# INTERACT-Bio: Integrated Action on Biodiversity

## Scoping Report

## ICLEI South America

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# ACRONYMS

AGEMCAMP - Agência Metropolitana de Campinas *(Campinas' Metropolitan Agency)*

ARMBH - Agência de Desenvolvimento da Região Metropolitana de Belo Horizonte *(Metropolitan Region of Belo Horizonte Development Agency)*

APA - Área de Proteção Ambiental (Environmental protection area)

APP - Permanent Preservation Areas

CAR - Environment Rural Register

CBD - Convention on Biological Diversity

CBRN - Coordination of Biodiversity and Natural Resources

CERH - State Environmental Policy (COPAM) and Water Resources

CETESB - Companhia Ambiental do Estado de São Paulo (Environmental Protection Agency of São Paulo)

CONAMA - National Environment Council

CPLA - Coordination of Environmental Planning

DF – Distrito Federal *(Federal District)*

EMPLASA - Empresa Paulista de Planejamento Metropolitano *(Metropolitan Planning Company of the State of São Paulo)*

GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit *(German Society for International Cooperation)*

IAC - Instituto Agronômico de Campinas (Campinas Agronomic Institute)

IDEB - Índice de Desenvolvimento da Educação Básica (Basic Education Development Index)

IDHM - Índice de Desenvolvimento Humano Municipal (Municipal Human Development Index)

IWA - International Water Association

ICLEI - Local Governments for Sustainability

LBSAP - Local Biodiversity Strategy and Action Plan

MMA - Ministério do Meio Ambiente *(Ministry of the Environment)*

MCidades - Ministério das Cidades *(Ministry of Cities)*

NBSAP - National Biodiversity Strategy and Action Plan

PDUI - Plano de Desenvolvimento Urbano Integrado de Campinas *(Integrated Urban Development Plan of Campinas)*

PDDI - Plano de Desenvolvimento Integrado de Belo Horizonte *(Integrated Development Master Plan of Belo Horizonte)*

PGRS - (Plano de Gerenciamento de Resíduos Sólidos (Solid Waste Management Plan)

PMV - Programa Municípios Verdes *(Green Municipalities Programme)*

PNB - National Biodiversity Policy

PMMA - Plano Municipal de Conservação e Recuperação da Mata Atlântica (Municipal Plan for the Conservation and Recovery of the Atlantic Forest)

PNMA - Política Nacional do Meio Ambiente *(National Environmental Policy)*

PNMC - National Policy on Climate Change

PNPDEC - Política Nacional de Proteção e Defesa Civil *(National Policy for Protection and Civil Defense)*

RL - Legal Reserve

RMC - Metropolitan Region of Campinas

SANASA - Sociedade de Abastecimento de Água e Saneamento (Society for Water Supply and Sanitation)

SEDU - Secretaria Estadual de Desenvolvimento Urbano *(State Secretary of Urban Development)*

SEMA PR - Secretaria do Meio Ambiente e Recursos Hídricos do Paraná *(State Secretary of Environment and Water Management)*

SEMAD - Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável *(State Secretary of Environment and Sustainable Development)*

SINIMA - National Environmental Information System

SISEMA - Environmental and Water Resources State System

SISNAMA - Sistema Nacional de Meio Ambiente *(National Environment System*

SMMA - Secretaria Municipal de Meio Ambiente *(Municipal Secretary of Environment)*

SNUC - Sistema Nacional de Unidades de Conservação (*National System of Conservation Units)*

SPG - Sistemas Participativos de Garantia (Guaranteed Participatory System)

SUSAN - Subsecretaria de Segurança Alimentar e Nutricional *(Sub Secretary of Food and Nutrition Security)*

SVDS - Secretaria do Verde, Meio Ambiente e Desenvolvimento Sustentável *(Municipal Secretary of the Green, Environment and Sustainable Development)*

TVA - Trama Verde e Azul (Green and Blue Trace)

UFZ - Helmholtz Centre for Environmental Research

ZAM - Zoneamento Ambiental Municipal *(Municipal Environmental Zoning)*

ZEE - Ecological and Economic Zoning

# PART A: INTRODUCTION AND METHODOLOGY

# 1. INTRODUCTION AND BACKGROUND

## 1.1. Outline of the INTERACT Bio Project

Throughout centuries of urban development, Brazil's biological diversity has been threatened by the uncontrolled growth of its cities. Although its local and federal governments weren't able to cope with the extremely rapid increase of size and population and plan accordingly, what led cities to significant natural losses and environmental conflicts, it is crucial to stress that the only way to achieve sustainable development is by managing natural resources, especially in a context of climate change. In order to support national and subnational policies towards the conservation of biodiversity, it was developed the INTERACT-Bio Project. Its goal is to integrate biodiversity and ecosystem services considerations into regional development plans and instruments n 3 selected metropolitan areas in Brazil.

## 1.2. Selection of city-regions

The selection of city-regions was made through an open call to all ICLEI Brazil members. ICLEI South America received seven applications from the following metropolitan regions: Belo Horizonte, Campinas, Curitiba, Distrito Federal (DF), Londrina, Recife and Sorocaba. The criteria established for accepting the candidatures are pointed below:

- The city-region must fit into the "metropolitan region" category according to Federal Law (Nr. 13,089/15);
- The metropolitan region must be located in a highly biodiverse area which ecosystems are or might be exposed to adverse effects;
- The metropolitan region must provide evidence on the dependency on ecosystem services offered by surrounding areas;
- There must be a formal political commitment to the project through a Mayor's letter, as well as a State Government's letter;
- The main city and the state government of the model city-region must be an ICLEI member;
- The main city of the observer city-region must be an ICLEI member.

Furthermore, ICLEI South America developed a scoring system considering aspects related to the cities' development, political and biodiversity framework and the project's potential impact in the region. As a result, **Campinas** was selected as the model city-region and **Belo Horizonte** and **Londrina** as observer city-regions.

## 1.3. Purpose and structure of the Scoping Report

This Scoping Report aims to assess the current situation at the national and subnational levels, gathering and analysing baseline information. The structure covers an overview of institutional landscape and policy framework, the specific city-region context, status of natural assets and its alignment with biodiversity priorities as well as drivers of change.

Finally, this report identifies the specific project intervention concepts for the respective city-regions through diagnosis studies, addressing an action plan for the next years.

# 2. SCOPING METHODOLOGY AND APPROACH

## 2.1. Purpose of scoping within the context of INTERACT Bio Project

To comprehend the local and regional context is fundamental to obtain a solid intervention concept, capable of guiding future actions and decisions. Local priorities and needs must be tracked in order to sustain the project actions and ensure that INTERACT-Bio truly delivers results people and government can benefit from. Its goal is to support institutionally and technically local decision making by highlighting biodiversity issues and taking them into account.

## 2.2. Scoping methodology

The Scoping process presented below was designed in partnership with UFZ (Helmholtz Centre for Environmental Research) and adapted to each city-region's context. Its results are mostly related to stakeholders engagement, but also based on available data, in such a way that the methodology combines participatory and technical perspectives.. ICLEI South America has also consulted GIZ's guidelines on "Integrating Ecosystem Services into Development Planning" and other literature on this topic in order to design these activities.

All three city-regions followed common steps, as seen in **Figure 1**. At first, a *preliminary diagnosis* (step 1) was conducted within each city-region's municipalities. This exercise intended to synthesise the social and economic context, as well as to map relevant stakeholders and initiatives. After that, a Scoping Workshop was organized, covering steps 2 to 5: (step 2) *introducing the concept of ecosystem services*; (step 3) *analyzing its current conditions and future trends*; (step 4) *prioritizing the most strategic ecosystem services and activities*; and, (step 5) *raising possible activities within INTERACT-Bio's context*.

The mentioned Scoping Workshops took place on:

- Belo Horizonte city-region: November 6th and 7th, 2017
- Campinas city-region: November 8th and 9th, 2017
- Londrina city-region: March 5th and 6th, 2018

All the municipalities were invited to participate in the workshops and a significant number attended them. A simple group exercise was conducted to analyse current conditions and trends of ecosystem services, pointing its respective sources, quality, quantity, main beneficiaries and drivers of change.

During step 6, *workgroups discussions* were developed, aiming to address specific themes. Finally, based on the results, an *intervention concept* (step 7) for each city-region was developed and aligned with local focal points.

In the case of Campinas city-region, there was also a particularly propitious situation that enabled INTERACT-Bio's achievements. The Project RECONECTA-RMC (further detailed in section 5), which was, at that time, articulating municipalities, found many synergies with our activities. Therefore, INTERACT-Bio catalysed and potentiated an on-going process, and specially steps 5 and 6 were adapted. Possible actions were mentioned not only within INTERACT-Bio's context, but also taking into consideration RECONECTA-RMC structure, and the workgroups were formed according to the thematic axes already proposed by the Project.

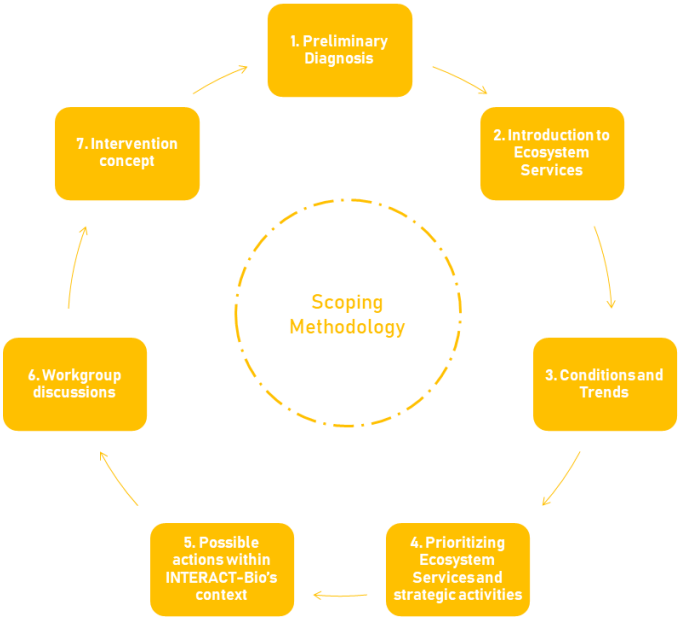


**Figure 1 - Scoping Methodology flow chart**

### 2.2.1 *Stakeholder engagement*

After selecting the three city-regions, ICLEI South America requested the indication of two focal points (one at the city level and other at the regional/state level). Therefore, six people involved with the Project's activities (two for each city-region) were responsible for engaging local stakeholders. The focal points also supported the coordination of workgroups and boosted communication among other key local stakeholders.

ICLEI South America, in its turn, promoted the engagement with national stakeholders - the Ministry of Environment and Ministry of Cities - by requesting the indication of two focal points in each (a political and a technical one). Periodical meetings are scheduled with political focal points in order to adjust INTERACT-Bio' strategy and technical focal points have been engaged along the key steps of scoping.

### 2.2.2 *Analysis of information*

Gathering all the information that resulted from steps 1-6 in a collaborative platform (Google Drive) made it possible to work together with focal points and workgroups simultaneously. Outputs were analysed and discussed according to their relevance, enabling the decision-making process.

## 2.3 Assumptions and limitations

In order to develop an intervention concept, ICLEI South America considers, at first, that all three selected city-regions have a political commitment to biodiversity and urban development, which was attested by the application letters. In general, the current political context is propitious to achieve INTERACT-Bio's expected results, since there is already a national framework that supports its core goals (due to the institution of Brazil's NBSAP and Metropolis Statute).

Timing is also an important variable to be considered in the integration of biodiversity and ecosystem services considerations into urban planning instruments. Campinas is currently developing its Integrated Urban Development Plan (PDUI), enabling positive horizon for advocacy and technical suggestions, while Belo Horizonte has already elaborated it - demonstrating openness for implementation possibilities. On the other hand, Londrina still has the challenge of configuring Metropolitan governance, what reflects on the status of results shown in this report.

Within municipalities' context, scarce financial and human resources are limitations identified and fully recognized as attention points regarding the mobilization strategy. The lack of integrative policies connecting the environmental agenda to other sectors, for instance the Planning and Budget Municipal Secretaries, challenges significantly the articulation potential. These aspects were taken into account during the activities and did not restrain Project's reach. Instead, boosted the search for innovative solutions that may improve this scenario.

# PART B: COUNTRY SCOPING

# 3. OVERVIEW OF GLOBAL AND NATIONAL BIODIVERSITY STATUS

Brazil made a political commitment to the 20 global biodiversity targets (Aichi Targets) during the Convention on Biological Diversity (CBD) at COP-10 in Japan. As a result, the Strategy and National Action Plan for Biodiversity (NBSAP) was published, translating this commitment into national targets to be achieved until 2020. The New Urban Agenda, adopted by Brazil in 2016 during the Third United Nations Conference on Housing and Sustainable Urban Development (Habitat III), delivers relevant considerations regarding territorial planning. The importance of connectivity, planning for integrated regions and the recognition of green areas as an essential factor for the quality of life are relevant aspects pointed out by the New Urban Agenda. These national commitments to global conventions have been pushing local governments to implement development plans and strategies that integrate environmental issues.

## 3.1 Global biodiversity hotspots and areas of high conservation value

The identification of biodiversity hotspots is a possible approach to highlight areas we must move attention to and drive investments for. The system of hotspots we use today results from a reworking of hotspots analysis set in 2004 (The Unfolding Earth, 2018). Currently, 35 biodiversity hotspots have been identified, most of which are located in tropical forests (**Figure 2**).

