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SUSTAINABILITY INDEX FOR LANDSCAPE RESTORATION

A tool for monitoring the biophysical and socioeconomic impacts of landscape restoration

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SICA

FOREWORD

Restoring degraded land has never been more urgent and important, with wildfires, droughts, floods, and other impacts of climate change ever more apparent. The benefits of restoring land are many, from improving food production to protecting water supplies, providing people with new sources of income, and storing carbon in soil and trees, thereby slowing future heating.

There is good news: land restoration is gathering momentum across Latin America, where 17 countries have committed to restoring 53 million hectares through Initiative 20x20, a region-wide, country-led venture. Several countries have prepared national restoration strategies, and money from public and private sources is starting to flow to specific projects.

How can this progress be accelerated? It is key to measure what matters and to allow practitioners to be able to manage landscape restoration projects effectively. This important report shows how.

Restoration is more complex than just planting trees. It requires that farmers, rural communities, businesses, and government agencies – all of which have different interests – unite behind a shared vision of how the land should be used. Establishing common goals and measuring progress facilitates deeper collaboration among these actors. This in turn can improve strategies and implementation, helping to direct investments into activities that maximize results.

The Sustainability Index for Landscape Restoration introduced in this report is a field-tested tool for measuring the impact of restoration efforts. It offers easy-to-use visual metrics to display biophysical and socioeconomic indicators that measure the health of a landscape. It also describes how these metrics have been used to convene dialogues among diverse stakeholders who must actively collaborate to restore the land.

To test the methodology, the World Resources Institute worked with the Government of El Salvador, the Regional Program for Research on Development and Environment (PRISMA), and the German Corporation for International Cooperation (GIZ), to create a Sustainability Index for Landscape Restoration in a 1200 square kilometer landscape. The area is home to about 300,000 people and includes the subtropical forests in the El Imposible National Park, mangrove areas in Barra de Santiago, and Ilamatepec, a volcanic mountain range with diverse natural and agricultural areas.

This report describes how the creation of the index enabled diverse stakeholders to create a common vision for their shared landscape, based on their own values and priorities; it also supports their plans for using the index to help ensure that various players follow through with their commitments.

I share the authors' hope that the Landscape Restoration Index can act as a roadmap for decision-makers in Latin America and the rest of the world as they design systems to track their progress. We also hope that by showing the benefits that El Salvador is poised to realize will inspire other governments, companies, and communities to apply the guide to galvanize local action to restore land at the pace needed to slow climate change and decarbonize economies.

Andrew Steer
President
World Resources Institute

EXECUTIVE SUMMARY

This publication presents a methodological framework for monitoring the impacts of landscape restoration through the construction of an index. The Sustainability index for Landscape Restoration (SILR) is a measure of the biophysical and socioeconomic impacts of restoration actions. The index provides a score (ranging from 0 to 1) for each landscape, based on the degree of compliance with the goals established in restoration plans or strategies with respect to a baseline, and its calculation can be broken down into different biophysical and socioeconomic components. The index was applied in a priority landscape in El Salvador, El Imposible-Barra de Santiago and Apaneca-Ilamatepec, and was implemented through the Ministry of Environment and Natural Resources (MARN). The results presented here represent an opportunity for the strategic assessment of restoration actions.

HIGHLIGHTS:

- Landscape restoration provides an opportunity to reverse ecosystem degradation and promote development. However, it is necessary to establish monitoring, reporting, and verification systems that allow for the evaluation of changes and establish correlations with the implemented actions.
- For addressing climate change in Latin America, monitoring the impacts of restoration is key to facilitating and improving the promotion and planning of adaptive landscape management.
- The potential impacts of restoration—such as increased carbon stocks, increased forest connectivity, improved water quality and quantity, and improved livelihoods, among others—need to be monitored cost-effectively by governments.
- This report offers a methodology for designing a landscape sustainability index for monitoring restoration progress and demonstrates its application in a specific landscape in El Salvador.
- The index is also a guide for decision-makers to assess progress in the implementation of policy instruments in landscapes.

