

Nature-based Solutions Policy Briefs

Nature-based Solutions are Job and Livelihood Solutions

By Alaina Boyle and Laura Kuhl | April 2021

with contributions from Claudia Ortiz, Montserrat Xilotl, Simone Bauch, Santiago Carrizosa, Alexandra Fischer, and Radhika Dave, Regional Technical Advisors for Adaptation and Ecosystems and Biodiversity in UNDP

UNDP has been implementing NbS to support climate adaptation and mitigation and biodiversity conservation throughout LAC. These projects provide a strong evidence base of the job and livelihood benefits of investments in NbS, including direct job creation, new livelihood opportunities, and increased incomes from PES, certification, biodiversity-friendly products, and increased productivity.

Climate change poses significant challenges to the economic resilience of Latin America and the Caribbean (LAC). The region is especially vulnerable to climate impacts that are already disrupting agricultural production, ecosystem degradation, and causing human health issues. Climate impacts contribute to increased poverty and food insecurity, as well as economic losses at local and national scales across LAC.¹ Nature-based solutions (NbS) can help address these challenges. NbS consist of activities that can be implemented for climate change adaptation and mitigation while also restoring ecosystems, conserving biodiversity, and enabling sustainable livelihoods.² Due to their multiple benefits, NbS have the potential to cost-effectively achieve ecological, social, and economic goals. NbS help communities build resilience in a way that provides “the most benefit for the least cost”³ compared to gray infrastructure.^{4,5,6} For example, NbS have been found to be 2-5 times more cost-effective than engineered structures for coastal flood and erosion management.⁷

UNDP has been implementing NbS throughout the region in numerous projects in the adaptation and biodiversity portfolio. These projects provide a strong evidence base of the job and livelihood benefits of investment in NbS. In this policy brief, we outline the ways NbS can help alleviate the job crisis in LAC and contribute to a climate-resilient green recovery.

One key benefit of NbS is that they can create jobs, new and more resilient livelihood opportunities, and increased incomes, including for vulnerable

1. IPCC. 2014. Central and South America. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. <https://www.ipcc.ch/report/ar5/wg2/central-and-south-america/>
2. UN Global Compact. 2021. Nature-Based Solutions to Address Climate Change. <https://www.unglobalcompact.org/take-action/events/climate-action-summit-2019/nature-based-solutions>.
3. FEMA. 2020. Building Community Resilience with Nature-based Solutions. https://www.fema.gov/sites/default/files/2020-08/fema_riskmap_nature-based-solutions-guide_2020.pdf
4. Onuma A and Tsuge T. 2018. Comparing green infrastructure as ecosystem-based disaster risk reduction with gray infrastructure in terms of costs and benefits under uncertainty: A theoretical approach. *International Journal of Disaster Risk Reduction* 32: 22-28. doi.org/10.1016/j.ijdr.2018.01.025
5. IUCN. 2016. Cost and Benefits of Ecosystem Based Adaptation: The Case of the Philippines. https://www.iucn.org/sites/dev/files/content/documents/philippines_cba_study_final_version.pdf
6. Daigneault A, Brown P, Gawith D. 2016. Dredging versus hedging: Comparing hard infrastructure to ecosystem-based adaptation to flooding. *Ecological Economics* 122: 25-35. doi.org/10.1016/j.ecolecon.2015.11.023
7. Narayan S, Beck MW, Reguero BG et al. 2016. The effectiveness, costs and coastal protection benefits of natural and nature-based defences. *PLoS one*, 11(5). doi.org/10.1371/journal.pone.0154735





Many NbS utilize a watershed approach to manage ecosystem services including water resources

photo credit: Laura Kuhl

households, improving the overall resilience of the economy and society.⁸ This is particularly important given the devastating impacts of the Covid-19 pandemic on jobs and livelihoods throughout LAC. Jobs are employment opportunities in exchange for a wage or salary. Livelihoods consist of the combination of activities and strategies pursued by household members, using their available assets (physical, natural, human, social, financial) to make a living, and can include formal jobs, but also self-employment and non income-generating subsistence strategies.