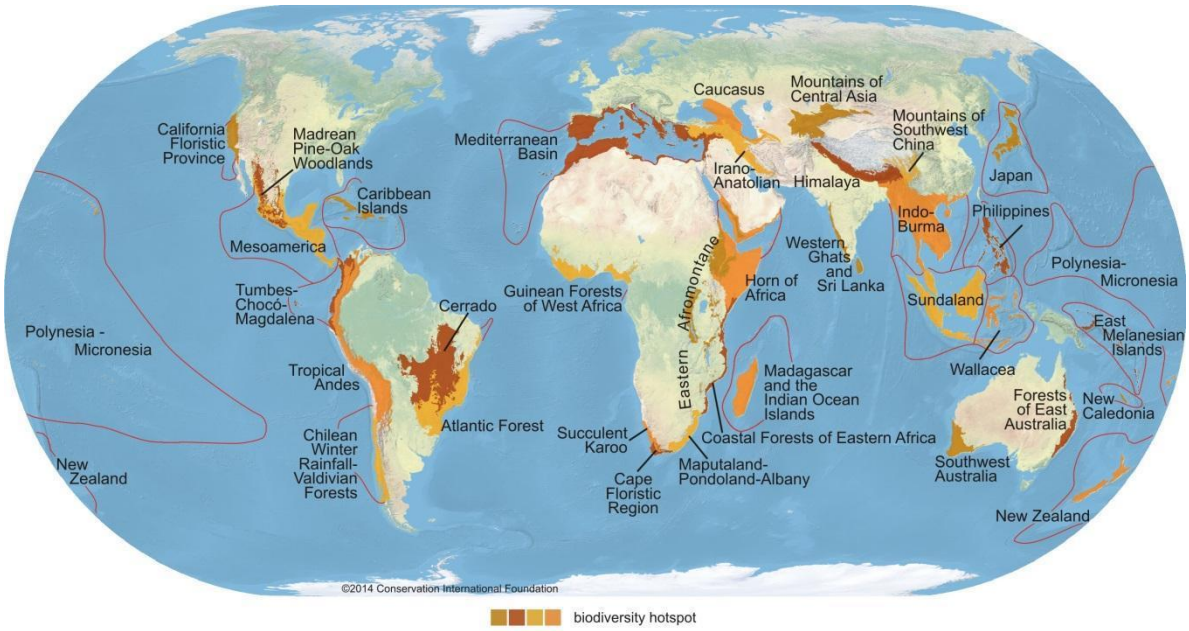


**Figure 2 - Global biodiversity hotspots**
(The Unfolding Earth, 2018)

Biodiversity hotspots represent only 2.3% of Earth's land surface, but they contain around 50% of the world's endemic plant species and 42% of all terrestrial vertebrates. Overall, hotspots have lost around 86% of their original habitat and additionally are considered to be significantly threatened by extinctions induced by climate change (Malcolm, 2006). The biodiversity hotspots are also the habitats with the highest vulnerability-levels, despite the fact that they contain the higher number of irreplaceable species found within large geographic regions. It means that these unique and valuable areas and species are both under high levels of threat (Conservation International, 2018).

## 3.2 Country level biodiversity status

Today, Brazil has 959 federal protected areas, 905 state protected areas and only 282 municipal protected areas, involving a total of 21,461 protected areas according to CNUC/MMA (2018) which protect 16% of the continental territory and 0.5% of the marine area according to UNESCO (2018). There are two hotspot areas: Atlantic Forest and Cerrado. All the three city-regions selected for INTERACT-Bio are located at these hotspots (Campinas and Londrina in the Atlantic Forest; Belo Horizonte in Cerrado).

The Atlantic Forest of tropical South America boasts 20,000 plant species, 40% of which are endemic, while Cerrado, comprising 21% of the country, is the most extensive woodland-savanna in South America and the world's most biologically rich savannah (The Sustainable Forestry Initiative, 2010).

Among the several challenges inherent to the consolidation of protected areas in Brazil the following challenges should be noted: creating and organising markets for sustainable products; strengthening community-based productive chains; entrepreneurship in the area of ecological tourism; and incentives to encourage a low carbon economy. In addition, initiatives to make charges for environmental services, and a mechanism that generates income and encourages or compensates for environmental conservation, aim to develop protected areas (UNESCO, 2018).

In addition, in order to enhance the role of protected areas, the National System of Conservation Units (SNUC) was established to plan and manage protected areas in an integrated manner, ensuring that significant and ecologically viable samples from different populations, habitats and ecosystems are well represented in the country extension. For this, the SNUC is managed by the three levels of government (federal, state and municipal).
It is composed of 12 categories, with different forms of protection and permitted uses: those that need greater care, their fragility and peculiarities, and those that can be used in a sustainable way and preserved at the same time. (Ministry of Environment, 2018)

### 3.3 Status of the NBSAP

After the approval of the 2011-2020 Strategic Plan for Biodiversity under the CBD, Brazil initiated in 2011 the process of internalizing the Aichi Targets and defining its National Biodiversity Targets for 2020.

Throughout this process, opportunities for synergy were created among the various sectors and government tiers. The National Biodiversity Strategy and Action Plan – NBSAP presents the Brazilian contribution towards the achievement of the Aichi Targets and its last revision was closely followed by ICLEI South America. As a result, it recognizes the importance of local governments in the implementation of this agenda.

NBSAP's mission is to promote, in an integrated manner, the conservation of biodiversity and the sustainable use of its components. In consequence, it intends to ensure the fair and equitable sharing of benefits that arises from the use of the genetic heritage, also to value the associated traditional knowledge and to respect gender and intergenerational equality, what contributes to poverty eradication. The expectation for the year of 2050 is to have valued, conserved, properly recovered and sustainably used Brazilian biodiversity and ecosystems. In terms of social and cultural development, it is desired that Brazilian society recognizes the biodiversity's intrinsic value and vital contribution for sustainable development and human well-being (NBSAP, 2018).

The Action Plan was initially developed with actions under the responsibility of the Secretariat of Biodiversity – SBio/MMA, to which were added others engaging institutions and programs that participated in the NBSAP construction process (NBSAP, 2018). The list of contributing institutions and programs is presented in **Figure 3** and described below:

· Group 1: MMA Secretariats (including SBio);
· Group 2: Agencies Connected to MMA;
· Group 3: Ministries, Special Secretariats and Public Corporations;
· Group 4: Institutes/Institutions (including those dedicated to research) Connected to Ministries; · Group 5: State (OEMAs) and Municipal Environmental Agencies;
· Group 6: Civil Society (NGOs and similar organizations)
· Group 7: Financing Agents and Private Sector;
· Group 8: Academia (Long-Term Ecological Research - PELD and Biodiversity Research Programs - PPBio)

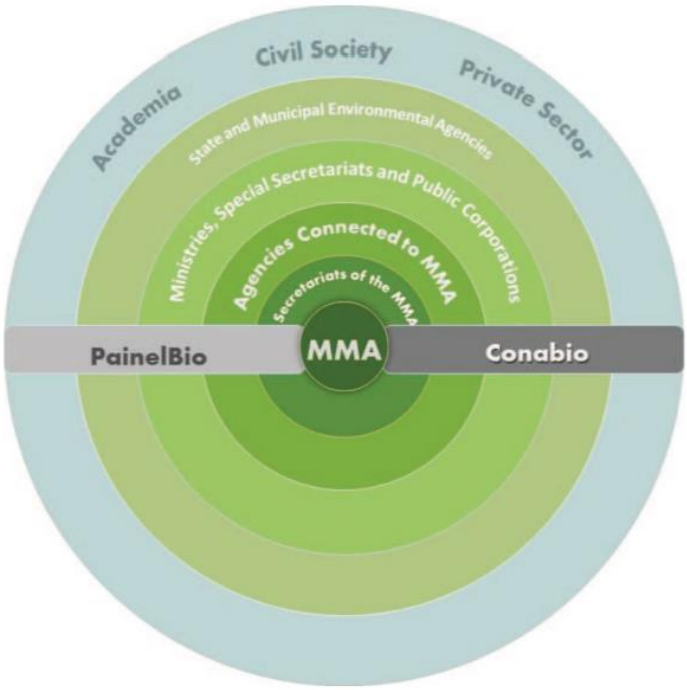


**Figure 3 - Work segments of the sectors of society engaged in the NBSAP construction and implementation process.**
(NBSAP, 2018)

The five strategic objectives of the Brazilian NBSAP and their respective National Biodiversity Targets 2011-2020, established according to Conabio Resolution Nr. 06/2013, are presented below:

**Strategic Objective A** – Address the underlying causes of biodiversity loss by mainstreaming biodiversity considerations across government and society.

National Target 1: By 2020, at the latest, Brazilian people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

National Target 2: By 2020, at the latest, biodiversity values, geo-diversity values, and socio-diversity values have been integrated into national and local development and poverty reduction and inequality reduction strategies, and are being incorporated into national accounting, as appropriate, and into planning procedures and reporting systems.

National Target 3: By 2020, at the latest, incentives harmful to biodiversity, including the so-called perverse subsidies, are eliminated, phased out or reformed in order to minimize negative impacts. Positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the CBD, taking into account national and regional socio economic conditions.

National Target 4: By 2020, at the latest, governments, private sector and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption to mitigate or prevent negative impacts from the use of natural resources.

**Strategic Objective B** – Reduce the direct pressures on biodiversity and promote sustainable use.

National Target 5: By 2020, the rate of loss of native habitats is reduced by at least 50% (in comparison with the 2009 rate) and, as much as possible, brought close to zero, and degradation and fragmentation is significantly reduced in all biomes.

National Target 6: By 2020 all stocks of any aquatic organism are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overharvesting is avoided, recovery plans and measures are in place for depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable

ecosystems, and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits, when scientifically established.

National Target 7: By 2020 the incorporation of sustainable management practices is disseminated and promoted in agriculture, livestock production, aquaculture, silviculture, extractive activities, and forest and fauna management, ensuring conservation of biodiversity.

National Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

National Target 9: By 2020, the National Strategy on Invasive Alien Species is fully implemented, with the participation and commitment of states and the elaboration of a National Policy, ensuring the continuous and updated diagnosis of species and the effectiveness of Action Plans for Prevention, Contention and Control.

National Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other marine and coastal ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

**Strategic Objective C -** To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.

National Target 11: By 2020, at least 30% of the Amazon, 17% of each of the other terrestrial biomes, and 10% of the marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through protected areas foreseen under the SNUC Law and other categories of officially protected areas such as Permanent Protection Areas, legal reserves, and indigenous lands with native vegetation, ensuring and respecting the demarcation, regularization, and effective and equitable management, so as to ensure ecological interconnection, integration and representation in broader landscapes and seascapes.

National Target 12: By 2020, the risk of extinction of threatened species has been significantly reduced, tending to zero, and their conservation status, particularly of those most in decline, has been improved.

National Target 13: By 2020, the genetic diversity of microorganisms, cultivated plants, farmed and domesticated animals and of wild relatives, including socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing the loss of genetic diversity.

**Strategic Objective D -** Enhance the benefits to all from biodiversity and ecosystem services.

National Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, traditional peoples and communities, indigenous peoples and local communities, and the poor and vulnerable.

National Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced through conservation and restoration actions, including restoration of at least 15% of degraded ecosystems, prioritizing the most degraded biomes, hydrographical regions and ecoregions, thereby contributing to climate change mitigation and adaptation and to combating desertification.

National Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

**Strategic Objective E -** Enhance the implementation through participatory planning, knowledge management and capacity building.

National Target 17: By 2014, the national biodiversity strategy is updated and adopted as policy instrument, with effective, participatory and updated action plans, which foresee periodic monitoring and evaluation.

National Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous peoples, family rural producers and traditional communities relevant for the conservation and sustainable use of biodiversity,

and their customary use of biological resources, are respected, in accordance with their uses, customs and traditions, national legislation and relevant international commitments, and fully integrated and reflected in the implementation of the CBD, with the full and effective participation of indigenous peoples, family rural producers and traditional communities, at all relevant levels.

National Target 19: By 2020, the science base and technologies necessary for enhancing knowledge on biodiversity, its values, functioning and trends, and the consequences of its loss, are improved and shared, and the sustainable use of biodiversity, as well as the generation of biodiversity-based technology and innovation are supported, duly transferred and applied. By 2017, the complete compilation of existing records on aquatic and terrestrial fauna, flora and microbiota is finalized and made available through permanent and open access databases, with specificities safeguarded, with a view to identify knowledge gaps related to biomes and taxonomic groups.

National Target 20: Immediately following the approval of the Brazilian targets, resources needs assessments are carried out for the implementation of national targets, followed by the mobilization and allocation of financial resources to enable, from 2015 on, the implementation and monitoring of the Strategic Plan for Biodiversity 2011-2020, as well as the achievement of its targets.

# 4. OVERVIEW OF INSTITUTIONAL LANDSCAPE AND POLICY FRAMEWORK

## 4.1 Governance system and institutional arrangements

### 4.1.1 *Governance system*

Since the National Constitution from 1988, Brazil is a legal democratic state established as a Federative Republic which comprises the indissoluble union of states, municipalities and the Federal District, all of them autonomous.

According to the Article 23, subsection VI, the Union, the states, the Federal District and the municipalities, in common, have the power to protect the environment and to fight pollution in any of its forms. Furthermore, all of them have the power to legislate on forests, hunting, fishing, fauna, nature's conservation, defence of the soil and natural resources, protection of the environment and control of pollution.

As long as respecting the state and the union legislation, the municipalities are able to legislate on local matters, establish and collect fees, create and organize districts and promote territorial planning, as well as to protect social and cultural heritage. Therefore, INTERACT-Biofinds a relevant action opportunity within the local context, once municipalities own a significant autonomy in their environmental planning process.

### 4.1.2 *National authorities*

When it comes to integrating biodiversity aspects into the urban context, two main national authorities are extremely relevant: the Ministry of Environment and the Ministry of Cities.

The Brazilian **Ministry of the Environment (MMA)** was established in 1992. Its mission is to promote the adoption of principles and strategies for the protection and restoration of the environment; sustainable use of natural resources; valuing of environmental services; and inclusion of sustainable development in public policies, in a participative, democratic and transversal way, at all levels and instances of government and society. It is responsible for addressing the following issues:

- A national policy for the environment and for water resources;
- A policy for the preservation, conservation and sustainable use of ecosystems, biodiversity and forests;
- Proposing strategies, mechanisms and socioeconomic instruments for improving environmental quality and for the sustainable use of natural resources;
- Policies for integration of production and the environment;
- Environmental policies and programmes for the Legal Amazon;
- Ecological and economic territorial zoning.

Within Ministry of Environment, one specific institution is relevant to INTERACT-Bio's context: the **National Biodiversity Commission (Conabio)**. Conabio is responsible for promoting the implementation of Brazilian commitments under the CBD, as well as for identifying and proposing priority areas and actions for research, conservation and sustainable use of biodiversity components.

The **Ministry of Cities (MCidades)** provides strategies, guidelines and the priorities for public resources application. It also creates regulations, follows and evaluates federal programs. It was created in January 1st 2003, by the provisional measure nº 103/2003, that lately was converted in the Federal Law Nr. 10,683 of 28th May 2003. Its detailed acting areas are mentioned below:

- Urban Development Policy;
- Housing, environmental sanitation, urban transport and traffic policy;
- The promotion of actions and programs that provide urbanization, habitation, basic and environmental sanitation, urban transport, traffic and urban development;
- Subsidy policy for popular housing, sanitation and urban transport;
- Planning, regulation and management of the application of resources in urban development, urbanization, habitation, basic and environmental sanitation, urban transport and traffic;
- Participation in the formulation of general guidelines for conservation of water urban systems, as well as for the adoption of river basins as basic units of the sanitation planning and management.

This Ministry is integrated by the Curator Council of the Social Development Fund; Council of Cities (Conselho das Cidades - ConCIDADES); National Transit Advisory; National Secretary of Housing; National Secretary of Environmental Sanitation; National Secretary of Transportation and Urban Mobility; National Secretary of Accessibility and Urban Programs and National Department of Traffic.