Challenges in landscape monitoring

Landscape restoration involves the implementation of activities with diverse social, environmental and economic impacts that need to be measured. Through the Initiative 20x20, 17 Latin American countries have expressed their ambition to restore around 53 million hectares of degraded land in order to generate positive impacts on the sustainability of landscapes. These impacts need to be monitored by the governments of the region in order to establish the correlation between the activities implemented and their effects on the landscape and to propose corrective actions if needed. Given the complexity of social, environmental, and economic factors within landscapes, it is necessary to design systems that allow, in a simple way, to evaluate and qualify the factors as a whole and, in turn, to provide individual information for each factor.

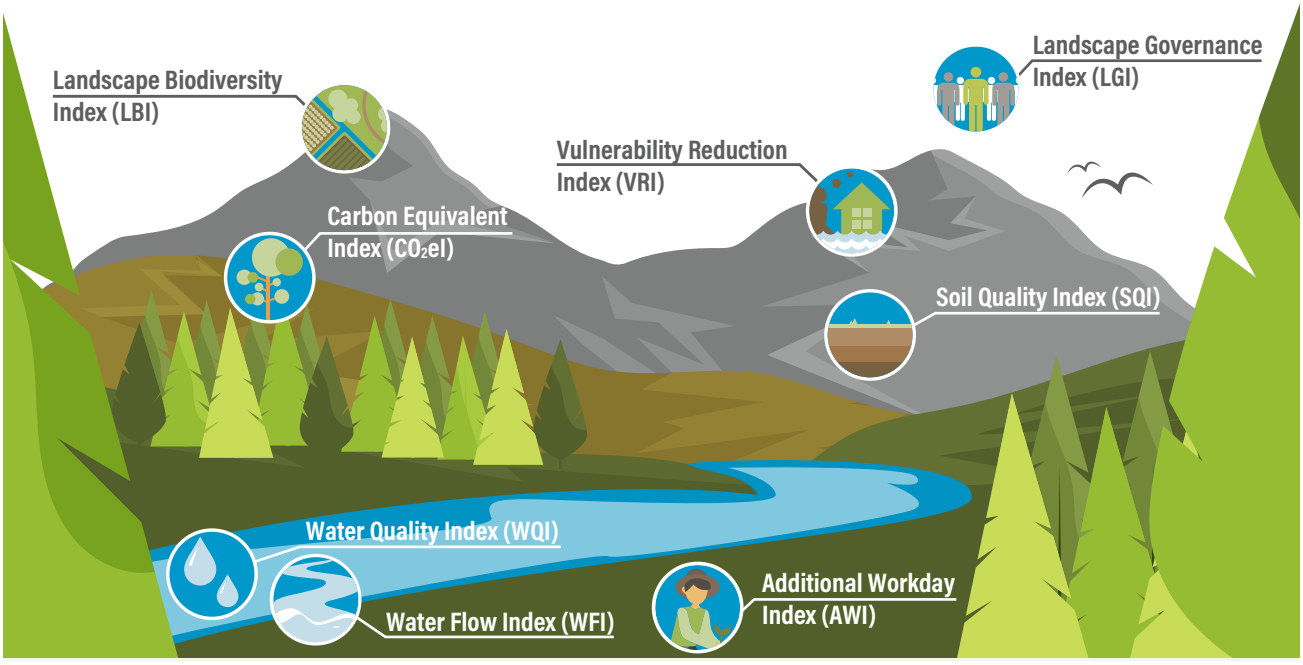
This publication presents a methodological framework for monitoring the impacts of landscape restoration through the construction of an index. The Sustainability Index for Landscape Restoration (SILR) is a measure of the biophysical and socioeconomic impacts of restoration actions. The index reports a score (from 0 to 1) for each landscape, which depends on the degree of compliance with the goals established in restoration plans or strategies with respect to a baseline. Within the SILR the rating 0 (zero) indicates the absence of progress while 1 refers to the achievement of the proposed goals. The rating is the entry point for determining the status of the targets and its calculation can be broken down into different biophysical and socioeconomic components. The index was applied in a priority landscape in El Salvador, El Imposible-Barra de Santiago and Apaneca-Ilamatepec, and was implemented through the Ministry of Environment and Natural Resources (MARN). The results presented here represent an opportunity for the strategic evaluation of restoration actions.

