IIIEE Theses 2024:28

Just Green Urban Transitions: Analysing Multispecies Justice in Mexico City

Multispecies Justice in Urban Greening and Urban Nature Governance

Anastasia Van Der Meer

Thesis Supervisor: Yuliya Voytenko Palgan

Thesis for the fulfilment of the
Master of Science in Environmental Sciences, Policy & Management (MESPOM)
jointly operated by Lund University – University of Manchester -
University of the Aegean – Central European University

Lund, Sweden, June 2024

Erasmus Mundus Masters Course in Environmental Sciences, Policy and Management

MESPOM

This thesis is submitted in fulfilment of the Master of Science degree awarded as a result of successful completion of the Erasmus Mundus Masters course in Environmental Sciences, Policy and Management (MESPOM) jointly operated by the University of the Aegean (Greece), Central European University (Hungary), Lund University (Sweden) and the University of Manchester (United Kingdom).

Published in 2016 by IIIEE, Lund University, P.O. Box 196, S-221 00 LUND, Sweden,
Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiee@iiiee.lu.se.

ISSN 1401-9191

–For those who build bridges–

Acknowledgements

This thesis is about interconnectedness and interdependence – that which upholds life on our planet and that allows the universe to function as it does. Likewise, I could not have written this thesis without the support and help of those around me.

Firstly, I would like to thank my thesis supervisor Yuliya, for making time to discuss the thesis and related topics despite her busy schedule, for always showing up with smiles and encouragement, and for providing me with direction and advice when I needed it. I also want to thank my professors who have taught me throughout the MESPOM programme, in Central European University, The University of the Aegean, and Lund University. Your expertise and insights have been very valuable and have helped me understand environmental sustainability in many ways. Thank you also to Tunde and Anne-Sophie, who were always there for us during challenging times.

Secondly, I want to thank everyone who helped me in Mexico City. Coming there without a set programme our outcome was scary and exciting at the same time, and I could not have done it without your support. Thank you, Maria, for being my flatmate and local advisor throughout my stay. Thank you, Tanya, for inviting me to your home and giving me the first encouragement and contacts I needed to start the interviews, as well as our insightful conversations. I am very glad to have met Victor, Andres, Marianne, and the rest of your family, and very grateful that you showed me a very different side to Mexico City. Thank you to my dearest Pau, and to Montse for introducing us. To have so many views and ideas in common with people who have grown up in such a different context is very inspiring. Thank you, Miguel, for taking me around so many places in CDMX and for our interesting chats. I also want to thank Valentina and Sofi for taking me to Xochimilco and Milpa Alta for the first time, experiences I will never forget. I am also grateful to Armando, Mario, Sergio, Sergio DRG, Pamela, Isaac, Erika, Don Nicho, Arturo, for sharing your insights and experiences with me.

Thirdly, I want to thank from all my heart my classmates. Thank you, Michele, for understanding our jokes like no one else, and for always having interesting thoughts and smart things to say. Thank you, Flor, for being like a big sister to me and for always, always being up for whatever we put our minds to. Thank you, Caro, for putting up with our at times crazy antics, for being so smart and tirelessly and patiently helping with GIS. Thank you, Carla, for your boldness, gentleness, and realness. Thank you Guilhem, for organising unforgettable trips for the Batch and for always helping sort out any issues that arose. MESPOM Batch 18, you all made these two years the chaotically wonderful, intense, and memorable time of our lives. I love you all and cannot wait to see where life takes us!

Finally, I want to thank my family. Michel and Emil, for keeping me humble and cheerful. Mama and Papa, without whom none of this would be possible. Мама, спасибо, что ты всегда рядом со мной и за то, что веришь в меня больше, чем я иногда верю в себя. Я люблю тебя больше, чем могу описать, и всегда благодарна за все, что ты для нас делаешь. Papa, ik mis je elke dag, maar ik hoop echt dat dit je op de een of andere manier trots zal maken.

And, last but certainly not least, thank you to my love, Memo. Your support, kindness, generosity, and humour never fail to life me up. Meeting you and going through life together has been one of the best things that has ever happened to me. Te amo siempre.

Abstract

This thesis investigates the intersection of urban greening and multispecies justice from a more-than-human (MTH) perspective in Mexico City (CDMX). The study addresses a critical gap in existing research, which predominantly focuses on the human-centric implications of urban greening, such as gentrification and human well-being, while neglecting the needs and well-being of non-human life forms. By exploring notions of multispecies justice (MSJ), this research highlights the interconnectedness of human and non-human life within urban environments and advocates for a more inclusive approach to urban greening initiatives.

The research employs an exploratory qualitative case-study methodology, incorporating 4 site visits, 2 events, and 15 interviews with urban planners, landscape architects, nature conservationists, local communities, traditional agriculturalists, lawyers, policy makers, activists, and NGOs in CDMX. Data collection also includes a systematic review of literature of 140 articles, historical accounts, and urban ecosystem mapping. The findings reveal that although initiatives like the Plan Verde (Green Plan) show promise in promoting ecological justice, their implementation is often inconsistent and fragmented. Moreover, there is a disparity in recognizing various forms of nature, emphasizing the need for a more coordinated and decolonial governance approach.

Key findings suggest that effective urban greening initiatives should integrate traditional knowledge with scientific understanding to promote a holistic and inclusive approach to ecological justice. This study underscores the importance of community involvement and interdisciplinary collaboration in advancing MSJ. Local communities are identified as crucial stakeholders in environmental governance, ensuring continuity and fostering a sense of identity and belonging.

The research also highlights the potential of the Rights of Nature legislation as a framework for promoting MSJ in urban environments, though its success depends on coordinated societal efforts. A hybrid governance approach, emphasizing community participation and interdisciplinary collaboration, emerges as a viable solution for bridging policy intent and practical realities.

Ultimately, the thesis calls for a paradigm shift in urban governance towards a more holistic and inclusive approach that acknowledges the interconnectedness of human and more-than-human worlds. By prioritizing the voices and needs of both human and non-human inhabitants, urban greening initiatives can foster a more equitable and sustainable coexistence in urban environments. The findings advocate for tangible actions and collaborative efforts across diverse sectors to address socio-ecological injustices and promote a pluriversal approach to MSJ in urban settings.

Keywords: Multispecies Justice, Urban Greening, Urban Nature Governance, Environmental Justice, Mexico City

Executive Summary

This executive summary provides a concise overview of the thesis, highlighting the key elements and implications of the research on multispecies justice in urban greening initiatives. It aims to equip policymakers, practitioners, executives, and professionals with a comprehensive but concise understanding of the research.

Background and Significance

Urban greening encompasses human-led actions such as Nature-based Solutions (NbS), Ecosystem-based Adaptation (EBA), and Green Infrastructure (GI), as well as examples of urban nature such as species, habitats, and ecosystems found in the city. It represents a significant approach to fostering sustainable and harmonious coexistence with nature within urban environments. This thesis explores the concept of multispecies justice (MSJ) within urban greening, examining how urban nature can be perceived not only as a tool for human benefit but also as an ecosystem deserving representation and protection. Urban greening initiatives often prioritize human-centric perspectives, neglecting the well-being of non-human species. Moreover, academic knowledge on MSJ has only started to be developed more in depth but is important because such topics shed light on how humans can live more harmoniously with other life on earth. This research addresses these gaps in literature by focusing on the ecological justice aspects of urban greening from a more-than-human perspective. It highlights the interconnectedness of human and non-human life forms and advocates for inclusive urban planning that considers the needs of all species.

Research Aim and Questions

The primary aim is to generate knowledge that transcends traditional academic and Western perspectives, incorporating local community knowledge and Global South perspectives. The research seeks to understand how urban greening initiatives in Ciudad de México, Mexico City (CDMX) contribute to just urban transitions and environmental justice. Just urban transitions here relate to transitions which explicitly tackle and take into account socio-ecological injustices and ensure, in their design and manifestation, the equal treatment of all species, allowing them to live their lives without (human) oppression, obstruction, and destruction.

The main research questions are:

1. To what extent are urban greening initiatives in Mexico City ecologically just? How do humans and nature co-exist in the city?

2. How is multispecies justice governed in Mexico City within the urban nature perspective?

Methodology and Research Approach

An exploratory qualitative case-study approach was adopted (*Figure 0-1.*), focusing on Mexico City, a pioneering case with municipal initiatives strategically focusing on including the More-Than-Human perspective with the introduction of the Rights of Nature Laws in 2017.

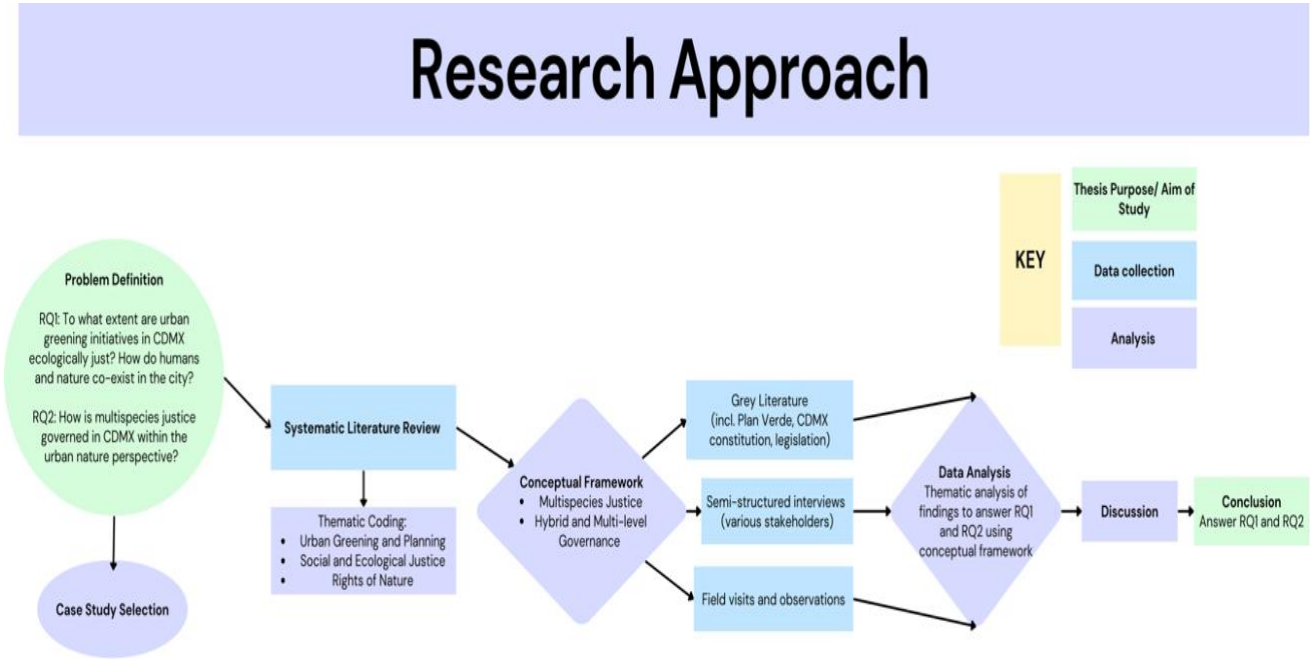


Figure 0-1. Research Approach. Source: Author.

The research involved a systematic literature review of 140 articles, 4 site visits, 15 practitioner interviews, a thorough analysis of the extensive Plan Verde (Mexico City's greening plan from 2019-2024), as well as an examination of grey literature and historical accounts related to the governance of urban nature in CDMX. A conceptual framework (*Figure 0-2.)* guided the data analysis, facilitating a comprehensive understanding of multispecies justice in urban environments.

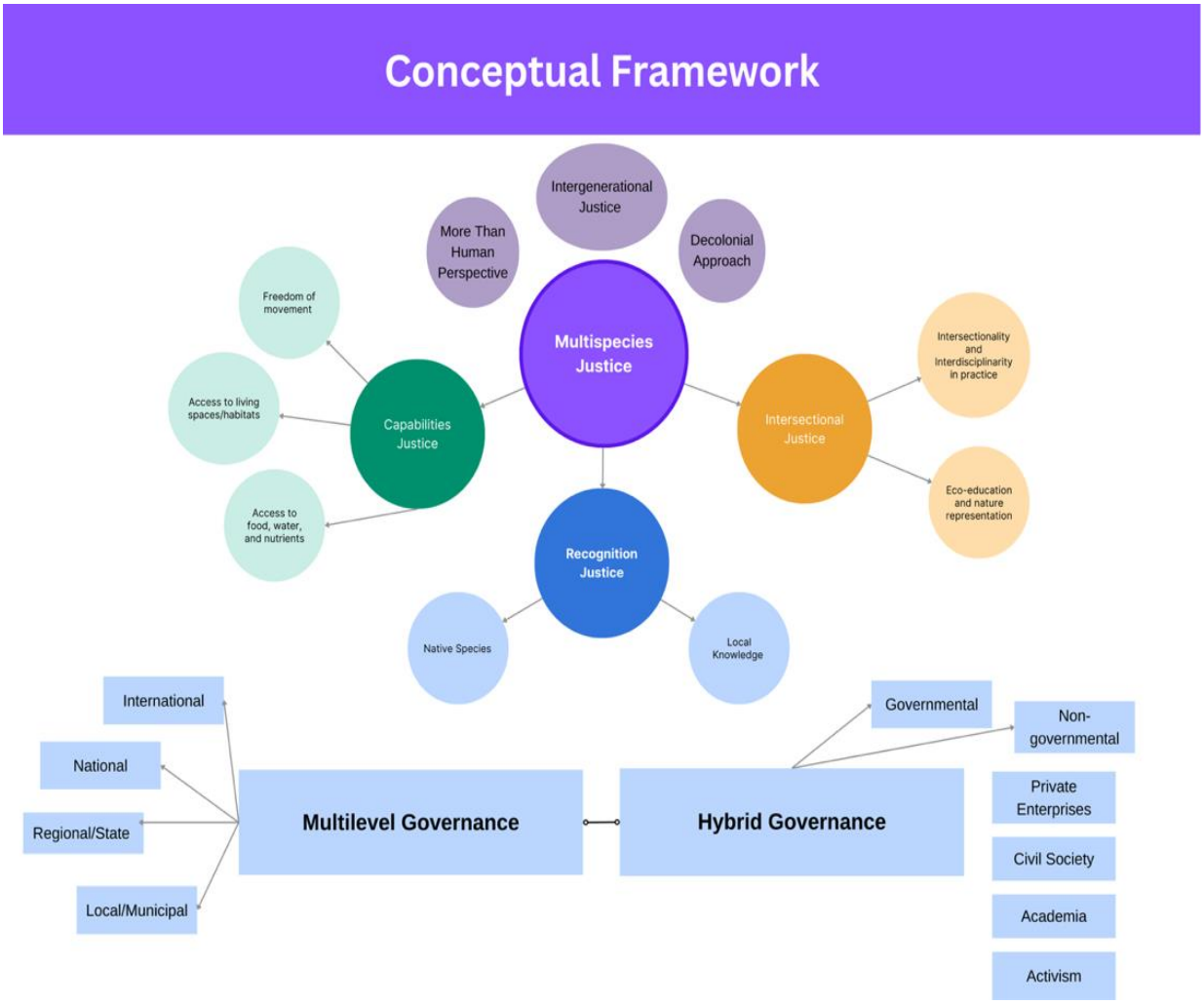


Figure 0-2. Conceptual Framework used for Analysis. Source: Author.

Key Findings

⇒ Ecological Justice: Initiatives like Plan Verde show positive steps but reveal inconsistencies and fragmented implementation across the city. There is a need for a decolonial perspective that recognizes and integrates local indigenous knowledge and perspectives to address multispecies justice in a more effective manner.

⇒ Governance: The Rights of Nature legislation in the constitution of CDMX provides a framework for MSJ, but effective implementation requires coordinated action from all societal sectors. Legal practicalities should be tailored to specific species needs rather than the broad concept of 'nature', and this should be coupled with societal awareness and changes.

⇒ Community Involvement: Local communities play a crucial role in sustaining environmental initiatives. There is a need for interdisciplinary collaboration and a shift in education towards experiential learning to foster deeper connections with nature. Security and financing are key aspects contributing to the sustained success of community initiatives.

⇒ The thesis emphasizes the need for a paradigm shift in urban governance towards a holistic and inclusive approach that acknowledges the interconnectedness of human and more-than-

human worlds. Urban greening initiatives should prioritize the voices and needs of both human and non-human inhabitants to promote equitable and sustainable coexistence.

Practical Policy Implications

⇒ Holistic Approach to municipal policy making: Foster a multispecies justice perspective by recognizing the interconnectedness between humans and nature, particularly through urban gardening and the restoration of green and blue infrastructure. There needs to be a recognition of urban nature as an interconnected system which extends not just across the city, but also beyond and around.
⇒ Decolonise higher levels of governance (including national and international authorities) of urban nature and include more perspectives of local and indigenous knowledge to promote MSJ, including the production of a set of indicators to comprehensively measure ecological justice in the urban environment.
⇒ Community Engagement in municipalities: Enhance community involvement and interdisciplinary collaboration in urban planning. Create "Third Spaces" for sharing diverse cosmovisions and ideas. Ensure stability in the aspects of security and financing when it comes to community projects to ensure sustained, long-term success.
⇒ Education and Awareness: Shift towards experiential learning and hands-on approaches in education (schools and universities) to foster a deeper connection with nature.

Recommendations for Future Research

⇒ Policy Instruments: Further research on policy tools representing more-than-human interests and integrating them into urban planning.
⇒ Knowledge Sharing: Develop arenas for information access and knowledge sharing, such as urban living labs.
⇒ Multispecies Justice and urban blue spaces, and the connection of urban greening and aquatic environments
⇒ Interdisciplinary Studies: Explore ecological transitions and future visions for cities, incorporating multispecies justice as a critical dimension.

In conclusion, achieving multispecies justice in urban environments requires collective action, interdisciplinary collaboration, and a profound reimagining of urban nature that fosters harmonious integration with the living world. Immediate, tangible actions are necessary to address ecological injustices and promote sustainable urban development for all species.

Table of Contents

List of Figures

Abbreviations and Glossary

CDMX - Ciudad de México, Mexico City

EBA - Ecosystem-Based Adaptation

EU – European Union

EC – European Commission

Ecocide – unlawful or wanton acts committed with knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts (*Legal Definition of Ecocide*, n.d.)

Food sovereignty - broadly defined as the right of local peoples to control their own food systems, including markets, ecological resources, food cultures, and production modes (Wittman H, 2011)

GI - Green Infrastructure

Global North/Global South - The first definition of the Global South is based on unequal economic development, the second on shared experiences of exploitation under global capitalism, and the third highlights internal wealth inequality within nations, exemplified by Antonio Gramsci's argument about northern Italian capitalists colonizing southern Italy, leading to concerns about the terms' relevance.(Environment & Nature, 2022)

IUCN - International Union for the Conservation of Nature

IPBES - Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC - Intergovernmental Panel on Climate Change

NbS – Nature-based Solutions

MSJ - Multispecies Justice

MTH- More Than Human

Placemaking - Placemaking involves a multi-faceted approach to planning, designing, and managing public spaces by leveraging a local community's assets, inspiration, and potential. Its goal is to create public spaces that enhance urban vitality and promote health, happiness, and well-being. Due to its impact on place identity, placemaking is inherently political. It is both a process and a philosophy rooted in urban design principles.

Pluriversal worldview - While the 'universe' claims that reality can ultimately be explained, a pluriversal approach acknowledges the existence of diverse worldviews contributing to the tapestry of reality. Each worldview has its own significance and value, and acknowledging the interconnectedness between all worldviews allows for the connection of your own well-being with the well-being of other beings with other perspectives.(*Why There Is More Than One Reality*, 2024)

RAMSAR - The Convention on Wetlands is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. (*Home Page | The Convention on Wetlands, The Convention on Wetlands*, n.d.)

RoN - Rights of Nature

SDGs – Sustainable Development Goals

SEDEMA - Secretaría del Medio Ambiente, Sedema is the agency in charge of protecting the environment and promoting sustainable development in the Mexican capital.

Speciesism - in applied ethics and the philosophy of animal rights, the practice of treating members of one species as morally more important than members of other species; also, the belief that this practice is justified. (*Speciesism | Animal Rights, Ethics & Philosophy | Britannica*, n.d.)