### 4.1.3 *Subnational authorities*

At the state level, the governance of environmental issues at the three selected city-regions is mainly led by a Secretary of Environment. Campinas city-region works according to the **State Secretary of Environment of São Paulo**, which is responsible for planning, coordinating, supervising and controlling the State Environmental Policy. Two Coordinations are specifically engaged with INTERACT-Bio's activities: the Coordination of Biodiversity and Natural Resources (CBRN) and the Coordination of Environmental Planning (CPLA). The State Council for the Environment and three institutes (Forestry, Geological and Botanical) are also part of the Environmental System of the State of São Paulo.

The **Metropolitan Agency of Campinas (AGEMCAMP)** is an important subnational authority that builds a dialogue between the state and the local levels. It integrates the organization, planning and execution of public functions of common interest in the Metropolitan Region of Campinas, enforcing metropolitan laws, applying the respective sanctions and establishing goals, plans, programs and projects of common interest.

Belo Horizonte city-region, located in the State of Minas Gerais is, at the state level, covered by the **State Secretary of Environment and Sustainable Development (SEMAD)**. It formulates and coordinates the state policy of protection and conservation of the environment and the state policy of water resources management. It also articulates policies for environmental resources management. SEMAD integrates the Environmental and Water Resources State System (SISEMA), along with the State Environmental Policy (COPAM) and Water Resources (CERH) councils and related bodies.

The **Development Agency of the Metropolitan Region of Belo Horizonte (ARMBH)** was created in 2009 and have been promoting the integrated development of the city region through the articulation of actors in the search for shared solutions. It is its responsibility to develop Public Functions of Common Interest (FPICs) through territorial planning.

When it comes to Londrina city-region, the main subnational authorities are the **State Secretary of Environment and Water Management (SEMA)** and the **State Secretary of Urban Development (SEDU)**. SEMA is responsible for formulating and executing policies on environment, water resources, forestry, cartography, agrarian development, erosion control and sanitation. The state's urban development policy is developed by SEDU, which provides technical assistance to municipalities in order to develop and improve their

services and solve their common problems. Currently, Londrina city-region has not instituted a Metropolitan Agency that regulates its specific topics. The direct dialogue with local authorities is attributed to Paraná State government bodies.

### 4.1.4 *City and local authority*

In Campinas, which is the model city-region, the local authority engaged in INTERACT-Bio's activities is the **Municipal Secretary of the Green, Environment and Sustainable Development (SVDS)**. Each municipality that integrates the metropolitan region also engaged its Secretary of Environment in the process.

In Belo Horizonte the Project is directly supported by the **Municipal Secretary of Environment (SMMA) and the Sub Secretary of Food and Nutrition Security (SUSAN)**. The discussions about metropolitan aspects are also including representatives from the Secretary of Urban Planning and other municipalities.

At the local level, the most important authority within the context of Londrina is the **Municipal Secretary of Environment**, as well as the other correspondent Secretaries from the municipalities that integrates the city-region.

### 4.1.5 *Coordinating structures*

The coordinating structure for INTERACT-Bio in Campinas city-region (**Figure 4**) engaged Campinas City Hall (which comprises the Municipal Secretary the Green, Environment and Sustainable Development - SVDS) and the Metropolitan Agency of Campinas (AGEMCAMP). The other municipalities are part of the workgroup, and are engaged also through RECONECTA-RMC process. As described later in this document, RECONECTA-RMC is a project led by SVDS and presents strong synergies with INTERACT-Bio. All the municipalities have signed a cooperation agreement within this Project, which has been catalysed by INTERACT-Bio.

RECONECTA-RMC arises from the Green Municipal Plan, a strategic political instrument, which defines the environmental programs that are going to be implemented over the next 10 years in the city of Campinas.

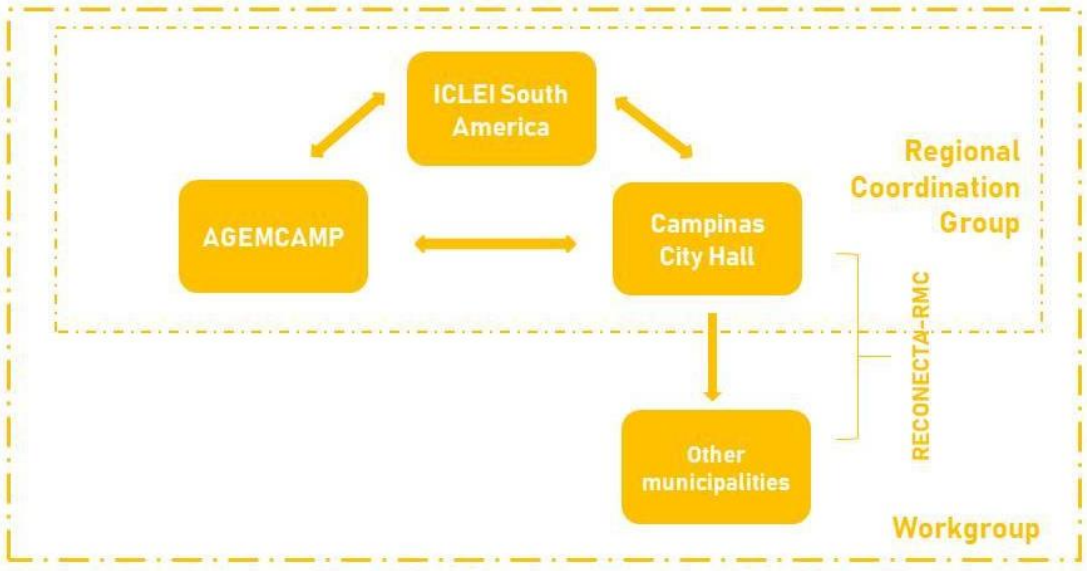


**Figure 4 - Governance Structure in Campinas city-region**

In Belo Horizonte city-region, in its turn, the Regional Coordination Group is composed by Belo Horizonte City Hall represented by the Municipal Secretary of Environment (SMMA), Development Agency of Belo Horizonte Metropolitan Region (ARMBH) and ICLEI South America. Betim and Contagem, two neighbouring municipalities, were also actively engaged during the candidature elaboration process and still contributes to the Workgroup as key actors. SMMA also promotes the articulation with other municipalities, as seen in **Figure 5**.

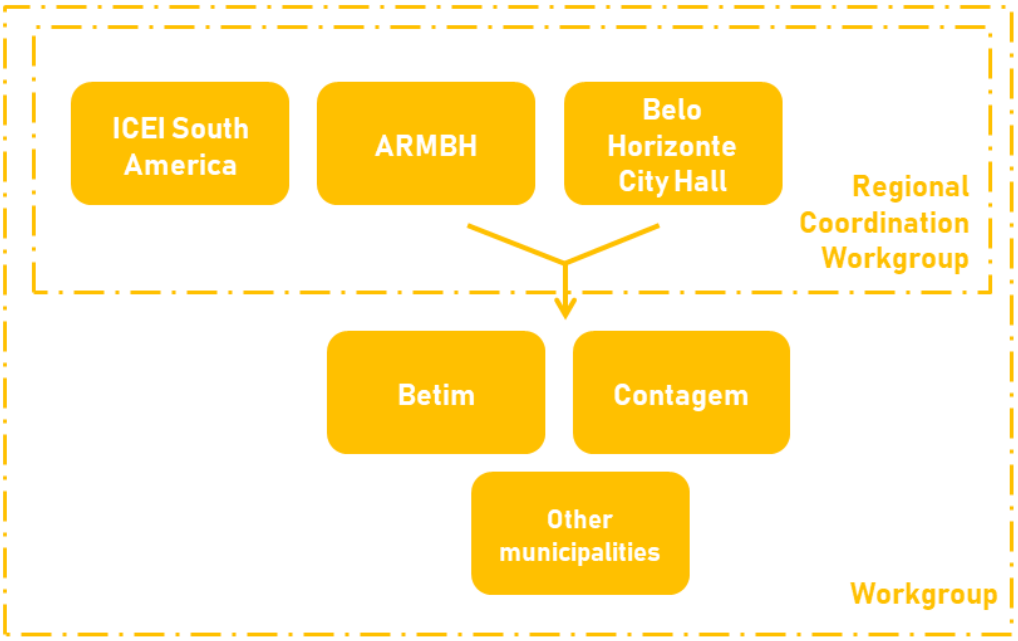


**Figure 5 - Governance Structure in Belo Horizonte city-region**

In Londrina city-region, the regional coordination is made by the State Secretariat of Environment and Water Resources (SEMA), the State Secretariat of Urban Development of Paraná (SEDU) and the Municipal Environmental Secretary of Londrina (comprised in Londrina City Hall). Other municipalities are also engaged in the process through the structure seen in **Figure 6**.

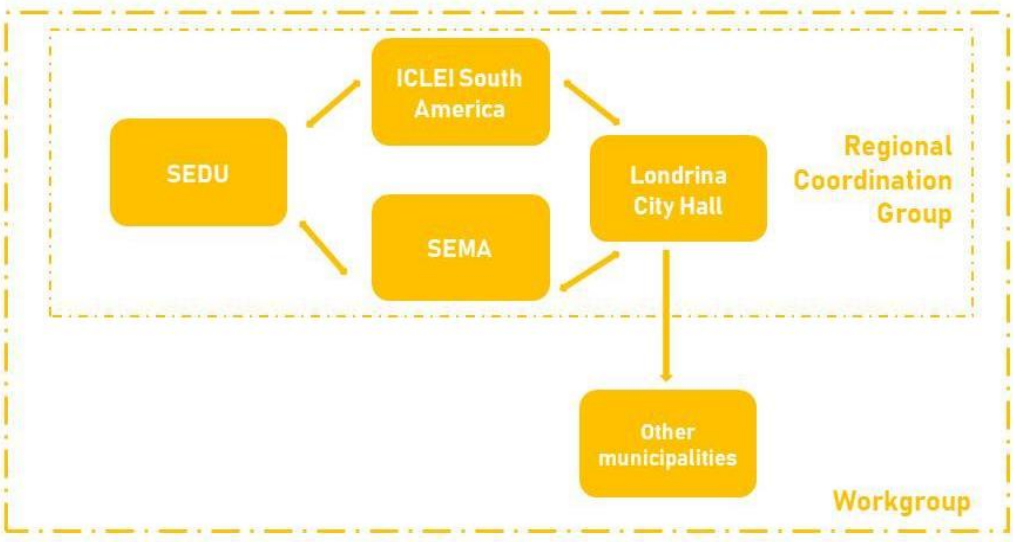


**Figure 6 - Governance Structure in Londrina city-region**

## 4.2 Macro policy frameworks

### 4.2.1 *Growth and development policy frameworks*

Assuming that income is not the only variable related to poverty scenarios, the Program "Brazil without Misery", coordinated by the Ministry of Social Development, recovered 22 million people from extreme

poverty. The Program, globally recognized for its successful results, is supported by 22 Ministries and a large portion of states and municipalities.

Three main aspects guides the Program: (1) the guarantee of income for immediate relief of the situation of poverty; (2) access to public services to improve education, health and citizenship conditions of families; and (3) productive inclusion, to increase the capacities and work opportunities among the poorest families of the countryside and the city.

A National Policy on Urban Development was democratically elaborated in 2003, from the National Conference of Cities. It is a set of principles, guidelines and objectives, for investing in housing, sanitation, environment, urban mobility, transport and transit, as well as promoting land policy and inclusive housing.

### 4.2.2 *Climate change and disaster risk management policy frameworks*

In view of the commitments made by Brazil at COP-15, the National Policy on Climate Change (PNMC) was established (Law 12,187 of 2009), formalizing the voluntary commitment to reduce the emission of greenhouse gases between 36.1% and 38% (which represents 9% of projected emissions by 2020), and providing for the establishment of sectoral mitigation and adaptation plans (BRASIL, 2009).

The Sendai Conference on Disaster Risk Reduction outlined more concise goals for 2015-2020 by already implementing the experience gained in the Hyogo Framework for Action, which set targets for 2005-2015. One of the actions of the plan drawn up in Sendai is the considerable increase in the number of countries with risk reduction strategies up to 2020. Brazil, as a signatory country, is gradually translating these goals for the local level.

Many Brazilian cities have signed up for the "Developing Resilient Cities" campaign, with the purpose of incorporating risk management into development projects. (PROCIV, 2015)

### 4.2.3 *Environment and biodiversity policy frameworks*

The National Environment Policy (PNMA), as detailed in item 4.3, was elaborated in 1981 and represents the main policy framework that guides Brazil's positioning on the topic, even before the existence of the current Federal Constitution, which dates from 1988. It qualifies a balanced environment as a right of all Brazilian citizens, working as a conceptual background for the policies established later.

Brazil's National Biodiversity Strategy and Action Plan, as detailed in the previous section, sets goals and priorities from Aichi Targets context and was a result of the country's political commitment at the Convention of Biological Diversity (CBD). It plays a significant role on guiding related policies and sectoral actions, consolidating a national positioning.

## 4.3 Key legislation

### 4.3.1 *Environmental and biodiversity law*

The Federal Constitution disposes of environment issues on its Article 225, which rules on the right to an ecologically balanced environment, guaranteed for all and recognized as an asset of common use and essential to a healthy quality of life. Moreover, both the Government and the Brazilian citizens shall have the duty to defend and preserve an ecologically balanced environment for present and future generations.

The **National Environment Policy (PNMA)** was established by Federal Law Nr. 6,938, of 31 August 1981, regulated by Decree Nr. 99,274, of 06 June 1990, which also created the National Environment System – Sisnama.

Sisnama is comprised by agencies and entities of the three government tiers that hold responsibilities and jurisdiction over the protection, enhancement and recuperation of environmental quality in Brazil. Its objective is to establish a coordinated and decentralized set of actions for environmental management in the country,

integrating and harmonizing specific rules and practices which complement each other at the federal, state and municipal levels (**Figure 7**).

Sisnama holds a variety of committees, councils, commissions and other institutional arrangements comprised by representatives of various sectors, with the purpose to inform, monitor and support the work of governmental environmental institutions.

Within Sisnama's structure, the Governmental Council has the function of advising the President of Brazil in the formulation of national policies and governmental directives for the environment and natural resources.

| **SISNAMA** | | |
|---|---|---|
| **Overarching Agency** | **Advisory and Deliberative Body** | **Central Agency** |
| **Government Council** | **National Environment Council CONAMA** | **Ministry of the Environment MMA** |
| **Executing Agencies** | **Sectional Agencies** | **Local Agencies** |
| **IBAMA and ICMBio** | **States** | **Municipalities** |

**Figure 7 - Composition and levels of governance of the National Environment System (Sisnama)**

The National Environment Council (CONAMA) advises studies and proposes to the Governmental Council the directives of governmental policies for the environment and natural resources, and deliberates, within its jurisdiction, on rules and standards that are compatible with the ecologically balanced environment. The following structures comprise CONAMA: I – Plenary; II – Special Resort Chamber; III – Committee on the Integration of Environmental Policies; IV – Technical Chambers; V – Working Groups; and VI – Advisory Groups.

