ECONOMIC EFFECTS OF INFRASTRUCTURE INVESTMENT AND ITS FINANCING

Sustainable Infrastructure to Secure the Natural Capital of the Amazon

Ana Cristina Barros (Eco-Axis Research)
Bruce McKenney (The Nature Conservancy)
Amar Bhattacharya (Brookings Institution)
Beatriz Nofal (Eco-Axis Research)
Carlos Nobre (Institute for Advanced Studies)
Kevin Gallagher (Global Development Policy Center, Boston University)
Linda Krueger (The Nature Conservancy)
Thomas Lovejoy (UN Foundation)

Submitted on March 8, 2019
Revised on March 31, 2019

Abstract

Sustainable infrastructure for the Amazon requires a recognition of the region's vast natural capital and unique importance for the world. The Amazon stores 120 billion tons of carbon, supports rainfall systems that are critical for regional economies, and provides habitat for one-third of the world's species. Investments to secure the Amazon's natural capital are an essential step to supporting sustainable infrastructure. We propose that the G20, and the Development Finance Institutions, promote conditions for quality and sustainable infrastructure investment by: (1) Supporting international public and private commitments and funding mechanisms to bolster Amazon countries' progress in conserving forests, securing natural capital, and promoting sustainable development; (2) Supporting sustainable infrastructure policies and guidelines that fully incorporate social and environmental costs for project selection and preparation; (3) Establishing lending principles that infrastructure investment must be compatible with land, water, and forest conservation and healthy ecosystems, necessary to maintain the Amazon's natural capital; and (4) Developing portfolios of small-scale, nature-based infrastructure projects in the Amazon that support local development, poverty reduction, and conservation.

Challenge

The Amazon has vast natural capital[1] that is of unique importance to the world. The Amazon's natural capital is at risk under traditional approaches to infrastructure development. Globally, traditional infrastructure development is often falling short in meeting economic development, inclusive growth, and climate goals.[2] In response, the call for sustainable infrastructure continues to grow. Sustainable infrastructure is defined as "infrastructure projects that are planned, designed, constructed, operated, and decommissioned in a manner to ensure economic, financial, social, environmental (including climate resilience), and institutional sustainability over the entire life cycle of the project." [3] A range of new infrastructure investment initiatives, project preparation facilities, and government reform efforts are supporting the movement for sustainable infrastructure.[4]

Sustainable infrastructure requires improved planning and development processes in ways that increase the pipeline of quality infrastructure projects, leading to higher levels of infrastructure investment.[5] In Latin America, this approach could help close a large and persistent infrastructure investment gap, estimated to be about $120-$150 billion a year, or equal to an additional 2.0-2.5 percent of GDP.[6] Moreover, sustainable infrastructure could break the long history of infrastructure project-related conflicts in Latin America. Conflicts due to social and environmental concerns have resulted in project delays, cost overruns, reputational damage for governments, investors, and the private sector, and adverse social and environmental impacts. A recent analysis of 200 conflict-affected infrastructure projects in Latin America found that conflicts resulted in project delays (81 percent of cases), cost overruns (58 percent), project redesign (42 percent) and project cancellations (18 percent), with an average project delay of five years and average publicly reported cost overrun of $1.2 billion, or 69 percent of the average original budget.[7]

Sustainable infrastructure investments in the Amazon must address the challenge of maintaining the region's natural capital—securing the Amazon's forests, rivers, and healthy ecosystems. The Amazon stores 120 billion tons of carbon—about 10 times more carbon than humans release into the atmosphere each year, supports rainfall systems that are critical for agriculture,

hydropower, and regional economies, and provides habitat for one-third of the world's species. The nine Amazon countries have made substantial progress in protecting forests and reducing deforestation to secure the region's natural capital. But deforestation continues and has increased in recent years. The Amazon system is nearing a tipping point of 20 percent deforestation, at which point the hydrological cycle could shift in ways that cause large forest regions to transition to non-forest ecosystems, [8] with potentially disastrous repercussions for the region's climate, agriculture and economy.

Large-scale infrastructure is a major driver of deforestation in the Amazon, both through direct impacts and by opening up new areas of the basin.[9] The impacts of these projects could undermine the Amazon's natural capital, and correspondingly undercut national and global goals for sustainable development, poverty reduction, climate, forests, biodiversity, and the rights of indigenous peoples.[10] Planned infrastructure investments in the Amazon could total up to $70 billion by 2020.[11] Roads, railways, dams, and transmission line projects, in support of new transportation routes and energy and mining development, are among the major potential threats to Amazon sustainability.