Investments that support jobs and livelihoods will be essential to pandemic recovery. Covid-19 has caused a significant economic recession, with an average 7.7% drop in GDP from January to December 2020 in the region and growing inequality measured by a nearly 3% rise in the average Gini index in 2020 across LAC.⁹ Regional unemployment rose to over 10% in 2020 and one third of LAC residents now live in poverty.¹⁰ This trend was particularly harmful for women who predominately work in the service and informal sectors and have heavier family and home care responsibilities. Thirteen million women left the labor force between March 2020 and March 2021 due to the pandemic.¹¹ Using economic stimulus policies to support NbS investments that simultaneously address climate and environmental goals and economic recovery will lead to a more equitable, climate-resilient future for the region.

Pathways to support Jobs, Livelihoods and Incomes – Evidence from UNDP Projects There are multiple pathways through which NbS can provide jobs, create new and more resilient livelihoods, and increase incomes for vulnerable households (Figure 1). Projects supporting NbS often combine these pathways to collectively maximize the economic opportunities that NbS can offer to households.

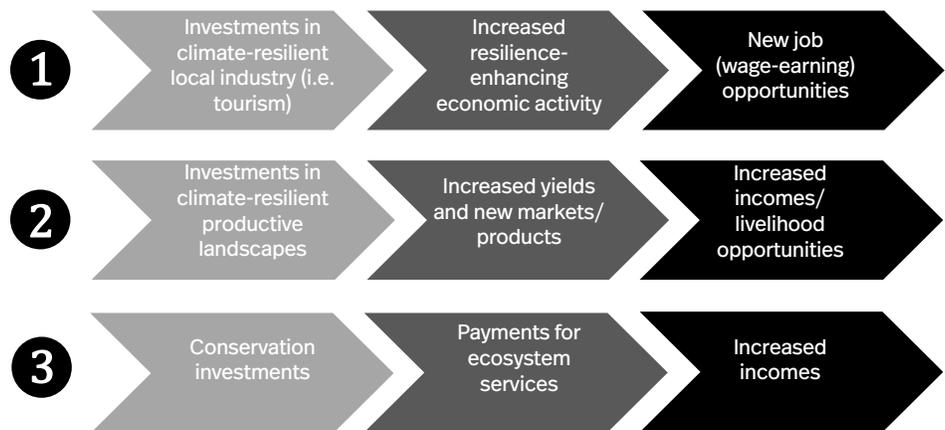


Figure 1. Illustrative pathways through which investments in NbS contribute to new job and livelihood opportunities and increased incomes. Note that this is not intended to be a comprehensive diagram of ways that NbS contribute to jobs and livelihoods.

8. UN Global Compact. 2021. Nature-Based Solutions to Address Climate Change. <https://www.unglobalcompact.org/take-action/events/climate-action-summit-2019/nature-based-solutions>

9. CEPAL. 2021. Social Panorama of Latin America 2020. <https://www.cepal.org/en/publications/46688-social-panorama-latin-america-2020>

10. Ibid

11. ILO. 2021. 13 million women in Latin America and the Caribbean saw their jobs disappear due to the COVID-19 pandemic. https://www.ilo.org/caribbean/newsroom/WCMS_775068/lang--en/index.htm



Investments in NbS can generate climate-resilient green job opportunities. These jobs can provide higher and more stable income opportunities from ecosystem maintenance, restoration, or adaptation.