The states, Federal District and municipalities are responsible for regionalizing the measures issued by Sisnama, creating supplementary and complementary rules and standards.

The regional and local agencies provide information on their action plans and programs under implementation, documented in annual reports. These reports are then consolidated by the Ministry of the Environment in one annual report on the country's environmental state, to be published and submitted to Conama's consideration at its second meeting of the following year.

The MMA is the Sisnama actor responsible for the elaboration and monitoring the **National Biodiversity Policy (PNB)**, and for its synergy with the various sectors and governmental levels. The PNB principles, directives and objectives were defined under Decree Nr. 4,339, of 22 August 2002.

PNB's overall objective is to "promote, in an integrated manner, the conservation of biodiversity and the sustainable use of its components, with the fair and equitable sharing of the benefits arising from the use of genetic resources, of components of the genetic heritage and of the traditional knowledge associated to these resources".

PNB is structured in components (thematic pillars) which guide its implementation:

- Component 1: Knowledge on Biodiversity;
- Component 2: Conservation of Biodiversity;
- Component 3: Sustainable Use of Biodiversity Components;

- Component 4: Monitoring, Evaluation, Prevention and Mitigation of Impacts on Biodiversity;
- Component 5: Access to Genetic Resources and to Associated Traditional Knowledge and Benefit Sharing;
- Component 6: Education, Public Awareness, Information and Dissemination on Biodiversity;
- Component 7: Legal and Institutional Strengthening for Biodiversity Management.

Brazil's new **Forest Code** (Federal Law Nr. 12,651) has been in force since May 25, 2012, with important regulations approved in 2014 and others under development. This law is intended to provide guidance for decision-makers and key actors who promote, regulate, produce, consume, export or import Brazilian agricultural, livestock and forest commodities. It regulates vegetation protection through Permanent Protected Areas (APP) and Legal Reserve (RL), which are other area based conservation measures.

The Environment Rural Register (CAR) was established within the Forest Code requirements for rural properties, under the National Environmental Information System - SINIMA, and regulated by a Normative Instruction of the MMA (Ministry of Environment). It is a public electronic register, mandatory for all rural properties, in order to integrate the environmental information about Permanent Preservation Areas (APP), areas of restricted use, legal reserve, remnants of forests among others forms of native vegetation. CAR composes a database for controlling, monitoring, and fighting deforestation.

Ecological and Economic Zoning (ZEE) is a planning instrument that integrates natural and social aspects in territorial management. It was initially called "Environmental Zoning", instituted by Federal Law Nr. 6,938/1981. In 2002, it was regulated by Decree Nr. 4,297, and had its name changed for Ecological and Economic Zoning (ZEE). This decree establishes criteria for zoning, among other measures.

### 4.3.2 *Land use and spatial planning law*

There are three levels of urbanistic planning: national, state and municipal. The National Urban Plan states the guidelines and general goals for the urban development, while the State and Municipal Plan states guidelines for local construction.

The Article 182 of the Federal Constitution states that the urban development policy, led by municipal governments, aims to develop city's social function and ensure the well-being of its inhabitants, establishing guidelines for elaborating Master Plans.

The Statute of City is a law that regulates the Articles 182 and 183 of the Federal Constitution. It states general guidelines for the urban policy, among other measures.

The Statute of Metropolis (Estatuto da Metrópole), instituted by the Federal Law Nr. 13,089/2015, states general guidelines for the planning, management and execution of public functions in metropolitan regions. The chapter VI of this law, states the instruments for an integrated urban development in metropolitan level, such as the Integrated Urban Development Plan (Plano de Desenvolvimento Urbano Integrado) (Federal Law Nr. 13,089, of 12nd January 2015. "Estatuto da Metrópole").

The Municipal Master Plan (Plano Diretor) is a document that states principles, guidelines and rules to be follow and to guide decisions about the urban development.

It follows a list with the main laws of Urban Planning:

- Federal Law Nr. 11,445/2007: Institutes the National Policy of Basic Sanitation (Política Nacional de Saneamento Básico);
- Federal Law Nr. 12,305/2010: Institutes the National Policy of Solid Waste (Política Nacional de Resíduos Sólidos);
- Federal Law Nr. 12,587/2012: Institutes the National Policy of Urban Mobility (Política Nacional de Mobilidade Urbana);
- Master Plans and Municipal Laws that regulate the urban instruments (Planos Diretores e Leis Municipais que regulamentam os instrumentos urbanísticos)
- Zoning Law (Lei de Zoneamento), Law of Urban Ground Division (Lei do Parcelamento do Solo Urbano), and Land Use and Occupation Act (Lei de Uso e Ocupação do Solo).

- Federal Law Nr. 13,465/2007: Rural Landholding and Urban Regularization (Regularização Fundiária Rural e Urbana)
- Federal Law Nr. 11,124/2005: Institutes the National System of Habitation of Social Interest (Sistema Nacional de Habitação de Interesse Social), and its fund.

An important urban policy instrument that dialogues with the Statute of Metropolis and the National Environment Policy is the Municipal Environmental Zoning (Zoneamento Ambiental Municipal - ZAM). It also subsidizes the implementation and management stages of the Municipal Master Plans. The instrument may have immediate applicability in municipalities that are in the process of reviewing or implementing their Executive Plans (Ministry of Environment - MMA).

### 4.3.3 *Disaster management law*

The National Policy of Protection and Civil Defence (Política Nacional de Proteção e Defesa Civil - PNPDEC), instituted by the Federal Law Nr. 12,608/2012, establishes principles, goals and instruments with the purpose of providing adequate social, economic and environmental conditions to ensure human dignity and sustainable development. It integrates different policies: land use planning, urban development, health, environment, climatic changes, water resources, geology, infrastructure, education, science and technology.

# PART C: CITY REGION SCOPING

# 5. CAMPINAS

## 5.1 CITY REGION CONTEXT

### 5.1.1 *Policy framework at city-region level*

The Metropolitan Region of Campinas was created and instituted by the Complementary Law Nr. 870, of 19th June 2000. Its Integrated Urban Development Plan (PDUI) is being developed, and intends to establish guidelines for sectorial policies and to provide instruments for implementation and management of urban planning. The moment is favourable for the discussion of urban policies of common interest and for the development of integrated solutions and strategies.

The integration and planning of public functions of common interests is currently a responsibility of the Metropolitan Agency of Campinas (AGEMCAMP), instituted by Law Nr. 946, of 2003. The Agency inspects the execution of laws that regulate metropolitan regions, establishes guidelines, goals, plans, programs and projects of common interest, but also inspects the execution and maintenance of technical and administrative structures, giving priority to the decentralized execution of constructions and services that will be attributed to private and public bodies and entities, capacitated for that and observing the applicable laws.

### 5.1.2 *Socio-economic profile*

Campinas metropolitan region is the second largest metropolitan region of the State of São Paulo in population. According to estimates by the Brazilian Institute of Geography and Statistics (IBGE) for 2017 it has more than 3.1 million inhabitants and generated 8.92% of the Domestic Product Gross - GDP of the State of São Paulo in 2015. The region has an area of 3.791,79 km² and an Annual Population Growth Rate - TGCA (based on data from 2010 to 2017) of 1,73% (EMPLASA, 2018).

### 5.1.3 *Urbanization and informality*

The Metropolitan Region of Campinas (RMC) is currently composed of twenty municipalities: Americana, Artur Nogueira, Campinas, Cosmópolis, Engenheiro Coelho, Holambra, Hortolândia, Indaiatuba, Itatiba, Jaguariúna, Monte Mor, Morungaba, Nova Odessa, Paulínia, Pedreira, Santa Bárbara d'Oeste, Santo Antônio de Posse, Sumaré, Valinhos and Vinhedo. The region is the second largest economic and demographic center in the state of São Paulo and trends of an intense urban expansion are continuously present.


**Figure 8 - The Metropolitan Region of Campinas (EMPLASA, 2018)**

The beginning of urbanization in Campinas was in the last quarter of the 19th century, during the period of the so-called "coffee cycle" in the state of São Paulo. Coffee activity declined after 1929, and in the following decades (between 1930 and 1956) Campinas initiated its industrialization process, especially with the textile industry. In the 1950s, industrial dynamism was intensified with the installation of mechanical, electrical, chemical, rubber and transportation companies. From 1956 to 1964, the Metropolitan Region of São Paulo underwent a process of increasing industrial concentration and Campinas, in turn, also attracted part of these new industrial sectors.

Currently the RMC presents the second largest industrial park in the country. The formation of the highly industrialized pole raised indicators of social inequalities and serious environmental degradation. According to data from the population census of 2010, there are about 12,9% of homes in precarious conditions in the city-region, which means that 14,4% of its population lives under tenure risk and within environmental conflicts. Most of them are located in the urban periphery, especially in the surrounding areas of the municipalities of Campinas (CAM), Hortolândia (HOR) and Sumaré (SUM).

### 5.1.4 *Climate change impacts and challenges*

The Municipality of Campinas, in partnership with the Municipal Secretary of Green, Environment and Sustainable Development, initiated the elaboration of the Greenhouse Gas Emissions Inventory of Campinas

and the RMC. It is a public policy tool that will base the elaboration of the Regional Climate Change Policy of the municipality, which in turn must be aligned with the National Policy of Climate Change (Inventário de Emissões de Gases de Efeito Estufa de Campinas e da Região Metropolitana de Campinas - Produto 1, Prefeitura Municipal de Campinas, Março de 2018).

### 5.1.5 *Growth and development priorities and challenges*

The challenge is to reconcile urban growth with the containment of pollutants and contamination and, above all, with the conservation of forests. Campinas faces disordered urban expansion, due to the presence of irregular activities/enterprises, building of new roads and formation of new allotments. It is important to control these development pressures in order to avoid the increase in the emission of pollutant gases, the loss of habitats, the reduction and fragmentation of green areas, the presence of invasive alien species, the loss of quality and quantity of water resources and in consequence, the climate change impacts.

## 5.2 STATUS OF BIODIVERSITY AND NATURAL ASSETS IN CITY-REGIONS AND ALIGNMENT WITH BIODIVERSITY PRIORITIES

### 5.2.1 *City-region biodiversity profile*

Two biomes are comprised within Campinas city-region: the Atlantic Forest (where Hortolândia, Indaiatuba, Itatiba, Monte Mor, Pedreira, Sumaré, Valinhos and Vinhedo municipalities are framed) and the Cerrado (encompassing Artur Nogueira, Cosmópolis and Holambra). Eight municipalities (Americana, Campinas (the center city), Engenho Coelho, Jaguariúna, Nova Odessa, Paulínia, Santa Bárbara d'Oeste and Santo Antônio de Posse) share both biomes in their territories. As mentioned early, both are considered hotspots for biodiversity conservation, facing strong degradation in the past decades.

**EXTENSION OF NATURAL FOREST**

| MUNICIPALITY | AREA (in ha*) | | VARIATION (2000 - 2014) | TMVA** (2000 - 2014) |
|---|---|---|---|---|
| | 2000 | 2014 | | |
| AMERICANA | 70 | 10 | -85,71% | -12,98% |
| ARTUR NOGUEIRA | 200 | 910 | 355,00% | 11,43% |
| CAMPINAS | 2.004 | 2.732,3 | 36,34% | 2,24% |
| COSMÓPOLIS | 390 | 1.800 | 361,54% | 11,54% |
| ENGENHEIRO COELHO | 500 | 564 | 12,80% | 0,86% |
| HOLAMBRA | 200 | 253,5 | 26,75% | 1,71% |
| HORTOLÂNDIA | 45 | 45,7 | 1,56% | 0,11% |
| INDAIATUBA | 1.000 | 3.000 | 200,00% | 8,16% |
| ITATIBA | 2.600 | 3.350 | 28,85% | 1,83% |
| JAGUARIÚNA | 950 | 1.424 | 49,89% | 2,93% |
| MONTE MOR | 165 | 1.200 | 627,27% | 15,23% |
| MORUNGABA | 2.000 | 1.100 | -45,00% | -4,18% |
| NOVA ODESSA | 90 | 20 | -77,78% | -10,19% |
| PAULÍNIA | 700 | 291,9 | -58,30% | -6,06% |
| PEDREIRA | 500 | 500 | 0,00% | 0,00% |
| SANTA BÁRBARA D'OESTE | - | 125 | - | - |
| SANTO ANTÔNIO DE POSSE | 980 | 400 | -59,18% | -6,20% |
| SUMARÉ | 80 | 100 | 25,00% | 1,61% |
| VALINHOS | 430 | 475 | 10,47% | 0,71% |
| VINHEDO | 200 | 425 | 112,50% | 5,53% |
| **TOTAL** | **13.104** | **18.726,4** | **42,91%** | **2,58%** |

Source: IEA/CATI - SAAESP — Elaboration: OMI/AGEMCAMP

* ha: hectare (1 ha = 10.000 m²)

** TMVA: Taxa média de variação anual (Middle rate of annual variation)

**Table 1: Extension of Natural Forest on the Municipalities of the Metropolitan Region of Campinas (AGEMCAMP)**

According to data from the Municipal Government of Campinas and the Municipal Secretary of Green, Environment and Sustainable Development, from the 20 municipalities analysed, only 5 have specific legislation for environmental policy and management, while 15 of them have urban policy and management (Prefeitura Municipal de Campinas/Secretaria do Verde, Meio Ambiente e Desenvolvimento Sustentável, 2016). Still, from 2000 to 2014 it was recovered 42,91% of the Natural Forest, with an average annual growth of 2,58%, as seen in **Table 1**.

### 5.2.2 *Approaches to land use and spatial planning, biodiversity mainstreaming and promoting ecosystem resilience*

The Campinas Environmental Protection Area (APA) was created by the Municipal Law Nr. 10,850, defining its extension. Representing a significant amount (22.300 ha) of the city-region territory, a specific management plan is currently being developed, detailing its sustainable use conditions.

The Green Municipalities Programme (PMV) is a unifying document, which defines guidelines and well-designed goals for effective, efficient and integrated management of the Green Areas in the city of Campinas. PMV will consolidate the actions of conservation and recovery of the Green Areas of Campinas, establishing programs that ensure basic functions and social benefits of these areas. It includes the Municipal Plan for the Conservation and Recovery of the Atlantic Forest (PMMA), which gathers and regulates the elements necessary for the protection, conservation, recovery and sustainable use of this forest and its ecosystem services. PMMA is the main planning instrument for the purpose of protecting the Atlantic Forest, foreseen by the Atlantic Forest Law (Law Nr. 11,428/2006).

