



International Institute for Sustainability at glance:

SELECTED ACTIVITIES 2013-2014



The International Institute for Sustainability (IIS) is an organization focused on applied research, based in Rio de Janeiro. Founded in 2009, IIS acts as a “think tank”, producing and disseminating knowledge in order to help public and private institutions in their decision-making processes. With a multidisciplinary team, our activities aim to conduct research about land use and provide assistance for the development of projects. The current IIS team consists mainly of postdocs, PhDs, and MSc with multiple skills to address the challenges related to the integrated land use.

IIS focuses on three main areas:

- Economic incentives for sustainable development;
- Strengthening the supply chain and economy of forest restoration;
- Integrated land use and analysis to support formulation of public policies.

This publication gathers the key information from our 2013/2014 Activity Report. It is with great pleasure and enthusiasm that we present, in the following pages, the results of our short journey, achieved with the collaboration of our team.

Enjoy your reading!

IIS founders:

Bernardo Strassburg
Executive Director

Agnieszka Latawiec
Project and Research Director

Mission

To promote the sustainable use of the land through interdisciplinary research, to subsidize the elaboration of public policies, and disseminate knowledge.



Business case for a more sustainable livestock

ECONOMIC INCENTIVES FOR SUSTAINABLE DEVELOPMENT

In 2014, IIS released the study entitled “Economic Analysis of a More Sustainable Livestock”, which shows the economic viability of a sustainable production model to cattle ranching. IIS assessed the impact of sustainable intensification in a financial perspective, measuring its risks and the role of credit to leverage best practices, among other implications arising from the livestock intensification. For this purpose, a study was conducted in eight farms within the Novo Campo Program, in the micro-region of Alta Floresta (state of Mato Grosso), in partnership with the Instituto Centro de Vida (ICV).

One of the strategies identified in the study to sustainable livestock intensification was the Crop-Livestock integration. The integrated production systems present technical and economic viability; it could be an option to recover degraded areas and to increase agricultural production without deforestation, not to mention the socioenvironmental benefits.

The study also proposes other complementary initiatives to ensure the success of sustainable intensification and avoid future deforestation, such as the expansion of technical assistance involving institutions, which already work in the field. Moreover, it is important to advance with the rural and environmental regulation, with clear and stable rules.



Rural credit mapping in the southeast of Pará

ECONOMIC INCENTIVES FOR SUSTAINABLE DEVELOPMENT

The municipality of São Felix do Xingu, in the southeast of the state of Pará, is recognized by its economic growth associated to livestock. This municipality have the largest cattle herd in Brazil. However, the municipality is also know by the high deforestation rate; approximately 1.85 million hectares in recent decades, and the growth of livestock is the main cause of deforestation in the region. Despite this, Protected Areas and Indigenous Lands cover more than 50% of the micro-region area. Moreover, in recent years several organizations such as The Nature Conservancy (TNC) have been working to promote the responsible use of natural resources and disseminate best agricultural practices.

In order to contribute to the efforts of TNC, IIS mapped the rural credit for cattle ranches in the micro-region of São Felix do Xingu. Such credit supported the creation of a new



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model of sustainable production, economically viable and focused on the conservation of natural resources in the region.



"Intensifica Pecuária"

ECONOMIC INCENTIVES FOR SUSTAINABLE DEVELOPMENT

In 2014, IIS conducted a detailed study for the Secretariat of Strategic Studies of the Presidency (SAE, in Portuguese acronym) and the United Nations Development Program (UNDP) about the potential economic impact of the oriented credit program: *Intensifica Pecuária* ("intensifies livestock", in a free translation). This credit intends to incentivize the livestock production techniques that contribute to the sustainability and development of the livestock activity. The main benefit is the lower interest rates to producers who meet the requirements.