We examine five UNDP projects as case studies of the job, livelihood, and income-generating benefits of NbS. Colombia's *Payment for Ecosystem Services (PES) and Biodiversity Conservation in the Coffee Sector* project (2010-2014)¹² combined economic benefits for coffee producers with increased conservation and sustainable use of biodiversity through landscape management, PES, and capacity-building. As part of the *Climate Change Resilient Productive Landscapes and Socio-economic Networks Advanced in Guatemala* project (2015-2018),¹³ efforts to increase resilience in productive landscapes and socio-economic systems included: local climate data sharing, an early warning system, and adaptation planning; productive landscape conservations through PES; and access to commercial networks and microfinance for producers. The *Reduction of Vulnerability to Coastal Flooding through Ecosystem-based Adaptation in the South of Artemisa and Mayabeque Provinces* project in Cuba (2014-2020)¹⁴ generated forestry jobs and related livelihood and income opportunities through ecosystem-based adaptation efforts to restore mangrove forests. Grenada's *Climate Resilient Agriculture for Integrated Landscape Management* project (2020-2023)¹⁵ plans to mainstream biodiversity conservation in productive landscapes and increase resilience of agricultural systems including through agro-tourism. Finally, Ecuador's *Sustainable Development of the Ecuadorian Amazon: Integrated Management of Multiple Use Landscapes and High Values Conservation Forests* project (2017-2022)¹⁶ supports integrated sustainable landscape management and access to markets, credit, and incentives for producers.

Job creation: Investments in NbS can generate green jobs that enhance climate resilience. While formal employment opportunities were not common in projects in the portfolio, there were some experiences with formal job creation that demonstrate the potential for NbS to create climate-resilient jobs. These jobs can provide higher and more stable income opportunities resulting from ecosystem conservation or restoration. Investments in local industries such as sustainable tourism increase economic activity in an area, which can create new employment opportunities.

Some of these jobs may be directly related to the NbS, while others result from the greater economic activity in the area. Jobs directly tied to investments in sustainable tourism, for example, can include jobs in restaurants and tour companies. Additional jobs can also be created in ancillary companies. For example, when NbS boost sustainable tourism, jobs doing machine or tour boat maintenance can be created. The increased eco- and agro-tourism in Grenada is expected to lead to new jobs for tour guides and operators, entertainers, local producers, and boat operators. The tourism and hospitality sector also provides numerous job opportunities for women, who have less access to opportunities for reliable wage-earning. The project in Grenada expects to increase incomes for women-owned agro-tourism and agro-processing small businesses by investing in grants for their adaptation initiatives, training, and marketing support, generating income that will be used to grow and hire additional employees.

12. Funded by the Global Environment Facility (GEF)

13. Funded by the Kyoto Adaptation Fund (KAF)

14. Funded by KAF

15. Funded by GEF

16. Funded by GEF



In exchange for maintaining, conserving, and restoring their landscapes, PES participants receive a payment, increasing income for the household. This income has the additional benefit of being predictable and reliable. Local communities benefit from landscapes with greater adaptive capacity and increased resilience to climate variability, which can lead to additional livelihood opportunities for the broader community as well.

Projects that incorporate NbS also create the demand for local jobs to support implementation, as NbS can be labor intensive and require significant engagement with local communities to be successful. While these jobs may be temporary, as they are often tied to the implementation of specific projects or programmes, they still represent significant employment opportunities that are uniquely tailored to local expertise. For example, a radio-based climate adaptation awareness program that was part of the efforts to build adaptive capacity in socio-economic systems in Guatemala created jobs for local technicians with specific cultural and linguistic knowledge of local communities. Their local knowledge helped ensure adaptation and NbS knowledge was widely accessible, reaching more than 120,000 people.

Other projects generate jobs directly implementing NbS, especially when the private sector is a partner in implementation. The project in Cuba directly generated new forestry jobs, more than doubling the number of employees from 20 to 55 in one of the two agroforestry companies involved and quadrupling their pay. In this case, NbS increased both the number of jobs and the incomes generated from these jobs. Despite the temporary or seasonal nature of some of these examples, the labor-intensive nature of implementation of NbS still compares favorably to other investment strategies in terms of its generation of climate-resilient formal employment opportunities.

New and more resilient livelihood opportunities and increased incomes: Livelihoods involve the employment of household labor and the use of other household assets to enable household members to live on the proceeds.¹⁷ NbS have the potential to contribute to new and more resilient livelihood opportunities that extend beyond formal jobs or employment opportunities.