For instance, from 2000 to 2015, the perimeters of international development finance institution (DFI)-financed infrastructure projects in the Andean countries of Ecuador, Peru, and Bolivia experienced tree cover loss at a rate of over four times the average in comparable areas without projects in these countries. That infrastructure-associated tree cover loss is equivalent of the annual emissions of Colombia, Chile, and Ecuador combined, with an estimated social cost between $2.1 and $10.5 billion. Such degradation is due to the direct impacts of the projects as well as indirect impacts such as illegal mining that can follow official opening of the forest. [12]

Proposal

Effective policy and institutional frameworks for conserving the Amazon's forests and natural capital are an essential step for supporting sustainable infrastructure. Rather than a traditional project-by-project approach, sustainable infrastructure requires more comprehensive planning early in the

infrastructure planning process at the scale of the Amazon system, and this should be carried out in ways that consider the services and benefits of natural capital and fully account for the social and environmental costs of projects. A precautionary approach is needed that seeks to avoid impacts on natural capital and the services it provides. For example, a true accounting of environmental and climate risks may prove that relocating projects to sites with less impact will have a better return on investment. Given the unique global and regional importance of the Amazon as well as its significance to the individual nations, and the increasing pressures on the basin, the international community can play a critical role in supporting the nine Amazon countries by facilitating conditions for sustainable infrastructure.

We propose that the G20, and the Development Finance Institutions, promote conditions for quality and sustainable infrastructure investment by: (1) Supporting international public and private commitments and funding mechanisms to bolster Amazon countries' progress in conserving forests, maintaining natural capital, and promoting sustainable development; (2) Supporting sustainable infrastructure policies and guidelines that fully incorporate social and environmental costs for project selection and preparation; and (3) Establishing lending principles that infrastructure investment must be compatible with land, water, and forest conservation and healthy ecosystems, necessary to maintain the Amazon's natural capital; (4) Developing portfolios of small-scale, nature-based infrastructure projects in the Amazon that support local development, poverty alleviation, with conservation.

1. Supporting international public and private commitments and funding mechanisms to bolster Amazon countries' progress in conserving forests, maintaining natural capital, and promoting sustainable development

Forest protection has been a major policy priority for Amazon countries, supported by overseas development assistance programs over the last 30 years. In the early 1990s, the G7 plus Japan committed hundreds of millions of dollars in funding to Brazil to support government capacity at both federal and subnational levels in order to increase and strengthen protected areas and

conservation in the Amazon. Through US, UK and German cooperation, this support was extended to other Amazon countries and continues. In 2008, Norway led the establishment of the $1 billion Amazon Fund as the largest funding mechanism to protect tropical forests under the Climate Change Convention. The Fund has been managed by BNDES, with 20% of funding flowing to other Amazon countries.[13] The Fund helped support a significant decrease in deforestation rates until recently, when rates began to climb again due to market pressures and fiscal and austerity reforms that have affected government capacity to advance forest conservation and local development.[14]

Commitments by Amazon countries to reduce deforestation and improve the provision of public services in the basin could be bolstered by additional international support, public and private, under the leadership of the G20. We propose that the G20 and DFIs support the development of funding streams that advance deforestation-free development models, as enabling conditions for sustainable infrastructure. Consistent with agriculture sector commitments, we also propose that the G20 and DFIs foster infrastructure deforestation-free commitments by the infrastructure sector and a working agenda that supports avoiding, minimizing, and offsetting forest impacts.[15]

2. Supporting sustainable infrastructure policies and guidelines that fully incorporate social and environmental costs for project selection and preparation

Achieving sustainable development requires new thinking about how to provide infrastructure services without further depleting the Amazon's natural capital. The failure to address environmental and social risks at the start of the project cycle—in national infrastructure planning and project selection—not only leads to unnecessary impacts and the loss of natural capital, it threatens project sustainability, performance goals, and financial returns.[16] The result is smaller pipelines of quality infrastructure projects. The primary tool that governments use to review sustainability components of major projects is Environmental and Social Impact Assessment (ESIA). But the EIA review generally comes too late in the project cycle for sustainability considerations to inform project alternatives and selection.[17]

The G20 countries and the DFIs should support Amazon countries in establishing a project prioritization framework that is applied at the national level at the start of the project cycle. This should include improving sector planning procedures and efficiencies and upgrading feasibility assessments as a critical step of project preparation. This will support sustainable infrastructure planning and project selection based on technical criteria and public consultation procedures. Currently, these actions are taken at the project licensing phase, which while a key decision point for infrastructure development is too late in the project cycle to adequately support sustainable infrastructure planning and project selection.