How is the index assembled?

The SILR is composed of eight indexes that allow monitoring of the impacts of restoration in different dimensions of mitigation and adaptation to climate change: the Water Quality Index (WQI),Water Flow Index (WFI), the Soil Quality Index (SQI), the Landscape Biodiversity Index (LBI), the Carbon Equivalent Index (CO_2eI); the improvement in the livelihoods of rural communities as measured by the Additional Workday Index (AWI); the reduction of vulnerability to environmental risk as measured by the Vulnerability Reduction Index (VRI), and governance for landscape management as measured by the Landscape Governance Index (LGI) (Figure ES 1). The components presented here may vary according to the conditions and information available in each country. The important aspects to emphasize are that the information to be used must be collected periodically, must be made available, and must have a reliable source validated by government agencies. In the case of El Salvador, the Water Flow and Soil Quality Indexes were included, but the information to calculate them was not yet available.

The SILR is composed of thematic indexes, which may or may not be aggregated in a modular manner, according to the information available. In some cases, the information available is directly related to restoration actions. For example, in the case of El Salvador, the indexes of Carbon Equivalent and Additional Workdays give more direct information on the impact of the restoration actions carried out while, for the rest of the indexes (Water Quality, Water Flow, Biodiversity, Soils, Vulnerability, and Governance), the information available regarding impacts also includes the effect of external factors, additional to the restoration actions. It will be shown that the Biodiversity Index not only includes the impact of restoration actions but also that of natural regeneration that has occurred during the analysis period.

Figure ES-1 | Components of the Sustainability Index for Landscape Restoration

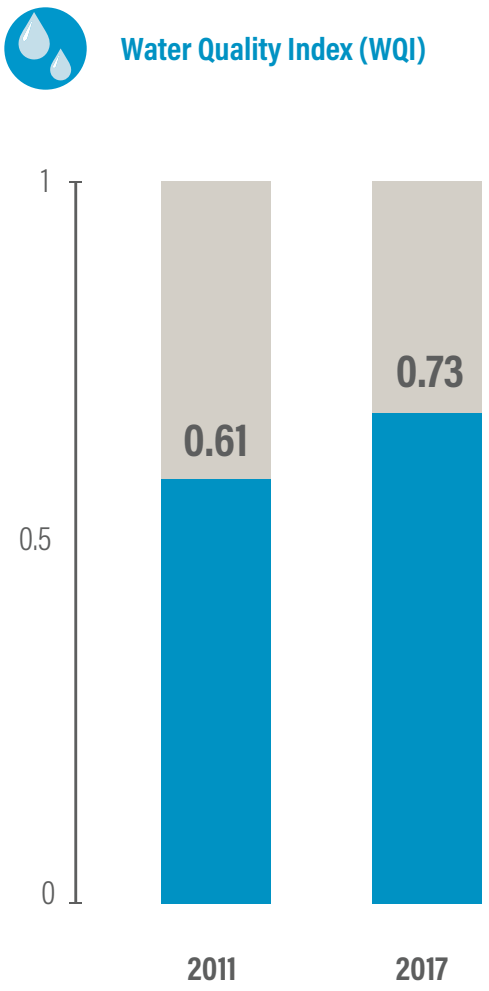


Source: WRI and PRISMA, 2019

What are the results?
Water Quality Index (WQI)

The Water Quality Index provides information on the level of water pollution and its capacity to sustain a high diversity of aquatic life in rivers. In El Salvador's target landscape, information was collected at the MARN measuring stations. The normalized results show a score of 0.73 (on a scale of 0 to 1) for the WQI, compared to 0.61 in 2011 (Figure ES 2).