Payments for Ecosystem Services (PES): PES are payments to farmers, landowners, or other users who have agreed to take certain actions to manage their land or watersheds to provide an ecological service.¹⁸ In exchange for maintaining, conserving, and restoring their landscapes, participants receive a payment, increasing income for the household. This income has the advantage of being predictable and reliable, enhancing its resilience value for households. PES arrangements are possible when users are willing to pay for NbS that increase ecosystem services (which can include biodiversity conservation, carbon sequestration and water quality improvement, among others). Users can include government, international actors, and the private sector. Some NbS produce global environmental benefits including climate mitigation and biodiversity conservation, which help to achieve international environmental goals and broaden the base of potential funders of NbS. Local communities benefit from landscapes with greater adaptive capacity and increased resilience to climate variability, which can lead to additional livelihood opportunities for the broader community

17. ILO. 2014. Employment, livelihood & social protection. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_397636.pdf

18. IIED. 2021. Markets and payments for environmental services. [https://www.iied.org/markets-payments-for-environmental-services#:~:text=Payments%20for%20environmental%20services%20\(also,to%20provide%20an%20ecological%20service.](https://www.iied.org/markets-payments-for-environmental-services#:~:text=Payments%20for%20environmental%20services%20(also,to%20provide%20an%20ecological%20service.)



as well. NbS that incorporate PES create win-win-win outcomes by creating incentives for participants to undertake ecosystem service-generating conservation activities that help communities and the environment.



Coffee drying in the sun- certified coffee can receive premium prices
photo credit: Laura Kuhl

Multiple UNDP projects have included PES schemes. In Guatemala, an estimated 2,491 participant households increased their income from PES for agroforestry protection and rehabilitation projects including soil and water conservation. From PES, increased income from improved agricultural production, and diversification to livestock and apiculture, participant incomes increased by over 17% over the course of the project, adding \$34.05 USD to their average monthly income. This brought vulnerable households' average incomes to \$231.35 USD, closer to the national average at the start of project implementation (2014) of \$258.62 per month.¹⁹

In Colombia, PES for sequestering carbon through sustainable agroforestry increased farmers' annual income by between 3-15%. Payments varied significantly because payments were calculated based on the ecosystem services provided by each participant. Participants received an average of \$5/ha/year depending on the region. By the end of the project, sustainable coffee covered over 32,000 ha (over 20,000 ha more than the baseline). These agreements were so successful in sequestering carbon (with a total of 7,662 tons of sequestered carbon between the project start in February 2010 and June 2013) that project evaluators recommended the government negotiate longer-term PES. Evaluators found that while initial economic incentives were required to support conversion of land use to sustainable ecosystem management, this sustainable land management generated long-term positive returns on investment, contributing to the economic sustainability of the project.

Certification: Certification schemes provide a mechanism to reward producers for sustainable harvesting strategies or production practices that reduce ecological degradation. In these cases, NbS can provide households with opportunities to access high-value markets. Unlike PES schemes, in which participants are paid for conservation and restoration directly, sustainability certifications provide an incentive to produce a more sustainable product. In some cases participating producers receive a premium for certified sustainable products, but often the greatest incentive is greater market access.

In the Colombian project, coffee farmers were able to increase their incomes by participating in certification schemes. Through more sustainable coffee cultivation that supported biodiversity goals, farmers certified their coffee and earned additional income from the premium product. Producers received a 3% average increase in price from certification in two of the regions. In the third region, households participated in a particularly beneficial partnership

19. World Bank. 2021. PovcalNet. <http://iresearch.worldbank.org/PovcalNet/povOnDemand.aspx>

20. Nair. 2016. Raised Beds for Vegetable Production. Small Farm Sustainability. <https://www.extension.iastate.edu/small-farms/raised-beds-vegetable-production>

21. Hawken. 2017. Tree Intercropping. Drawdown. <https://www.drawdown.org/solutions/tree-intercropping>

22. FAO. 2009. FAO and Traditional Knowledge: The Linkages with Sustainability, Food Security, and Climate Change Impacts. <http://www.fao.org/3/i0841e/i0841e00.htm>





Climate-resilient practices like drip irrigation can enable small-scale producers to grow new crops with strong market demand, including tomatoes

photo credit: Laura Kuhl

with Nespresso. By participating in the Nespresso premium verification scheme, producers received up to a 29% price premium per pound of coffee produced. Through the project's combination of interventions, participant farmer incomes increased by an average of 8.5% by the end of the project period, demonstrating the significant potential that the combination of certification, PES, and diversification has for increasing household incomes.