The analysis and recommendations of IIS for this credit were used as a support material to the credit program developed by the SAE. The IIS analysis considered the demands of the livestock supply chain to increase productivity and the overlap with

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other credit offered. The results of the economic impact analysis to this credit supported the Ministry of Finance in discussions about the Brazil's Agriculture and Livestock Harvest Plan.



Sustainable Credit Project

ECONOMIC INCENTIVES FOR SUSTAINABLE DEVELOPMENT

IIS designed the Sustainable Credit Project, which proposes expanding access to rural credit for producers of Alta Floresta region that adopt good agricultural practices. The idea came up within discussions of the Novo Campo Program, which IIS is a partner. The Novo Campo Program was created in order to expand the adoption of Good Agricultural Practices (GAPs) through the intensification of pastures in the Alta Floresta region. However,

early surveys of IIS with producers in the region have identified that there is a demand for financial resources for investment in good agricultural practices.

In this context, in late 2014 the Novo Campo Program and IIS signed an agreement with the Agribusiness Department of Banco do Brasil and the Office of Business and Trade of Mato Grosso government, to develop a pilot project in the Alta Floresta micro-region. This agreement was made during meetings with bank representatives of the cities comprising the micro-region of Alta Floresta, and the stakeholders showed enthusiasm when the project was presented.



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Spatial analysis and diagnosis of land use

STRENGTHENING THE SUPPLY CHAIN AND ECONOMY OF FOREST RESTORATION

This study was conducted for the state of Espírito Santo, in partnership with IUCN Brazil, and is part of the Private Investments in Landscape Restoration Project (PILaR, in Portuguese acronym), which in Brazil aims to encourage the establishment of financial flows that enable the scale up and the strengthening of the restoration supply chain in the Atlantic Rainforest.

IIS contributed to the implementation of a pilot area in the state of Espírito Santo and produced a Sustainable Landscape Development Plan in the São Mateus region, which cover nine cities. This report presented the main patterns of land use and land cover, as well as identifies the riparian areas to be protected in the region.

The results shows the demand for restoration of large areas and the high potential for the deployment of large-scale restoration initiatives, taking into account the market characteristics and the offer of seeds and seedlings



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in the region. Our analysis also shows the existence of many degraded areas or below the potential of productivity, which contributes to the feasibility of the restoration.