Third space - an in-between where 'cultural boundaries meet and blur' allowing people to synthesise elements of different identities and create new, hybrid identities and knowledge (Tatham, 2023)

UN – United Nations

UNEP - United Nations Environment Programme

zero-KM - food produced, sold and eaten locally - food which travelled zero kilometres. ('ZERO KM FOOD', 2014)

1 Introduction

The introduction sets the scene *(Section 1.1)* by providing an overview of the current situation concerning the Anthropocene and the Sixth Mass Extinction, raising the issue of the human-nature disconnect which is at the root of so many of our current crises. *Section 1.2* delves into the background of the research thesis, and sheds light on the definitions of Urban Greening/Urban Nature and Multispecies Justice. *Section 1.3* introduces the Research Problem this thesis addresses, followed by *Section 1.4* which outlines the aim and specific research questions of the thesis. *Section 1.5* addresses the scope and limitations of the research and outlines the reasons for choosing Mexico City as the case study. *Section 1.6* points to the audiences of this thesis, whilst *Section 1.7* outlines the disposition of the main chapters.

1.1 Setting the Scene

Humanity's quest for justice cannot be separated from the ecological wellbeing of our planet and the many other species that call it their home. Achieving balance demands not only a just future for Earth but also equitable treatment for all its inhabitants. This encompasses not just humans but also the most vulnerable communities bearing the impact of the climate crisis. Without adopting an intersectional lens(Amorim-Maia et al., 2022; Anguelovski et al., 2020), environmentalism risks perpetuating the same colonial mindset that has led us to this ecological crisis (García López & Navas, 2019), a perspective fundamentally incompatible with the biodiversity vital for our collective survival. Recognizing the interconnectedness of all life forms is paramount.

The phenomenon of urbanization is rapidly unfolding worldwide (United Nations, Department of Economic and Social Affairs, Population Division, 2019), spurred on by the advent of the Industrial Revolution (Stearns, 2020). However, this urbanization often occurs at the expense of the environment, resulting in widespread environmental degradation and irreparable biodiversity loss (Ren et al., 2023), contributing to what is now recognized as the Sixth Mass Extinction (Understanding Evolution, 2021). From an ethical standpoint, the mass depletion and destruction of countless life forms that share our planet (Hayhoe, 2023) constitutes a profound injustice. Shifts are constantly occurring, and the pivotal transition at hand revolves around the inquiry of how to coexist more harmoniously with the natural world (United Nations, 2020), of which we are an integral part, rather than perpetuating its exploitation for our own gain. Our survival hinges upon nature, as it provides us with sustenance, water, and a sense of belonging (Nesmith et al., 2021). Yet, we often overlook the fact that we are merely one species among many that inhabit this planet, a mindset that carries consequences.

This era has been dubbed the 'Anthropocene' (Folke et al., 2021), highlighting the significant impact humans wield over the planet. Concurrently, we are also experiencing the 'Urban Age' (Loorbach et al., 2016) characterized by the proliferation of urban centres, which exert substantial influence on the broader ecosystem despite occupying less land area. Cities, while compact, leave a significant carbon and energy footprint (Moran et al., 2018), exacerbating environmental concerns - they cover only 2-3% of land, but 'account for 75% of natural resource consumption, up to 80% of energy consumption, 70% of greenhouse gas emissions, and 50% of waste production' (IUCN, 2023).

The prevailing narrative underscores the urgency for change and transition, as evidenced by numerous countries declaring climate crises and emergencies (Climate Emergency Declaration, 2024), signaling a growing awareness of our detrimental impact on the planet. The

interdependency between humans and the natural world is increasingly acknowledged, reflected in initiatives such as the United Nations' Sustainable Development Goals (United Nations, n.d.), which emphasize the symbiotic relationship between humanity and nature.

While historically viewed as diametrically opposed (Schaeffer et al., 2014), the urban and the natural are intricately intertwined, evidenced by the blurring boundaries facilitated by urban greening initiatives and the adoption of Nature-Based Solutions (NbS). As we navigate the Anthropocene, there is a collective aspiration to transition toward a 'good Anthropocene' (Wyborn et al., 2020) or at least a more sustainable one, with cities serving as focal points for reevaluating our relationship with nature.

Current urban greening initiatives often prioritize human-centric perspectives, neglecting the needs and well-being of non-human life forms, despite extensive literature on social justice implications such as gentrification (Busà, 2022; Quinton et al., 2022; Rigolon et al., 2024) and benefits to human health and climate (Murray et al., 2022; Tozer et al., 2023). This thesis addresses this gap by exploring how modern cities can transition to become more green, sustainable, and in harmony with the surrounding natural environment, adopting a More-Than-Human lens to articulate urban green transitions from the perspective of nature.

The selection of Ciudad de México, Mexico City (CDMX) as the case study for this thesis is driven by its status as one of the world's largest megacities facing significant urbanization challenges (Garcia Ferrari et al., 2022), as well as its ambitious greening plan, 'Plan Verde', dedication to environmental conservation, and groundbreaking declaration of the rights of nature (Calderón-Gamboa, J., & Recinos, J. D., 2022). This makes it an ideal focal point for exploring urban greening initiatives and their implications for ecological justice in contemporary urban environments (more in *Methodology*).

Restoring equilibrium necessitates recognizing the inherent value of all human and non-human life. It requires acknowledging that the multifaceted crises we face—whether personal, political, or planetary—are interconnected (Rasanathan & Pillay, 2024) manifestations of the same underlying discord between humanity, each other, and the natural world. Embracing a holistic perspective reminds us that the notion of individuality is fluid; just as we are integral parts of larger networks and ecosystems, we also harbour microbiomes and communities comprising myriad species collaborating to maintain our well-being (Ogunrinola et al., 2020). We are both distinct entities and part of a unified whole. Taking a multispecies justice perspective allows us to shed light on how this can be incorporated in a practical manner.

1.2 Background, Significance, and Definitions

We need to transition towards a more sustainable and harmonious coexistence with the planet, and urban greening offers an attractive approach to moving towards this, through physically bringing nature into urban environments.

Urban Greening/Urban Nature

There are numerous categorisations of 'urban greening', including Nature-Based Solutions (NbS), Ecosystem-Based Adaptation (EBA), and Green Infrastructure (GI) (Dorst et al., 2019). Dorst et al. (2019) outlined these various concepts, differentiating between the forms and functions of 'nature' included in the definitions – whether the nature was 'artificial' and human 'engineered' (like green roofs and walls) or part of the existing 'natural' ecosystems and biodiversity (like wetland management, restoration of existing natural areas, and coastal defence through vegetation). According to Dorst et al. (2019), all these interventions have a utilitarian

view of nature in that it can provide benefits to society and help address sustainability challenges, especially in urban contexts. Moreover, the scholars saw EBA and GI as 'subsets' of the 'umbrella concept' of NBS (Dorst et al., 2019), a concept which has been gaining traction internationally ever since 2014, when the European Commission launched a working group to support the application of NBS and the connection of nature with cities(Li et al., 2021). Indeed, international organisations such as United Nations Environment Programme (UNEP), the International Union for the Conservation of Nature (IUCN), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC) recognise the role and importance of nature-based solutions in tackling the current environmental crises that face our world (*Nature-Based Solutions - European Commission*, 2023).

This thesis will touch on all these types of urban greening, and analyse aspects which are covered by NBS, EBA, and GI, yet from a different perspective. Stepping away from seeing this urban nature as an instrument and tool primarily 'serving humans' and (human) society, as is the case in dominant discourses (Menton et al., 2020) this thesis will take on a multispecies perspective, and examine these manifestations of urban nature as species, habitats, and ecosystems in and of themselves, worthy of representation and discussion.

Multispecies Justice

Whilst the Multispecies Justice perspective is relatively new in Western academia (Chao & Celermajer, 2023), numerous indigenous philosophies and cosmologies around the world have perceived the world, both human and non-human, as 'animated, agential, knowing, feeling, and relational'(Celermajer et al., 2021). There has also been work done denominating this approach as recentring the 'More Than Human' (MTH) (Fieuw et al., 2022; Maller, 2021; Petra Tschakert, 2020), but as Celermajer et al. (2021) argue, this still takes humans as the 'benchmark'. Indeed, some scholars have gone further, proposing 'multibeing' perspectives (Dr Christine Winter, University of Otago et al., n.d.), as this provides an even broader conception of nature which includes ecosystems, as well as the abiotic environment like rocks and water. The multispecies perspective of this thesis encompasses interconnected ecosystems within urban environments (like parks, water cycle systems, ecological corridors, and green walls) as well as specific species (corn, the axolotl, and pollinators like hummingbirds and bees), to see how Mexico City's general transformation over the past decade, and more specifically under the current administration (2019-2024) has affected and impacted these underrepresented beings.

Whilst the benefits and trade-offs of urban greening to humans are well documented and researched (Baumeister & Hornberg, 2016; Murray et al., 2022; Syrbe, et al., 2021), much less work has been done to understand the other side involved – nature and species other than humans (Cousins, 2021). These two aspects are interconnected, but for a just world, we need to consider the other, often underrepresented side as well.

Indeed, MSJ touches on notions of ethics, and 'forces engagement, questions, and decisions about which species, which beings, which relationships and which interconnections are valued and which are not, and who makes such decisions', and is a space where 'claims are made not merely in terms of care or protection [of animals], but under the more demanding principle of justice'. Thus, 'realizing MSJ will thus require building coalitions beyond scholarly multidisciplinary, and beyond the movement groups already committed to animal and environmental rights' (Celermajer et al., 2021), encompassing all sections of society. Under MSJ, 'human and nonhuman animals, species, microbiomes, ecosystems, oceans, and rivers – and the relations among and across them – are all subjects of justice'(Celermajer et al., 2021). Though

this has been notoriously difficult to theorise and enact, this thesis aims to further explore MSJ, a crucial but underdeveloped/underused theoretical framework which could help us move towards a more just and harmonious relationship with the living world around us.

1.3 Research Problem

The research problem is defined within the broader context of urban greening initiatives, which often prioritize human-centric perspectives while neglecting the needs and well-being of non-human life forms. Existing literature predominantly focuses on the social justice implications of urban greening, often discussing gentrification (Busà, 2022; Quinton et al., 2022; Rigolon et al., 2024), or effects of urban nature on humans, be it from direct enhancements to well-being and mental health (Murray et al., 2022) to indirect contributions to climate change mitigation (Tozer et al., 2023). There is a notable lack of research exploring the intersection between urban greening and ecological justice, particularly from a more-than-human (MTH) perspective (Cousins, 2021; Pineda-Pinto, Frantzeskaki, & Nygaard, 2022). Urban greening initiatives often overlook the needs and perspectives of non-human life forms, leading to their marginalization within urban environments. This oversight is problematic considering the interconnectedness of all life forms and the inherent value of biodiversity. This research seeks to address this gap by highlighting the interconnectedness of human and non-human life within urban environments and advocating for a more inclusive approach to urban greening initiatives. Drawing from the One Health perspective, which emphasizes the interconnectedness of human, animal, and environmental health (Murray et al., 2022), this research underscores the importance of considering the perspectives of diverse species in urban planning and decision-making processes (Pauleit et al., 2017).

Moreover, justice within nature-based solutions (NbS) and urban greening is paramount to prevent these initiatives from merely perpetuating existing power dynamics and inequalities (Sekulova et al., 2021). Such initiatives risk becoming vehicles for 'business as usual' urban development, prioritizing economic growth over justice-oriented and sustainable futures (Sekulova et al., 2021). Therefore, addressing the concept of multispecies justice (MSJ) is crucial, as it fosters empathy and responsibility towards non-human beings, challenging human exceptionalism and promoting solidarity across species boundaries (Tschakert, 2020). By integrating diverse perspectives, particularly from the Global South, this research confronts Eurocentrism within NbS discourse and advocates for a more inclusive and equitable approach to urban planning and decision-making processes (Pauleit et al., 2017; Sekulova et al., 2021a). This holistic approach is essential for advancing justice within NbS and fostering a more sustainable and interconnected urban environment (Tschakert, 2020).

1.4 Aim and Research Questions

The primary aim of the thesis is to generate knowledge about urban nature that goes beyond traditional academia and Western perspectives, placing a strong emphasis on incorporating practitioner perspectives, local community knowledge, 'Global South' perspectives, and raising awareness of more-than-human life in urban environments. By exploring notions of multispecies justice in Mexico City, the research seeks to understand how urban greening initiatives contribute to just urban transitions and address various forms of environmental (in)justice.

Specifically, the study also aims to contribute with practical insights into the practical realization of multispecies justice, exploring the validity and efficacy of legal instruments and policy tools that represent more-than-human beings in urban settings. Through an

interdisciplinary approach, the research aspires to contribute to the ongoing discourse on justice in urban greening, facilitating more inclusive and equitable urban transitions. By addressing these aims, the thesis endeavours to enhance our understanding of how urban nature can promote multispecies justice and foster sustainable urban development.

Research Questions:

1**. To what extent are urban greening initiatives in Mexico City ecologically just? How do humans and nature co-exist in the city?**

2. **How is multispecies justice governed in Mexico City within the urban nature perspective?**

1.5 Scope and Delimitations

The scope of this study encompasses a focused examination of Mexico City as a case study, acknowledging its status as one of the world's megacities characterized by urban sprawl and environmental challenges. Mexico City's comprehensive 'green plan' spanning 476 pages (Plan Verde, 2019), coupled with its designation of 50% of its area as protected natural areas and its pioneering declaration of the rights of nature in 2017(Constitution, 2017), renders it a compelling subject for investigation. This research justifies the selection of a single city as a case study due to its significance within the broader context of urban environmental management and nature-based solutions (NBS). By delving into the nuances of Mexico City's progressive legislation for nature conservation in contrast to the federal government's stance, this study aims to extract valuable insights that may have informed and inspired similar initiatives in other cities across Mexico (Colima, Guerrero, Oaxaca) and Latin America (Earth Law Center, n.d.). The temporal scope of the study extends over the past 10 years, but more specifically in the past 5 years (2019-2024), as this was the time delimitation for the Green Plan of the current government of CDMX. The research acknowledges the importance of urban blue spaces, habitats, and infrastructure to MSJ in CDMX, but focuses on urban greening due to practical constraints, including a limited timeframe of one month for fieldwork and interviews. Through on-the-ground site visits, interviews, event attendance, and thorough analysis of grey literature, this study seeks to illuminate and amplify the often-overlooked perspectives and needs of diverse species and ecosystems within the urban landscape. Additionally, while the primary focus remains on Mexico City, relevant examples of NBS from other contexts are drawn upon to enrich the discourse surrounding multispecies justice and urban greening. By amplifying indigenous and local knowledge systems and agency, this research seeks to foster a more equitable and just approach to NBS implementation and governance (Sekulova et al., 2021a).

1.6 Audience

The anticipated findings of this research project hold the potential to shape novel ideas and visions regarding green urban planning, offering alternative perspectives on just governance of/governing with nature in urban environments.

These findings are particularly relevant to NBS practitioners, including NGOs and urban planners, who can benefit from new perspectives and practices. Moreover, the insights generated can be crucial for the local communities residing in these cities, contributing to enhanced representation, and fostering a deeper understanding of justice dimensions within NBS. Also, the research will add to the scholarship of more-than-human life in urban environments, hopefully facilitating interspecies cohabitation as well as the improvement of the human-nature connection in urban environments. The anticipated outcomes align directly with

the research problem by shedding light on dimensions of justice that have been underexplored, providing a comprehensive understanding of the intricate dynamics within urban landscapes undergoing green transitions.

1.7 Disposition

The thesis follows a logical structure which is outlined below:

Chapter 1: The *Introduction* gives the reader an overview of the topic and research problem, further outlining the aim, research questions, scope and case study, and audience.

Chapter 2: The *Methodology* explains the research design and strategy used by the author to collect and analyse the data necessary to answer the RQs. It also gives an overview of the limitations of the chosen methodology and sets out the ethical guidelines followed throughout the thesis.

Chapter 3: The *Literature Review* provides a thorough, up-to-date analysis of the existing literature on different aspects of environmental justice, urban greening, urban planning and the Rights if Nature Movement. It also gives on overview of existing related literature specific to the case study of CDMX.

Chapter 4: The *Conceptual framework* presents the author's analytical framework on Multispecies Justice and Governance, amalgamating various theories and concepts found during the *Literature Review*. This framework is used to analyse the findings in the subsequent chapter.

Chapter 5: The *Case Study Analysis* presents the findings from the interviews, field observations, and grey literature, analysing them according to RQ1 and RQ2 using the Conceptual Framework.

Chapter 6: The *Discussion* discusses insights from the findings and connects them to the existing literature. In addition, it considers the theoretical and practical limitations of the study, whilst also highlighting its contribution.

Chapter 7: The *Conclusion* summarizes the main conclusions of the thesis concerning the two RQs. It also provides practical policy implications of the findings and suggests areas for future research.

2 Methodology

This chapter provides an overview of the research design, materials and methods employed in this thesis. *Section 2.1* presents general information about the overarching research design, with the following section providing more details about the Case-Based Research Design (*2.2*). Section 2.3 goes into details about data collection, and data analysis. Section 2.4 outlines the limitations of the methodology as well as the validity and reliability of the findings and Section 2.5 sheds light on the ethical considerations which were adhered to throughout the research process.

2.1 Research Approach

To achieve the aim of exploring how multispecies justice is enacted in practice, the research adopts an exploratory qualitative case-study approach (Bellamy, 2011; Priya, 2020). The iterative research design (*Figure 1*) began with defining the problem through readings, general knowledge, and personal interest and experiences.

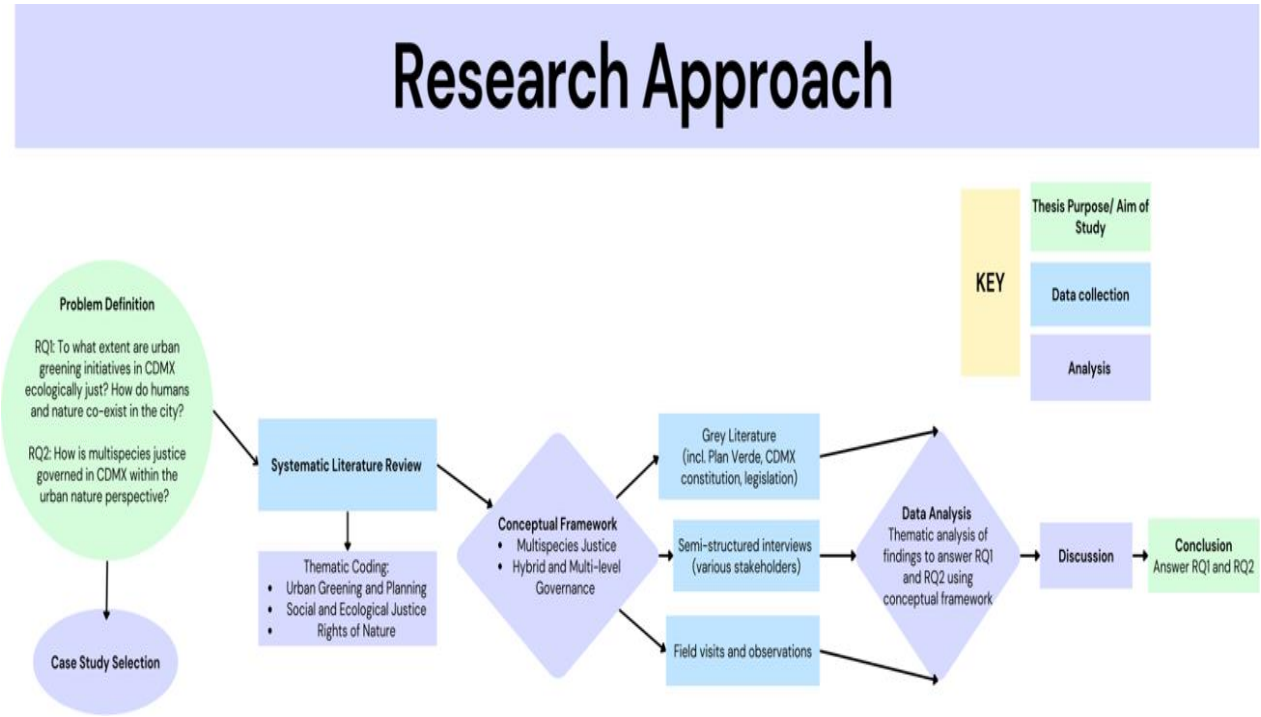


Figure 1. Research Approach and Steps. Source: Author.

The selection of Ciudad de México, Mexico City (CDMX) as the case study for this research is justified by its significance as a megacity facing complex urbanization challenges and its proactive stance towards environmental conservation and sustainability. Two research questions were formulated which were used to guide the study, empirically and theoretically.

The first step involved a systematic literature review to understand the current state of knowledge in the related topics. The initial search terms returned 1545 articles, out of which 140 were selected after initial screening (see *Section 2.3.1* for detailed description). These were then grouped thematically according to emerging themes (see *Section 2.3.1*). In addition, the *Literature Review* was used to inform and create a *Conceptual Framework* to sort and analyse the findings from the data collection, which included grey literature, interviews, and field observations (see *Section 2.3* for more details). The collected data was analysed through the

conceptual framework to comprehensively answer the two RQs. These findings were then compared to the knowledge from the literature in the *Discussion*. The RQs were answered in the *Conclusion*.