In the Ecuadorian project, Amazonian producers receive support to enter the European cocoa, livestock, and coffee markets, which pay higher prices for products that have sustainable and deforestation-free certification. Evaluators found that sustainable certification increased the volume of products sold three-fold on foreign markets, providing new revenue for households.

Increased Productivity: Many NbS can sustainably increase the productivity of landscapes and seascapes. Agriculture is directly dependent on the ecological services provided by soil, water, and forest ecosystems. NbS can lead to higher crop yields due to improved environmental quality, increased soil health and biodiversity, and reduced pollution. They can also lead to higher livestock yields due to better-quality grazing lands, access to shade, and improved nutrition. Improved agricultural techniques, such as raised crop beds,²⁰ alley/intercropping plants,²¹ and incorporating traditional and meteorological knowledge,²² can increase yields in sustainable ways.

NbS can reduce the costs of production. Improved ecosystem services can reduce the need for chemical fertilizers, seeds, and other expensive inputs. In Guatemala, participants did not need to purchase these inputs as they produced 166,273 kg of organic fertilizer and established 17 community seed banks as part of cultivating 107.45 ha with organic agriculture. These reductions in cost, coupled with increases in yields, create higher revenues for producers, which can be used for further investments in their production, diversification into new livelihoods, or savings to reduce vulnerability.

NbS can also provide enhanced productivity outside of agriculture. For example, investments in mangrove restoration can increase the productivity of fish stocks, as mangroves serve as essential nursery grounds for important fisheries.²³ The Cuban project increased participant income by increasing fishery productivity through improved water quality and vegetation cover. Interviews identified an increased volume and diversity of marine fauna in the area after project implementation, including 4 new species of fish.

New Livelihood Opportunities: NbS not only can increase the productivity of existing livelihoods; they can provide new livelihood opportunities as well. These opportunities may allow households to diversify into new agricultural production, or engage in new complementary livelihoods, such as adding beehives to a smallholder farm. These additional livelihood opportunities contribute to the portfolio of income-generating strategies that households

23. IUCN. 2017. Mangroves: nurseries for the world's seafood supply. <https://www.iucn.org/news/forests/201708/mangroves-nurseries-world%E2%80%99s-seafood-supply#:~:text=Mangroves%20support%20rich%20biodiversity%20and%20protection%20of%20mangrove%20forests.>



NbS not only can increase the productivity of existing livelihoods; they can include new livelihood opportunities as well. Diversification of livelihoods increases the resilience of vulnerable households and often leads to increased income.

employ. Additionally, diversifying livelihoods reduces the risks associated with any individual shock or stress. Diversification of livelihoods therefore increases the resilience of vulnerable households even if it does not directly translate into increases in income, although diversifying the sources of household revenue often does lead to increased incomes.

In the Guatemala project, NbS strategies included livelihood diversification. While local farmers predominately produce four agricultural commodities: honey, cocoa, vegetables, and maxán leaf, project participants expanded cultivation to additional products through support for integrated agriculture. Approximately 50 hectares of agroforestry land was diversified with new products including 3,000 livestock, over 1,400 beehives, and plants from 17 community seed banks, which resulted in new products for market.

NbS and the new opportunities that arise from these strategies can also provide synergistic benefits across livelihood strategies. In Guatemala, the introduction of livestock production provided organic fertilizer for agricultural production. Increased ecosystem quality and development of a coastal trail in Cuba also expanded opportunities for beekeeping and ecotourism, which particularly benefited women. Invasive species were eradicated and used to produce charcoal, pallets to support export sales, and beehive boxes. This is an example of how environmental goals can be achieved in a way that enhances livelihood opportunities for vulnerable populations that would not otherwise have been available.