### 5.2.3 *Alignment with biodiversity policy frameworks (NBSAP)*

NBSAP's considerations are significantly reflected in regional approaches to biodiversity conservation. Through the development of is respective PMMA, municipalities are addressing strategies and actions to promote conservation and recuperation of priority areas, as well as result's monitoring and evaluation. Established as a mandatory Plan for all the municipalities located in Atlantic Forest, PMMA is, therefore, considered as a LBSAP (Local Biodiversity Strategy and Action Plan).

## 5.3 DRIVERS OF CHANGE

### 5.3.1 *Rapid urbanisation*

The intense urban population dynamics occurred in the municipalities of the RMC from the 1970s onwards is associated with the numerous migratory flows directed to the region due to industrialization and rising job opportunities. Since the 1970s, there are typical characteristics of population growth manifested in the old national metropolis, such as higher growth rates in surrounding municipalities, reduction of the relative participation of the population of the host municipality in the regional total (from 49.3% in 1970 to 39% in 2010) and increase of the participation of smaller cities in the regional urban demographic growth. The migrations to the region came mostly from the metropolitan area of São Paulo (where there was urban issues resulted from advanced metropolization), but also from areas of economic stagnation, for example Minas Gerais and Paraná.

### 5.3.2 *Informality*

The city of Campinas underwent three periods of expansion of irregular occupation: the first one began between the 40s and the 60s, the second one extended from 1970 to 1989, and the third one began in the 1990s and is still going on.

As a general rule, population poverty is reflected in the organization and use of land, as can be observed considering the great concentration of low-income population in the southern portion of the territory, where the two largest occupations of Campinas are located: region of Jardim Campo Belo (surroundings of the Airport of Viracopos) and the region of the Oziel Park.

In 2006, the Vip Viracopos social project was created in partnership with the federal government, in order to initiate the process of regularization and redevelopment of these two irregular occupations.

### 5.3.3 *Solid waste and effluent*

The Solid Waste Management Plan of Campinas was presented by the Council of the Metropolitan Region of Campinas Development, in 2015. This document is mandatory as instituted by the National Policy on Solid Waste (Federal Law Nr. 12,305/2010).

In the city of Campinas, solid waste management should prioritize the environmentally adequate destination of solid waste from civil construction, expand its coverage to 100% of the Municipality's territory and disseminate and strength the recyclable waste collection, as well as creating incentive mechanisms for waste segregation practices. The Municipality should also encourage the creation of a business chain for solid waste that can generate income, with a special consideration to technological tools, should extend waste collection to 100% of the rural area, and should license a new sanitary landfill (Campinas City Hall, 2013). As shown in the Table 2, it is possible to notice the increase in the Urban Solid Waste Generation in the city region, which has almost doubled in eleven years.

| Urban Solid Waste Generation | | | |
|---|---|---|---|
| Municipality | Production (tons/day) | | Variation (%) |
| | 2004 | 2015 | |
| Americana | 100,00 | 205,43 | **105,43** |
| Artur Nogueira | 16,50 | 36,39 | **120,55** |
| Campinas | 718,40 | 1258,49 | **75,18** |
| Cosmópolis | 19,10 | 49,64 | **159,90** |
| Engenheiro Coelho | 3,60 | 9,53 | **164,72** |
| Holambra | 1,90 | 6,78 | **256,84** |
| Hortolândia | 125,60 | 194,24 | **54,65** |
| Indaiatuba | 89,20 | 205,84 | **130,76** |
| Itatiba | 30,60 | 76,51 | **150,03** |
| Jaguariúna | 11,00 | 40,33 | **266,64** |
| Monte Mor | 16,80 | 41,64 | **147,86** |
| Morungaba | 3,50 | 7,73 | **120,86** |
| Nova Odessa | 18,50 | 44,67 | **141,46** |
| Paulínia | 24,50 | 78,09 | **218,73** |
| Pedreira | 15,50 | 36,16 | **133,29** |
| Santa Bárbara D'Oeste | 91,50 | 169,78 | **85,55** |
| Santo Antônio de Posse | 6,70 | 14,29 | **113,28** |
| Sumaré | 139,80 | 236,54 | **69,20** |
| Valinhos | 35,10 | 103,00 | **193,45** |
| Vinhedo | 22,30 | 56,22 | **152,11** |
| **Metropolitan Region** | **1490,10** | **2871,30** | **92,69** |

**Table 2: Urban Solid Waste Generation on the Municipalities of the Metropolitan Region of Campinas (Database from CETESB, elaborated by AGEMCAMP)**

In the year of 2013, 88.26% of the urban population was contemplated with the collection of sewage. The expansion and modernization of the sanitary sewage system are necessary for the universalization of access to the sanitation service. The Society for Water Supply and Sanitation (Sociedade de Abastecimento de Água e Saneamento - SANASA) is implementing the Basic Sanitation Program, which provides sewage collection and treatment system for 100% of the urban population of Campinas (Basic Sanitation Plan of the Municipality of Campinas, elaborated by the Campinas' Municipal Government and Municipal Secretary of the Green, Environment and Sustainable Development).

The implementation of a water reuse program to meet less demanding uses and to reduce the consumption of potable water is under study. Projects and partnerships in this area are important for the rational use of water, in addition to investments in infrastructure and personnel in order to make the Sewage Treatment Station more efficient.

The Sewage Master Plan, the Diagnosis and Preliminary Study of the Proposed System, and the Design of the Sewage Removal and Treatment System of Campinas Sanitation, led the preparation of the Program for Designing the Sewage Collection and Treatment System of the Municipality of Campinas, developed by the technical staff of SANASA in 1994 and through constant updates has been progressively implemented, seeking to achieve the integrality of the sanitary sewage system.

The relevant points of the sanitary sewage system of Campinas are the coverage of the system, the reuse of water and alternative destination of biosolids generated during the treatment process at the Sewage Treatment Station (currently, the biosolids are deposited in sanitary landfill) (Data from the "Plano Municipal de Saneamento Básico - Produto 1", of 2013).

### 5.3.4 *Water catchment and water quality*

The city-region has its main water sources the rivers Atibaia and Capivari. The Society for Water Supply and Sanitation (Sociedade de Abastecimento de Água e Saneamento - SANASA) serves almost the entire urban population and continuously invests in the maintenance and modernization of the supply system, in order to maintain efficiency and achieve economic equilibrium. SANASA is already implementing the Water Safety Plan for the municipality of Campinas, following the recommendations of the Manual for the Development and Implementation of Water Safety Plans, edited by the World Health Organization and the International Water Association (IWA) in 2009. This Plan includes the following phases:

1. Establishment of objectives for the quality of water intended for human consumption, in the context of public health;
2. Evaluation of the system, in order to ensure that the quality of the water in the supply system meets current norms and standards. This evaluation should also include projected systems;
3. Operational monitoring, with the identification of control measures in order to achieve the quality objectives, from a public health perspective. This step includes the risk assessment and management methodology;
4. Preparation of Management Plans, with a description of routine actions and exceptional conditions, and with the development of monitoring and communication plans;
5. Development of surveillance system and control of security plans.

The Program to Combat Water Losses was initiated in 1994 and has actions to control and reduce water losses. Relevant points of the drinking water supply system are Supply Capacity and Supply Network Coverage. To ensure the supply capacity for the new settlements and condominiums, SANASA is increasing the water collection and distribution system. It also plans to increase the supply network coverage by implementing the Basic Sanitation Program, that intended to serve 100% of the population of Campinas with the water supply system, and in fact, 99.5% of the population is served (Basic Sanitation Plan of the Municipality of Campinas, elaborated by the Campinas' Municipal Government and Municipal Secretary of the Green, Environment and Sustainable Development).

# 6. BELO HORIZONTE

## 6.1. CITY REGION CONTEXT

### 6.1.1 *Policy frameworks at city-region level*

The Metropolitan Region of Belo Horizonte was created and instituted by the Complementary Law Nr. 14, of 1973. Its Integrated Development Master Plan (PDDI) has been developed since 2009 and was finally launched at May 5th of 2018. Its objective is to build a process of metropolitan planning in the RMBH, gathering together its municipalities, the state of Minas Gerais, federal bodies, organised civil society, business and popular associations, and also the municipalities located in the city-region surroundings.

The integration and planning of public functions of common interests is currently a responsibility of the Metropolitan Agency of Belo Horizonte (ARMBH), as mentioned in the session 4.1.3 (Sub-national authorities). It was created in 2009 and has been promoting the integrated development of the city region through the articulation of actors in the search for shared solutions. The Agency inspects the execution of laws that regulates the metropolitan region, establishes guidelines, goals, plans, programs and projects of common interest, and also inspects the execution and maintenance of technical and administrative structures, giving priority to the decentralized execution of constructions and services.

### 6.1.2 *Socio economic profile*

Belo Horizonte metropolitan region is the third largest metropolitan region of Brazil and the 88th largest urban agglomeration of the world. The region has an area of 9,467.797 km² and is the political, financial, educational, cultural and commercial center of the state of Minas Gerais. According to the PDDI, 9.8% of its economic active population are unemployed and the majority of them are young people from 15 to 24 years old. It is also known that a large number of people with higher education face the unemployment, and that, at the other side, the 1% richest people of the city-region concentrates 31,22% of the incomes.

### 6.1.3 *Urbanisation and informality*

Belo Horizonte metropolitan region is composed by 34 municipalities and 5.,8 million inhabitants (RMBH, 2017). It includes the cities of Baldim, Belo Horizonte, Betim, Brumadinho, Caeté, Capim Branco, Confins, Contagem, Esmeraldas, Florestal, Ibirité, Igarapé, Itaguara, Itatiaiuçu, Jaboticatubas, Juatuba, Lagoa Santa, Mário Campos, Mateus Leme, Matozinhos, Nova Lima, Nova União, Pedro Leopoldo, Raposos, Ribeirão das Neves, Rio Acima, Rio Manso, Sabará, Santa Luzia, São Joaquim de Bicas, São José da Lapa, Sarzedo, Taquaraçu de Minas and Vespasiano.

According to the Brazilian Institute of Geography and Statistic (IBGE), from 2000 to 2010 it emerged 277,434 new homes on the city-region, 11.6% of which can be classified as inadequate households. That means that in 2010 more than 32,111 families lived in vulnerable conditions, with lack of infrastructure and constantly threatened by contaminations risks. Nowadays it is to be estimated that this number has significantly increased.

### 6.1.4 *Climate change impacts and challenges*

Future climate trends indicate an increase of 32% (thirty-two percent) in relative exposure to climate events related to heavy rains in Belo Horizonte, increasing the risks of floods and landslides and amplifying the chance of losses and damages.

In regard to health, previous years have shown a relevant increase in the number of cases of mosquito-borne tropical diseases. Taking Dengue Fever as an example: Belo Horizonte saw the number of cases quadruple over the last decade. This fact is associated to the increase of minimum temperature and the increase of air humidity, the main climate conditions which favours the diseases.

Belo Horizonte's model of urbanization has contributed for the building of a stressful microclimate and for the increasing of thermal discomfort, also amplified by heat waves. These are expected to intensify by 10 (ten) fold by 2030. In the future, increases in temperature might impact children and elderly people, and intensify cardiac and respiratory diseases.

Belo Horizonte City Hall developed, from July 2015, to June 2016, a study called "Assessment of vulnerability to climate change of the municipality of Belo Horizonte", taking two scenarios into consideration: one for the year of 2016 and another with projections for 2030.

The study looked at the following potential climate impacts, chosen by Municipal Secretariats, based on the level of historical events observed in the municipality: floods; landslides; dengue fever and heat waves.

As such, the study is a technical foundation for the development of the future Belo Horizonte's Plan for Adaptation and Resilience and is seen as the first step to its accomplishment. The assessment of vulnerabilities offers strategic information for the decision making process, supporting the mitigation of potential threats through proactive measures, according to the specificities of the several regions of the municipality.

### 6.1.5 *Growth and development priorities and challenges*

Belo Horizonte city-region has been drastically transformed since its formation at the decades of 1940 and 1950. Its expansion is due to the process of industrial and residential integration of its municipalities, mainly after World War II, which resulted on the emergency of new service centralities, high level neighbourhoods and mineral activities. Its growth wasn't oriented by any proper structuring plan and soon, the symptom of overpopulation led the urban agglomeration to overflow beyond its originally planned boundaries. Nowadays the city-region faces serious problem of urban mobility and infrastructure distribution (Terenzi, 2017).

## 6.2 STATUS OF BIODIVERSITY AND NATURAL ASSETS IN CITY-REGIONS AND ALIGNMENT WITH BIODIVERSITY PRIORITIES

### 6.2.1 *City-region biodiversity profile*

Belo Horizonte has about 38 million square meters of green areas, which include: Eleven private ecological reserves and 1.070 municipal public green areas, distributed in 75 parks, 790 yards and gardens, and about 200 other open spaces for public use. In the Metropolitan Region of Belo Horizonte there are currently 44 state conservation units and 5 federal ones. This is an important environmental patrimony.

### 6.2.2 *Approaches to land use and spatial planning, biodiversity mainstreaming and promoting ecosystem resilience*

The Metropolitan Region of Belo Horizonte, which now has about 5.8 million inhabitants distributed in 34 municipalities, is strongly threatened by socio-spatial segregation resulting from processes of urban sprawl with great unbalance in availability of services and in quality of life of the population.

Therefore, its greatest challenge is to integrate forces of all the stakeholders in the region. Not only government representatives, but mainly other interested parties, such as civil society and private sector, to work on behalf of biodiversity conservation, aiming to reduce unequal service provision.

### 6.2.3 *Alignment with biodiversity policy frameworks (NBSAP)*

The Integrated Development Master Plan (PDDI) already contemplates great synergy with the guidelines brought by the UN's New Urban Agenda, which assumes that inclusive, equitable and sustainable urban development depends on the involvement of different government actors, civil society and the private sector and must be implemented through integrated approaches that put the citizens at the center of the process.

It proposes that the manager of the RMBH must act together with the municipal administration in order to make sure that the tenure regularization process of use and occupation in those areas be compatible with the environmental specificities. It appears to be a great opportunity to promote the maintenance of native vegetal coverage on the rural areas and to ensure the maintenance of green areas on the sites that must be parcelled, reaching higher permeability.

The PDDI also includes measures of geotechnical and overflow risk mapping, especially in urban green areas, and programs of financial incentive and payment for environmental services for landowners that restore the native vegetation on priority spots indicated by the Forest Code.

Another important proposal is the governmental action for encouraging the creation of Private Reserves of Natural Heritage, by volunteer initiative of private actors. These areas totalize more than the amount of other Conversation Units, and are therefore strategic for environmental conservation. Also, approximately 16.9% of the metropolitan area are occupied by Areas of Environmental Protection (APA), where private property of land, activities and uses are compatible with conservation, and allows the integrated and participative management of assets.