2.2 Case-Based Research Design

A single case study methodology was chosen for this research due to its suitability in capturing the richness, complexity, and nuances of socio-ecological life in an urban environment, particularly in the context of multispecies justice and urban greening initiatives in Mexico City (CDMX). Case-Based Research (CBR) focuses on understanding the interactions between various factors within a case, allowing for a holistic conception of social phenomena. CBR is especially useful for exploring the dynamics and interactions within a specific context, as it seeks to understand effects that emerge in complex ways from the interplay of multiple variables, rather than isolating individual factors (Bellamy, 2011). This methodology enables a comprehensive examination of CDMX's unique initiatives and policies related to urban nature and multispecies justice.

One key reason for selecting a single case study design is the intrinsic interest and significance of the subject matter. Mexico City is particularly notable for its proactive environmental policies, including the incorporation of Rights of Nature (RoN) legislation in its own constitution, a stance that contrasts sharply with the national government's anti-environmentalist ethos. This unique positioning makes CDMX an exemplary case for in-depth study. The city's initiatives serve as a model for understanding the factors that contribute to successful urban greening and multispecies justice, providing insights that can inform similar efforts in other urban contexts. Additionally, CDMX provides a valuable opportunity to explore perspectives from the Global South, which are often underrepresented and under researched in environmental justice studies, especially concerning multispecies justice. This case selection aims not to develop new theory but to illuminate undervalued perspectives, integrating local and practitioner insights to enrich the discourse on urban greening and justice. The diverse range of stakeholders involved in CDMX's environmental initiatives, from policy makers to local community members, provides a broad spectrum of perspectives, enhancing the depth and relevance of the study.

CBR methodologies employ a wide range of data, from various sources. This approach is essential for capturing the multifaceted nature of the study, including the presence or absence, strength or weakness of various factors such as time, information, conscience, and trust (Bellamy, 2011). The goal is to develop a nuanced understanding of how these factors interrelate and influence urban greening efforts and justice outcomes. To achieve this, I employed diverse data collection methods, including interviews, participant observations, field visits, and document analysis. This open-ended approach (Bellamy, 2011) allowed for the identification of additional relevant factors that might emerge during the research process.

By focusing on a single, well-defined case, this research aims to offer detailed, context-specific insights that contribute to the broader understanding of urban greening and justice, highlighting the importance of integrating diverse perspectives and addressing complex social and environmental interactions.

2.3 Methods for Data Collection and Analysis

A variety of methods were used to collect data, including a systematic literature review, 15 stakeholder interviews, and observations from 4 site visits (Milpa Alta, Xochimilco, the Great Water Forest, Axolotitlan) and 2 events (IUCN Forum and Sin Maiz no Hay Pais). Moreover,

when possible, data from interviews was triangulated and supported either with academic or grey literature.

2.3.1 Data Collection

Data was collected from numerous sources, including academic literature, interviews, field visits and observations, event attendance and observations, and grey literature collection.

Literature Review

The Literature Review consisted of two steps – firstly, to collect general literature related to the themes of the RQs, and secondly, to collect specific literature related to the case study of CDMX and justify the knowledge gap in this context.

For the systematic literature review, a comprehensive search was conducted using SCOPUS, employing keywords such as Urban Nature, Urban Greening, Green Infrastructure, Landscape Approach, Ecosystem-based Approach, Urban Forest, Green Space, Nature-Based Solutions, and Green City (*see table of search strings in Appendix VI*). Screening criteria were established to focus on articles addressing Environmental Justice, including social justice, and connected with More Than Human justice, encompassing Multispecies Justice, while also considering practical approaches to planning for justice. Specifically excluded were articles focusing solely on technical mapping related to gentrification and housing values, spatial inequality, housing and real estate valuation, as well as those delving into distributive justice exclusively for humans and gentrification. Articles with very specific topics such as park-going behaviours or in-depth analyses of certain aspects of urban greening were also omitted. Included articles primarily explored the benefits of human-nature contact, emphasizing human health and wellbeing in relation to nature and green spaces as a means of enhancing justice for both people and nature. Theoretical screening was conducted based on the landscape architecture approach, urban planning, and assemblages of NbS, ensuring a connection with justice. A literature matrix was used to sort through the literature, which was coded thematically according to the themes of the RQs.

Themes emerged, particularly focusing on articles where urban greening was employed as a strategy to advance environmental, social, and More Than Human justice, or where this connection was explicitly addressed or questioned. Additionally, grey literature was gathered through internet searches, primarily government websites and official plans. A literature review matrix in Excel was utilized to systematically thematically code the gathered literature, facilitating the organization and analysis of relevant articles based on predetermined criteria and themes. A total 140 of articles was used, the themes were: Urban Greening and Planning, Social/Ecological/Multispecies Justice, Rights of Nature (which were also all grouped into sub-themes of: literature gaps, conceptual notions, practical applications).

After a systematic review and search for papers connecting urban greening and environmental justice issues in CDMX, 56 documents were found, of which 14 were about CDMX specifically, of which 9 were relevant after the screening process. Of these, 7 articles focused on the relationship of people's socio-economic status to exposure to pollutants, especially air pollution (Grineski et al., 2016; Guibrunet et al., 2017; Islas-Camargo et al., 2022; Lome-Hurtado et al., 2020; Mahady et al., 2020; Ortega Montoya et al., 2021; Romero-Lankao et al., 2013), and 2 were about socio-economic status and access to urban nature (Ayala-Azcarraga et al., 2023; Thornhill et al., 2022).

The multispecies perspective in Mexico City was also underrepresented in the SCOPUS literature review. From the initial search, 4 articles out of 43 were relevant, of which only three were about CDMX specifically. Two were about increasing the city's resilience to 'natural disasters' of earthquakes and flooding through nature-based solutions (Soto-Montes-de-Oca et al., 2023) and disaster risk governance (Alcántara-Ayala et al., 2023). One article explored the disturbance of non-native species on the city's 'original' ecosystems, and found that there was a relatively high occupancy of non-native plants (>40%), mostly in 'specific patches of the reserve where *human*-made structures are present and where gardening activities take place', which has 'potential negative effects on native species'(Ramírez-Cruz et al., 2018).

Overall, the perspective of other species is underrepresented in academic articles about urban nature, and its connection to humans is not always explicit, as confirmed by this literature.

Interviews and Field Visits / Observations

The study employs an immersive approach centred around site visits, events, and on-the-ground practitioner interviews, aiming to understand their perspectives on the practical realization of multispecies justice in urban environments.

Data collection methods included on-the-ground site visits to various urban green spaces and nature reserves within Mexico City, allowing for direct observation and documentation of ecological features, biodiversity, and human interactions with these environments. In addition, semi-structured interviews with key stakeholders such as environmental policymakers, conservationists, community activists, and local residents were conducted to gather insights into the perceptions, challenges, and aspirations related to urban greening and MSJ (*see Appendix VIII for interview guide*). The selection of interviewees was purposeful, aiming to capture diverse perspectives and experiences relevant to the research questions. Initially the interviewees were found on LinkedIn, through social media, and through relevant websites. On the ground, the snowballing technique was used (*Snowball Sampling*, 2012).

Interviews were conducted with a range of participants, including: a Law Maker (LM), Nature Conservationists (NC1, NC2), Urban Planners (UP1, UP2), Landscape Architects (LA1, LA2), Traditional Agriculturists (TA1, TA2, TA3), an Animal Rights Lawyer (ARL), a Youth Initiative Founder (YIF), an Axolotl Private Sanctuary Founder (ASF), an Environmental NGO Founder (NF), and an Animal Rights Activist (ARA). In total, 15 interviews were conducted. The interviews lasted from 45-60 minutes and were recorded and later transcribed. During the interview, detailed thematic notes were taken to answer the RQs and the Interview Questions (see *Interview Guide in Appendix VIII*).

Embedded experience, or sense-making experience (Urquhart et al., 2024), was integrated into the methodology to provide researchers with firsthand understanding and immersion in the urban environments under study. Participant observation was also undertaken at events such as the *Sin Maiz No Hay Paiz* (Without Corn, There is No Country) (Sin Maiz No Hay Pais, n.d.) and the IUCN 2024 Regional Conservation Forum (IUCN Forum, 2024)to capture discourses and narratives, and themes emerging from discussions. Field visits to locations like Xochimilco, Milpa Alta, the Axolotitlan museum and Axolotl Sanctuary, urban vegetable gardens, and the Great Water Forest were conducted to gain firsthand experience of different urban greening initiatives.

2.3.2 Data Analysis

The research uses thematic analysis due to its flexibility and ease of understanding in analysing the qualitative data (Creswell & Creswell, 2022). This process involved 'identification, segmentation, categorization, and summarization of the data' (Creswell, 2022) to capture important concepts concerning the implementation of multispecies justice. Interviews were audio recorded (as agreed upon by the interviewees) and transcribed for later reference.

A literature synthesis matrix (Toronto & Remington, 2020) was used to sort the literature, which was coded thematically according to the themes of the RQs (see above). Qualitative data analysis techniques, including thematic coding and content analysis, were employed to systematically analyze the interview transcripts and observational notes. Thematic transcribing was conducted based on the literature matrix, emerging themes, and detailed notes from field visits and events. To ensure the validity and reliability of the interview findings, the research employed triangulation of data from academic literature, grey literature on legal and policy briefs. To analyse the interviews, the responses were structured according to the initial two RQs, and analysed based on the conceptual framework created by the author (*Page 18*).

The methodology and methods employed in this study are deemed appropriate for achieving the aim of the thesis, allowing for a nuanced exploration of multispecies justice within urban environments, through interaction with a diverse set of stakeholders and various sources of information.

2.4 Limitations, Validity, and Reliability

A notable limitation of this study is its reliance on SCOPUS for literature searches, which may introduce a bias toward English-language publications. Although SCOPUS does include Spanish articles, the use of a more comprehensive Spanish-language database could potentially provide a broader and more inclusive range of sources, particularly relevant for the context of Mexico City.

The qualitative nature of the research design presents several challenges. Qualitative data is inherently subjective, and there is a risk of bias during analysis. Efforts must be made to address and mitigate these biases to ensure the integrity of the findings. Conducting on-the-ground interviews also poses challenges related to resource intensity, including time, budget constraints, and the need to maintain consistency across diverse cultural contexts. While the depth of understanding gained from qualitative insights is invaluable, it may limit the generalizability of the findings, making them context-specific and not directly applicable to other urban environments.

Additionally, the study's reliance on qualitative data may hinder the ability to provide quantifiable measures of justice within Nature-Based Solutions (NbS). Future research could incorporate more quantitative data to enhance the robustness and generalizability of the findings.

Case-Based Research (CBR) offers deep insights into specific contexts, but it is limited in its ability to analyse large numbers of cases or handle vast volumes of data (Bellamy, 2011). This limitation means that the insights gained may be particularistic, and their relevance to other contexts or broader theoretical frameworks may remain uncertain. Despite this, the richness of data collected from a single case study can provide valuable, detailed insights into complex social

phenomena, offering a depth of understanding that broader, more generalized studies might miss.

As a qualitative researcher, the author's own experiences and background affected data gathering and analysis and shaped the results and findings. The positionality of the author is such that the author supports a decolonial approach as well as an increase of animal and nature rights, as well as the fundamental belief that everything, the social and ecological, are profoundly interconnected.

More theoretical limitations are considered in the discussion *(Page 48)*.

2.5 Ethical Considerations

Throughout the course of my research, I am committed to critically reflecting on and explicitly addressing ethical considerations in accordance with the ethical research standards set forth by Central European and Lund Universities. This commitment encompasses various facets of ethical conduct, including researcher honesty and integrity. The research process will maintain independence and remain uninfluenced by external organizations, ensuring that the researcher's autonomy is preserved, and bias is not introduced into the study, even in cases where financial support is provided through university grants. Additionally, a paramount ethical concern involves the responsibility to research participants. Informed consent will be diligently sought from all participants, clearly outlining the purpose of the study, the nature of their involvement, and the procedures for data collection and analysis, either orally or through written documentation (*see Consent Form in Appendix VII*). Participants will retain the right to withdraw from the study at any stage without facing repercussions. Confidentiality measures will be rigorously upheld to protect the privacy of participants, with collected data treated confidentially and personal identifiers anonymized or pseudonymized to prevent the disclosure of individuals' identities. All confidential information will be securely stored on a protected drive, accessible only to the researcher. Moreover, cultural sensitivity will be prioritized, recognizing the diverse cultural contexts of the study locations. Efforts will be made to understand and respect the local norms and values of the communities involved, ensuring that the study acknowledges and embraces the unique perspectives of each participant while striving to mitigate personal and structural biases and prejudice. By adhering to these ethical guidelines and maintaining transparency and reflexivity throughout the research process, the aim is to uphold the integrity of the research, safeguard the rights of participants, and ensure the reliability and validity of the study's findings.

3 Literature Review

This Literature Review delves into the key academic literature related to the Research Questions (RQs), particularly focusing on Urban Greening (*3.1*) and Multispecies Justice (*3.2*). Each section comprehensively explores of the themes central to the RQs.

Section 3.1 begins with a broad overview of the Environmental Justice (EJ) and Urban Greening literature (*3.1.1*), establishing the foundational context for RQ1, which investigates the ecological justice of urban greening initiatives in Mexico City. This sets the stage for a critical examination of the widespread absence of a Multispecies perspective in Urban Greening (*3.1.2*), directly engaging with the aspect of how humans and nature co-exist in the city as questioned in RQ1. The final subsection (*3.1.3*) addresses the inherent tension between social and ecological justice in Urban Greening, which is vital for understanding the complex dynamics that RQ1 seeks to unravel.

In Section 3.2, the focus shifts to Multispecies Justice (MSJ) with a discussion of the few recent examples in urban planning that incorporate MSJ (*3.2.1*). This serves as a precursor to exploring RQ2, which questions how multispecies justice is governed within the urban nature framework in Mexico City. The subsequent subsection (*3.2.2*) provides an overview of Urban Greening and MSJ in the specific context of CDMX, exploring existing literature directly related to this city's context. The review concludes with section *3.2.3*, which connects the Rights of Nature Movement with MSJ—a connection that is particularly significant in the context of Mexico City, as it provides a crucial theoretical and contextual framework for analysing RQ2.

3.1 Urban Greening

3.1.1 Environmental Justice and Urban Greening

The conscious inclusion of nature in urban spaces by urban planners is not a new thing (Benton-Short & Short, 2013). Indeed, cities have always had a relationship with nature, which changed as cities grew and industrialised, requiring more from nature, like water and food, whilst at the same time polluting it more, in air, water, and landfills. Throughout history, urban citizens have tried to manage this cycle in various ways, from 'light greening' efforts such as planting trees to absorb extra chemicals to extensive sustainability plans which incorporate ecological, economic, and equity principles in 'urban sustainability'(Benton-Short & Short, 2013).

Planning for green transitions in cities inevitably involves the notion of justice and power. Who gets to decide what these sustainable transitions look like? Who is in/excluded from visions of 'sustainability'? How will these newly designed cities be 'just' and 'equitable', and for whom? Various environmental justice scholars have been researching and theorizing exactly on these questions.

One common area of scholarship explores the issue of urban greening and gentrification, a process whereby ecological improvements of an area lead to rising living and housing costs, hereby displacing and excluding disadvantaged and vulnerable residents of a lower socio-economic background (Busà, 2022), who are forced to move out of their homes which have been in their families for generations. Such studies have been conducted in many regions of the world, including Europe, Asia, the United States, and to a lesser degree, Africa and Latin America (Li et al., 2021). In a systematic literature review of published research in international peer-reviewed journals, Tubino de Souza and Campello Torres (2021) analysed how environmental justice and green gentrification issues in relation to urban greening were mostly focused on the 'Global North'. They concluded that issues of justice in the implementation of

an urban green agenda in the Global South were at an 'initial stage in the international debate', and called for more research in this field 'in a heterogeneous Global South context while gaining insights from advances made by research on the Global North'(Tubino de Souza & Campello Torres, 2021).

In another systematic review of environmental justice implications of NbS in urban areas, Kato-Huerta and Geneletti (2022) found that articles addressed urban NbS from the recognitional, procedural and distributional interpretations of justice (for a comprehensive list of definitions, see *Appendix III)*, with a dominance towards the distributive dimension of justice. Other studies also explored the potential of NbS in creating just cities (Raymond et al., 2023), but still focused primarily on the human dimensions of justice, although sometimes briefly questioning the valuation of nature and its commodification in the NbS realm (Cousins, 2021). Only one article in the search explicitly underlined that environmental justice in NbS was highly anthropocentric and focused on 'social justice with no direct reference to the dimensions of ecological justice', even if there was 'an underlying recognition of the importance of nonhumans, ecosystem integrity and well-being, and a need to consider their needs and capacities through multispecies nature-based solutions design and planning' (Pineda-Pinto, Frantzeskaki, & Nygaard, 2022). This echoes wider criticisms of the mainstream Environmental Justice movement, and justifies the need for 'a more intersectional decolonial approach to environmental justice that recognises the indispensability of both humans and non-humans' and one that 'listens to the different 'senses of justice' and desires of theorists, activists, and other stakeholder from the Global South' (Menton et al., 2020).

One article by Murray et al. called for the need to integrate an Environmental Justice Lens into the One Health concept, by becoming aware of 'social inequities in environmental disamenities, exposures, and policy', and that there is a need for 'One Health solutions informed by environmental justice principles to help build healthier, more resilient cities' (Murray et al., 2022). Yet whilst this article was insightful, it also focused on the people-based environmental justice aspect.

3.1.2 The Multispecies Perspective in Urban Greening

Creating and planning green infrastructure and nature in the city ultimately involves decisions – where do we put nature, and what does nature in urban areas look like? What 'counts' as nature? It becomes imperative to bring up notions of justice when discussing urban planning. However, the notion of the central subject of justice in green urban planning – justice for 'nature', i.e. ecological or multispecies justice, is underdeveloped.

In an article which reviewed US urban forest management plans (UFMPs), Grant et al. (2022), found that more recent UFMPs included more environmental justice themes, and that whilst distributive and procedural justice were somewhat included, 'it was often brief and lacking in substance' and that 'recognitional justice themes were absent in almost all documents'(Grant et al., 2022). Yet even though these plans concerned urban forests, the primary focus of this 'justice' lens remained the human residents, with no mention of other species and ecosystems – they were not recognized as worthy of inclusion at all, not being included in recognition or in terms of their capabilities justice.

In a wide-ranging study which focused on the treatment of environmental justice and nature-based solutions in the Urban Climate Action Plans of Latin American metropolitan areas, Kato-Huerta & Geneletti (2023) reviewed the framing of environmental justice concerns and how these were translated into concrete strategies in 30 Latin American cities. They found that EJ concerns have become more prominent through the years, especially in larger cities (including

CDMX), but that these were 'rarely concretised into specific actions' and framed more as 'educational and capacity-building strategies' rather than 'policy interventions'. Interestingly, they found that most planning documents framed NbS in 'biodiversity conservation purposes, forgoing the opportunity to adopt the socially transformative potential of the term for enhancing sustainable and just futures'(Kato-Huerta & Geneletti, 2023). But is framing NbS for biodiversity purposes not contributing to justice, if seen from the multispecies perspective? Indeed, even this analysis framed EJ in anthropocentric terms, focusing on distributive, procedural, and participatory aspects from the human perspective. Even the sphere of biophilic design, though the name means 'love of life' centres on the 'health and well-being' (Panagopoulos et al., 2021) of human life.

Anguelovski et al. recognized the limits of 'examining urban green inequities' through the three traditional justice aspects and proposed a new framework which 'considers the needs, identities, and everyday lives of marginalized groups', by focusing on 'greening for well-being, care, and health and greening for recreation and play'(Anguelovski et al., 2020). Similarly, Shaoxu Wang and Kai Gu wrote a book on Spatial Justice and Planning, referring to themes like critical spatial consciousness (Wang & Gu, 2023). However, even these analyses centre the human and do not explicitly address the More Than Human perspective.

3.1.3 The Tension between Social and Ecological Justice in Urban Greening

Traditionally, in mainstream Western academia, there has been a perceived tension between human/social justice and ecological justice, most often manifesting itself as a dichotomy between choosing a better life for people and disadvantaged communities, versus conserving nature, as seen above (*Protecting Earth*, n.d.). Indeed, most literature focuses on justice for either humans or animals/nature, despite the general awareness that we are connected and live in the same world.