The project prioritization framework should be developed based on sustainability guidelines and criteria[18] and leading standards, such as the IFC Performance Standards.[19] To support decision-making, the framework should require: (a) region-scale spatial planning information for the Amazon to identify and map potential points of complementarity and conflict for infrastructure development and natural capital[20]; (b) inclusion of the full environmental and social impacts and costs of potential projects; (c) the assessment of options to meet infrastructure service needs outside and inside the Amazon; and (d) public consultation procedures. This framework can be used to strengthen the evaluation of alternatives and trade-offs at the start of the project cycle, providing a more informed basis for delivering sustainable infrastructure and securing the Amazon's natural capital.

3. Establishing lending principles that infrastructure investment must be compatible with land, water, and forest conservation and healthy ecosystems, necessary to maintain the Amazon's natural capital

Consistent with lending principles to maintain natural capital, the G20 and the DFIs should support Amazon countries in establishing infrastructure investment plans that integrate sustainable development objectives and coordinate them with Amazon sustainability strategies and national policies, such as those for a low-carbon economy, biodiversity commitments, and sustainable development goals. This requires integrated plans for action that include Amazon-scale spatial planning information to identify and resolve

potential points of conflict between infrastructure development and natural capital. In support of these plans, G20 countries should work with multilateral and regional and national development banks to increase sustainable project preparation and guarantee facilities that are managed at the country level and anchored by multilateral, regional and national development banks. The G20 and the DFIs should also develop specific and explicit environmental policies for investments in the Amazon in recognition of the region's unique importance for the world and the urgent need to maintain its natural capital. These policies should include requirements to assess options to meet infrastructure service needs outside the Amazon and ensure potential projects incorporate their full environmental and social costs.

4. Developing portfolios of small-scale, nature-based infrastructure projects in the Amazon that support local development, poverty reduction, and conservation

We propose that the G20 and DFIs promote the development of a portfolio of small-scale, nature-based infrastructure projects[21] to meet local demands for universal services, such as energy and mobility/transportation. Local energy systems (e.g., solar PV, wind, in-stream turbines, mini-power plants) and river navigation can promote local green development that also supports standing forests and free-flowing rivers. This infrastructure can support local forest-based economies and markets in sectors such as food, cosmetics, medicines, and materials. [22]

[1] Natural capital refers to the stock of natural assets from which people derive a wide range of benefits and services, including food, drinking water, and fuel, and less visible services like climate regulation, carbon storage, and the natural flood defenses of forests, pollination of crops by insects, and cultural and biodiversity values. World Forum on Natural Capital. What is Natural Capital? https://naturalcapitalforum.com/about/

[2] The New Climate Economy. 2018. Unlocking the Inclusive Growth Story of the 21st Century: Accelerating Climate Action in Urgent Times. The Global Commission on the Economy and Climate.