## 6.3 DRIVERS OF CHANGE

### 6.3.1 *Rapid urbanisation*

Studies for the elaboration of the Integrated Development Plan - PDDI of Belo Horizonte pointed out that years of uncontrolled urban development led the city-region to a problematic status of socio-spatial inequality. The urban growth followed the pattern of center-periphery development, which reinforced central access to infrastructure and services and peripheral lack of opportunities. The proposal of Belo Horizonte's territorial reorganization, within the context of the PDDI, intends to create conditions for the implementation of a concentrated and selected decentralization, aiming to cross from a single-center structure, based on radial transport, to a polycentric structure, covered by a multi-modal mobility system.

It is necessary to concentrate land use and occupation, in order to take advantage of an established urban infrastructure and save resources of the urbanisation process. As a consequence, a polycentric structure provides the increase of employment, commerce and service in local centralities.

### 6.3.2 *Informality*

In the sector of housing, the PDDI highlights the importance of a transversal approach to guide housing policies and investments. Phenomena such as imobiliary dynamics, public investments, big productive ventures, environmental conditions, transport and mobility influence directly on the success or failure of municipal housing programs. Therefore, it is necessary to establish a metropolitan plan that guarantees favourable condition for the development of the municipal territory in articulation with wider and multisectorial standards.

The Metropolitan and Integrated Politic of Right to Everyday Space: Home and Urban Environment, proposed by the PDDI, was formulated as a set of programs, projects, interdependent actions that can create conditions for the autonomy of space production on the local scale, but still in congruence with the metropolitan dynamics. An essential aspect of this policy is the implementation of measures that sets limits to the expansion of the imobiliary private sector, specially on territories occupied by vulnerable population.

### 6.3.3 *Solid waste and effluent*

The management of urban solid waste is one of the biggest problems of the RMBH, where major municipalities present malfunctioning urban cleaning systems. The majority of them dispose trash in dumps with serious socio-environmental problems for the surrounding communities, such as increase of diseases.

The lack of resources and technical capacity of local managers to solve the problem contributes for the worsening of the situation. Generally the services are operated without planning, with minimum or inexistent resources' control and yet, with management restrictions. Small municipalities' low technical support and administration capacity led even to the waste of federal investments. Financing lines directed to the construction of landfill sites resulted on the abandonment of the unities and transformation of the landfills into dumps, after a while.

### 6.3.4 *Water catchment and water quality*

Belo Horizonte's urban expansion originated the shortage of water resources. This scenario demands from the local decision makers and civil society the proper management of water resources, in a democratic and decentralized way. Currently, individual, sectorial and collective interests dispute for the use of water resources and have therefore override the balance of water systems. As a consequence, its rivers are disputed for domestic, industrial and agricultural consume, at the same time they disperse non-treated domestic sewage, industrial, mineral and diffuse pollution.

The lack of public policies made it easier for the mentioned interests to over explore water springs, to waste water and to direct non-treated effluents to local rivers. These pressures have contributed to the water shortage framework and to the exacerbation of regional inequalities. In this context, the RMBH demands the reinforcement of the protection and management of water resources and the recovery of polluted rivers, aiming the socio-economic sustainability of the region and the guarantee of quality of life for its population.

# 7. LONDRINA

## 7.1 CITY REGION CONTEXT

### 7.1.1 *Policy frameworks at city-region level*

The Municipal Environmental Policy of Londrina was established by the Law Nr. 4,806/1991. It proposes mechanisms of formulation and application of environmental action, creates the Municipal Council for the Environment and establishes the Municipal Environment Fund.

### 7.1.2 *Socio-economic profile*

Londrina metropolitan region is in the list of the most thirty populated municipalities of Brazil, with 1,067,214 habitants (IBGE, 2014). The region has an area of 7,442.544 km² and it is one of the educational, cultural and commercial center of the state of Paraná. In terms of economy, the region has always had the agriculture as main activity, but recently the trade industry has gaining strengths. The population of the region has grown during the years, went from 665.618 habitants in 1970 to 1.057.660 in 2013. The municipal human development index (Índice de Desenvolvimento Humano Municipal - IDHM) in 1991 was 0,747 and improve to 0,813 in 2000. The majority of the inhabitants of the region has between 10 and 34 years, according to IBGE (2013).

### 7.1.3 *Urbanisation and informality*

The Metropolitan Region of Londrina was instituted by the State Complementary Law number 81, of 17th June 1998. Since the beginning, it includes cities such as Londrina, Bela Vista do Paraíso, Cambé, Ibiporã, Jataizinho, Rolândia, Sertanópolis and Tamarana.

Over the years more cities were added: Alvorada do Sul and Assaí (2010); Jaguapitã, Pitangueiras, Sebáudia, Florestópolis and Porecatu (2012); Arapongas, Centenário do Sul, Lupinópolis, Miraselva, Prado Ferreira, Rancho Alegre, Sertaneja and Uraí (2013).

The city of Londrina has always had the role of leading the regional progress. On April 2007, it was created the Coordinator Body of the Metropolitan Region of Londrina with the purpose of promoting the regional integration and articulating the public policies of common interest. The body is composed by one Coordinator of the Londrina City-Region, one Legal Advisor and one Administrative Advisor.

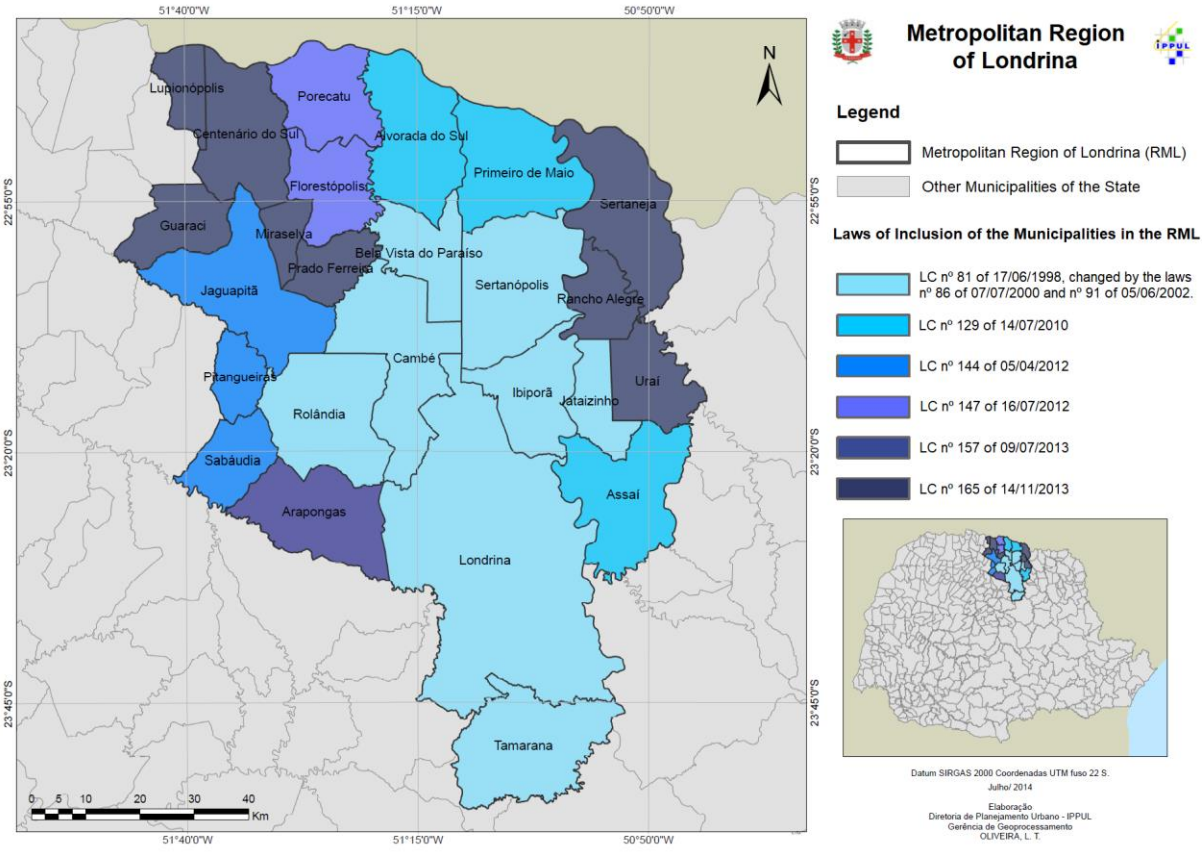


**Figure 9: The Metropolitan Region of Campinas and the laws of inclusion of the municipalities in the region. (Diretoria de Planejamento Urbano - IPPUL; Gerência de Geoprocessamento; OLIVEIRA, LT)**

### 7.1.4 *Climate change impacts and challenges*

In the context of the population of higher income, despite their private vehicles and the facilities of transportation since streets and avenues are more well-structured, the congestion of the road system occurs with the high emission of CO2, directly damaging the environmental quality of the cities, which contributes to the phenomenon of heat islands (Polidoro, Lollo & Neto, 2011). This topic was approached at the scoping workshop, and the possible actions raised on the subject were to increase the green areas in the urban centers.

### 7.1.5 *Growth and development priorities and challenges*

Londrina's urban sprawl derives from the urbanization process of Brazilian cities from early 20th century, especially from the 1970s decade. As seen at the socio-economic profile topic, the metropolitan region has increased from 665.618 inhabitants in 1970 to 1.057.660 in 2013. The main priorities and challenges of Metropolitan Region of Londrina's growth and development are the lack of green areas for soil permeabilization, undersizing the storm sewers, flooding and erosion points along the slopes of urban rivers, environmental disasters caused by drainage and waterproofing problems, low water quality, regulation of soil fertility and erosion in rural areas and the wrong disposal of waste.

## 7.2 STATUS OF BIODIVERSITY AND NATURAL ASSETS IN CITY-REGIONS AND ALIGNMENT WITH BIODIVERSITY PRIORITIES

### 7.2.1 *City-region biodiversity profile*

Two Brazilian biomes are present at the State of Paraná: the Atlantic Forest in its majority, and the Cerrado at small spots. However, a large part of the metropolitan region territory isn't covered by native forest. The biggest

part of the territory is used by agricultural activities, which has threatened the region's biodiversity over the years.

### 7.2.2 *Approaches to land use and spatial planning, biodiversity mainstreaming and promoting ecosystem resilience*

There is no official material about land use, biodiversity mainstreaming, and promotion of ecosystem resilience. The central municipality is elaborating the Master Plan, which was fragmented in four steps: I) Methodological Proposal; II) Integrated Thematic Analysis; III) Guidelines and Proposition; IV) Elaboration of a Law Project. The Participatory Forum about the second step (Integrated Thematic Analysis), was held on 12th December, 2017 (Institute of Research and Urban Planning of Londrina - Instituto de Pesquisa e Planejamento Urbano de Londrina).

### 7.2.3 *Alignment with biodiversity policy frameworks (NBSAP)*

The biodiversity agenda is being addressed very recently by the metropolitan region, so there are no regional studies on the subject.

## 7.3 DRIVERS OF CHANGE

### 7.3.1 *Rapid urbanisation*

The genesis of the urban occupation of Londrina initially began in the central area in the early 1930s. At 1950, the occupation reached the periphery, mainly from the northern part of the city. After 1960, the occupations became sparser, giving rise to the sprawl phenomenon. The creation of Lake Igapó, the construction of the Londrina airport and improvement of the BR–369 highway are the agents that contributed to the urban sprawl and land speculation. The construction of universities and shopping malls spurred the emergence of numerous subdivided land lots and gated communities. Consequently, it was formed urban voids in the central-south direction, fully served by infrastructure, however underutilized and often obsolete. At the age of 1980's, verticalization took on a new meaning, and the construction increase was intense. The surrounding towns were influenced by this process and, due to their strategic location, had their urbanization process also increased, becoming in some cases an metropolitan center.

### 7.3.2 *Informality*

There is no compiled data about irregular occupations of the entire metropolitan region of Londrina. However, according to data from Londrina's Housing Company (COHAB-LD, 2006), which analysed the city of Londrina, there are 14 urbanized occupations suitable for regularization, 3 urbanized favelas regularized, 11 settlements capable of regularization, 5 regularized settlements and 21 irregularities of occupations in the municipality. These occupations totalize 28,789 inhabitants and 8,120 families in situations of risk and even in unhealthy regions (Takeda, Polidoro & Barros, 2009).

### 7.3.3 *Solid waste and effluent*

The city of Londrina developed its Solid Waste Management Plan (Plano de Gerenciamento de Resíduos Sólidos - PGRS), an instrument instituted by the National Solid Waste Policy (Federal Law Nr. 12,305/2010) and by Municipal Decree Nr. 769/2009.

Since January 1, 2010, all natural or legal persons, whether public or private, directly or indirectly responsible for the generation of solid waste and those that carry out actions related to integrated management or solid waste management are obliged to prepare and present a document containing the characteristics and quantities of its solid waste (from the source to the final disposal). The PGRS suggests actions within the company to reduce waste generation and ensure the correct handling, segregation, packaging, transportation and disposal of those resources that will not be reused. This reduces the amount of waste disposed in the landfill as well as the risks to public health and the environment. This plan can also be used for controlling companies classified as large generators of solid waste.

### 7.3.4 *Water catchment and water quality*

The region has a good amount of water, but in many locations it has the quality compromised due to the practice of rural and urban waste inappropriate discarding and because of the deforestation of the riparian forests around the rivers.

# PART D: PROJECT INTERVENTIONS

# 8. RECOMMENDATIONS FOR CONCEPT PROJECT INTERVENTIONS

## 8.1 Policy instruments

The **Statute of Metropolis** (Federal Law Nr. 13.089/2015) is the main guideline for planning and managing metropolitan regions and urban agglomerations in Brazil. A metropolitan area is defined as an urban territorial unit constituted by two or more neighbouring municipalities, which present functional complementarity and integration of geographic, environmental, political and socioeconomic dynamics, and which, due to their population and political and socioeconomic relevance, have national or regional influence (Federal Law Nr. 13,089/2015). The Statute foresees interfederative governance arrangements, such as an **interfederative compensation instrument for environmental services.** Therefrom, the Statute of Metropolis was identified as the main policy instrument to be approached by INTERACT-Bio in Brazil.

According to the Statute, all metropolitan regions and urban agglomerations must develop, by January 2021, their **Integrated Urban Development Plans (PDUIs)** in order to be considered as holding a full-fledged management structure. In addition to the minimum contents defined by this law, after PDUI's approval, the municipalities that integrate these territorial units must also reconcile their Municipal Master Plans to these metropolitan plans. The PDUI, as a legal instrument of planning, establishes guidelines, projects and actions to guide urban and regional development, seeking to reduce inequalities and improve living conditions of the metropolitan population. It also establishes the bases of joint action between states and municipalities.