Li et al. (2021) identified the key gaps and trends in the NbS research landscape. They found that there was an increase in topics such as adaptive and hybrid governance of NbS as well as the incorporation of social justice in sustainability transitions (Li et al., 2021), but did not mention the place of other species and nature or ecological justice in this conception of governance and justice. They noted that there was an awareness of the linkages between NbS and Green Infrastructure (GI) with human wellbeing and public health, indicating the benefits of humans connecting with nature, a topic which has been well-researched and developed (Baumeister & Hornberg, 2016; Murray et al., 2022; Syrbe, Ralf-Uwe, Ina Neumann, Karsten Grunewald, Patrycia Brzoska, Jiři Louda, Birgit Kochan, Jan Macháč, Lenka Dubová, Petr Meyer, Jan Brabec, and et al., 2021), which this thesis will also build on.

When they identified future research areas, they called for (amongst other things) more research on the linkages of NbS and GI, the integration of NbS into urban planning, the evaluation of NbS 'from comprehensive and transdisciplinary aspects', which included socio-environmental justice (Li et al., 2021). In an earlier study on GI research in Europe, Chatzimentor et al. (2020) also called for more research on the social aspects of GI, and 'an explicit incorporation of both nature conservation and social-environmental justice goals in GI research to support sustainability transitions within and beyond the city'(Chatzimentor et al., 2020).

3.2 Multispecies Justice

3.2.1 Urban Planning for Multispecies Justice

More recently, there have been initiatives bridging the human and non-human worlds in the urban environment – the Hotspot Cities Project investigated whether and how conservation values and urban development can be symbiotic and how this can be explicitly reflected in the spatial planning of the city (Weller et al., 2021). The scholars concluded that urban design should be a 'process of compromise in which both urban logistics and the ecological imperatives perform as *a single system*, each adding value to the other'(Weller et al., 2021).

One study explicitly explored the possibility of planning ecologically just cities through integrating 'the needs and capabilities of nonhuman nature', specifically through applying the capabilities justice framework to ecosystems (Pineda-Pinto, Frantzeskaki, Chandrabose, et al., 2022). Other related ideas of ecologically just urban planning include using a MTH approach to urban design (Fieuw et al., 2022), as well as the concepts of landscape urbanism and critical urbanism. In landscape urbanism, the natural landscape is taken as the basis for 'working with natural processes for the benefit of socially and ecologically inclusive and thriving urban landscapes', recentralising the biosphere as the context for social and economic development (Nijhuis, 2022). This approach integrates urban development with the 'preservation of biodiversity, water resource management, improved leisure facilities, community building, stronger cultural identity and economic development' through developing 'robust landscape structures'. Not only is this cheaper and more energy efficient, it is also 'critical for water supply and retention', can mitigate 'flood protection', and 'hosts many ecosystem functions like soil formation [and] nutrient cycling' (Nijhuis, 2022), regulating natural cycles and provisioning food and water. There is also a recognition of the relational aspects humans have with the landscape, including cultural services like spiritual, aesthetic, physical and mental health (Nijhuis, 2022). Indeed, landscape urbanism integrates the social and the ecological aspects in a practical manner, by providing physical manifestations and structures to be used for the benefit of all. Interestingly, Nijhuis conceives the landscape as 'a living system', an 'interface between nature and society which manifests itself in a material space made up of both structures and processes'. Also, he mentions that for this kind of design, traditional ecological knowledge and local knowledge are key (Nijhuis, 2022).

Critical urbanism questions landscape urbanism, suggesting that seeing nature as infrastructure is anthropocentric and inherently political, that it can be 'built, invested in, made functional, and managed', the emphasis being placed on nature's 'functions, benefits, or services' (Carse, 2012), rather than its inherent value. In a more recent article analysing oyster reef restoration as a risk management solution in New York City, Stephanie Wakefield (2020) questioned 'natural' infrastructures, emphasising that these actions are humans 'harnessing' and 'ordering' nature in a biopolitical Foucauldian manner, rather than harmoniously living with it and letting it be an autonomous agent on its own. Wakefield (2020) sees this practice as 'neoliberal and anthropocentric', and one that relies on the 'commodification and financialization of nature', that it is 'humans trying to make nature live in a particular way—not according to a social norm, but in the way they imagine is natural'(Wakefield, 2020). It is thus important to keep these views in mind when critically examining the contribution of landscape-based urbanism to multispecies justice.

Through a multispecies justice perspective, this thesis hopes to add to this discussion, uniting concepts such as NbS and GI by seeing them as manifestations of 'urban nature', and creating space for a conception of this nature that is relational, rather than the dominant transactional and dominatory, colonial neoliberal capitalist discourse which focuses on the 'biopolitical'

control of and harnessing, commodification and financialization of nature (Wakefield, 2020). Of course, these perspectives co-exist in our pluriversal world (Escobar, 2015), but the perspective taking the multispecies justice perspective when talking about urban nature is clearly underrepresented and under-theorised, as this literature review has shown.

3.2.2 Urban Greening and Multispecies Justice in CDMX

Overall, the perspective of other species is underrepresented in academic articles about urban nature in CDMX, and its connection to humans is not always explicit, as confirmed by the initial screening of literature (*Section 2.3.1*), which yielded very few relevant articles, none of which *combined* the themes or urban greening and multispecies justice.

Additionally, there has been a lot of attention as to how good European cities are at developing sustainability plans (Benton-Short & Short, 2013; *The 100 Climate-Neutral and Smart Cities by 2030 - Eurocities*, 2022), with cities like Copenhagen, Vienna, and Amsterdam frequently being mentioned in the World's Top Greenest Cities (DGB Group, 2023; Earth.Org, 2022; Jaynes, 2022). Only occasionally in such rankings do non-European cities like Singapore and Curitiba, Brazil come up, with little mention of any Latin American countries at all.

Some scholars have rightly noted that 'our current urban knowledge is predominantly shaped by research on and from the global north'(Nagendra et al., 2018), and indeed, between 2015-2020, perspectives (in the form of scientific papers) of the Global South on urbanism and NBS were greatly underrepresented (*See Map in Appendix V*), with no literature within Mexico being identified at all (Li et al., 2021).

3.2.3 The Rights of Nature Movement and Multispecies Justice

The Rights of Nature Movement started in 1972, when the Southern California Law Review published Christopher Stone's article, "Should trees have standing – toward legal rights for natural objects" (Stone, 2010) in which he described the anthropocentrism of the traditional law system and how nature is 'rightless' but that this 'can and should change', as it changed with the commencement of human rights, the rights for women, children, marginalised communities, and people of colour (Stone, 2010). Whilst declaring legal rights for the oppressed does not automatically resolve structural violence and inequalities, it does provide a discourse through which to tackle injustice, creating norms and values for a more just world.

Throughout the decades, the movement has gained momentum, to the extent that some countries, most notably Ecuador in 2008 (The Ecologist, 2020) and Bolivia in 2010 (Australian Earth Laws Alliance, n.d.) incorporated the Rights of Nature in their legal systems. Moreover, the UN General Assembly issued several Resolutions and reports on Harmony with Nature, recognising humankind's interdependence on nature and non-human entities(United Nations, 2019), and on April 22, 2024, held the first 'Earth Assembly' (Universitat Rovira i Virgili, 2023).

In 2017, after political reforms which made Mexico City its own entity as the other 31 states of Mexico, the city's new Constitution included a Rights of Nature Law (Constitution, 2017). This included the recognition and regulation for 'broader protection of Rights of Nature formed by all its ecosystems and species as a collective entity subject of rights', 'the right to the preservation and protection of nature', and the 'restoration of the ecological balance, with the aim of satisfying the environmental needs for the development of present and future generations'(Anima Mundi Law Initiative, 2021). Indeed, after the drafting of this constitution, Mexico City held the First International Forum for the Rights of Mother Earth in 2016, and the

resulting report concluded that 'Mexico has gained significant legal steps to shift from an anthropocentric to a biocentric view' (First International Forum for the Rights of Mother Earth, 2016).

Indeed, declaring the rights of nature does seem like a promising step towards a just urban future which includes multispecies justice in theory, but what is it like in practice?

Escobar sees this movement as part of transitions to a more ecocentric world (Arturo Escobar, 2018), but to what extent is this truly a transition that ensures multispecies justice? In an article assessing Inter-American approaches to the Rights of Nature, the Secretary at the Mexican Supreme Court of Justice and Advisor to the Chief Justice concluded that 'a direct mechanism for the protection of environmental rights and the Rights of Nature in Europe is necessary in order to confront the grave climate and pollution crises facing the Planet', implying that this approach has great potential to tackle our current crises(Calderón-Gamboa, J., & Recinos, J. D., 2022).

This requires us to look at how this law has been implemented in CDMX in practice, and to what extent humanity is living in harmony with nature because of such legislation. A multispecies justice lens will allow us to assess just how well this law is implemented in practice, taking urban greening and nature protection initiatives in CDMX as case studies.

4 Conceptual Framework

This chapter creates the conceptual framework (*Figure 2*, below) through which to analyse the findings of the thesis, using theories and concepts encountered throughout the literature review.

4.1 Theorising Multispecies Justice

Overall there is a tension or lack of conversation between the overlap of social and ecological justice in environmental justice literature, even though the original declaration of EJ emphasized our ecological unity and interdependence with all components of the planet (Schlosberg & Collins, 2014), a concept that has its roots in Indigenous thought and scholarship (Mascarenhas, 2021; Murray et al., 2022). Indeed, even the head of the Mexican Environmental Commission of CDMX SEDEMA, Marina Garcia Robles, indicated that the two are profoundly interlinked, declaring that the environment cannot get better without social justice (IUCN Forum, 2024). Certainly, the idea that 'functioning environments are a necessary condition for the fulfilment of other, intersectional justices – like environmental justice, social justice, and racial justice' (Chao et al., 2022), is echoed by many, in academia and in practice (MGR, IUCN Forum, 2024).

Although there have been frameworks acknowledging the interconnectedness of the human and 'non-human' spheres, not many have explicitly connected the two in terms of justice. Thus, the premise of this thesis is based on the concept of *multispecies justice* – that is, justice for multiple species, both human and non-human, as justice for one means justice for many. Just as systems of oppression are connected and reinforce each other, so do systems of liberation. This builds on the idea of intersectional justice, acknowledging the 'intergenerational legacies of colonialism and racism'(Chao et al., 2022) which are so intricately tied with our predominantly speciesist worldview. This is why one of the lenses this study takes is that of decolonialism, through 'centring concerns and world views of non-Western individuals, and respectfully knowing and understanding theory and research from previously "Other(ed)" perspectives'(Thambinathan & Kinsella, 2021), through the inclusion of citizens, professionals, and traditional agriculturalists who work and live the realities of CDMX life (see *Methodology*).

The main concept of multispecies justice is based on 'Western continental philosophy and political theory related to rights and capabilities', through considering the 'physical, psychological, emotional, and cognitive well-being of animals, as well as their social relationships and ecological interdependencies'(Chao et al., 2022). Ultimately this stems from indigenous philosophies and worldviews such as animism and kinship, which acknowledge the agency of non-human beings (Athope, 2021; Martinez et al., 2023; Snodgrass, 2008). The framework (*Figure 2*) is aware also of distributive justice theories which is related to the experience of urban nature in the city, as mentioned in the literature review, as well as recognitional and procedural justice, but looks at these from the underrepresented perspective of non-human beings (for these interrelated concepts and perspectives which inspired the MSJ approach, see purple icons in *Figure 2*).

The main reason for taking the multispecies justice lens is with the aim of combining social and ecological justice, which traditionally have been analysed separately in environmental justice literature (Beretta, 2012). In other disciplines like epidemiology and ecology, the human and non-human spheres have been brought under one theory, with the One Health Approach (World Health Organization, 2024) and Socio-ecological systems (Science Direct, n.d.) respectively. This framework builds on these ideas, adding the environmental justice angle (for a comprehensive set of definitions see *Appendix III*).

To analyse the extent to which MSJ is achieved, the theories of capabilities, recognition, and intersectional justice will be used. Capabilities signify 'the elements that enable life to function in a state of wellbeing, not only for individual species, but ecosystems or ecological entities', but also 'about ensuring that capability thresholds for human and nonhuman individuals and systems allow both to flourish'. This can be done by not only ensuring access to healthy habitats, but also taking actions that create opportunities for flourishing and cultivate spaces for choice that allow life to flourish (Nussbaum, 2009; Pineda-Pinto, Frantzeskaki, Chandrabose, et al., 2022).

Such an approach has been used recently in the newly developed Ecologically Just Cities Framework, which 'demonstrates how the needs and capabilities of nonhuman nature can be embedded within transitions to multi- and interspecies relational futures that regenerate and protect urban social-ecological systems (Pineda-Pinto, Frantzeskaki, Chandrabose, et al., 2022). This approach 'considers the nonhumans in order to plan and design cities that can deliver nature-based benefits, both to humans and nonhumans. This will require different types of analysis and new ways of understanding that challenge our relation to nonhuman nature from one of services and benefits to humans, to one of stewardship, care, respect and active representation'. This 'working framework' seeks to shift nature-based planning from purely anthropocentric 'enhancement and harnessing of NBS', to 'restitution, reparation and redistribution of benefits through NBS for the multiple life forms that inhabit urban territories' and through using NbS to 'enhance and expand ecosystem and nonhuman natures' capabilities'(Pineda-Pinto, Frantzeskaki, Chandrabose, et al., 2022).

The capabilities of non-human life forms (green icons, *Figure 2*) will be evaluated based on predetermined parameters, namely freedom of movement, availability of food and water, and living space/habitat availability. This approach is justified by the recognition that non-human life forms, integral components of urban ecosystems, possess inherent rights to sustain their well-being. Assessing their capabilities through these parameters enables a comprehensive understanding of their living conditions within urban environments. Freedom of movement reflects the extent to which non-human organisms can navigate and access diverse habitats, essential for their ecological functioning and survival. Availability of food and water directly impacts their nutritional intake and hydration, crucial for maintaining physiological functions. Additionally, evaluating living space/habitat availability acknowledges the significance of suitable environments for species-specific behaviours, reproduction, and overall population health. Also, recognition justice will be analysed (blue circular icons, *Figure 2*), specifically in the argument on native species versus invasive, as well as the extent of the inclusion of local traditional ecological knowledge in urban nature governance. By employing these parameters, this analysis aims to shed light on the nuanced dynamics of multispecies justice and highlight areas for improvement within urban greening initiatives.

Yet whilst the primary focus of the thesis will be on the underrepresented non-human perspective, the human perspective will be included by default, as the holistic multispecies justice approach accounts for both sides. Indeed, designing cities so that they enhance human–wildlife interactions can increase co-benefits (Apfelbeck et al., 2020). This relates to the intersectional justice approach discussed earlier, which examines 'the overlapping and interdependent systems of disadvantage and oppression that restrict people's [*and the MTH*] adaptive capacity and create new or exacerbate existing social-ecological vulnerabilities ([*own addition*], Djoudi et al., 2016; Kaijser and Kronsell, 2014 from (Amorim-Maia et al., 2022) and circles back to the central idea of the thesis that we can, and should, aim to live in harmony with all living beings. As all interviews were conducted with humans, and related documents written by them, their perspectives on urban nature and multispecies justice will be represented, albeit analysed from a critical, anti-speciesist, decolonial perspective this thesis hopes to achieve.

4.2 Governing Multispecies Justice

To analyse the manifestation of MSJ in CDMX, two frameworks will be combined. To account for the wide array of stakeholders involved in the governance of urban nature, the multi-level governance approach will be used (bottom left, blue rectangles, *Figure 2*). 'Governance' here means 'the relations between municipalities, regional authorities and national governments (vertical co-ordination) and between different agencies and policy divisions within municipal governments (horizontal co-ordination)', in a manner where power between these entities is 'dispersed' (Bulkeley et al., 2009). Indeed, 'a perspective informed by multilevel governance can examine the ways in which urban sustainability is being constructed and contested at a variety of scales of governance and through multiple political spaces' (Harriet Bulkeley & Michele Betsill, 2005). Likewise, 'polycentric governance allows one to bring together multiple actors engaged in the provision and consumption of collective goods', and 'the interplay of multiple interdependent but autonomous individual and collective, public, private, and civil society actors operating on and across different scales', and that 'a configuration of individual and group actors [can] self-organize to cater for the particular demands of a collective' through this governance model (Thiel, 2023). This will be combined with the parallel concept of hybrid governance (bottom right, blue rectangles, *Figure 2*), which refers to 'a type of governance where policy makers collaborate with non-public actors such as businesses, citizens and NGOs'(Toxopeus et al., 2020). All these concepts are interrelated and overlap, the main aspect is that these theories acknowledge that governance of urban nature occurs at various levels and numerous stakeholders are involved in decision making, maintenance, and management of urban nature, and are thus implicated in MSJ in the city.

4.3 Theoretical Limitations

There are two main limitations to this framework that need to be addressed. Firstly, justice, especially multispecies justice, is not a universal, fixed concept, and will inevitably be 'for some worlds more than others'(Chao et al., 2022), and informed by a specific place, context, and worldview. Hopefully, the 'world' this multispecies perspective hopes to add to, is one where humans and more-than-humans live in a more connected, harmonious, and aware manner. Whilst it may seem idealistic to some, I argue that hope is one of the most powerful forces that can mobilise our human species towards building a better world, creating a better Anthropocene. Indeed, it is also the start of the conversation, and recognises that 'multispecies justice is anchored in the ongoing practice of being open and alive to the generative possibilities of each encounter'(Chao et al., 2022). Secondly, the thesis will be anthropocentric by default, being written and theorised and commented on by humans in the way we see and perceive the natural world, which may not be 'fully present, individuated, and autonomous subjects' (Chao et al., 2022) we perceive them and ourselves to be. Here, I invite us to embrace the 'grey' area of relationality, to be open to 'differently embodied, situated, and entangled beings'(Chao et al., 2022), including our own species.

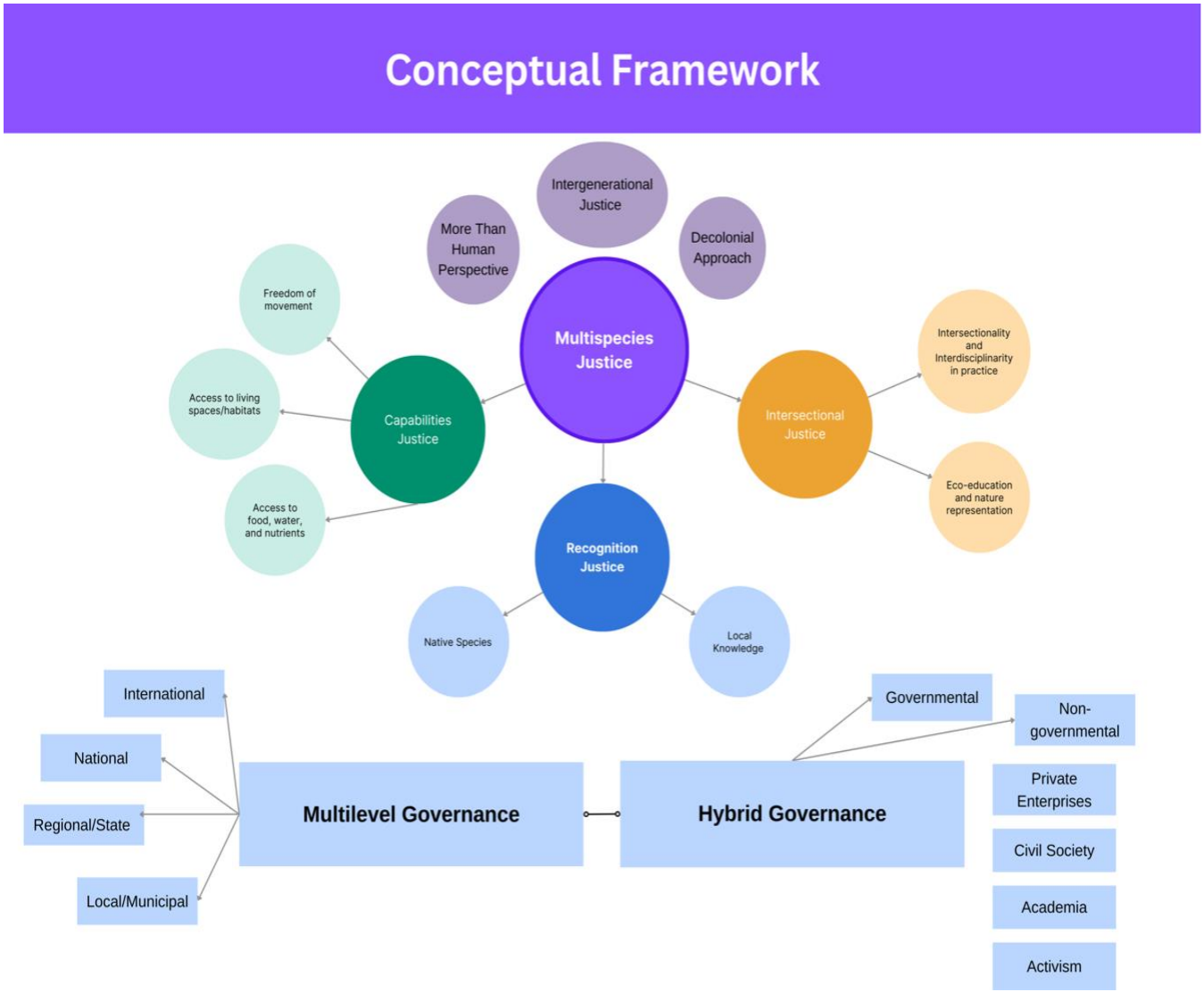


Figure 2. Conceptual Framework for Analysis. Source: Author.