Figure ES-2 | Water Quality Index Results 2011 and 2017

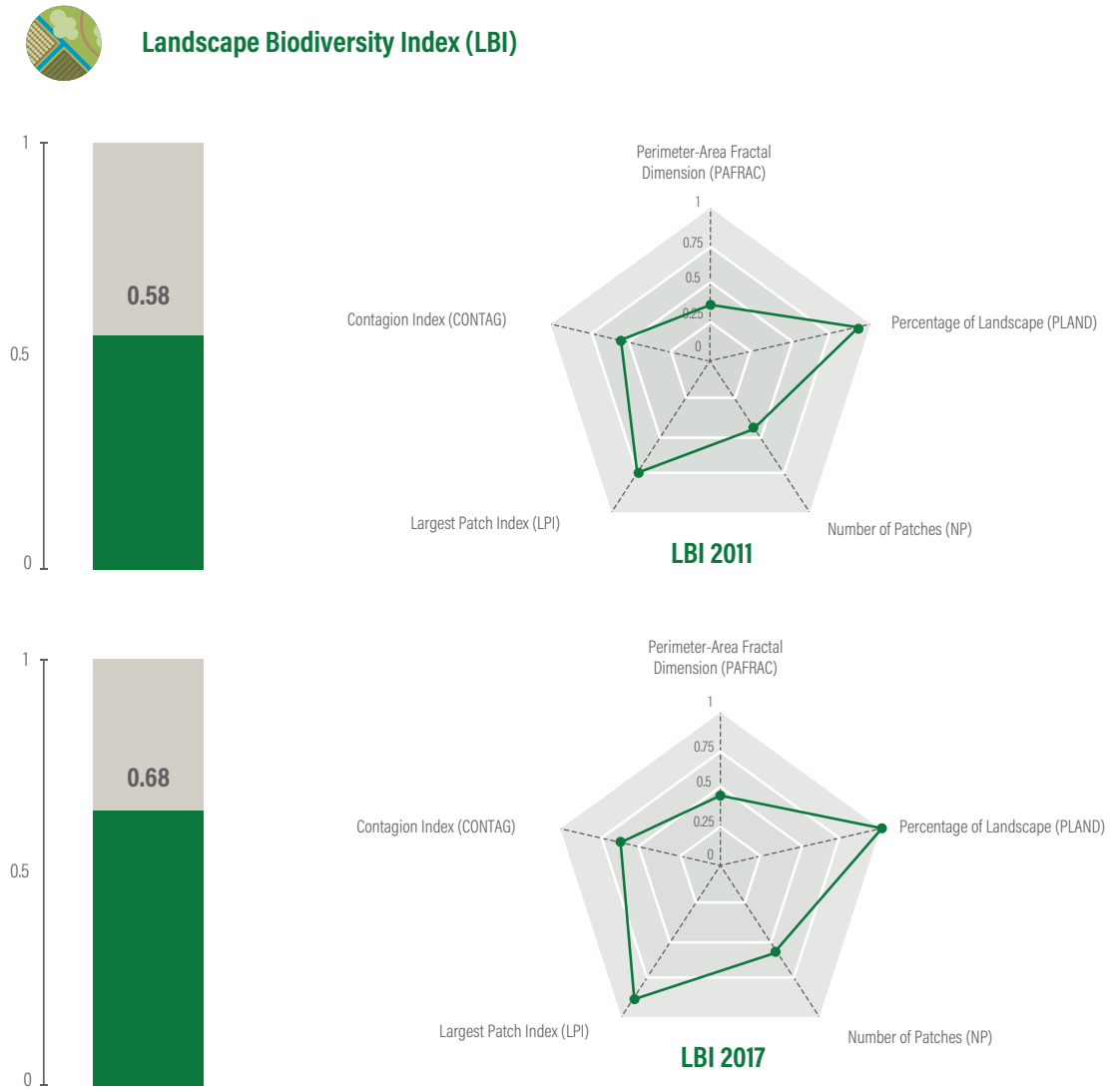


Source: WRI and PRISMA, 2019

Landscape Biodiversity Index (LBI)

The Landscape Biodiversity Index measures the degree of connectivity and fragmentation of the landscape. The index is composed of five parameters that together provide information on the number of existing forest patches, how they are connected, and their level of fragmentation. A maximum LBI of 1 indicates that the landscape has sufficient attributes to protect the biodiversity it harbors, but that number decreases as the degree of degradation of the landscape increases. In El Salvador's landscape, the LBI increased from 0.58 in 2011 to 0.68 in 2017 (Figure ES 3).