Business Case for ecological restoration with economic benefits

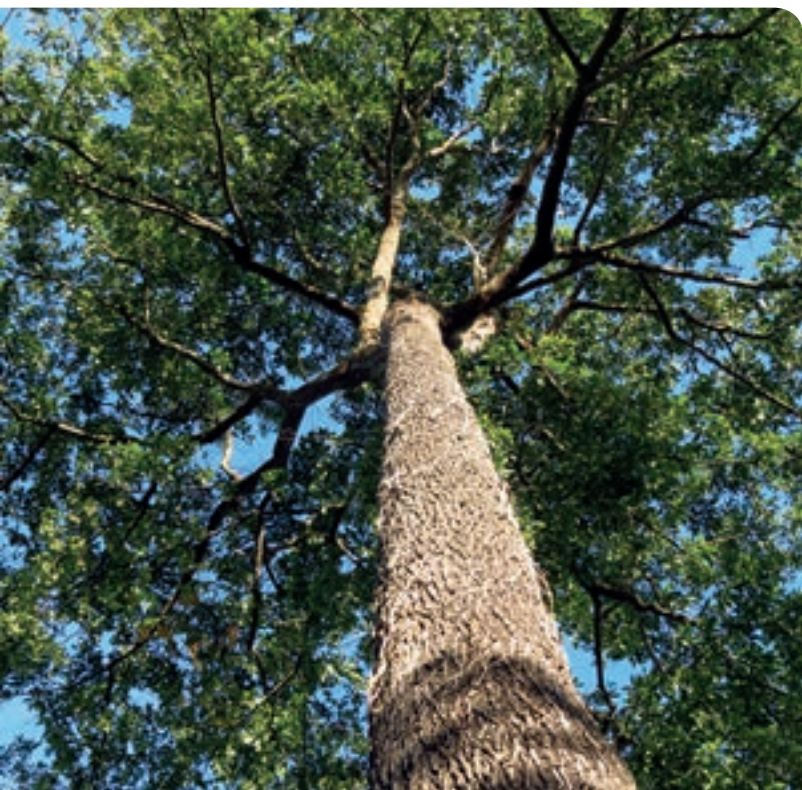
STRENGTHENING THE SUPPLY CHAIN AND ECONOMY OF FOREST RESTORATION

IIS analyzed the economic benefits of the restoration in the region of São Mateus, Espírito Santo State, Brazil. For this analysis, we consider the logging in the area to be restored, based on models developed for ecological restoration.

It was noted that a consortium of native species and eucalyptus (to woodpulp and logging) has more

economic advantages than planting only native species of the Atlantic Rainforest. It reduces the cost of restoration, ensures the timber trade in the region, and encourages the development of technology for the management of native species. It has been estimated that the cost of implementation for this model is almost half of the cost of a conventional restoration planting model and, even in the worst case scenario, the internal rate of return was higher than or similar to the crops most widespread in the region.

To increase forest cover in the Atlantic Rainforest, and ensure the conservation of biodiversity and its ecological processes, the study developed by IIS shows that the use of models that generate economic and ecological benefits has potential for large-scale restoration in this biome.



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Evaluation successful restoration through sustainability indicators

STRENGTHENING THE SUPPLY CHAIN AND ECONOMY OF FOREST RESTORATION

In Rio de Janeiro, the “Projeto Mutirão do Reflorestamento” (Effort for Reforestation Project, in a free translation), by the Municipal Agency of Environment (SMAC, in Portuguese acronym), has been coordinating since 1986 the implementation and monitoring of plantations in more than two hectares, spread over 140 places in the city and surroundings.

This initiative included the participation of more than 800 employees and focuses primarily on offering improvements to the urban environment and the prevention of disasters by landslides and floods. From this successful initiative, IIS in partnership with PUC-Rio, Columbia University (New York), the Rio de Janeiro’s Botanical Garden Research Institute, the Conservation International, and SMAC, has been contributing to the assessment of the benefits and limitations of the project through sustainability indicators (ecological, economic, and social).

These indicators will serve as a tool to measure the impact of projects in the long term, enabling the management and the adjustment of future projects in the city.

The use of indicators of sustainability in projects involving restoration, biodiversity, livestock farming, water resources management, and other important social and environmental fronts has been gaining strength since they serve to point out possible paths towards the improvement and the evaluation of management models, processes, and impacts. Case studies present challenges in establishing these indicators, since the definition of the indicators involves different places and their spatial and temporal intricacies. In 2014, IIS researchers wrote chapters of the book “Sustainability Indicators in Practice”, which deals with the use of sustainability indicators in Brazil and in international contexts.



Study of the restoration supply chain in the Atlantic Rainforest

STRENGTHENING THE SUPPLY
CHAIN AND ECONOMY OF FOREST
RESTORATION

IIS conducted a review of the economic and ecological benefits of the restoration supply chain in the Atlantic Rainforest, and the results show that the main challenge for the development of this supply chain is create the demand for seeds and seedlings. In addition, the analyses show different wood

productivity scenarios with cost reduction curves and payback ranging from 19 to 39 years. It also shows a high potential for the development of plantations with economic benefits, confirming the proposed plantation model presented in the other study.



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STATE OF SÃO PAULO



Integrated land use analysis for the Paraitinga River Basin

INTEGRATED LAND USE
AND ANALYSIS TO PUBLIC
POLICIES

IIS conducted a study for the State Environmental Agency of São Paulo, which aimed to develop an integrated analysis on land use and incorporation of ecosystem services in the formulation of regional policies, focusing on the Paraitinga River Basin, State of São Paulo. This basin is in a strategic position and its part of a river system that supplies water for millions of people in the states of São Paulo and Rio de Janeiro. Currently, part of the region's soil is exposed and degraded and with low permeability. The water crisis that occurred in 2014 seems to be directly related to this scenario.