5 Analysis of Mexico City Case Study

The analytical approach involves a thematic organization of empirical findings and data collection aligned with the initial two research questions. The findings from interviews and field visits will undergo a rigorous exposition supported by academic and grey literature, integrating analytical insights within the conceptual framework (*Figure 2*). This framework will serve as a lens and structure to evaluate the efficacy of urban greening and urban nature initiatives in advancing multispecies justice within the context of Mexico City (CDMX), with particular emphasis on **capabilities, recognition, and intersectional justice,** as visualised in *Figure 3*. Through examining these related conceptual parts and going deeper with some concrete examples, including a deeper analysis of some concepts like Protected Areas, Biodiversity and Pollinators, and Food Sovereignty (*Figure 3*) - *Section 5.1* answers RQ1. While acknowledging other modalities of justice (*Appendix III*), this analysis prioritizes the examination of these types of justice to allow a particular focus on the more-than-human dimension. *Section 5.2* answers RQ2, delving into the governance aspect of MSJ in CDMX, and using multilevel and hybrid governance models as analytical structures (*Figure 7*). The summaries of the answers to RQ1 and RQ2 are covered in the conclusions in *Chapter 7*.

Figure 3. Overview of Ecological Justice in the Plan Verde. Source: Author.

5.1 Ecological Justice in the 'Plan Verde'

The primary materials for analysis in Section 1, which answers RQ1, include the CDMX 'Plan Verde' Urban Greening Plan spanning 2019-2024 (Plan Verde, 2019). This document serves as a foundational text for evaluating the ecological justice and sensitivity of urban greening initiatives in Mexico City. Additionally, supplementary data will be drawn from the insights and lived experiences of interviewees, predominantly consisting of landscape architects and urban planners. Complementing these perspectives are firsthand observations of the urban landscape in CDMX. Furthermore, this analysis will be enriched by referencing appropriate academic and

grey literature, providing theoretical frameworks and empirical evidence to contextualize and validate the findings.

RQ 1. To what extent are urban greening initiatives in Mexico City ecologically just? How do humans and nature co-exist in the city?

The Greening Plan of Mexico City derives its foundation from the constitutional guarantee of the right to the city, ensuring full and equitable access based on principles of social justice, sustainability, and respect for nature. Emphasizing the right to a healthy environment, the plan commits to safeguarding ecological balance and promoting citizen participation in environmental preservation.

It adopts a landscape approach, recognizing the significance of natural elements (topography, microclimates, temperature) and prioritizing safety considerations such as seismic resilience, flood risk, and landslide susceptibility (*Figure 4*). Central to its vision is the concept of Green Infrastructure, reflecting a paradigm shift towards integrating artificial and natural components within the urban fabric. It sees 'green and blue spaces' as 'backbone elements' and explicitly moves away from the 'traditional urban vision, which has sometimes tended to consider the city and nature as opposite and exclusive elements' (p. 8, Plan Verde, 2019).

The plan emphasizes the interconnectedness of urban elements and aims to enhance sustainability through the four principles of connectivity, accessibility, functionality, and resilience. The footnote in the introduction reads 'All the elements that make up the city (territory, environment, economy, infrastructure, society, government, etc.) are *interconnected* for it to function. […] None of them is independent, they cannot decide actions in isolation (without consulting another agency) because then they do not form the city.' (*own emphasis*, p6, Plan Verde, 2019).

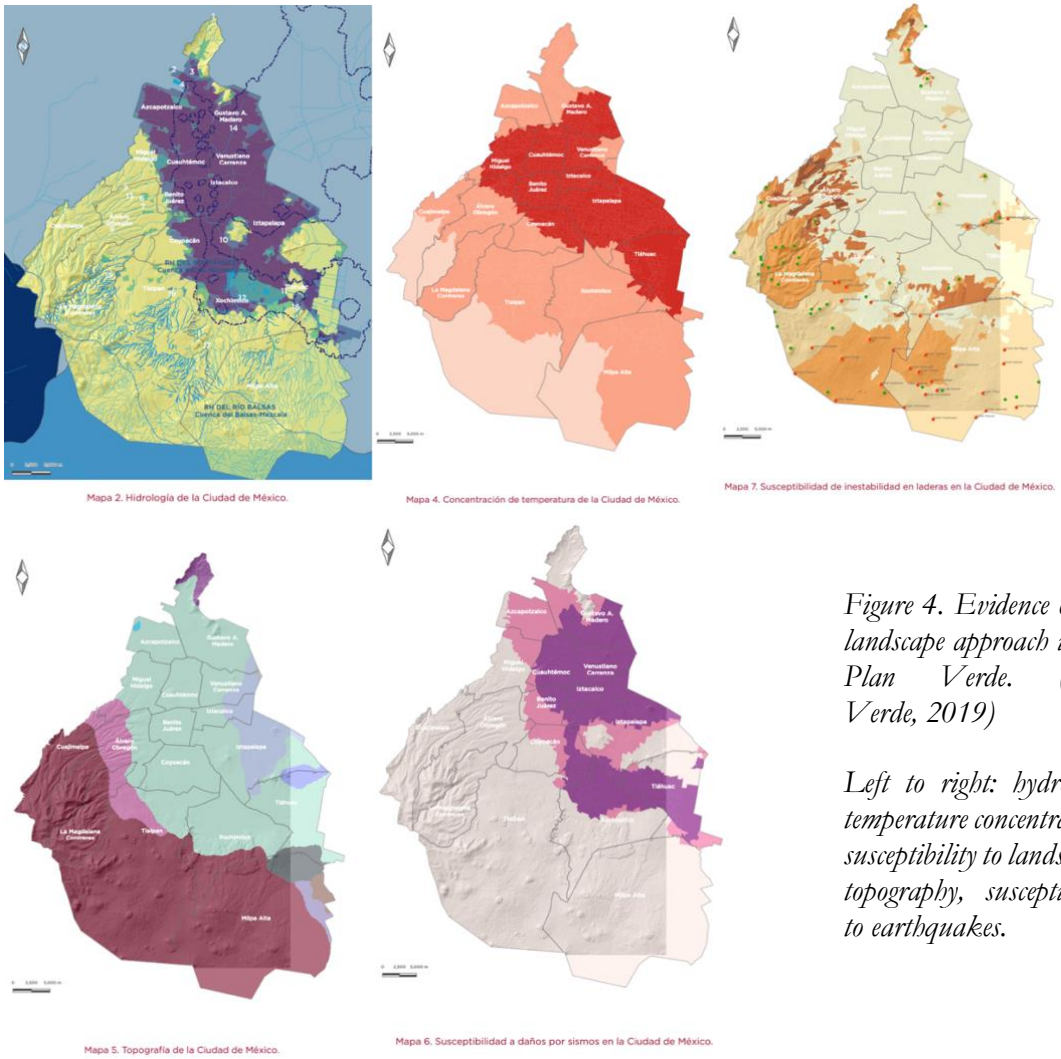


Figure 4. Evidence of the landscape approach in the Plan Verde. (Plan Verde, 2019)

Left to right: hydrology, temperature concentration, susceptibility to landslides, topography, susceptibility to earthquakes.

By enhancing green and blue spaces, the plan seeks to mitigate climate risks, conserve biodiversity, and improve citizens' health and well-being. It prioritizes reversing imbalanced urban growth by regenerating rural areas, increasing green spaces, and reforesting existing ones. The plan's zoning approach analyses socio-environmental indicators such as social cohesion and habitat provision across various zones, emphasizing functionality over mere aesthetics in landscape architecture.

5.1.1 Capabilities Justice Perspective

This section will assess the capabilities of non-human life forms using specific criteria: freedom of movement, access to food and water, and availability of suitable habitats. This approach is justified by the acknowledgment of non-human organisms' intrinsic rights to maintain their well-being within urban ecosystems. Evaluating their capabilities through these parameters provides a comprehensive understanding of their living conditions in urban environments. Freedom of movement indicates the extent to which non-human organisms can traverse and access diverse habitats, essential for their survival and ecological functioning. Assessing the availability of living spaces/habitats recognizes the importance of suitable environments for species-specific behaviours, reproduction, and overall population health. The availability of food and water directly impacts their nutritional intake and hydration, crucial for sustaining physiological processes.

a) Freedom of Movement

The Greening Plan underscores the importance of freedom of movement for non-human life forms by emphasizing connectivity as a fundamental principle. It advocates for the development of a Green Infrastructure System aimed at 'rebuilding Mexico City's ecological network', particularly focusing on establishing 'pollination corridors' (Plan Verde, 2019). These corridors, delineated geographical spaces, facilitate connectivity between landscapes and ecosystems, ensuring the preservation of biological diversity and ecological processes. Specific initiatives include the creation of linear parks and green corridors, converting interstitial areas between roads into green spaces to enhance ecological connectivity. From my own field observation, most roads within CDMX had green spaces around and between them (*see Appendix I*).

The significance of trees and plants emerges as a central theme in discussions surrounding urban greening initiatives. Notably, recent reports highlight a substantial increase in deforestation (Polavarapu, 2023), contributing to concerns about rising temperatures and increased vulnerability to heatwaves (Pelaez-Fernandez & O'Boyle, 2024). Efforts to address this deficit involve a deliberate selection of tree species, including local Mexican varieties as well as the adaptive Mediterranean lavender and rosemary, alongside a diverse range of species recommended in SEDEMA's booklet on city plants(Gobierno de la Ciudad de México, n.d.-b). Landscape Architect 2 (LA2) underscores the importance of urban taxonomy in understanding tree pests and diseases, emphasizing the need to recognize and revalorize the identities of these species, often overlooked despite possessing medicinal and nutritional properties. Testimonies from Nature Conservationist 1 and Urban Planner 1 further illustrate the tangible benefits of increased greenery diversity in urban areas, including improvements in air quality and aesthetics, as well as resilience to plant plagues (NC1; UP1). Moreover, insights from Marina Robles highlight the interconnectedness of trees, stressing the importance of planting trees in communities rather than solitary settings to facilitate optimal functioning in terms of humidity and nutrient cycling (MGR, IUCN Forum, 2024). These findings underscore the multifaceted role of trees and plants in urban ecosystems and emphasize the importance of strategic planning and community involvement in urban greening efforts.

The Plan also prioritizes the creation of pedestrian and bicycle corridors embedded with green areas to promote the movement of and interaction between people, fauna, and flora. It proposes a methodological approach analysing spatial distribution of green areas in conjunction with other urban infrastructure elements like educational and recreational facilities. This analysis categorizes elements into Cores, Nodes, and Connectors (*Figure 5*). Cores comprise spaces with high naturalness and conservation levels such as Protected Natural Areas and Urban Forests, while Nodes denote green spaces within the city that serve as foundational components of the urban green system. Connectors, linear elements like cycle paths and rivers, facilitate linkage between core elements and nodes.

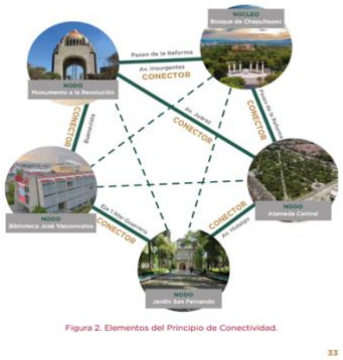


Figure 5. Visual representation of connectivity in the Plan Verde. (Plan Verde, 2019)

Overall, these strategies underscore the Plan's commitment to enhancing ecological connectivity within urban landscapes, ensuring the free movement of non-human life forms while also promoting environmental sustainability and human well-being. From a One Health perspective, more interconnected green spaces also help to regulate disease transmission. As Murray et al. (2022) point out, when 'forest fragments become smaller, they can paradoxically sustain greater numbers of a major tick host, the white-footed mouse (*Peromyscus leucopus*), possibly due to a lack of predation or an abundance of forest-edge habitat' (Murray et al., 2022). Higher biodiversity in the city enables the ecological system to self-regulate disease outbreaks which is beneficial to humans as well as non-humans.

b) Access to living spaces/habitats

1. **Habitat(s):** Defined as spaces meeting specific environmental and biological criteria necessary for the survival and reproduction of species, populations, or communities. These criteria include physical space, air and water quality, plant associations, food sources, protective cover, soil conditions, and topography.

2. **Protected Natural Area**: Designated areas within the national territory, or under national sovereignty and jurisdiction, where original environments remain largely unaltered by human activity or require preservation and restoration as per the General Law of Ecological Balance and Environmental Protection (lgeepa).

3. **Areas of Environmental Value**: Green spaces where original environments have been modified by human activities but still retain certain biophysical and scenic characteristics contributing to the city's environmental quality.

4. **Urban Forests**: Areas of environmental value predominated by tree and shrub flora, supporting wildlife and biodiversity representative of the city's ecological richness.

5. **Green Infrastructure**: A network of interconnected natural, semi-natural, and built landscapes that enhance environmental services, promote resilience to natural phenomena, and mitigate urban development-related issues. This includes planned solutions and techniques based on natural processes.

Figure 6. Different types of green areas in CDMX. Adapted from Plan Verde, 2019.

In the context of habitat and shelter availability within the Greening Plan, several key definitions and initiatives are outlined to ensure the preservation and enhancement of environmental quality and biodiversity in Mexico City. The Plan denominates different types of green spaces with various functions (*Figure 6, own translation*).

Recognising and classifying these various green areas emphasizes the extent to which an area is 'natural' or 'man-made', and the different legal statuses mean that some areas have more protection than others (i.e. National Protected Areas), which allow these areas to receive more security and funding (NC2) under specific programmes, be it national or international.

The Greening Plan also encompasses various programs aimed at regenerating environmental conditions and promoting green infrastructure. For instance, the Planting Parks (Sembrando Parques) program focuses on creating and revitalizing green spaces to improve environmental quality and social cohesion. Actions under this program include sanitation, landscape recovery, revegetation, and implementation of green infrastructure techniques to enhance the environmental and socio-cultural value of green spaces.

Moreover, considerations were raised regarding the need to broaden environmental indicators beyond homocentric measures like clean air and water (IUCN Forum, 2024). Proposals include incorporating species richness as an indicator for environmental health and integrating it into city planning

processes. This broader perspective acknowledges the importance of biodiversity conservation in maintaining ecological balance and enhancing urban habitats for diverse species.

Protected Areas

In the examination of protected areas within Mexico City, insights from interviews with various stakeholders illuminate multifaceted challenges and opportunities inherent in conservation efforts. Notably, it was revealed that approximately half of the city, predominantly in the southern region, is designated as Protected Areas, underscoring a substantial commitment to environmental preservation. Also, citizen involvement in expanding protected areas emerges as a notable aspect, with citizens having the opportunity to apply for the designation of their green spaces or gardens as protected areas (UP2, (Constitution, 2017)), reflecting a voluntary initiative towards conservation.

Nevertheless, challenges in effectively safeguarding these areas persist, as highlighted by Nature Conservationist 1 (NC1), who identified corruption and insufficient resources for enforcement (e.g. not enough forest rangers) as significant impediments to protection efforts. Moreover, specific areas such as the Barranca de Tarango face distinct challenges, including littering and inadequate waste management, underscoring discrepancies between legislative intent and practical implementation (ASF, *Appendix I*). Activism also plays a pivotal role, as demonstrated by social media movements like #eljuezprotegeelhumedal (the Judge protects the wetlands) (*see Appendix I*) opposing government infrastructure projects in protected areas, illustrating tensions between conservation objectives and developmental agendas. Furthermore, concerns are raised regarding the varying levels of protection afforded to different types of protected areas, with 'environmentally valued' areas like Ravines (Barrancas) receiving inadequate protection despite their ecological significance, as articulated by Youth Initiative Founder (YIF). NGO Founder (NF) underscores the imperative for enhanced collaboration between legal frameworks and authorities to bolster the *implementation* of protection measures, while also emphasizing the ecological significance of Mexico City as a crucial stopover for migratory species and questioning the adequacy of the Plan Verde in addressing the need for refuges for these species. These insights underscore the intricate interplay between legal frameworks, governmental action, community engagement, and ecological preservation, underscoring the imperative for comprehensive and collaborative approaches to advancing multispecies justice and environmental sustainability within urban environments.

Biodiversity and Pollinators

The exploration of pollinators and biodiversity within Mexico City reveals nuanced perspectives and challenges, as articulated by stakeholders in interviews. Landscape Architect 1 (LA1) underscores the intrinsic value of creating green spaces and habitats to foster biodiversity, drawing connections between diverse ecosystems, species richness, and social justice imperatives. LA1's observations are contextualized within historical responses to environmental crises, suggesting that a healthy environment is integral to societal well-being. Furthermore, LA1 suggests that encountering a variety of species in urban settings fosters human empathy towards nature, a phenomenon which has been researched by scholars as well (Myers Jr et al., 2009). Conversely, Landscape Architect 2 (LA2) prioritizes the maintenance of existing green spaces over creating new ones, citing challenges such as tree deficits and extreme weather events as barriers to effective environmental management. Interestingly, research has shown that greening projects appear to be most valuable for urban biodiversity' if they target preserving, increasing and connecting existing green space'(Strohbach et al., 2013), but in more socio-economically deprived neighbourhoods, 'strategies aiming to increase tree and shrub cover will promote a

more environmentally just city [for people]'(Villaseñor & Escobar, 2022). From an MSJ perspective, planning a just city would require awareness of such trade-offs.

Nature Conservationist 1 (NC1) highlights the increasing sightings of hummingbirds in the city as indicative of pollinators' vital role in ecosystem health and food production. NC1's perspective underscores the significance of pollinators as key indicators of urban biodiversity (Katumo et al., 2022). Challenges in collaborating with government agencies are illuminated through stakeholders' accounts (ASF, NF), reflecting divergent priorities and bureaucratic complexities.

Marina Robles Garcia, head of the Environment Ministry in CDMX, emphasizes women's pivotal role in biodiversity conservation efforts, particularly through initiatives such as the Women Pollinator Initiative (Ambiental, n.d.). She also emphasized the utility of the Urban Nature Index (*IUCN Urban Nature Indexes*, 2020) for understanding invasive species dynamics, suggesting its potential as a tool for consolidating information.

However, discussions highlighted challenges in collaborating with governmental bodies, as exemplified by LA1's struggles to navigate biopolitical constraints imposed by specific government preferences for pollinator species in urban greening initiatives, that is, the preference for bees and hummingbirds over bats, for example. Despite initiatives like Earthgonomic NGO's establishment of a pollinator sanctuary in a city park (Earthgonomic México, n.d.), insufficient collaboration with local (government) gardeners underscores the need for enhanced education among environmental workers regarding the broader implications of their actions. Moreover, LA2 underscored the ecological significance of barrancas ecosystems, highlighting their diverse native species, including pollinators and endangered wildlife. The company's efforts to mitigate the impact of escaped exotic species from markets like Sonora underscore the importance of mapping existing animal sanctuaries to facilitate strategic species relocation efforts, a gap in current information systems maintained by SEDEMA and other agencies. These insights underscore the need for enhanced collaboration, education, and information-sharing mechanisms to address complex urban environmental challenges effectively (MGR, IUCN Forum; LA1; NF; LA2).

All these insights touch on the One Health perspective, emphasizing the interdependence of biodiversity and human health. Insights suggest that greater species diversity can mitigate public health risks, illustrating the complex dynamics between urban ecosystems, biodiversity conservation, and human well-being. These perspectives underscore the multifaceted nature of urban biodiversity conservation efforts, highlighting the importance of stakeholder collaboration, governmental engagement, and holistic approaches grounded in principles of multispecies justice.

c) Access to Food, Water, and Nutrients

In examining capabilities justice concerning access to food, water, and nutrients within CDMX, several key issues and initiatives come to light. Firstly, CDMX faces a water distribution crisis rather than a scarcity issue, as articulated by the CDMX water commissioner, Pedro Moctezuma (Hidalgo, 2024). This perspective underscores the importance of efficient water management rather than solely focusing on water availability. The concept of the "Great Water Forest", (Bosque Del Agua) introduced by Conservation International and Greenpeace (NC1; *Mexico City water forest*, n.d.), aimed to highlight the significance of natural areas in water conservation efforts. However, this initiative's effectiveness waned over time, highlighting the challenges of sustaining public engagement in environmental campaigns (NC1).