Figure ES-3 | Landscape Biodiversity Index

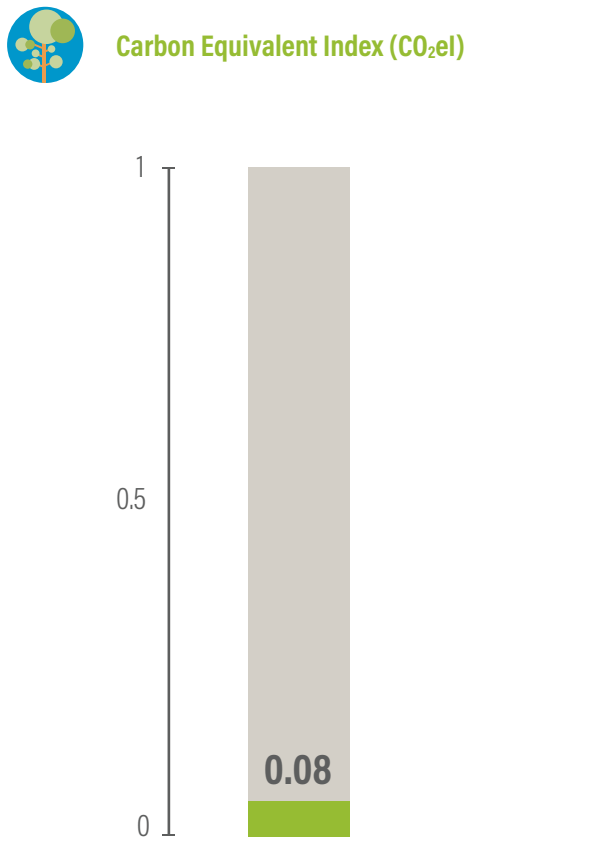


Source: WRI and PRISMA, 2019

Carbon Equivalent Index (CO_2eI)

The Carbon Equivalent Index (CO_2eI)) measures the additional carbon captured through restoration actions within the landscape. The index is obtained by adding the areas by type of restoration during the study period. In El Salvador, for each type of restoration, its annual carbon contribution and its total contribution up until 2030 were determined. Based on the available information, a carbon gain of 221,623 t of CO_2e was estimated for 2016, which contrasts with the maximum potential of 2,707,195 t of CO_2e that is expected to be obtained if all the restoration activities estimated in the Action Plan for the Restoration of Ecosystems and Landscapes of El Salvador in 2030 are implemented (Figure ES 4).

Figure ES-4 | Carbon Equivalent Index Results

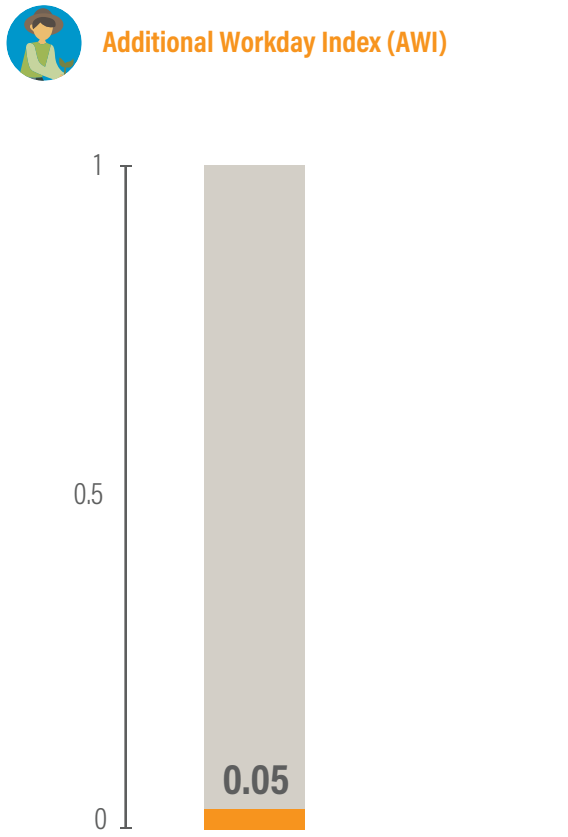


Source: WRI and PRISMA, 2019

Additional Workday Index (AWI)

