives include the Iniciativa 20x20, Pacto Nacional por la Madera Legal; Movimiento Ciudadano frente al Cambio Climático. In Brazil: Grupo de Trabalho da Pecuária Sustentável – GTPS; Moratória da soja; Coalizão Clima, Floresta, Agricultura; Compromisso Público da Pecuária; Monitoramento da cadeia de produção no bioma Amazônia (Walmart); Observatório do Clima; Coalizão Clima, Floresta; Programa Mato-grossense de Municípios Sustentáveis (PMS). In Colombia: Conservación y Gobernanza; Paisajes conectados en Caquetá; Chiribiquete Corazón de la Amazonia; Camino de las Anacondas; Gobernanza para la Amazonia; Cartografía sagrada binacional Colombia-Brasil; Amazonas 2030.

[55] Groupe Danone, Kao Corp., Nestlé S.A., Procter & Gamble, Reckitt Benckiser Group, and Unilever are some of the leading companies addressing deforestation risk in their supply chains (see Forest500.org)

[56] See for example the Unlocking Forest Finance programme in Acre and Mato Grosso in Brazil, and San Martin in Peru.

[57] For example, the sustainable Landscapes Pilot Program in the municipality of São Félix do Xingu in Pará, Brazil. See: http://www.cifor.org/redd-case-book/case-reports/brazil/sustainable-landscapes-pilot-program-sao-felix-xingu-brazil/#footnote-9099-1. For more information on public-private partnerships at the subnatioanl level see: Edwards, R., D. Tepper, S. Lowery. 2014. Jurisdictional REDD+ Bonds: Leveraging Private Finance for Forest Protection, Development, and Sustainable Agriculture Supply Chains. Forest Trends' Public-Private Co-Finance. See: http://www.forest-trends.org/documents/files/doc_4208.pdf

[58] Renewed annually until 2016 when it was indefinitely extended

[59] See: http://news.mongabay.com/2015/07/moratoria-beat-certification-to-reduce-deforestation-for-soy-palm-oil-cattle/. For a soy supply chain brief and further analysis of public-private sector initiatives see segamazonia.org

[60] H. K. Gibbs, L. Rausch, J. Munger, I. Schelly, D. C. Morton, P. Noojipady, B. Soares-Filho, P. Barreto, L. Micol, N. Walker. 2015. Brazil's Soy Moratorium. Science 347, 377 (2014) DOI: 10.1126/science.aaa0181 https://nelson.wisc.edu/sage/docs/publications/GibbsetalScience2015.pdf

[61] Sustainable Cattle Programme led by Federación Colombiana de Ganaderos (FEDEGAN) http://www.fedegan.org.co/programas/ganaderia-colombiana-sostenible

[62] Instituto Nacional de Pesquisas Espaciais. See: http://www.inpe.br/ingles/index.php

[63] For example the Transformative Transparency platform

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