Deforestation emerges as a critical concern, impacting biodiversity, water conservation, and climate regulation. Stakeholders, including agro-farmers, conservationists, and environmental policymakers, stress the interconnectedness of deforestation with species conservation, water availability, and temperature regulation (TA1, TA2, TA3, NC1, NC2, LM). Recognizing the fluctuating nature of water resources due to factors like evaporation and rainfall, stakeholders emphasize the need for holistic approaches to water management beyond isolated metropolitan strategies (LM).

In addressing these challenges, various initiatives are proposed. Rain harvesting programs, such as those implemented by SEDEMA, aim to improve water access in low-income neighbourhoods while reducing strain on existing water infrastructure (Gobierno de la Ciudad de México, n.d.-c). However, these programmes are not widespread, and many regions of the city regularly face water shortages (UP1, field observation, own experience). Moreover, efforts to rehabilitate public spaces, promote water treatment, and facilitate the reuse of treated water underscore a multifaceted approach to water resource management.

Reclaiming natural water bodies, such as lakes and wetlands, emerges as a priority for biodiversity conservation and water cycle restoration. Stakeholders advocate for the reconstruction of biomes and ecosystems, emphasizing the symbiotic relationship between human and animal habitats (LA1). Initiatives like the Parque Bicentenario project exemplify efforts to create new ecosystems that accommodate diverse species while addressing water scarcity challenges (LA1).

Furthermore, the revitalization of existing water infrastructures, such as canals and ravines, holds potential for enhancing urban water management. However, stakeholders highlight the need for comprehensive planning and investment in blue infrastructure (UP1, NC1), particularly considering the city's historical reliance on water bodies like lakes (Climate Policy Lab, 2020). MRG highlights significant progress in the protection of Canal Nacional, including the establishment of 34 new wetlands and the restoration of 722 hectares (MGR, IUCN, 2024); nonetheless, there remains a pressing need to revalue these wetlands, given their historical degradation stemming from negative associations with foul odours and illness (NC2).

In summary, addressing capabilities justice in access to food, water, and nutrients in CDMX necessitates a multifaceted approach encompassing sustainable water management practices, biodiversity conservation efforts, and community engagement strategies. Through collaborative initiatives and holistic planning, the city can strive towards equitable access to essential resources while promoting environmental resilience and social well-being.

Food Sovereignty

In the realm of agriculture and food sovereignty in Mexico City (CDMX), various initiatives and movements underscore the significance and interrelation of local food systems, biodiversity conservation, and cultural identity. The event "Sin Maiz no Hay Pais" (Without corn, there is no country) exemplifies this sentiment, with key figures like Vandana Shiva advocating for the defence of food diversity and sovereignty. The event featured eco-farmers from across the city and emphasized themes of respect for Mother Earth and the spiritual significance of seeds and water.

Discussions at the event highlighted the intrinsic connection between maize cultivation, cultural identity, and food sovereignty. Maize, often regarded as more than a commodity but also a symbol of life and culture, serves as a focal point for movements advocating for seed sovereignty and the preservation of ancestral knowledge. The event fostered international solidarity, linking

movements in Mexico with those in Argentina, the USA, Bolivia, Colombia, Costa Rica, and beyond.

Central to the discourse on food sovereignty is the recognition of seeds as a common good, not private property. Initiatives such as the opening of a new seed bank by the government of CDMX in 2024 (Portal Ambiental, 2024) underscore efforts to safeguard indigenous crops and promote agro-biodiversity. Additionally, grassroots efforts, like the Tlazana initiative and the Foodscapes Project (NC1), prioritize healthy, local, organic, and traditional foods to promote multispecies justice (NC1).

Xochimilco emerges as a critical site for agro-biodiversity conservation, with its historic chinampas offering opportunities for cultivating native species and relearning traditional farming techniques (Urban Nature Atlas, n.d.). However, concerns persist regarding the underutilization of other urban gardens and spaces for food production. In the IUCN forum, representatives of SEDEMA showed a map of hundreds of urban agriculture gardens around the city (*see Appendix I*), yet this information is not widespread and difficult to find for normal citizens (YIF).

In conclusion, initiatives and movements in CDMX underscore the integral connection between food sovereignty, cultural heritage, and environmental justice. Through collective action, education, and policy interventions, stakeholders strive to reclaim control over local food systems, promote biodiversity conservation, and preserve traditional knowledge for future generations.

5.1.2 Recognition Justice Perspective

In the context of recognition justice in Mexico City (CDMX), the Plan Verde emphasizes the need for clear legal regulations to promote respect for trees and green elements. It acknowledges that prioritizing private interests over the common good of the capital's residents has led to ecocide, where limited mobility or reduced habitat connectivity in urban areas have resulted in species loss. This recognition of the detrimental effects of urbanization on biodiversity underscores the importance of protecting and preserving natural ecosystems and genetic heritage as common goods and of public interest (Mejía, M. A., Amaya-Espinel, J. D. (eds.), 2022).

The Plan Verde recognizes biodiversity as the variability of living organisms from any source, including terrestrial, marine, and other aquatic ecosystems. It emphasizes the diversity within each species, between species, and across ecosystems. Furthermore, it acknowledges the role of environmental and ecosystem services, which benefit people in various ways, including provision (such as food and water), regulation (such as climate regulation), cultural (such as spiritual and recreational benefits), and support (such as maintaining biodiversity).

Moreover, recognition justice in CDMX extends to the representation of animals throughout the city in murals and graffiti, reflecting a profound respect and knowledge of ancestral and pre-Colombian history (*see Appendix I*). Initiatives such as green roofs and walls, exemplified by the Periferico ring roads green columns Via Verde (*see Appendix I*), are recognized as successful endeavours that contribute to mitigating ambient air pollution. However, it is acknowledged that these initiatives need to be expanded to further enhance their impact (YIF).

Furthermore, there is a call for justice from the Animal Rights Activist (ARA), in ensuring that such green infrastructure is not solely dependent on human maintenance but rather functions

independently to truly serve the needs of the environment and its inhabitants. This recognition highlights the importance of equitable and sustainable approaches to urban development that prioritize the well-being of both human and non-human residents of Mexico City.

a) Native species

In the realm of recognition justice, the Plan Verde underscores the significance of native plants in urban greening initiatives. It acknowledges the importance of environmental characteristics, such as the type of vegetation and its interaction with pollinating fauna, in improving the resilience of green areas. By focusing on revegetation with native plant species, particularly those that promote biodiversity and increase environmental services, the plan aims to mitigate the effects of climate change and reduce hazards like overheating, flooding, and runoff.

Interview insights (LA1, LA2) reveal a nuanced understanding of the challenges and opportunities associated with native plant restoration efforts. Landscape architects and urban planners often prioritize aesthetics over ecological suitability, impacting soil composition, wildlife, and water usage (NF). Despite increased awareness and international agreements like the RAMSAR Convention on Wetlands, there are trade-offs and limitations in implementing projects. For instance, the success of initiatives like the Xochimilco ecological park is tempered by strict regulations that prioritize migratory birds over native species like the Tekohote tree (LA1).

Collaborative strategies involving residents, authorities, universities, organizations, and companies are essential for the successful implementation of native plant restoration projects. Initiatives such as seed collections, guerilla gardening (*see Appendix I*), and germplasm banks aim to propagate native species and reintegrate them into the urban landscape. However, challenges such as sourcing enough native species from local greenhouses to cover the entirety of the city and unrealistic implementation plans persist (LA1, LA2).

The recognition of native plants as integral components of urban ecosystems reflects a shift towards acknowledging the importance of preserving native biodiversity and enhancing environmental resilience. Indeed, understanding better the dynamics between invasive and native species and the impact on biodiversity and social life (Sikorska et al., 2019) may help to better plan the city from an MSJ perspective. By prioritizing the incorporation of native species into urban greening initiatives, CDMX strives to create healthier, more sustainable environments that benefit both humans and wildlife.

In addition to the extensive planting efforts, CDMX has undertaken initiatives to address pest and disease control, as well as conducting censuses and phytosanitary diagnoses of green areas. These efforts have yielded significant findings, such as the technical ruling by SEDEMA for the registration of fungi like *Cocoicola californica* and *Serenomyces phoenicea* in palm trees within the city (Plan Verde, 2019). Moreover, preliminary reports indicate the absence of the vector insect of Coconut Tree Lethal Yellowing in palm trees, as revealed through biodiversity monitoring of insects using yellow sticky traps on Av. de las Palmas, Mexico City, conducted by SEDEMA in October 2021(Plan Verde, 2019).

Furthermore, the city is actively producing over 80 native plant species, including but not limited to *Agave inaequidens, Arbutus xalapensis, Asclepia curassavica, Bouvardia ternifolia, Bursera cuneata,* and *Echeveria gibbiflora*. However, landscape architects (LA2) note challenges in sourcing native species from local greenhouses, indicating a need for more accessible avenues for acquiring native plants. Despite this, there is recognition that planting native species near large trees can

enhance their functionality, particularly in adapting to dry conditions and fulfilling ecological roles (LA2).

Reflecting on past practices, LA1 acknowledges that in the 1980s, many plants were introduced without adequate consideration, leading to 'a loss of purity but a gain in richness'. However, iconic trees like the invasive Jacaranda, well-adapted to the Mexican ecosystem, continue to bring beauty and happiness to people and support various species. Marina Robles, the Director of the Ministry Environment of CDMX (SEDEMA), emphasizes the importance of creating communities of trees rather than planting them alone, highlighting the need for trees to function optimally by facilitating humidity and nutrient exchange among themselves (IUCN Forum, 2024).

b) Local knowledge

The recognition of traditional local knowledge is integral to fostering inclusive and sustainable environmental practices in CDMX. Orlando Habet, the Minister of Sustainable Development, emphasized the importance of incorporating indigenous perspectives into landscape conservation approaches during the IUCN forum. This holistic approach acknowledges the valuable insights and practices indigenous communities possess regarding land stewardship and conservation (Habet, IUCN Forum, 2024).

In projects such as the restoration of Chapultepec Forest, the involvement of local communities and public participation has been paramount. Mario Schjetnan, a landscape architect, underscores the significance of public engagement and community involvement in ensuring the continuity and success of projects aimed at promoting environmental sustainability and urban greening (*Interview with Mario Schjetnan, FASLA | Asla.Org*, n.d.).

Furthermore, landscape architects like LA1 recognize the invaluable contribution of indigenous and local knowledge to environmental stewardship. LA1 has collaborated with multi-generational gardeners from Xochimilco, whose deep understanding of plant care and local ecosystems enriches conservation efforts. LA1 advocates for greater appreciation of this knowledge, emphasizing its role in sustaining biodiversity and cultural heritage (LA1).

LA2 acknowledges the efforts made by the government to incorporate practitioner opinions in modifying legislation related to green spaces. This participatory approach ensures that diverse perspectives are considered in shaping policies and initiatives aimed at environmental conservation and sustainability (LA2). However, 'more participation alone is insufficient to address epistemic justice concerns' unless they actually influence urban nature strategies (Mabon et al., 2022), signalling that a decolonial approach is needed (*as discussed later in Section 2 in the governance of the Altepetl initiative*). Moreover, public spaces are viewed by LA2 as dynamic environments that serve as living museums, fostering interactions between people and nature. Recognizing the importance of green spaces as a third space for both human recreation and ecological resilience highlights the need to prioritize their preservation and enhancement (LA2).

Overall, there is a growing recognition of the importance of traditional local knowledge and community involvement in environmental conservation efforts in CDMX. By integrating indigenous perspectives, fostering public participation, and acknowledging the significance of green spaces as cultural and ecological assets, the city can move towards a more inclusive and sustainable future.

5.1.3 Intersectional Justice Perspective

Multispecies justice intersects with various dimensions of justice, including social justice, environmental justice, and economic justice, particularly evident in the context of urban greening initiatives in Mexico City. The history of greening efforts in the city, while commendable, has also been entangled with issues of gentrification, leading to unequal access to nature and forced displacement (Castillo, 2018), highlighting the need for an intersectional approach to justice. Urban greening initiatives, such as the creation of parks, planting of trees, and introduction of wildlife sanctuaries, have undoubtedly enhanced the city's biodiversity and improved the living conditions of its residents, as noted by Animal Rights Activist (ARA) and NGO Founder (NF). However, the unequal distribution of green spaces across different neighborhoods has perpetuated socioeconomic disparities, with marginalized communities often having limited access to nature, adversely impacting mental health and well-being (Xian et al., 2024).

The greening of urban spaces, exemplified by projects like the revitalization of Istapalapa under the leadership of Mayor Clara Brugada, has not only enhanced the aesthetic appeal of neighborhoods but also contributed to community safety and cohesion, as observed by NC1. Yet, the legacy effects of societal inequalities, including income inequality and historical redlining, continue to shape patterns of urban biodiversity, further exacerbating disparities in access to green spaces, as highlighted by Murray et al. (2022).

Moreover, the inclusive approach adopted in the development of the city's green infrastructure plan, with input from civil society, academia, and government institutions, reflects a commitment to transparency and participatory decision-making, as articulated by SEDEMA. This collaborative effort aims to ensure that green spaces are accessible and safe for all residents, irrespective of their socioeconomic status or geographic location. Additionally, initiatives such as Gardens for Life, Women Pollinators, demonstrate a gender-sensitive approach to urban greening, empowering women through training and employment opportunities in gardening and pollination (Ambiental, n.d.).

Incorporating traditional knowledge and community participation, as advocated by LA1 and LA2, is essential for the success of urban greening initiatives. Indigenous and local knowledge systems offer valuable insights into sustainable land management practices and biodiversity conservation, which can complement scientific expertise and contribute to the resilience of urban ecosystems. By recognizing the interconnectedness of social, environmental, and economic justice, multispecies justice seeks to create inclusive and equitable urban environments where human and non-human beings can thrive together.

a) Intersectionality and Interdisciplinarity in Practice: Landscape Architects

Practitioner perspectives in intersectional justice within urban greening initiatives in Mexico City shed light on the complexities and challenges inherent in creating sustainable and equitable environments. Landscape architects play a crucial role in bridging social concerns, aesthetics, and ecology, as emphasized by LA1, who underscores the significance of integrating diverse perspectives to inform urban planning decisions. Despite the growing importance of landscape architecture in urban planning over the past 50 years, there remains a need for greater interdisciplinary collaboration, particularly between environmentalists, geographers, and urban planners (LA1), to ensure holistic and inclusive approaches to urban greening.

LA1 highlights the frustration of working within urban greening projects, where authorities often prioritize scientific perspectives over social and urban considerations, neglecting the importance of experience and adaptation in species management. Moreover, LA1 emphasizes

the intrinsic value of human-nature interactions in fostering emotional and spiritual well-being, underscoring the significance of nature in shaping human identity and connection.

Similarly, LA2 emphasizes the role of innovation in landscape architecture in connecting social and environmental dimensions, advocating for a multidisciplinary approach that integrates biological, architectural, and sociological perspectives. Furthermore, LA2 emphasizes the importance of public spaces in defining the identity of citizens and underscores the need for technological advancements to facilitate a true green transformation in cities.

Lawmakers, such as LM, acknowledge the demographic and economic pressures influencing urban greening efforts, highlighting the importance of sustainable practices and improved city design to mitigate environmental impacts and enhance public health. The inequitable distribution of urban heat and its associated health risks underscores the need for a city-wide approach to urban greening, as emphasized by Murray et al. (2022), advocating for a multispecies capabilities approach to expand forest cover and address socioenvironmental disparities.

In addition, LA2 emphasizes the importance of creating secure public spaces through corridors of movement and pedestrian-friendly design, which contribute to a sense of safety and inclusivity. By addressing issues of insecurity and promoting visibility and accessibility, urban greening initiatives can foster social cohesion and well-being, aligning with principles of intersectional justice.

b) Eco-education and Nature Representation

Representation of nature and eco-education are integral components of urban greening initiatives in Mexico City, playing significant roles in fostering environmental awareness, behaviour change, and community engagement. Indeed, research has shown that ecological literacy is crucial for sound justice outcomes (Kellogg, 2021). Through various artistic mediums, such as murals, museums, and advertising campaigns (*see Appendix I*), the city showcases diverse representations of nature, aiming to instil cultural shifts that lead to behavioural change, as emphasized by the IUCN (IUCN Forum, 2024). Notably, the Axolotitlan project celebrates the axolotl through artistic expressions, serving as a symbol of environmental conservation and cultural identity for artists and children alike (*see Appendix I*).

Eco-education emerges as a vital tool for promoting environmental stewardship and sustainability, as underscored by Marina Robles, head of SEDEMA, who emphasized the inseparable link between conservation and environmental education (IUCN, 2024). Initiatives like using worms for compost, establishing zero-waste stores, and distributing free seeds campaigns (*see Appendix I*) contribute to eco-literacy and empower individuals to adopt more sustainable lifestyles. Furthermore, eco-friendly establishments, like the vegan, zero-KM Axolotitlan café, provide platforms for dialogue and reflection on sustainable practices, prompting individuals to reconsider their habits and consumption patterns.

Children play a pivotal role in driving environmental awareness and action, as observed by ASF, with around 40% of visitors to Axolotitlan being children who educate their parents about environmental issues. Moreover, there is a notable generational transition towards a deeper care for the planet, with younger generations exhibiting a stronger connection to nature and a desire for environmental change, as noted by NF. However, bridging the gap between urban and rural communities remains essential to fostering a collective sense of environmental responsibility and respect for nature (TA1).

NGOs like Earthgonomic employ innovative approaches, such as edutainment, to engage individuals and corporations in environmental education and action. By combining entertainment with education, these initiatives create meaningful and memorable interactions with nature, fostering empathy for ecosystems and promoting environmental advocacy. NF emphasizes the importance of fostering connections between city dwellers and nature, stressing that change occurs through meaningful actions on the ground rather than low-intensity activism.

In conclusion, representation of nature and eco-education are essential pillars of urban greening efforts in Mexico City, driving cultural shifts, empowering communities, and fostering environmental stewardship. By harnessing the power of art, education, and community engagement, the city can cultivate a deeper appreciation for nature and inspire collective action towards a more sustainable and equitable future.

5.2 Urban Nature Governance

In the urban context of Mexico City (CDMX), the governance of urban nature presents a multifaceted challenge that intersects with various dimensions of justice, particularly multispecies justice (MSJ). This section addresses RQ2 and seeks to unravel the intricate mechanisms and stakeholders involved in governing MSJ within the framework of urban nature in CDMX. The multilevel and hybrid governance approaches (*Figure 7*) aim to dissect the policies, perspectives, and practices that shape the relationship between humans and non-human entities in the urban landscape. The findings are structured according to the conceptual framework (*Figure 2*), grouping the examples according to the levels of governance (*Figure 7*). Section 5.2.1 goes into who governs urban nature in CDMX and how, using a multilevel governance perspective to capture governance from international to local levels. The regional/state and local municipal levels are merged given their intersection in the case of CDMX (as shown in the Altepetl initiative), as well as the temporal limitations of the study. A separate section (*5.2.2*) on the Rights of Nature laws of CDMX analyses their theoretical and practical manifestations, delving into a rich theoretical discussion and numerous opinions of relevant stakeholders. Section 5.2.3 then takes a hybrid governance approach to MSJ to analyse four non-governmental initiatives important to MSJ in CDMX as shown in *Figure 7*.

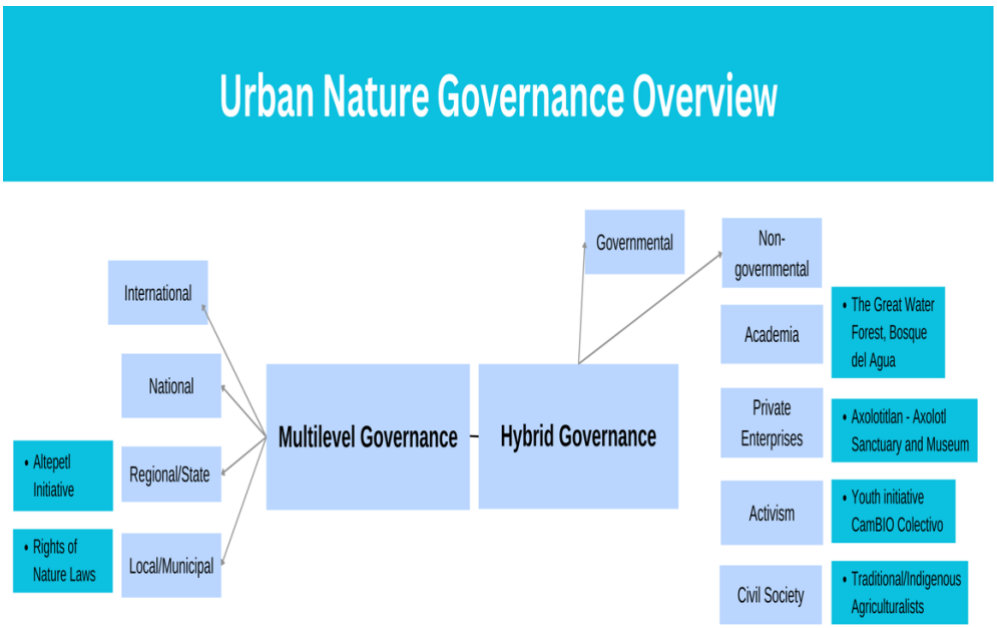


Figure 7. Urban Nature Governance Overview. Source: Author.