The Additional Workday Index is a measure that estimates the additional working days generated in restoration activities, both in their establishment and in their maintenance. A workday is equivalent to an effective full day of work. For the landscape under study it was determined that a total of 2.6 million additional workdays have been generated in the period between 2016 and 2018. The maximum potential number of additional workdays is 47.3 million if all restoration activities presented in the Action Plan for the Restoration of Ecosystems and Landscapes of El Salvador for the year 2030 were to be fulfilled. The index reported a value of 0.05 (Figure ES 5).

Figure ES-5 | Results of the Additional Workday Index

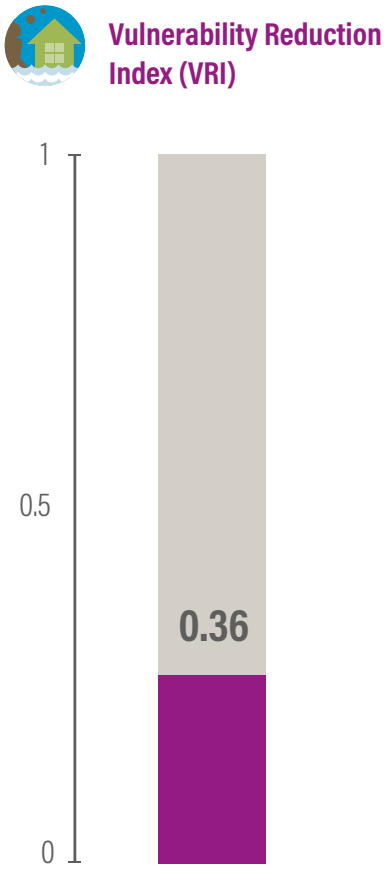


Source: WRI and PRISMA, 2019

Vulnerability Reduction Index (VRI)

The VRI is an indirect metric to estimate the reduction of vulnerability to natural factors. It is calculated from the data of a more complex index, the Risk Management Index (INFORM), which is calculated by MARN and responds to a global collaborative initiative of the Inter-Agency Standing Committee (IASC) and the European Commission. For the calculation of the VRI, only the hazard and exposure component in the natural hazard category was taken into account, from which the values corresponding to flood, landslide, and drought indexes are taken, as these are the factors that would potentially suffer impacts as a result of the restoration actions being carried out. The index value for this landscape is 0.36 (Figure ES 6).