[3] Inter-American Development Bank and IDB Invest (2018). What is Sustainable Infrastructure? A Framework to Guide Sustainability across the Project Cycle. IDB Technical Note 1388.
[4] Mercer and Inter-American Development Bank (2017). Crossing the Bridge to Sustainable Infrastructure Investing; Inter-American Development Bank. NDC Invest https://www.ndcinvest.org/; OECD. 2016. Multi-dimensional Review of Peru: Volume 2. In-depth Analysis and Recommendations, OECD Development Pathways, OECD Publishing, Paris.
[5] The Sustainable Infrastructure Imperative Financing for Better Growth and Development. The 2016 New Climate Economy Report.
[6] The gap is defined in terms of the infrastructure that countries need to meet a target growth rate, improve services to a target level (e.g., percentage of population with access to water and sanitation), and/or to achieve an infrastructure stock similar to a benchmark group of countries. Serebrisky, T. et al. 2015. Financing Infrastructure in Latin America and the Caribbean: How, How Much and by Whom? Inter-American Development Bank.
[7] Watkins, G., et al. 2017. Lessons from four decades of infrastructure project related conflicts in Latin America and the Caribbean. Inter-American Development Bank.
[8] T. E. Lovejoy, C. Nobre, Amazon Tipping Point. Sci. Adv. 4, eaat2340 (2018).
[9] Red Amazonica de Informacion Socioambiental Georreferenciada (2012). Amazonía bajo presión. 68 p; Ahmed, S. E., Souza Jr, C. M., Riberio, J., & Ewers, R. M. (2013). Temporal patterns of road network development in the Brazilian Amazon. *Regional Environmental Change*, *13*(5), 927-937; Barber, C. P., Cochrane, M. A., Souza Jr., C. M., Laurance, W. F., (2014). Roads, Deforestation, and the Mitigating Effect of Protected Areas in the Amazon. *Biological Conservation*. *177*(1) 203–209. Retrieved from http://www.sciencedirect.com/science/article/pii/S000632071400264X; Finer, M., Jenkins, C. N., Pimm, S. L., Keane, B., & Ross, C. (2008). Oil and gas projects in the western Amazon: threats to wilderness, biodiversity, and indigenous peoples. *PloS one*, *3*(8), e2932; Lees, A. C., Peres, C. A., Fearnside, P. M., Schneider, M., & Zuanon, J. A. (2016). Hydropower and the future of Amazonian biodiversity. *Biodiversity and Conservation*, *25*(3), 451-466. Retrieved from http://link.springer.com/article/10.1007/s10531-016-1072-3
[10] Commitments of Latin American countries include: the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement and Intended National Determined Contributions to reduce national greenhouse gas emissions; Sustainable Development Goals under the 2030 Agenda for Sustainable Development; Convention on Biological Diversity; 2014 UN Climate Summit's New York Declaration on Forests; and the United Nations Declaration on Rights of Indigenous Peoples.
[11] FGV EAESP and IFC. 2017. Large Scale Projects in the Amazon: Lessons learned and guidelines. Sao Paulo. March 2017.
[12] Ray, R., Gallagher, K, Sanborn, C. (2018). Standardizing Sustainable Development? Development Banks in the Andean Amazon. Boston University and Universidad del Pacífico. 44 p.
https://www.bu.edu/gdp/files/2018/04/Development-Banks-in-the-Andean-Amazon.pdf
[13] Gonzalo Castro de la Mata. Sait Riega-Campos. 2014. An Analysis of International Conservation Funding in the Amazon. Commissioned by Gordon & Betty Moore Foundation.

[14] Juliano Assunção. Clarissa Gandour. Rudi Rocha. 2015. Deforestation Slowdown in the Brazilian Amazon: Prices or Policies? Climate Policy Initiative. https://climatepolicyinitiative.org/wp-content/uploads/2012/03/Deforestation-Slowdown-in-the-Brazilian-Amazon-Prices-or-Policies-Executive-Summary.pdf; Moutinho P. Guerra R. Azevedo-Ramos C. 2016. Achieving zero deforestation in the Brazilian Amazon: What is missing? Elem Sci Anth 4: 000125. Doi: 10.12952/journal.elementa.000125

[15] Amsterdam Declaration. 2015. "Towards Eliminating Deforestation from Agricultural Commodity Chains with European Countries." The Netherlands. 7 December 2015; Trase. Yearbook 2018. Zero-deforestation commitments and Brazilian soy. (https://yearbook2018.trase.earth/chapter6/)

[16] Watkins, G., et al. 2017. Lessons from four decades of infrastructure project related conflicts in Latin America and the Caribbean. Inter-American Development Bank.

[17] Ritter, C. D., G. McCrate, R. H. Nilsson, P. M. Fearnside, U. Palme, A. Antonelli. 2017. Environmental impact assessment in Brazilian Amazonia: Challenges and prospects to assess biodiversity. Biological Conservation. Vol. 206, p. 161-168

[18] Inter-American Development Bank and IDB Invest (2018). What is Sustainable Infrastructure? A Framework to Guide Sustainability across the Project Cycle. IDB Technical Note 1388.

[19] World Bank. IFC Performance Standards (2012). See especially IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards

[20] McKenney B.A., Krueger L.I., Kiesecker J.M., Thompson J.F. (2016). Blueprints for a Greener Footprint Sustainable Development at a Landscape Scale. World Economic Forum.

[21] OECD, World Bank and UN Environment (2018). Financing Climate Futures: Rethinking Infrastructure. Policy Highlights. See page 6 for reference to the concept of nature based infrastructure solutions.

[22] Nobre, I. and Nobre. C. A. The Amazonia Third Way Initiative: the role of technology to unveil the potential of a novel tropical biodiversity-based economy. In: Loures, L. C. (Org.). Land Use - Assessing the Past, Envisioning the Future. Open Access Book, IntechOpen, 2018. ISBN 978-953-51-6945-1 (in press). Available for download at: https://www.intechopen.com/online-first/the-amazonia-third-way-initiative-the-role-of-technology-to-unveil-the-potential-of-a-novel-tropical.