The IIS's study proposed transition strategies from traditional production to more sustainable land use. The assessment considered the potential productivity and the socioeconomic and cultural characteristics of the region. This study has influenced public policy of encouraging sustainable agricultural practices in the Paraitinga River Basin.

We noticed that more than half of the land use is pasture in the Paraitinga Basin, and dairy farming is the main economic activity to 65% of local producers. Forests are present in less than a quarter of the area and are small fragments, mostly within protected areas. This diagnosis, scenarios and future projections for land use were presented through analyses and thematic maps of potential agricultural productivity.



Land use integrated analysis for the micro-region of Alta Floresta

INTEGRATED LAND USE AND ANALYSIS TO PUBLIC POLICIES

In late 2014, IIS published a study about the sustainable development of the micro-region of Alta Floresta with an integrated land use approach, entitled “Contributions to the development of sustainable livestock on large scale in the micro-region of Alta Floresta, MT”. The financial viability to increase livestock productivity without deforesting new areas was shown in this study.

A diagnosis of the land use was projected from the data collected through focus groups and interviews with region's farmers, in 2014. From these data, we created possible scenarios for the expansion of the livestock in the micro-region.

With the rational land use, environmental regularization of rural properties would be possible without impact on production. Currently, the micro-region has 68% of its area covered by forests and 82% of opened areas intended for grazing. In comparison with the projection of the business as usual, the

intensification would require 40% more credit than the current credit available in the Alta Floresta region. The cost of transition to a more sustainable agriculture could be covered by REDD+ programs, which may contribute to the creation of financial mechanisms for this transition. A transition to a more sustainable scenario would mitigate the emission of 203 million tons of CO₂.



Biochar – a sustainable mechanism for land management

INTEGRATED LAND USE AND ANALYSIS TO PUBLIC POLICIES

In November, 2014, IIS started experiments with biochar, a project in partnership with Embrapa Agrobiologia, in Seropédica municipality (state of Rio de Janeiro), and the Norwegian Geotechnical Institute (NGI).

Biochar is produced through the process of pyrolysis (decomposition of organic material at elevated temperatures with little oxygen) of biomass residues in sealed ovens. The final product, rich in carbon, can enrich the soil and contribute to the reduction of greenhouse gases emissions. Recent studies show that biochar can be a sustainable tool to increase agricultural productivity, improve the quality of tropical soils, and even contribute in restoration.

In order to test the potential of biochar, three experiments (with pastures, corn/beans, and seedlings to restore the Atlantic Rainforest) were initiated at Embrapa Agrobiologia's farm (Fazendinha Agroecológica, in Portuguese) in Seropédica.

The feasibility of reducing the use of fertilizers and improving its efficiency has been evaluated, as well as the capacity to increase organic matter content in the soil, increase agricultural productivity, and to assist the forest restoration.



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The Unlocking Forest Finance Project (UFF)

INTEGRATED LAND USE AND ANALYSIS TO PUBLIC POLICIES

The Unlocking Forest Finance project (UFF) is coordinated by the Global Canopy Programme (GCP) and is being developed in partnership with several institutions such as the Center for Environmental Research (UFZ-Germany), Center for Development and Research in Selva Alta (CEDISA-Peru), the Environmental Research Institute in Amazon (IPAM-Brazil), International Institute for Applied Systems Analysis (IIASA-Austria), the Environmental Services Development Company (CDSA-Peru), the World Wide Fund for Nature (WWF), the National Institute For Space Research (INPE-Brazil), and the Climate Bonds Initiative (CBI). Its main objective is the modeling of land use to generate funding models for the states of Acre and Mato Grosso, in Brazil, and for the province of San Martin, Peru, using public capital to leverage private funding through capital markets. This funding model will enable the transition of the business-as-usual model to a sustainable development, as a way to slow deforestation, restore degraded areas, promote more sustainable management systems, as well as conserve forests and improve rural livelihoods in each one of the studied regions.