Figure ES-6 | Results of the Vulnerability Reduction Index

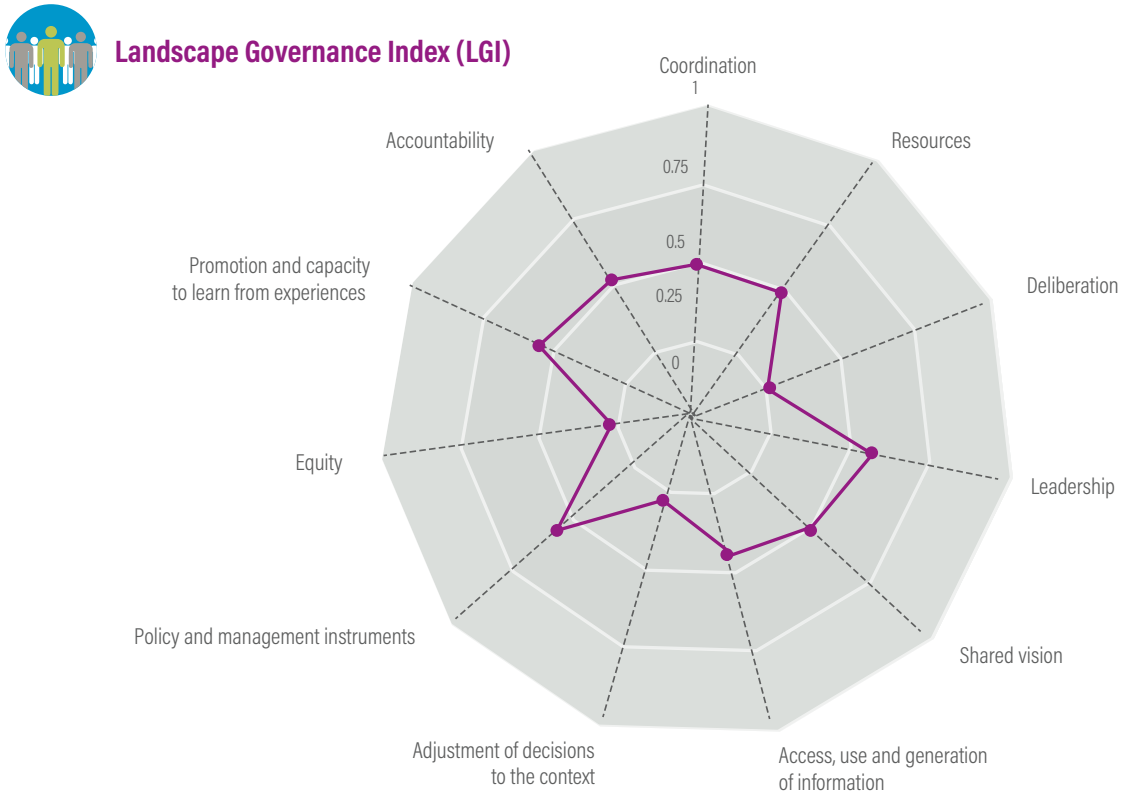


Source: WRI and PRISMA, 2019

Landscape Governance Index (LGI)

The LGI measures the governance situation for the management of a given landscape. This index measures different aspects of governance such as equity, leadership, or shared vision, among others. The index was calculated through surveys with focus groups on the landscape of interest. By applying the methodology described in this report, an LGI of 0.44 was obtained (Figure ES 7).