RQ 2. How is multispecies justice governed in CDMX within the urban nature perspective?

At its core, the governance of urban nature encompasses a complex web of actors, institutions, and policies that dictate the management, conservation, and utilization of natural resources within urban spaces. From national governments to grassroots organizations, a diverse array of stakeholders play a pivotal role in shaping the governance structures and decision-making processes related to urban nature in CDMX.

However, the notion of justice within this governance framework extends beyond human concerns to encompass the rights and well-being of non-human entities, including animals, plants, and ecosystems. Multispecies justice, as conceptualized in this section, acknowledges the interconnectedness of all living beings and seeks to ensure equitable treatment and consideration for the diverse species that coexist within urban environments.

Drawing on insights from government officials, environmental activists, indigenous communities, and urban planners, this section delves into the diverse perspectives and understandings of multispecies justice in CDMX. By examining these perspectives, I aim to unravel the complexities and tensions inherent in governing MSJ in a densely populated and culturally diverse city like Mexico City. Furthermore, I analyse the impact of legal frameworks, such as the Rights of Nature law (Constitution, 2017), on the governance of multispecies justice in CDMX. Through this analysis, I evaluate the effectiveness of legal mechanisms in promoting the rights and protections of non-human entities and fostering harmonious coexistence between humans and other species in the urban landscape.

5.2.1 A Multilevel Perspective of Governing Urban Nature

In the dynamic urban landscape CDMX, the governance of urban nature is a complex endeavour that involves multiple levels of governance, diverse actors, and competing interests.

CDMX emerged as a distinct political entity in 2017 (Constitution, 2017), becoming its own state, marking a significant milestone in the city's governance structure. The creation of a new constitution, developed with the participation of various stakeholders, laid the foundation for innovative approaches to urban governance, including explicit recognition of the importance of nature (Federal Ministry for Economic Cooperation and Development, n.d.). However, tensions between the CDMX government and the Mexican national government highlight disparities in prioritizing nature conservation, with budget cuts to nature areas at the national level (*Mexico Announces 20 New Protected Areas despite Budget Cuts*, 2024)contrasting with laws preventing budget cuts in CDMX (Tang, 2021).

a) International Governance of Urban Nature

International initiatives often influence urban nature governance, but they may overlook local contexts and needs, as exemplified by the introduction of invasive species like tilapia by the Food and Agriculture Organization (FAO) in the 1970s, when Mexico was deemed a 'third world country' with malnutrition problems (Canonico et al., 2005).

This decision had far-reaching consequences, as highlighted by Traditional Agriculturist 2 (TA2), who shed light on the historical significance of introducing the invasive tilapia. TA2 emphasized that before the introduction of tilapia, it was common practice to consume axolotl, a species native to the region. However, the introduction of tilapia led to unintended

consequences, including the decline of axolotl populations, making them 'critically endangered species' (*To Save the Axolotl, Mexico Looks to the Past*, n.d.), and damaging to the roots of foundational trees around the chinampas of Xochimlco.

The rationale behind the introduction of tilapia was to alleviate poverty and increase food production, reflecting a well-intentioned but ultimately misguided approach that overlooked the interconnectedness of ecology and local food systems. This oversight underscores the importance of analysing local connections to nature and food production before implementing international initiatives. TA2 emphasized the need for decolonial, and local approaches rooted in traditional knowledge, highlighting the political implications of invasive species management and the need for a more nuanced understanding of ecology and politics.

Additionally, self-regulating mechanisms within ecosystems, such as the increase of migratory pelicans preying on tilapia in recent years (U.S. Department of Agriculture et al., 2019), highlight the self-regulation of nature.

b) National Governance of Urban Nature

At the national level, discrepancies between the Federal Government and the CDMX government's approaches to nature conservation present governance challenges. While the Federal Government may prioritize other agendas, such as the Tren Maya project which was on the international Rights of Nature tribunal for ecocide (*Tren Maya Tribunal 2023 - Rights Of Nature Tribunal*, 2024), CDMX has taken proactive steps to enshrine nature conservation in its constitution (*Mexico City Introduces New Environmental Legislation*, 2024). This tension underscores the importance of multilevel coordination and cooperation to achieve MSJ.

c) Regional/State and Local/Municipal Governance of Urban Nature in CDMX

SEDEMA plays a pivotal role in overseeing environmental protection and sustainable development in CDMX. SEDEMA is the environmental agency responsible for overseeing environmental protection, conservation, and sustainable development within Mexico City. Its primary focus is on urban environmental issues, such as air quality, water management, waste management, and green spaces. SEDEMA works to implement environmental policies, regulations, and programs aimed at mitigating environmental impacts, promoting environmental sustainability, and enhancing the quality of life for city residents (Gobierno de la Ciudad de México, n.d.-c).

Through initiatives like the Special Program of Green Infrastructure Plan Verde, as analysed above, SEDEMA aims to enhance green spaces and promote environmental sustainability. However, challenges persist in coordinating efforts between the city government, local governments, and private enterprises, highlighting the need for a collaborative and multidisciplinary approach to urban nature governance. CDMX's strategic axes for urban nature governance prioritize legal frameworks, institutional coordination, comprehensive management of green spaces, and promotion of social participation. These axes underscore the importance of synergies between government bodies, technical frameworks for green space management, and citizen engagement in shaping urban nature policies and initiatives.

The shortcomings of the CDMX government in implementing green governance initiatives are evident in the fragmented management of public spaces, where responsibilities are often divided between government agencies and private enterprises, as highlighted in the interview with landscape architect 2 (LA2). While the government grants permissions and manages the distribution of management tasks to some extent, the lack of integration and coordination between the city government and local administrations often results in conflicting projects and inefficient resource allocation. LA2 emphasizes the need for a comprehensive plan of work and

workflow that fosters collaboration among governmental, private, community, and academic sectors. Multidisciplinarity is deemed crucial to ensure diverse perspectives are considered, but the absence of a decision-making framework exacerbates coordination challenges. Moreover, LA2 underscores the necessity of leveraging technology for true green transformation, advocating for the integration of innovative solutions to bridge the gap between people, nature, and technological advancements. In addition, LA2 emphasized the importance of experimentation in urban planning, suggesting that exploring new approaches and strategies is essential for addressing the complex challenges of sustainable development effectively. Despite the importance of legislation in guiding environmental efforts, the government's limited supervision of environmental laws leaves implementation gaps, emphasizing the need for more robust oversight mechanisms to translate vision into action effectively.

Incorporating Indigenous Perspectives: The Alteptl Initiative

The government of CDMX has initiated the Alteptl program (Gobierno de la Ciudad de México, n.d.-a), aiming to engage indigenous local communities in environmental conservation efforts. Named after the Nahuatl word for landmark or mountain, the program focuses on regions inhabited by descendants of indigenous peoples, particularly in the southern metropolitan area (NC1).

Nature Conservationist 1 (NC1), who collaborates with these communities, notes their unique perception of nature, though some individuals may not readily identify as indigenous due to social repercussions. The Alteptl initiative offers various benefits to participants, including community involvement, financial compensation (ranging from 6000 to 8000 pesos per month), and reduced commute times. However, challenges exist, such as the requirement to work six days a week, attend government meetings, and lack of social security coverage for accidents.

NC1 highlights the complexity of the initiative, viewing it as a continuation of colonialism. While it acknowledges and involves indigenous communities, it falls short in terms of upholding international human and worker rights standards. Adan Pena from the CONAP national commission of protected areas emphasizes the interconnectedness of community well-being and environmental protection (IUCN Forum, 2024), underscoring the need for a holistic approach that addresses social and environmental concerns in tandem.

5.2.2 Rights of Nature Laws: Bridging Theory and Practice

The enactment of the Rights of Nature (RoN) law in Mexico City (CDMX) represents a significant milestone in recognizing the intrinsic value of nature and promoting environmental justice. However, the translation of these principles into tangible actions and outcomes presents a complex challenge. Insights from various stakeholders shed light on the evolution of RoN laws, their implementation, and the broader implications for multispecies justice.

Legislation and Policy Development

According to the Law Maker (LM), involved in drafting environmental legislation, the updated climate change and circular economy laws (Global Legal Group, 2024) marked a paradigm shift towards a greener and more socially just city. The inclusion of climate and environmental justice considerations, along with gender and intergenerational equity, reflects an evolving legal landscape. Nevertheless, implementing justice criteria poses practical challenges, requiring innovative approaches and ongoing updates to legislation.

He emphasized the role of public participation in legitimizing environmental laws and promoting accountability. However, challenges persist in prioritizing multispecies justice in decision-making processes and ensuring compliance with existing regulations.

LM also emphasized the concept of Multispecies thinking and its incorporation into legal frameworks, acknowledging the challenge of creating laws for entities that cannot speak. Translating climate justice and other forms of justice into law requires careful consideration of indicators and positive outcomes. Additionally, the dynamic nature of climate and environmental legislation necessitates continuous updates to address emerging challenges and opportunities (ARL).

LM underscored the importance of linking various environmental issues, such as air quality and climate change, within legislative frameworks. While laws provide stability and continuity, ensuring their implementation and prioritization in decision-making processes remains a challenge. The integration of multispecies justice into policy agendas requires concerted efforts to elevate its importance and relevance.

Despite advancements in legal frameworks, discrepancies exist between theory and practice. Animal Rights Lawyer (ARL) points out contradictions within legal texts, where animals are recognized as sentient beings in the constitution but treated as property in civil codes. This dissonance underscores the complexity of operationalizing RoN concepts and the need for clearer definitions and enforcement mechanisms. ARL stresses the importance of collaboration across sectors and disciplines to advance animal rights and environmental protection.

ARL highlights a significant transformation in societal attitudes towards animals, moving from viewing them as mere objects to recognizing them as sentient beings deserving of rights. This evolution, rooted in the principles of antispeciesism and veganism, has influenced the development of animal welfare and protection laws. However, inherent speciesism within legal systems, which are de facto grounded in anthropocentric traditions, presents barriers to achieving comprehensive animal rights.

Despite significant advancements in legal text, including the incorporation of RoN principles in the CDMX constitution, discrepancies persist in their application. The dichotomy between recognizing animals as sentient beings and treating them as property underscores the complexities of translating RoN ideals into practical legal frameworks. ARL emphasizes the crucial role of judicial power in holding governments and society accountable for upholding animal rights laws.

ARL underscores the importance of individualizing aspects of nature in legal proceedings, citing examples like the rights of rivers or lakes (Macpherson, 2021), which are easier to defend than abstract notions of nature. While some degree of anthropocentrism may be necessary to navigate legal discourse, ARL highlights the importance of utilizing RoN concepts as guiding principles in the pursuit of justice. In reflecting on the limitations of legal frameworks, ARL highlights the nuanced relationship between laws, societal norms, and the broader context of security. While laws serve as critical instruments in shaping norms and values, they alone are insufficient to eradicate deeply entrenched forms of oppression, such as slavery, homophobia, and misogyny. ARL emphasizes that while legal prohibitions establish new standards, they must be accompanied by broader societal shifts to effectively combat systemic injustices. ARL draws parallels between contemporary struggles for animal rights and historical movements against oppression. While laws provide a foundation for resistance, true transformative change requires societal buy-in and a collective commitment to challenging existing norms. By codifying principles of justice and equality, legal frameworks can contribute to the gradual evolution of societal attitudes and behaviours.

In addition to legal mechanisms, ARL identifies security—both social and judicial—as essential components of a just and equitable society. Without a sense of security and trust, individuals and communities cannot fully realize their well-being. ARL's mention of wellness resonates with the One Health approach advocated in CDMX documents, highlighting the interconnectedness of human, animal, and environmental health. Recognizing the inseparable link between security and well-being underscores the need for holistic approaches to justice and sustainability.

ARL advocates for collaborative efforts involving activists, academics, and legal experts to drive systemic change in animal rights advocacy. By leveraging diverse perspectives and expertise, stakeholders can navigate the intricacies of legal systems and effectuate meaningful transformations. Examples from countries like Colombia and Argentina (*Centro de Estudios de Derecho Animal Argentina – Centro de Estudios de Derecho Animal Argentina*, n.d.; Wesche, 2021) underscore the potential for innovative legal approaches to advance MSJ.

The insights provided by ARL underscore the urgency of addressing systemic injustices and advancing animal rights within legal frameworks. By fostering collaboration, challenging anthropocentric paradigms, and cultivating a deeper understanding of interdependency, society can work towards a more just and equitable future for all living beings.

Social Awareness and Activism

Insights from landscape architects and NGO founders highlight the role of social awareness and activism in shaping legal and policy reforms. The increased appreciation of nature and human rights, driven by grassroots movements and civil society organizations, has influenced governmental responses and policy outcomes (ASF, NF). However, challenges related to corruption and enforcement persist, emphasizing the need for active citizen engagement and collaboration with governmental authorities.

Animal Rights Activist (ARA) has been a passionate advocate for animal welfare and multispecies justice in CDMX since her teenage years, demonstrating a longstanding commitment to promoting empathy and compassion towards all living beings. ARA's activism encompasses various initiatives aimed at challenging systems of exploitation and advocating for transformative change.

For ARA, multispecies justice (MSJ) is rooted in empathy, extending compassion not only to animals but also to the humans involved in their exploitation. Through initiatives like vigilias (CDMX Animal Save, n.d.), ARA engages directly with animals in slaughterhouses, affirming their worth and advocating for their rights. ARA recognizes the systemic injustices inherent in animal exploitation, viewing MSJ as a means of addressing broader issues of class inequality and social injustice. ARA's activism extends beyond animal rights, like trying to outlaw bullfighting and advocating for environmental justice in transport systems. ARA highlights the interconnectedness of issues such as transportation emissions and habitat destruction, emphasizing the need for a holistic approach to systemic transformation. By addressing the root causes of exploitation and injustice, ARA envisions a society where humans and nature coexist harmoniously.

ARA emphasizes the importance of education and language in fostering societal change. By disseminating concepts like ecocide and anti-speciesism in accessible, empathetic terms, ARA seeks to broaden public awareness and engagement. ARA recognizes the significance of empathy and care towards animal suffering, noting a positive shift in societal attitudes towards multispecies justice in CDMX within the past decade.

Animal Rights Activist (ARA) emphasizes the transformative potential of collective action and public awareness in shaping societal norms and values. ARA envisions a future where nature and cities coexist in harmony, emphasizing the importance of green urban spaces and collective responsibility. By acknowledging past mistakes and embracing empathy and data-driven solutions, ARA believes in the power of collective action to foster meaningful change. While legal frameworks provide a foundation for change, meaningful progress requires a shift in consciousness and societal attitudes towards nature and animals, as mentioned by ARL. ARA advocates for holistic approaches that combine empathy, education, and regulatory reforms to foster multispecies justice and coexistence between humans and nature. The convergence of legal expertise, social mobilization, and governmental action is essential to realize the transformative potential of RoN laws and advance multispecies justice in CDMX.

5.2.3 Hybrid Governance for Multispecies Justice

In the pursuit of multispecies justice (MSJ) in Mexico City (CDMX), various actors and initiatives, both governmental and non-governmental, contribute to advancing environmental sustainability and equitable relations among species. While urban greening efforts by the government have shown limitations and disparities between policy and practice, the emergence of hybrid governance models presents a promising avenue for addressing these challenges and fostering intersectional justice.

Academic-civil initiatives like the Water Forest, private enterprises such as Axolotitlan sanctuary, youth organizations like camBIO, and traditional agriculturists from Milpa Alta and Xochimilco, play pivotal roles in advancing environmental sustainability and fostering equitable relations among species. These actors challenge conventional top-down governance structures, offering alternative visions rooted in community engagement and ecological stewardship. Despite government-led urban greening efforts facing implementation challenges, hybrid governance models emerge as crucial mechanisms bridging policy intent with on-the-ground realities. By incorporating diverse perspectives, these models foster inclusive decision-making processes (Toxopeus et al., 2020). The contributions of non-governmental initiatives exemplify collaborative efforts in promoting urban reforestation, wildlife protection, and sustainable land management. Intersectional justice lenses recognize the interconnectedness of social, ecological, and economic systems, foregrounding marginalized communities' experiences and non-human species' needs. This pluralistic approach acknowledges diverse pathways to environmental justice, emphasizing collaboration, dialogue, and co-creation in shaping inclusive and resilient urban environments.

Diverse understandings of MSJ exist, reflecting the plurality of perspectives and approaches within the broader movement for environmental justice. Hybrid governance, characterized by the involvement of multiple stakeholders from governmental, private, academic, and community sectors (Toxopeus et al., 2020), offers a multifaceted approach to addressing complex environmental issues.

The management of urban green spaces in CDMX often involves a mix of government agencies, private enterprises, and community initiatives. However, there is a notable lack of integration and coordination between the city government and local administrations (alcaldías), leading to inconsistencies in project implementation and management (ASF, LA2). Coordination challenges highlight the need for improved communication and collaboration mechanisms to ensure cohesive and effective governance of urban ecosystems.

Non-governmental initiatives

Non-governmental initiatives underscore the pivotal role of local communities in advancing environmental stewardship and multispecies justice in CDMX. Representatives from organizations like the IUCN and WWF Mexico emphasize the enduring significance of local communities, noting that while governments may change, these communities remain constant forces for conservation and sustainability (IUCN Forum, 2024). Within the IUCN, there is a growing emphasis on relocalization as a strategy to enhance the effectiveness of conservation efforts, highlighting the importance of grassroots involvement alongside international frameworks. However, both IUCN and WWF Mexico acknowledge that security and financing are crucial factors in ensuring the success of community-led initiatives (IUCN Forum, 2024). Landscape architect 2 (LA2) echoes this sentiment, expressing the need for greater political interest in green spaces and their connection to local identity and placemaking. LA2 emphasizes the inadequacy of existing green plans, calling for centralized information on parks, their management, and biodiversity. To address this gap, some scholars have suggested leveraging geospatial information systems and community-based data collection methods, such as citizen science initiatives (Guevara et al., 2008). Additionally, LA2 proposes adopting systems like Implan (Instituto Municipal de Planeacion, n.d.), already utilized in other parts of Mexico like Guanajato (Instituto Municipal de Planeacion Guanajato, n.d.), to enhance data management and decision-making processes within CDMX. These insights underscore the critical role of local communities in shaping and implementing sustainable environmental policies and practices.

a) Academic-civil initiative: the Great Water Forest, Bosque Del Agua

The Water Forest initiative represents a notable civil-academic collaboration aimed at advancing multispecies justice (MSJ) in the Bosque del Agua (BDA) area (*green polygon on the map of Figure 8*) of CDMX. Led by academics, researchers, and nature conservationists, this initiative actively engages with local communities residing in the Bosque del Agua, recognizing and valuing their distinct perceptions of nature. Through participatory approaches like Soy the Tlazlan, which involves the collaborative production of materials and documentation in the Otomi language, the Water Forest initiative fosters inclusive and culturally sensitive environmental stewardship. Beyond its local focus, the initiative promotes a regional vision that encompasses not only CDMX but also the surrounding areas in the states of Mexico and Morelos, acknowledging the interconnectedness of ecosystems and communities across geographical and municipal boundaries.

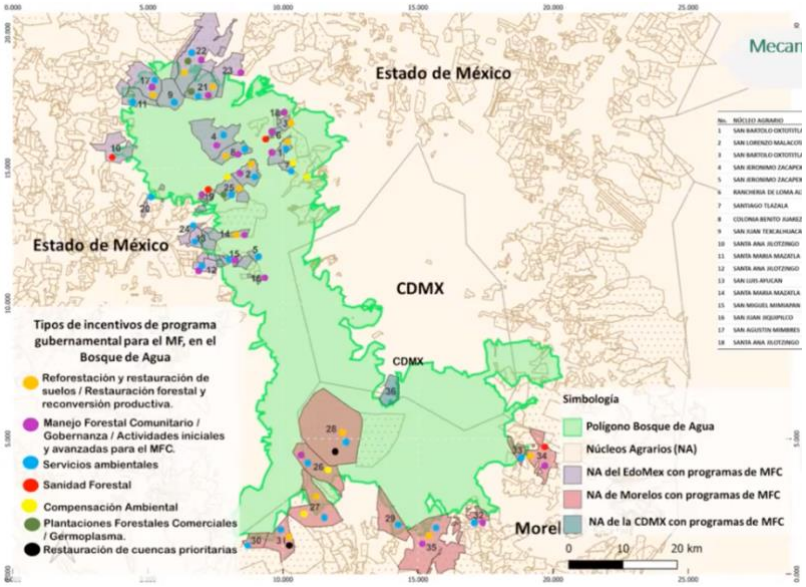


Figure 8. Map showing the Great Water Forest. Bosque Del Agua. Source: Educación ambiental Bosque de Agua, 2024.