Under this project, IIS is producing, together with other partners, a methodology for valuation of the Ecosystem Services (ESA) and is selecting which ESA will be integrated into the transition plan for each studied area. In addition, IIS has been working in the designing and modeling of an ideal financing option for Acre, Mato Grosso, and San Martin.

Throughout 2014, UFF partners pooled their efforts to identify and prioritize the ecosystem services from the data of the three regions and the methodology started being developed through meetings and workshops to exchange knowledge among the institutions.

This project started in 2013 and ends in 2017.

RESEARCH AND EDUCATION

Sustainability Science is a new field of scientific knowledge geared towards sustainability issues. It consolidates multidisciplinary approaches defined by the problems it addresses, through concepts, tools, practices, and intrinsic ethical issues. Thus, it seeks continuous interaction with related natural, human, and social sciences, as well as technical and scientific disciplines. Despite consolidation efforts in recent decades, this scientific field remains little explored by Brazilian education and research institutions.

LUNCH SEMINAR

Lunch Seminar, a practice that IIS started in 2014. Lunch Seminar is a monthly meeting aimed to foster scientific research and encourage the exchange of knowledge among internal and external experts, Brazilians and foreigners. It is a presentation by a guest researcher (whether an IIS member/collaborator or not) to the IIS staff and other professionals that have interest or concerns on the theme. The presentation may be on a case study, experience report, documentary, ongoing projects etc. Examples of speakers at the Lunch Seminar:

“Advances in the knowledge on Sustainability Science” Toby Gardner (Stockholm Environment Institute and International Institute for Sustainability)

“Institutional presentation and on the tools Water Calculator and Road Filter” Susan Edda Seehusen (CSF)

“Agriculture Intensification: risks and opportunities for forest conservation” Ben Phalan (Cambridge/IIS)

Pontifical Catholic University of Rio de Janeiro (PUC-Rio)

In 2013, Dr. Bernardo Strassburg became an Assistant Professor in the Department of Geography at the Pontifical Catholic University of Rio de Janeiro (PUC-Rio). Based on his experience, Dr. Bernardo Strassburg and Dr. Agnieszka Latawiec developed a new discipline, Sustainability Science, which consequently was formally included in the university's curriculum. In addition to Dr. Bernardo Strassburg, other IIS specialists collaborate in undergraduate and graduate courses. ção e pós-graduação do Departamento de Geografia da PUC-Rio.

Other research and/or education institutions with which we collaborate:

- Stockholm Environment Institute (SEI)
- Cambridge University
- Brazilian Agricultural Research Corporation (EMBRAPA) – Embrapa Agrobiologia
- Norwegian Geotechnical Institute (NGI)
- International Institute for Applied Systems Analysis (IIASA)
- “Luiz de Queiroz” College of Agriculture at the University of São Paulo (ESALQ/USP)
- Rio de Janeiro's Botanical Garden Research Institute (JBRJ)

In 2013 and 2014, the International Institute for Sustainability had key involvement in various environmental initiatives towards sustainability in land use, which resulting public policies are of interest to the civil society. Through these initiatives, IIS has the opportunity to apply, discuss, and disseminate the knowledge generated in the studies conducted by the institution. Selected examples:

1. Brazilian Roundtable on Sustainable Livestock (GTPS, in Portuguese acronym)

IIS is an associate member of GTPS in the segment of civil society organizations and participates in meetings promoted by the Economic and Financial Incentives Commission. IIS participate in discussions about incentive for the sustainable development and adoption of public and private financing policies, such as rural credit, tax exemption, and payment for environmental services.