Furthermore, the PDUI addresses the lack of a legal planning tool to guide urban and regional development. It defines guidelines, projects and actions that favour the physical-territorial dimension and that are capable of inducing and/or structuring appropriate conditions for sustainable metropolitan development, guaranteeing economic competitiveness, reducing spatial inequalities and improving population's welfare.

Campinas city-region is currently developing its PDUI, what creates optimal context for the integration of biodiversity considerations into such an instrument. Belo Horizonte city-region, in its turn, has developed its PDUI in 2014, but has not legally approved it as a state law yet. The existent proposal includes some biodiversity aspects in one of its specific thematic axes, "Sustainability". At the moment, Londrina city-region is not yet developing its PDUI, despite a call for proposals has been opened in 2017.

## 8.2 Vertical and horizontal integration

Considering that the existing Plans, Laws and Programs are numerous, and that government structures are limited, integrating biodiversity considerations in other agendas (for instance, urban development) is crucial to enable its implementation by local authorities. Taking also into account local government's limitations to systematize data and build capacity, integrating existing initiatives can save time and resources.

Campinas city-region, for instance, has faced difficulties to gather spatial data to develop its intervention concept. The State Secretary of Environment, on the other hand, has an ecological zoning program which can positively contribute to it. During the scoping exercises, representatives of both levels were led to jointly identify these connections. Within INTERACT-Bio's activities, the Metropolitan Region of Campinas will be able to experience more and more opportunities that promote this governance alignment through workshops, events and integrative facilitation. It is important to articulate multilevel governments, and also involve multi-tier actors on those activities, such as municipalities and secretariats. The discussion of the strategies and policies in a participatory way, taking into account considerations of the majority of the governing bodies involved, is an important step to ensure the proper planning of the territory and the concrete implementation of the proposals.

When it comes to vertical integration, *PainelBio* is also an important measured that the city-regions can benefit from. Achieved by the Action Plan for Biodiversity, it is a multisectoral body that monitors the implementation of the NBSAP, encouraging and catalysing efforts and seeking to broaden social participation, especially of traditional communities and indigenous people, acting as a catalyst and facilitator of communication with society on biodiversity-related issues. It integrates multilevel actors towards the discussion and implementation of the NBSAP. ICLEI South America has requested participation in this body and considers it a relevant space for generating a horizontal dialogue within INTERACT-Bio's context.

### 8.3 Capacity building interventions

All three city-regions have participated in ecosystem services conceptual trainings during the respective scoping workshops, exploring its conditions and trends.

Four main training topics came out of the scoping workshop in Campinas city-region: (1) **environmental planning**, (2) **georeferenced data analysis**, (3) **protected areas** and (4) **recovery of degraded areas**. ICLEI South America, through its network, is currently articulating with the State Secretary of Environment and Chico Mendes Biodiversity Institute (ICMBio) to provide capacity building workshops and approach these subjects. A workshop about georeferenced data analysis, the first topic to be addressed, is planned for the second semester of 2018.

Belo Horizonte city-region, in its turn, raised the subjects of **community engagement techniques** and **landscape recovery methodologies**. Both of them will be approached in capacity building workshops until the end of the year. Finally, Londrina city-region is going towards a **Nature Based Solutions** perspective, especially oriented to drainage and erosion issues.

## 9. CONCLUSIONS AND ACTION PLAN FOR WAY FORWARD

### 9.1 Key findings

The possibility of creating dialogues between government levels was made clear during group work meetings and workshops. Several representatives raised the importance of being aware of the particular challenges faced by other tiers so that combined (and more effective) initiatives are developed. Platforms for sharing experiences and building joint strategies are insufficient, when not non-existent.

All three city-regions have reported a lack of integrated GIS capacity, not only for collecting data, but also for systematizing and sharing it. This aspect is comprised in general limitations faced by local governments, which also frequently includes low availability of human and financial resources. Another common challenge to Campinas, Belo Horizonte and Londrina is the coverage of its size - including 20, 34 and 25 municipalities, respectively. Taking into account that territorial dynamics crosses boundaries, this factor increases exponentially managing complexity.

Despite sharing similar difficulties, Campinas, Belo Horizonte and Londrina are noticeably at very different stages in terms of settling of their governance structure, consequently affecting their mobilization capacities. While Campinas and Belo Horizonte counts with consolidated Metropolitan Agencies, Londrina city-region lacks a regional institution to develop the path towards a dialogue between state and municipal level. This factor plays a significant role in the elaboration of integrated development plans and in the perspective of effectively implementing it.

Among the synergies identified, the Project RECONECTA-RMC, as detailed in the previous sections, has become strategic to accomplish INTERACT-Bio's objectives at Campinas city-region. The existing political commitment to jointly design conservation actions has potentiated ICLEI's activities and demonstrated the strength of political instruments, such as the Green Municipal Plan, when it comes to regionally influencing neighbouring municipalities.

## 9.2 Way forward action plan

### 9.2.1 *Campinas*

Three topics have been clearly strategic for the city-region since the Scoping Workshop: (1) Fauna Protection, (2) Recuperation of Permanent Preserved Areas (APP) and (3) Protected Areas. These priorities guided the creation and strengthening of the work groups, As a result of several workshops and work group meetings, Campinas city-region has chosen to develop a **multifunctional connectivity area**. Due to the optimal context set by PDUI's elaboration, previously mentioned in topic 8.1, INTERACT-Bio's activities at Campinas city-region are running in a fast pace. In this sense, the intervention concept is not only defined, but also validated and ready to be considered by the planning instrument, following closely PDUI's specific chronogram.

This concept has emerged from the need of a regional network to connect strategic areas and remaining forests, protecting springs and endangered species. Later, it also compassed a welfare component, approaching the need of mobility alternatives and reduction of greenhouse gases. The connectivity area is preceded by the "multifunctional" adjective, in the sense that it aims to address traditional biodiversity conservation issues (such as gene flow) and social aspects (leisure, urban mobility and food production), which differs it from the traditional concept of "landscape corridor".

As previously introduced in topic 2.2 (Scoping methodology), a collaborative process for defining this intervention concept was promoted by INTERACT-Bio and catalysed by RECONECTA-RMC, gathering all municipalities. Based on key aspects of the city-region, such as its hydrography, protected areas, highways and environmental zoning, the work group designed a first version of what would later become the connectivity line. Then, each municipality adjusted the outline in order to fit local specific needs in its territory, resulting in the final version of the connectivity line (**Figure 10**).

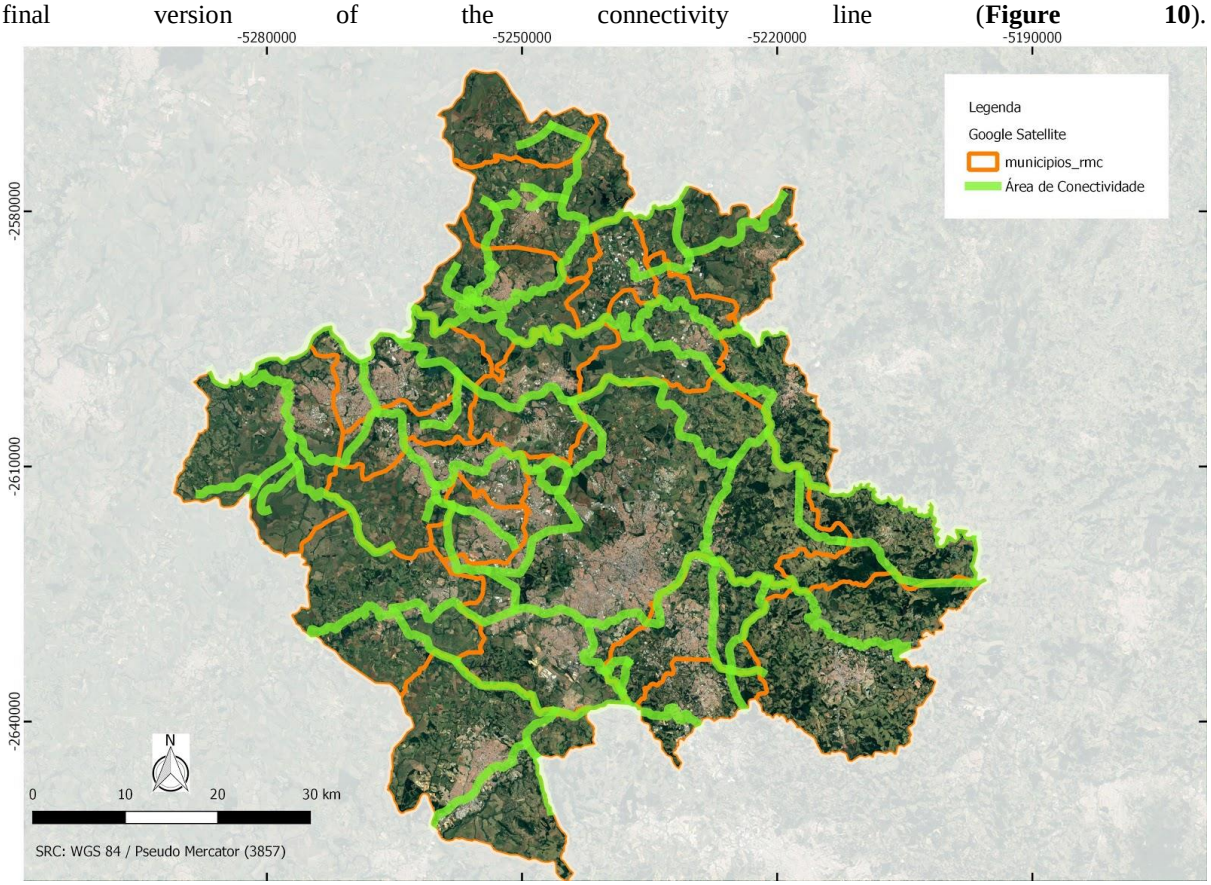


**Figure 10: Connectivity Area - Campinas City-Region. (Developed by the Municipal Secretary of the Green, Environment and Sustainable Development)**

In order to highlight the benefits provided by the connectivity area, a mapping exercise was conducted to evaluate the provision of ecosystem services by each land use class. This exercise was adapted from a methodology proposed by Buckhard et. al (2012) and consists in a matrix linking ecosystem services supply and land use. The state government of São Paulo has been using this approach in the Ecological and Economic Zoning and was invited to support this activity. This collaboration, besides promoting a methodological support, illustrates vertical integration strengthening in the city-region.

The first step was to observe the specific land use classes within the context of the connectivity area, as seen in **Figure 11**. This visualization does not only provide information on its condition, but also enables an ecosystem services analysis from the contribution of each territorial aspect. It is worth noticing that 25% of the connectivity area is covered by original vegetation (which encompasses protected areas), 25% is covered by grass (for cattle purposes, mainly), 22% is characterized by agricultural activities, 17,9 % by urban areas and 3,1% by water flows.

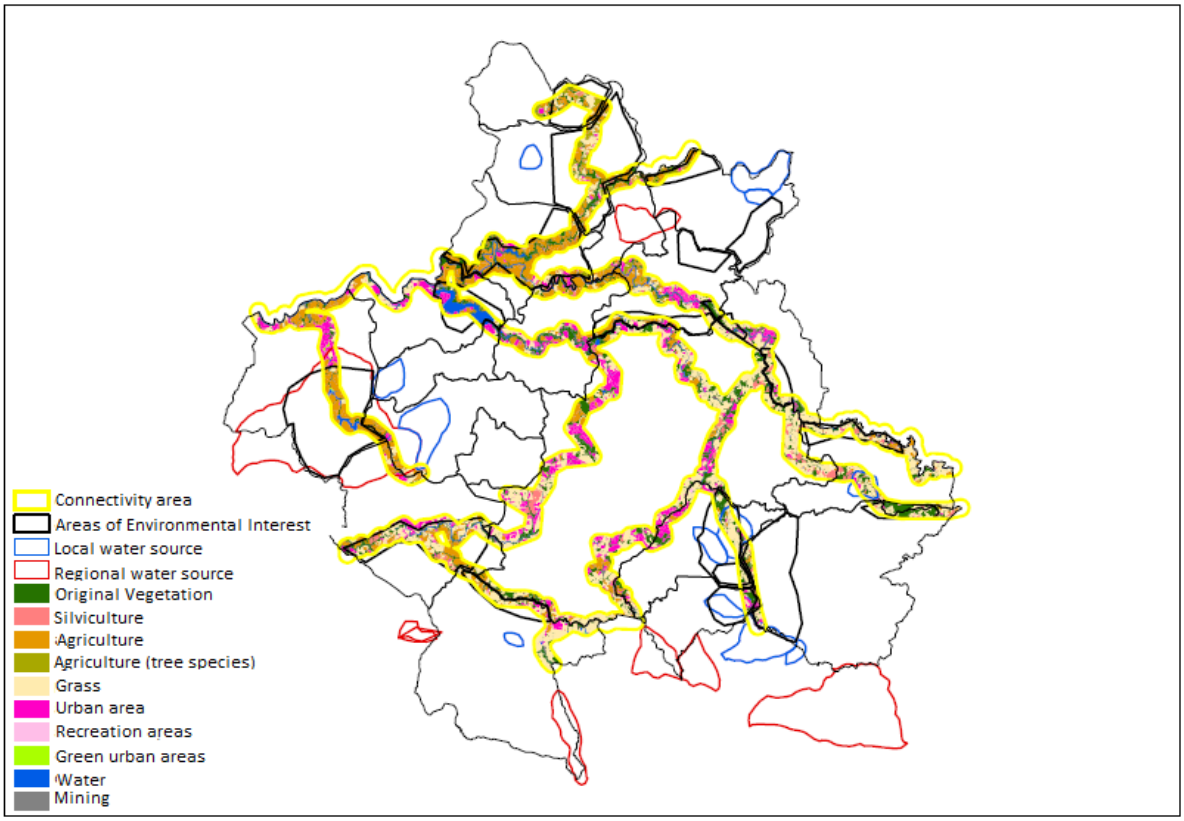


**Figure 11 - Land use classes within the context of the connectivity area (Developed by the Forestry Institute of the State of São Paulo, in partnership with ICLEI South America and Municipal Secretary of the Green, Environment and Sustainable Development)**

Secondly, each land use class was evaluated based on its current capacity of providing the respective ecosystem service, using a score system that goes from 0 (does not present any capacity) to 3 (presents a high capacity). As seen in **Table 3**, the ecosystem services with higher final scores are (1) Cultural, recreation and tourism, (2) Geological and hydrological process regulation, (3) Habitat support and Water flow regulation.

Another interesting perspective resulted from this exercise is that "original vegetation" is the land use which presents the highest capacity of providing ecosystem services in the city-region, followed by Water, Silviculture and Agriculture of tree species (such as fruits and coffee crops). These results will lead to the definition of possible implementation strategies in the next months.