Figure ES-7 | Landscape Governance Index Results

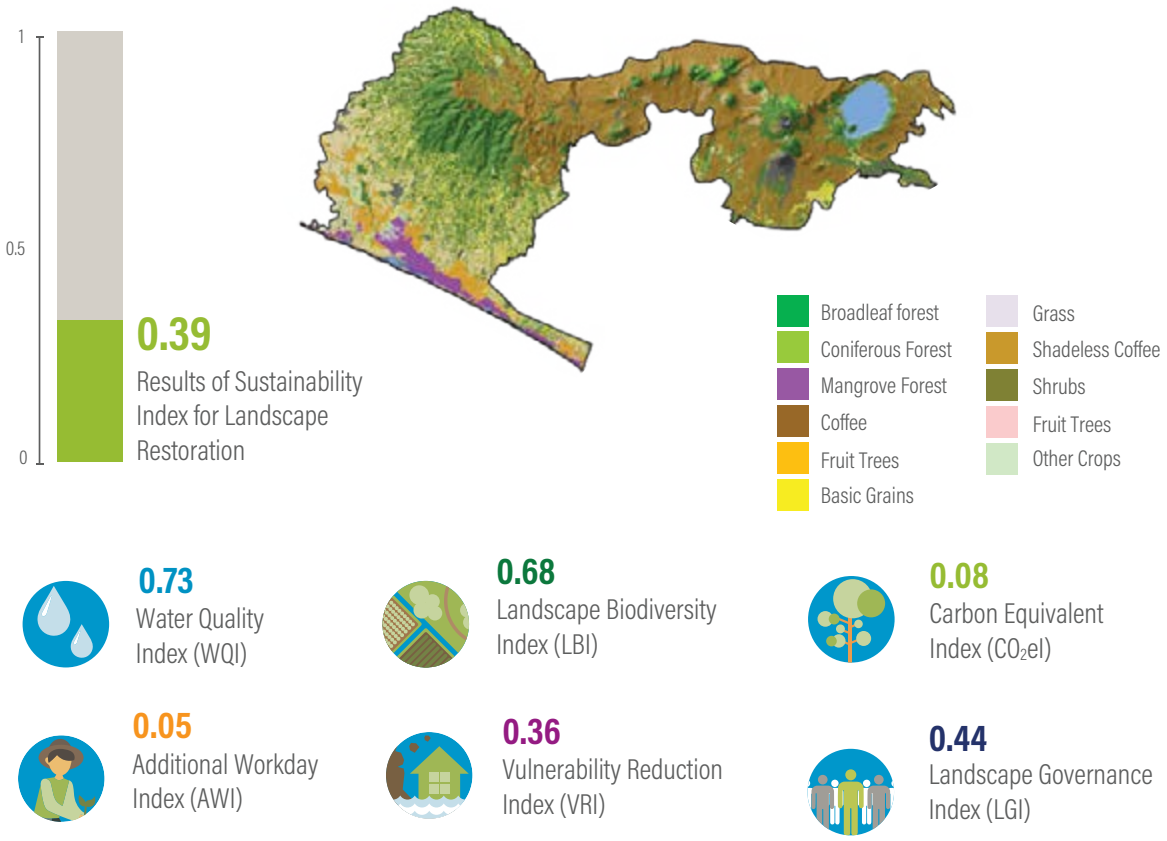


Source: WRI and PRISMA, 2019

Sustainability Index for the Restoration of El Imposible-Barra de Santiago and Apaneca-Ilamatepec

The SILR for the landscape of Imposible-Barra de Santiago and Apaneca-Ilamatepec in El Salvador reported a value of 0.39 by 2018 (Figure ES 8). The LBI and the WQI present the best ratings. In the case of the LBI, the result is related to the presence of three important forest masses, such as the country's most important natural protected area, the largest shaded coffee area, and an important mangrove. For its part, the WQI reports improvements in almost all of the country's rivers, of which 27 percent have increased their quality. **CO_2eI and AWI more clearly reflect the impact of restoration actions because the values included in their calculation come directly from the list of restoration actions reported by MARN.** Due to the fact that these actions have been initiated recently, these indexes report the lowest values. The SILR is a broader monitoring, reporting, and verification system that reports on the country's progress in terms of local and national level adaptation-based mitigation.

Figure ES-8 | Sustainability Index Results for Landscape Restoration



Source: WRI and PRISMA, 2019

Regional Implications

The SILR has the potential to contribute to strengthening Latin American ecosystem and landscape restoration and management efforts. It is a useful tool to guide the delimitation of restoration actions based on more appropriate criteria of the landscapes' socio-environmental characteristics and dynamics, while promoting efforts that strengthen social capital and landscape governance.

The index can be easily applied as well as integrated into broader national level monitoring systems. Its application will help to improve the criteria for selecting and locating restoration actions from which to define calls for project proposals and priorities for directing international cooperation resources, in addition to promoting productive reconversion processes with private investments.

ABBREVIATIONS

CENTA	Centro Nacional de Tecnología Agropecuaria y Forestal (National Center for Agricultural and Forestry Technology)
CRS	Catholic Relief Services
ENso	El Niño Southern Oscillation
IASC	Inter-Agency Standing Committee
WQI	Water Quality Index
LBI	Landscape Biodiversity Index
CO_2el	Carbon Equivalent Index
SQI	Soil Quality Index
LGI	Landscape Governance Index
WFI	Water Flow Index
VRI	Vulnerability Reduction Index
SILR	Sustainability Index for Landscape Restoration
AWI	Additional Workday Index
MARN	Ministry of Environment and Natural Resources
AbM	Adaptation-based Mitigation
PREP	Ecosystem and Landscape Restoration Program
PRISMA	Regional Program for Research on Development and Environment
ERM	Ecological Restoration of Mangroves
ROLAS	Network of Local Environmental Observers
IUCN	International Union for the Conservation of Nature
WRI	World Resources Institute

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ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

Our Challenge
Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision
We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach
COUNT IT
We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT
We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT
We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

PHOTO CREDITS

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