Additional Findings from the UNDP Portfolio

Significant investments in the enabling environment are required to realize the job and livelihood potential of NbS. While NbS have significant potential to create jobs and enhance livelihoods, evidence from UNDP projects suggests that NbS require investments in complementary strategies to maximize their potential. Smallholder farmers need support and training to undertake new livelihood strategies. Investments in education, training, and resources for sustainable production are necessary to ensure that households can take advantage of the income-generating opportunities of NbS. Support for policy processes and institutional strengthening is needed to facilitate PES and certification schemes, and land management policies are required to implement the NbS that generate these benefits. For example, increasing access to finance is needed for participants to make the initial investments necessary to participate in certification programs.

The benefits to vulnerable households extend beyond simply creating new jobs, livelihood opportunities, or increasing incomes. While it is important to identify the job and livelihood benefits of NbS, NbS have significant economic benefits beyond their potential for job creation and livelihood enhancement. One of the greatest benefits is disaster risk reduction. The Cuba project's mangrove restoration efforts were explicitly intended, and successfully implemented, to reduce the risk of flooding. Mangrove restoration was selected after conducting a cost-benefit analysis of flooding protection strategies and the



NbS increase economic opportunities for vulnerable populations while improving environmental quality and contributing to international climate commitments.

economic losses of flooding. In addition, economic benefits are not the only value that NbS provide. NbS can lead to greater health for local communities as producers become less reliant on toxic chemical inputs in agriculture and water quality improves. While increased incomes can indirectly enhance food security, improvement in agricultural productivity and diversification of agricultural production can directly increase household food security, especially for rural households that are dependent on their own production. For example, alongside promoting production for markets, the Guatemala project supported 328 family gardens which not only increased household food security, but also empowered women by directly addressing their needs and goals. These findings point to the importance of a holistic assessment of the value of investments in NbS.

Projects also show evidence that the geographic benefits of NbS extend far beyond the communities in which these strategies are implemented. In Colombia, improvements in water quality and pollution levels were observed in nearby urban communities due to the improved water management in connected agricultural areas with project participants. Guatemala's climate communication efforts increased awareness beyond rural participants to local urban areas, disseminating knowledge and analysis tools to increase future resilience and adaptive capacity.

Acknowledgements:

The authors gratefully acknowledge that this publication was funded by UNDP.

FOR CITATION: Boyle A and Kuhl L. "Nature-based Solutions are Job and Livelihood Solutions" Policy Brief. School of Public Policy and Urban Affairs, Northeastern University and United Nations Development Programme, April 2021

The views expressed in this publication are those of the authors and do not necessarily represent those of the United Nations, including UNDP, or the UN Member States.

Policy Recommendations: As LAC develops Covid-19 recovery plans, addressing the drastic employment, equity, and economic losses from the pandemic while providing alternatives to increased unsustainable primary resource exploitation will be imperative. As the region with the highest levels of inequality in the world,²⁴ it is critical that recovery prioritizes strategies that generate opportunities for the most vulnerable, including jobs and livelihood opportunities. As evidenced by the case studies above, NbS can help create local jobs, new and diversified livelihoods, and increased income through investments in local sustainable industry, productive landscapes, and conservation initiatives. Investments in NbS increase economic opportunities for vulnerable populations while improving environmental quality and contributing to international climate and biodiversity commitments.

NbS may be more complex to implement than alternative strategies, such as gray infrastructure options, necessitating greater investment in governance and institutional capacity. It may also take longer to realize the full benefits. However, unidimensional approaches to policy priorities will not sufficiently address the compounding Covid-19, economic, and climate crises in LAC. Investments in NbS projects can simultaneously meet these needs while empowering local communities, restoring ecosystems, and improving quality of life. The individual, community, and national economic, equity, infrastructure, and ecosystem benefits from investments in NbS are much higher than alternatives, with synergistic benefits for health, gender empowerment, resilience, and sustainability. Given these many benefits, NbS are worth the investment.

24. CSIS. 2020. Covid-19 Exposes Latin America's Inequality. <https://www.csis.org/analysis/covid-19-exposes-latin-america-inequality>