2. Novo Campo Program

The Novo Campo Program was launched in 2014 and IIS participates in its Steering Committee. Through meetings, IIS has contributed to the alignment among all partners of the program's governance and the identification of challenges and opportunities to promote sustainable agricultural practices. The institution has contributed to the design of policies for

the adoption of good agricultural practices in livestock (such as Brazilian GAP) and in the development of a strategic planning for sustainable land use in Alta Floresta. In addition, IIS has discussed with local financial agents mechanisms to release credit for landowners that adopt good agricultural practices.

3. Sustainable Development Solutions Network (SDSN)

IIS joined the Sustainable Development Solutions Network in Brazil (SDSN Brazil) when it was launched, in 2014. SDSN is intended to mobilize universities, research centers, civil society organizations, companies, and other knowledge centers to search for practical solutions to address the problems related to sustainable development regarding city management. With the theme "Sustainable Cities: Inclusive, Resilient, and Connected," the focus initiative is to identify practical solutions for improving urban management.

4. Pact for the Atlantic Rainforest Restoration

IIS is one of the partner organizations of the Pact for the Atlantic Rainforest Restoration, a movement promoted by the Brazilian society dedicated to the relationship among public and private institutions, governments, businesses, and landowners for the restoration and conservation of the biodiversity of the Atlantic Rainforest. Besides the active participation in Council meetings, IIS is part of the Working Group that discuss the economic impacts of restoration, which has the purpose of supporting the Board and the Executive Secretariat in the elaboration of issues related to this topic, and participate in the Pact's decision-making processes.



CIVIL SOCIETY



2013-2014 Selected Publications

The following documents are available here:
www.iis-rio.org/publicacoes

When enough should be enough: Improving the use of current agricultural lands could meet production demands and spare natural habitats in Brazil. 2014. Strassburg, B.B.N.; Latawiec, A.E.; Barioni, L.G.; Nobre, C.A.; Silva, V.P.; Valentim, J.F.; Vianna, M.; Assad, E.D. *Global Environmental Change* 28, 84–97.

↳ Study coordinated by the International Institute for Sustainability (IIS), in partnership with the Brazilian Agricultural Research Corporation (Embrapa, in Portuguese acronym) and the National Institute For Space Research (INPE, in Portuguese acronym), and published in the journal “Global Environmental Change” showed that a rational use of land with livestock could allow a significant expansion of domestic agriculture with zero deforestation. The analyses showed that Brazil already has enough agricultural and livestock areas to promote the increase of production in the world in the next three decades without deforestation.

The article has been widely accepted by the specialized media and guided major mass media outlets, like Bloomberg View and CBN.

Biophysical suitability, economic pressure and land-cover change: a global probabilistic approach and in-sights for REDD+. 2014. Strassburg, B.B.N.; Latawiec, A.E.; Creed, A.; Nguyen, N.; Sunnenberg, G.; Miles, L.; Lovett, A.; Joppa, L.; Ashton, R.; Scharlemann,

J.P.W.; Cronenberger, F.; Iribarrem, A. *Sustainability Science*, Volume 9, Issue 2, 129–141.

↳ Coordinated by the IIS directors, Dr. Bernardo Strassburg and Dr. Agnieszka Latawiec, and written by the IIS modeling analyst Alvaro Iribarrem along with other researchers, this paper aimed to estimate the probability of future changes in land use by 2050, including the effectiveness of protected areas.

Suriname: Reconciling agricultural development and conservation of unique natural wealth. 2014. Latawiec, A.E.; Strassburg, B.B.N.; Rodriguez, A.M.; Matt, E.; Nijbroek, R.; Silos, M. *Land Use Policy*, v. 38, 627–636.

↳ The journal “Land Use Policy”, published by Elsevier, released in its May/2014 edition the article “Suriname: reconciling agricultural development and conservation of unique natural wealth”, written by IIS researchers. The study analyzes the agricultural sector in the country, presents alternatives that combine land-sharing and land-sparing strategies to reconcile the expansion of agriculture with protection of natural resources and identifies opportunities for a sustainable development of the agricultural sector in Suriname.