As seen in **Figure 12**, this evaluation enables a visual diagnosis of the potential of the intervention concept and highlights its contribution to the city-region.

| Ecosystem service | Land use classes | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Original vegetation | Silviculture | Agriculture (Tree species) | Agriculture | Grass | Urban area | Green Urban areas | Water | |
| Support - habitat | 3 | 2 | 1 | 1 | 1 | 0 | 1 | 2 | **11** |
| Local climate regulation | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 3 | **10** |
| Pollinization | 3 | 1 | 2 | 1 | 0 | O | 1 | 0 | **8** |
| Geological and hydrological processes regulation (erosion, floods) | 3 | 2 | 2 | 1 | 1 | 0 | 1 | 2 | **12** |
| Carbon storage and sequestration regulation | 3 | 2 | 2 | 0 | 0 | 0 | 1 | 0 | **8** |
| Food provision | 1 | 0 | 3 | 3 | 0 | 0 | 1 | 2 | **10** |
| Water flow regulation | 3 | 2 | 2 | 1 | 0 | 0 | 1 | 2 | **11** |
| Raw materials provision | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| Cultural, recreation and tourism | 2 | 1 | 2 | 0 | 0 | 3 | 3 | 3 | **14** |
| **Total** | **22** | **15** | **15** | **7** | **2** | **3** | **10** | **14** | **88** |

**Table 3 - Ecosystem services provision according to each land use class (Consolidated by ICLEI South America)**

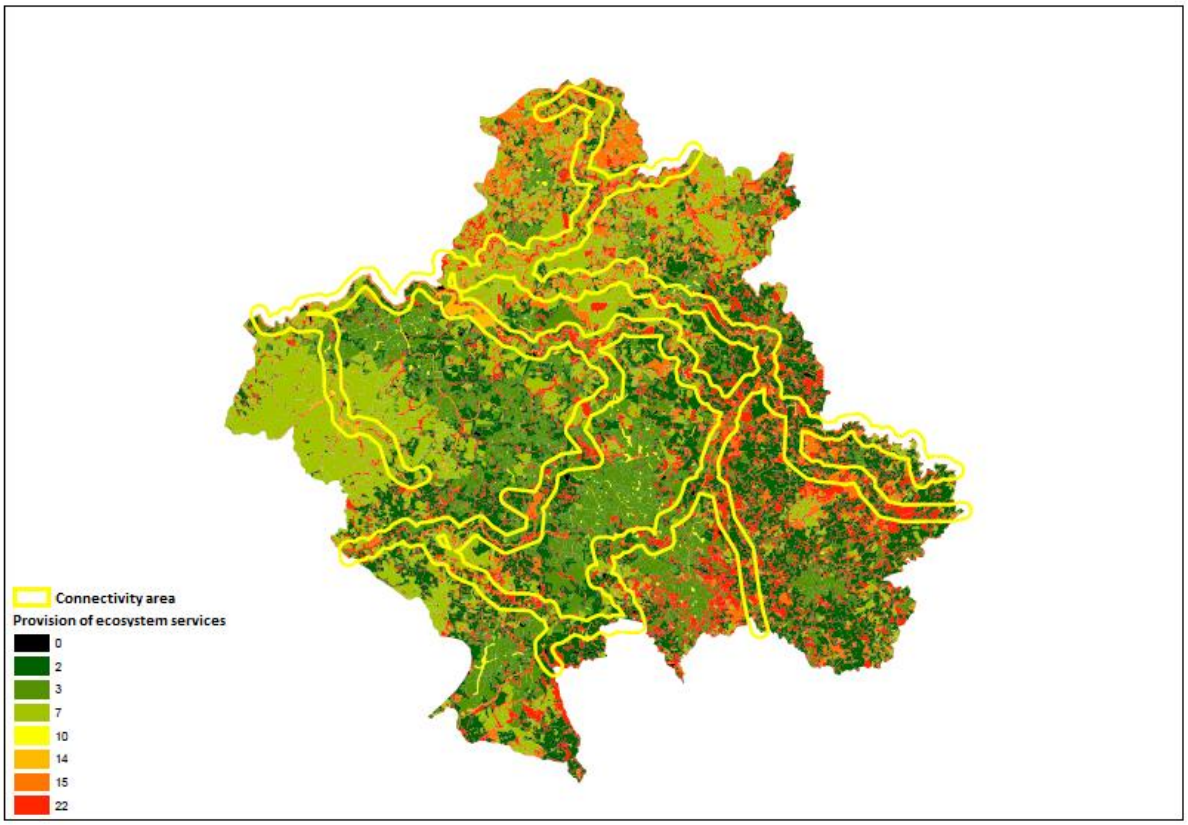


**Figure 12 - Ecosystem services provision at the connectivity area. Developed by the Forestry Institute of the State of São Paulo, in partnership with ICLEI South America)**

A technical supporting document was elaborated, detailing this process and results, as well as its importance. This document will be submitted by the end of June to EMPLASA (Planning Company of the State of São Paulo), who is responsible for developing the PDUI. Therefore, INTERACT-Bio will contribute for including biodiversity aspects into a regional development plan.

The next step is to map synergies between the connectivity line and the macro-zoning settled for the metropolitan region, in order to potentialize its effect and to strength its adoption. Considering that the alternatives can't be implemented individually, but in fact, the success of the Connectivity Area depends on the combination of them along its length, INTERACT-Bio will promote a workshop in order to prioritize strategic mechanisms (including financial instruments).

### 9.2.2 *Belo Horizonte*

Food production and biodiversity conservation have been strongly connected and approached by Belo Horizonte's work groups. It is known that a sustainable regional food system boosts urban resilience in face of climate risks, and within a country where rural activities represents a significant share of economic growth, practices that promotes food provision through an ecosystem service perspective can achieve expressive benefits. These aspects are addressed and recognized by Belo Horizonte's PDUI, which illustrates an opportunity for implementing its proposed guidelines. Finally, being a member of the CITYFOOD network, the city-region has demonstrated a strong commitment to this issue, which has also reflected in INTERACT-Bio's unfolding. The ICLEI-RUAF CITYFOOD network aims to accelerate local and regional government action on sustainable and resilient city-region food systems by combining networking with training, policy guidance and technical expertise to its participants.

CITYFOOD is active in both the Global North and South and will build a strong south-south-north exchange platform for learning amongst cities. It will establish direct connections with people on the ground and between staff engaged in policy development.

As a result of the scoping process and work groups discussion, the intervention concept was defined. Connectivity of existing conservation units will be promoted through the recovery of degraded areas, located primarily in the green-blue network (already established in its PDUI). Agroecology practices will be in the center of recovering alternatives, strengthening the synergies between biodiversity conservation and food production.

Possible recovery techniques raised are agroforestry systems, reforestation (direct planting interventions) and nucleate for regeneration. Social articulation with small rural producers is considered as a critical strategy to promote these techniques. Two priority areas were selected, as seen in **Figures 11 and 12**, with their respective possible recovery interventions.

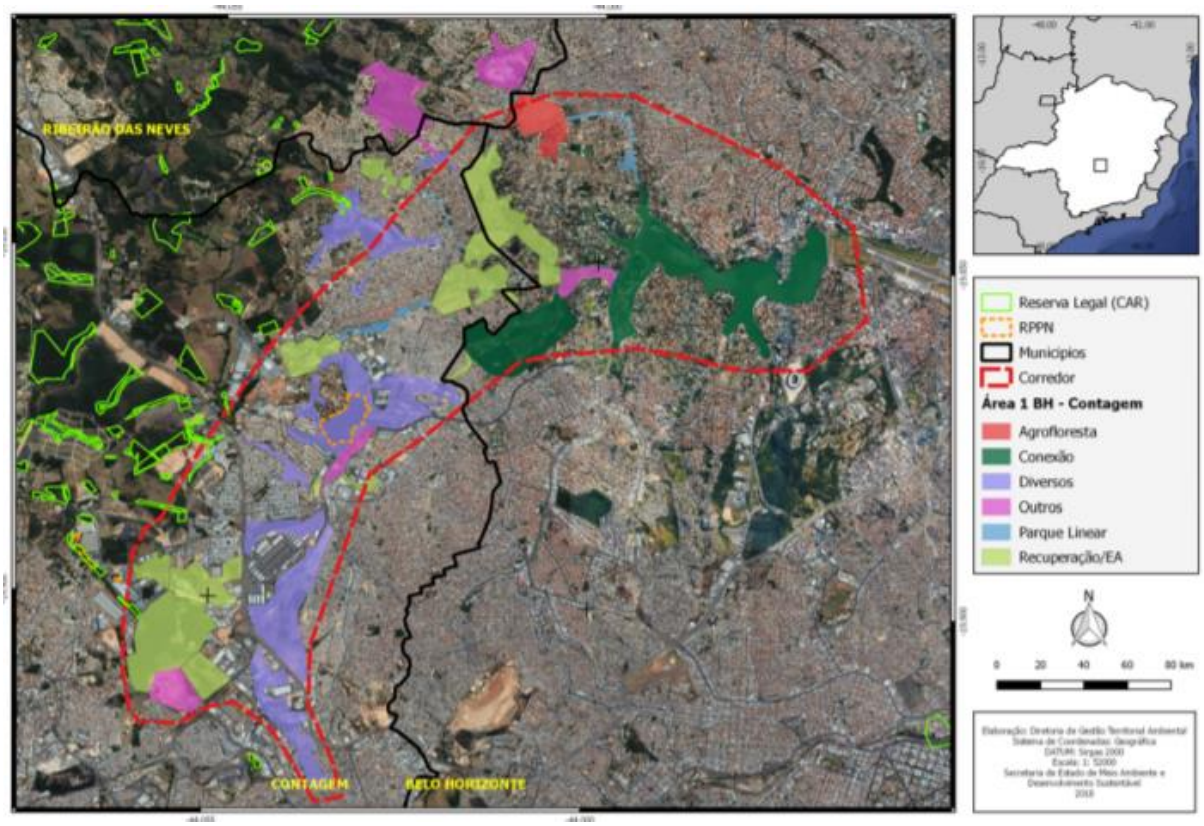


**Figure 11 - Priority are for intervention, located at the administrative boundary of Contagem and Belo Horizonte municipalities. (Developed by INTERACT-Bio work groups)**

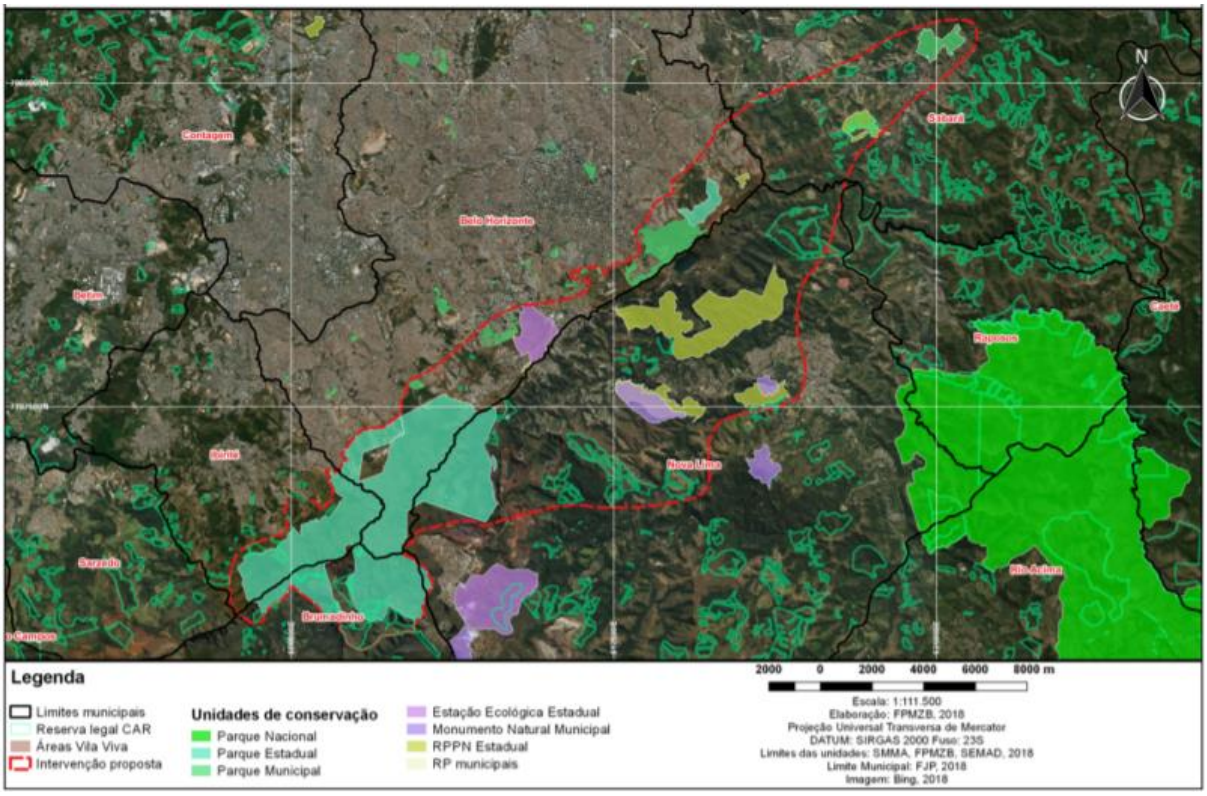


**Figure 12 - Priority area for intervention, located at "Serra do Curral" area. (Developed by INTERACT-Bio work groups)**

At the moment, thematic work groups are actively raising and systematizing social movements, engaging important stakeholders such as local producers. In this sense, INTERACT-Bio will support the articulation of an open data platform to gather existing agroecology initiatives and promote a workshop for community mobilization methodologies.

In July, INTERACT-Bio will lead a workshop for mapping ecosystem services within the context of the two priority areas, detailing what services are provided by each of it.

### 9.2.3 *Londrina*

The most important topic discussed at the scoping workshop was drainage and soil erosion. The city-region is located in a very irrigated region, with a large water network and high precipitation index. Its urbanization process resulted in an extensive soil impermeabilization, the reason why floods events are very frequent. On the other hand, when compared to the other two city-regions, Londrina is expressively rural, accounting for its soil erosion issues. This contrast was strongly highlighted at the scoping workshop, and Nature Base Solutions were reinforced as possible alternatives.

The strength of the concept of Nature-Based Solutions is its integrated perspective for addressing societal challenges. Ecosystem services are the contributions that ecosystems, in combination with other inputs, make to human well-being. Nature-Based Solutions operationalize the concept of ecosystem services in real-world situations to promote sustainability more explicitly. Nature-Based Solutions also play a critical role in promoting 'transitions' from a resource-intensive growth model towards a more resource-efficient, inclusive and sustainable growth model. (Faivre et al., 2017)

Nevertheless, Londrina city region has not concluded the definition of its intervention concept. In July 4th, ICLEI will conduct one more exercise to finalize its action plan. At the same occasion, a capacity building session will take place, exploring examples of Nature Based Solutions.

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