Intensification of cattle ranching production systems: socioeconomic and environmental synergies and risks in Brazil. 2014. Latawiec, A. E.; Strassburg, B. B. N.; Valentim, J. F.; Ramos, F.; Alves-Pinto, H. N. *Animal* (Cambridge. Print), v. 8, 1255–1263.



LAW AND PUBLIC POLICIES ELABORATION

National Native Vegetation Recovery Plan (PLANAVEG, in Portuguese acronym)

Planaveg was developed by the Ministry of Environment in order to implement the Native Vegetation Protection Act (Law nº 12,651 of May 25, 2012), which replaces the Brazilian Forest Code. The Plan, which is currently under public consultation, has as its goal the restoration of 12.5 million hectares in the next twenty years.

IIS participated in the elaboration of Planaveg, an essential policy for the environmental conservancy in Brazil. It provides mechanisms for financial incentives and Good Agricultural Practices, compliance with the market expansion forecasts in the coming years, and the analysis and recovery of major areas, such as areas of permanent protection, legal reserves, and degraded areas with low productivity. In addition, the study *"Preliminary analysis of restoration methods as an alternative income for farmers in the Atlantic Rainforest"*, coordinated by the Institute, supported the elaboration of this public policy.





Evaluating impacts of development and conservation projects using sustainability indicators: Opportunities and challenges. 2014. Agol, D.; Latawiec, A.E.;

Strassburg, B.B.N. Environmental Impact Assessment Review, v. 48, 1-9.

Pervasive transition of the Brazilian land-use system.

2013. Lapola, D.M.; Martinelli, L.A.; Peres, C.A.; Ometto, J.P.H.B.; Ferreira, M.E.; Nobre, C.A.; Aguiar, A.P.D.; Bustamante, M.M.C.; Cardoso, M.F.; Costa, M.H.; Joly, C.A.; Leite, C.C.; Moutinho, P.; Sampaio, G.; Strassburg, B.N.N.; Vieira, I.C.G.. Nature Climate Change , v. 4, 27-35.

Conciliating Ecosystem Services and Human Needs through Improved Land Use.

Latawiec, A.E.; Strassburg, B.B.N. Sustainability Science and Technology. 1ed.: CRC Press, 2014, v. , 93-108.

2013-2014 Events

Workshop - The Role of Natural Regeneration in the restoration of forest landscapes on a large scale: Challenges and Opportunities - Building the foundation for a global partnership for natural regeneration

Local: Rio de Janeiro - RJ

Date: November 19 to 21, 2014

- ↳ Organized by the IIS, the World Resources Institute (WRI), International Union for Conservation of Nature (IUCN), and PARTNERS, the event held at Botanical Garden's National School of Tropical

Botany, in Rio de Janeiro, aimed to evaluate natural regeneration as an economically feasible strategy to achieve a large-scale restoration worldwide.

The event sought to improve the discussions about the challenges and opportunities of natural regeneration of forests and building an agenda for its inclusion as an important component of a restoration initiative on a large scale. The speakers highlighted many shared goals and proposed a unified comprehension on how to incorporate natural regeneration in the range of approaches to achieve the restoration of forests and landscapes.

Through his study "Economic Aspects of Natural Regeneration", Bernardo Strassburg demonstrated the potential of forest restoration as an economic sector that generates wealth, jobs, and a value chain with a multiplying effect. Also, Agnieszka Latawiec, IIS Research Director and Co-Founder, complemented the discussion presenting the work "Making Room for Large-Scale Restoration in Agricultural Tropical Landscapes", which shows the current conflict between the goals of restoration and the need to use the land, increasing tension and disputes over land.

By the end of the event, the draft of the Rio Call or Letter of Rio was presented and discussed. This document records an agreement set by the present audience to create a global collaborative network to promote natural restoration in large scale.

ICONS CREDITS



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