The Bosque Del Agua harbours approximately 2% of global biodiversity and serves as a vital water resource, with plants like Abies religiosa playing a crucial role in water capture (NC2). Moreover, the area is home to four indigenous groups – the Mazau, Otomi, Mexica, and

Tlahuica – each with unique cultural and ecological perspectives. For instance, the Otomi's historical relationship with the mountain is emblematic of their spiritual and practical connection to nature, as the mountain itself serves as their 'pyramid'.

Central to the Water Forest initiative's objectives is the aspiration to establish the Bosque Del Agua as a federally protected area (NC2), which would afford it greater conservation status and access to funding. This move is seen as essential not only for environmental protection but also for securitizing the area, positioning it as a matter of national security. Addressing pressing environmental challenges such as water scarcity and evaporation due to heat islands, the initiative advocates for greening strategies as a means of mitigating these issues.

However, the initiative also confronts significant challenges related to forest management and water treatment. Inadequate afforestation practices, including the indiscriminate planting of trees in wetlands (NC2), highlight the need for a landscape-based approach to tree planting. Moreover, issues with the functionality and maintenance of water treatment plants underscore the importance of holistic and sustainable infrastructure management practices (UP1). Overall, the Water Forest initiative exemplifies a concerted effort to integrate ecological conservation, cultural preservation, and community engagement in the pursuit of multispecies justice.

b) Private Enterprise: Axolotitlan

The private initiative Axolotitlan stands as a unique endeavour in the landscape of conservation efforts in CDMX, driven by the vision of its founder, Axolotl Sanctuary Founder (ASF). Unlike traditional conservation projects primarily catering to researchers and policymakers, Axolotitlan aims to engage ordinary people, civil society, and children, providing them with an opportunity to interact with and be inspired by the fascinating axolotls. With an affordable entrance fee of 50 pesos, Axolotitlan attracts a considerable number of visitors, sometimes reaching up to 400 individuals per day.

Functioning as a sanctuary, Axolotitlan serves as a refuge for abandoned axolotls and those from researchers at universities who lack the resources to care for them post-experimentation. Prior to the pandemic, Axolotitlan collaborated with Xochimilco, but such partnerships have been suspended to prevent potential contamination. Despite being the largest axolotl sanctuary, Axolotitlan operates independently without a centralized initiative connecting other sanctuaries, highlighting a broader issue of decentralized information and nature management in CDMX.

Financed entirely as a private enterprise, Axolotitlan sustains itself through ticket sales, brand collaborations, a souvenir shop, and an eco-friendly canteen. Notably, the initiative receives no government support, although the Alvaro Obregon municipality assists with marketing and advertising. This independence from government influence allows ASF to pursue her vision without bureaucratic constraints, emphasizing a different approach to conservation rooted in civil engagement and inspiration.

One of Axolotitlan's innovative initiatives was an art exhibition titled "50 Axolotls for 50 Pesos" in 2021 (*see Appendix I*), coinciding with the release of a new 50 peso note featuring the axolotl. Artists were invited to explore the cosmological significance of the axolotl, reflecting its deep-rooted connection to Mexican identity and cultural traditions such as the Day of the Dead, where axolotls are believed to guide spirits to the afterlife.

ASF views Axolotitlan as a platform for advancing multispecies justice through conscious and inspirational work, fostering greater awareness and appreciation of nature among the public. By offering a space for meaningful interactions with axolotls and showcasing their cultural

significance, Axolotitlan contributes to a broader dialogue on conservation and the interconnectedness of humans and nature.

c) Youth initiative: CamBIO Colectivo

CamBIO is a youth initiative founded by university students in 2016 out of a need to address sustainability gaps on campus. Despite initially focusing on university activities, including campaigns, waste management, and educational initiatives, the group expanded its reach beyond campus boundaries, collaborating with various universities and engaging in city-wide environmental projects post-COVID. Notably, their efforts extend to forest restoration in the Barranca of Santa Fe, axolotl conservation education, and reforestation projects using the Miyawaki method (Suzuki Shin'ichi, 2022). Funding sources include grants from international organizations, community contributions, and corporate partnerships for team-building activities. While open to collaboration with the government for legitimization, CamBIO emphasizes the importance of local community involvement for sustainability. Their work reflects a commitment to multispecies justice by addressing the city's ecological imbalances while fostering public awareness and action toward environmental stewardship (Cambio Colectivo, 2023).

Additionally, the group advocates for the restoration of ravines and rivers, the establishment of urban gardens, and increased tree planting efforts. They recognize the importance of local communities and NGOs in maintaining long-term environmental projects, given the challenges posed by changes in government administrations (YIF). Furthermore, they highlight the gap between Mexico's robust environmental legislation and its implementation, stressing the need for direct citizen participation to overcome this hurdle. CamBIO sees multispecies justice as encompassing the well-being of various organisms, including endemic species like axolotls, and emphasizes the importance of controlling invasive species to preserve local biodiversity. Despite a disconnect from nature in CDMX, the group sees a growing willingness among people to engage in environmental efforts, catalysed by water crises and increased awareness of environmental dependence. In this context, initiatives like CamBIO play a vital role in bridging the gap between environmental awareness and tangible action.

d) Traditional/Indigenous Agriculturists

The perspectives of traditional agriculturists (TA) from Milpa Alta and Xochimilco (*Map in Appendix II*) offer profound insights into multispecies justice (MSJ), rooted in their intimate connection with the land and ecosystems they inhabit.

In Milpa Alta, TA1 exemplifies the symbiotic relationship between human activities and natural cycles, demonstrating a nuanced understanding of biodiversity and ecological dynamics. His advocacy for preserving traditional agricultural practices underscores the importance of communal land ownership under the ejido system (Mexlaw, 2017) in resisting urban encroachment and preserving cultural heritage. Additionally, TA1's vision of urban transition highlights the need for harmonizing rural and urban landscapes to restore ecological equilibrium and promote sustainable development.

In Milpa Alta, TA1's journey back to the land after receiving a university education reflects a deep-seated desire to reconnect with his cultural heritage and the natural environment. Despite economic challenges and demographic shifts favouring urbanization, his commitment to traditional agricultural practices underscores the resilience of rural communities in preserving

their way of life. The ejido system, characterized by communal land ownership, emerges as a vital mechanism for safeguarding local autonomy and resisting external pressures.

TA1's profound connection with nature is evident in his intimate understanding of ecological cycles and the delicate balance between human activities and environmental dynamics. His advocacy for agrobiodiversity and participation in reforestation initiatives highlights the importance of traditional knowledge in promoting sustainable land management practices. Moreover, his cultivation of pre-Hispanic crops like amaranth and maize embodies a commitment to ancestral traditions and ecological resilience.

Furthermore, TA1's vision of urban transitions as moments of rupture underscores the disconnection between urban and rural realities and the need for holistic approaches to environmental sustainability. His critique of monocultures and the green revolution reflects a deep-seated commitment to promoting agricultural diversity and resilience in the face of changing climatic conditions.

In considering the perspective of multispecies justice (MSJ), TA1 acknowledges the inherent complexities of human-nature relationships and the need for holistic approaches to environmental conservation. His reflections on the legal identity of the earth and the role of humans as stewards of the environment underscore the importance of reimagining human-nature relationships in ways that promote harmony and coexistence.

Additionally, the presence of non-endemic bees in Mexico which pollinate endemic flora underscores nature's ability to adapt and self-regulate, despite the introduction of foreign species, as with the migratory pelicans consuming the invasive tilapia in Xochimilco. This observation reflects a broader theme of nature rebalancing and regulating itself, even in the face of anthropogenic disturbances. Moreover, TA1's acceptance of non-endemic species for planting emphasizes the multifunctionality of different flora and fauna, challenging conventional notions of conservation and production. Furthermore, traditional agricultural practices like the use of Mexcite plants to bring nutrients and water from deep within the earth demonstrate the interconnectedness of human activities and ecological processes, highlighting the importance of sustainable land management.

In addressing the challenges of transition, TA1 emphasizes the importance of synchronizing nutrient cycles between urban and rural areas and fostering greater reciprocity between human activities and natural processes. The importance of soil in sustainable agriculture and ecosystem health cannot be overstated. As emphasized by TA1, the nutrient and soil cycle must be synchronized to ensure the fertility and productivity of the land. Soil serves as the foundation of terrestrial ecosystems, playing a crucial role in nutrient cycling, water retention, carbon sequestration, and supporting microbiodiversity (Lehmann et al., 2020). Effective soil management is essential, as it not only benefits plant health but also influences the overall ecological balance. Furthermore, integrating old and new techniques in soil conservation and management is imperative for sustainability, highlighting the need for a holistic approach that bridges rural and urban practices. Encouraging communal vegetable gardens and composting initiatives, as advocated by TA1, fosters direct engagement with nature while promoting organic waste recycling and nutrient cycling. Addressing the current deficiencies in the nutrient cycle, water management, and waste disposal systems is essential for achieving a more circular and sustainable approach to land use and resource management. By prioritizing soil health and implementing effective management strategies, communities can enhance agricultural productivity, mitigate environmental degradation, and foster greater harmony between human activities and natural ecosystems.

Furthermore, TA1's recognition of humans as both agents of environmental degradation and potential catalysts for positive change underscores the imperative to foster harmony and coexistence with the natural world. Ultimately, embracing MSJ entails not only reimagining human-nature relationships but also striving for collective action and ecological stewardship grounded in mutual respect and reciprocity.

Similarly, in Xochimilco, TA2 emphasizes the significance of ancestral knowledge and holistic approaches to agriculture, rejecting monocultures in favour of diverse, sustainable farming methods. TA2's observations on the impact of colonial knowledge and the need to bridge traditional and scientific knowledge systems underscore the importance of incorporating indigenous wisdom into contemporary environmental stewardship efforts. TA2's deep connection to the cycles of nature and adherence to pre-Hispanic farming methods reflect a profound respect for traditional ecological knowledge. European agricultural practices, upon their introduction, prioritized speed and productivity over nutrient recycling, diverging from indigenous approaches, as exemplified by TA1's regenerative views on soil and nutrient regeneration. Furthermore, TA2's reflections on the impact of urbanization and migration on land use patterns highlight the need for holistic approaches to urban-rural planning that prioritize ecological integrity and cultural preservation. The displacement, migration, and movement of populations exert significant influence on the landscape, altering notions of place attachment and belonging, consequently affecting environmental dynamics. His emphasis on the need for educational reform to incorporate hands-on, experiential learning underscores the transformative potential of reconnecting with nature.

TA2 emphasized that there is a pressing need for the city to reassess the value of ecosystems within its confines. Furthermore, interviewees TA1, TA2, TA3 all underscored the vital importance of acquiring an in-depth understanding of nature to facilitate its preservation. Additionally, discussions during the interviews revealed a consensus on the significance of exploring ways to foster social interactions and communication with the natural environment, underlining the importance of the MSJ perspective. Moreover, interviewees highlighted the role of food production and agriculture as pathways for establishing meaningful connections with nature.

In a field study conducted with TA2, it was observed that composting practices entail a multi-layered process involving diverse organic and mineral components. Sediment and lime sourced from the canal bed, alongside carbon charcoals, eggshells, and ashes, contribute essential nutrients to the compost. Additionally, organic materials such as wood chips, leaves, dried grass, and plant matter are incorporated into the compost mixture. Notably, exchanges with local boat artisans provide supplementary resources, such as seeds in exchange for wood chips. This intricate blend of organic and mineral elements results in a nutrient-rich compost 'cake', further enriched by the inclusion of invasive aquatic plant species (*see Appendix I*).

TA2 emphasized the importance of valuing ancestral knowledge for MSJ alongside scientific understanding, advocating for a unified knowledge system that bridges the gap between the two. He highlighted the transformative potential of activities that integrate traditional and scientific knowledge, like gardening and farming, to create a deeper connection to identity and purpose. Furthermore, TA2 underscored the need for experiential learning, suggesting a shift in the education system towards hands-on experiences that transcend the confines of a laboratory, promoting interdisciplinary approaches and cross-pollination of ideas among individuals, including older generations, to catalyse positive change.

Furthermore, TA3's perspective on ecological justice underscores the interconnectedness of human actions and environmental health, advocating for a holistic understanding of nature as a living organism. Her metaphorical portrayal of Mother Earth as a body highlights the need for collective responsibility and cooperation in nurturing and preserving natural ecosystems. She emphasized the concept of "equilibrio" (balance) as fundamental, advocating for a *reciprocal* relationship with Mother Earth, wherein humans give back to the natural world. Integral to this ethos is the practice of "siembra," which underscores the importance of planting and cultivating, alongside composting and water purification efforts. TA3 expressed concerns about the limited scope of vision exhibited by large corporations and pharmaceutical companies, highlighting their failure to consider the holistic environmental cycle. Moreover, she stressed the necessity of fostering awareness of nature and actively engaging in the natural world. A critical observation made by TA3 was the tendency of modern society to prioritize convenience over environmental stewardship, obstructing the Earth's ability to "breathe" under layers of concrete. Drawing an analogy between Mother Earth and the human body, she likened trees to lungs, the Earth's nucleus to a heart, volcanoes to blood, and the sky to the head, emphasizing the interconnectedness and vitality of each component.

Furthermore, TA3 underscored the importance of communication and cooperation among individuals to promote shared perspectives and worldviews. She advocated for the exchange of ideas and the sharing of stories to foster a deeper understanding of humanity's relationship with the environment. Overall, TA3's insights shed light on the urgent need for collective action and mindful stewardship to achieve ecological equilibrium and promote sustainability.

Overall, the perspectives of traditional agriculturists underscore the importance of holistic, community-centred approaches to environmental conservation and highlight the potential for indigenous wisdom to inform contemporary sustainability efforts. Their insights offer valuable lessons for fostering multispecies justice and nurturing harmonious relationships between humans and the natural world.

6 Discussion

The discussion of this research delves into several key areas, shedding light on the theoretical and practical implications and limitations of the study while addressing the broader context of urban greening initiatives in CDMX.

The findings of this research provide significant insights into the role of urban greening in promoting multispecies justice in Mexico City. By focusing on a single case study, this research highlights the complexity and richness of urban greening initiatives and their potential to foster social and ecological justice. This study contributes to the existing debate by bringing forward the often-overlooked perspectives of the Global South, offering a nuanced understanding that is essential for comprehensive sustainable development.

The mix of theories used to conceptualize multispecies justice, whilst seemingly 'eclectic', allowed for a holistic approach that underscored the interconnectedness of social and ecological justice. While a single theoretical lens might have provided a more in-depth exploration of specific concepts, the interdisciplinary approach employed here served as a bridging exercise, illustrating the interdependence of various justice dimensions.

Firstly, the study's findings highlight the challenge of achieving multispecies justice (MSJ) within the city, revealing a disparity between the theoretical framework laid out by initiatives like the Plan Verde and their practical implementation. Despite efforts to promote urban greenery, the fragmented nature of these initiatives and the unequal distribution of resources underscore the need for a more cohesive and inclusive approach. As articulated by Pineda-Pinto et al. (2023) (Pineda-Pinto, M., Frantzeskaki, N. & Raymond, C.M., 2023)and Chao et al. (2022), the tangible manifestations of injustice often overshadow the pursuit of justice, emphasizing the importance of community-based participatory research initiatives in amplifying the voices of marginalized groups impacted by environmental racism. Such problems are structural and notoriously difficult to tackle, but when cities fail to address entrenched social and racial inequalities(Bremer et al., 2021; Tozer et al., 2020)) it can 'prevent them from ensuring the co-creation and co-protection of diverse uses, preferences, and identities linked to nature, eventually undermining how attached and connected people feel towards such spaces'(Tozer et al., 2020). The research underscores the importance of including diverse perspectives, particularly those from underrepresented groups such as traditional agriculturalists and indigenous communities, something which has been done in other parts of the world like Australia (Bush & Doyon, 2023). These insights are critical for developing a more inclusive and equitable framework for urban greening and sustainable development.

Furthermore, the findings touch only slightly on the emergent forms of solidarity and sociality among communities and animals facing intertwined forms of oppression. The desire for a world free from constraints such as walls and borders underscore the need for collective action and (interspecies) alliance-building, as highlighted by Chao et al. (2022). However, as emphasized by Murray et al. (2022), navigating the complexities of interdisciplinary collaboration poses a significant challenge due to differing priorities and funding structures. Nonetheless, a multidisciplinary, community-focused approach remains essential for advancing One Health goals and promoting social cohesion within urban environments. Indeed, focusing on the commonalities of stakeholders and citizens like identity-based placemaking (Bush et al., 2020) as well as the construction of a 'commons', be it 'a common non-excludable resource', such as '(green) infrastructures and artifacts' or 'intangibles such as skills, methods, and values', has proven to be 'transformative' for living harmoniously with humans and nature (Mejía, M. A., Amaya-Espinel, J. D. (eds.), 2022).

Moreover, the findings underscore the importance and value of decolonial practices in urban governance and stewardship programs. Sekulova et al. (2021b) emphasize the need to address structural divisions and inequalities inherent in current governance frameworks, advocating for deeper forms of engagement with nature rooted in justice. Li et al. (2021) further highlights the potential of NbS to foster social cohesion and wellbeing yet underscore the need for coordinated information systems and inclusive planning processes, as confirmed in the findings. Also, Cellermajer et al. mention that to advance MSJ we must look at indigenous perceptions of nature and the MTH realm to 'challenge dominant understandings of human and non-human relations', as indigenous understandings of interconnectivity produce 'obligations to respect not just the individual but everything […] living, ancestor, spirit, future beings, and material' , making them good 'environmental defenders'(Celermajer et al., 2021), something which was echoed in the perspective of the traditional agriculturalists in CDMX, but also featured in the shortcomings of the Altepetl initiative.

In light of these insights, the study underscores the imperative for coordinated action and inclusive governance structures to ensure the equitable distribution of urban green spaces and the promotion of multispecies justice in CDMX.

Employing Case-Based Research (CBR) methodology has both strengths and limitations. According to Bellamy (2011), CBR encourages an iterative dialogue between theory and empirical evidence, allowing researchers to adapt and refine theoretical frameworks considering new data. This flexibility is a significant advantage, enabling the study to remain responsive to emerging insights and complexities. However, as Bellamy (2011) notes, the challenge of generalizing findings from single or small-N designs can lead researchers to overemphasize the unique aspects of their case studies, potentially limiting their contributions to broader theoretical development. In this study, the focus on a single case—Mexico City—provides deep, context-specific insights but may not fully capture the diversity of experiences in other urban settings.

The conclusions drawn from this thesis reveal a critical reflection on the entire research process, encompassing methodological choices and the outcomes derived from it. It is imperative to acknowledge that this study focused solely on one city, thus limiting the generalizability of its findings to broader contexts. Additionally, the constrained timeframe of one month allocated for data collection might have impacted the depth and breadth of the research. Moreover, considering the relatively concise length of the thesis, spanning 55 pages, there exists the potential for more in-depth analysis in future investigations. These factors underscore the need for caution when generalizing the findings and conclusions of this study to other settings, emphasizing the importance of further research to validate and extend the insights gained herein. Despite these limitations, the study's findings are valuable, particularly in highlighting underrepresented perspectives from the Global South. The research sheds light on the unique challenges and opportunities in promoting multispecies justice in urban environments, emphasizing the need for inclusive and context-sensitive approaches.

Overall, this research makes a meaningful contribution to the discourse on urban greening and multispecies justice, emphasizing the importance of interdisciplinary approaches and the inclusion of diverse, often marginalized perspectives in the quest for sustainable development.

7 Conclusion

The conclusion restates the research questions (RQs) and summarizes the findings, emphasizing their contributions to the existing discourse on multispecies justice and urban greening. By revisiting the primary objectives, this section highlights the study's insights and significance, particularly the inclusion of underrepresented perspectives from the Global South. The thesis ends with expressing the practical policy implications which can be gleaned from the findings, and, finally, branches out into potential areas of future research.

7.1.1 Key findings

RQ1: To what extent are urban greening initiatives in CDMX ecologically just? How do humans and nature co-exist in the city?

The analysis of urban greening initiatives in CDMX through the lens of multispecies justice underscores several key findings. While initiatives such as the Plan Verde demonstrate positive steps towards ecological justice, their implementation often falls short, revealing inconsistencies and contradictions within governmental approaches across different areas of the city. Furthermore, the unequal treatment of various animal species highlights the need for a decolonial perspective that recentres indigenous knowledge in addressing multispecies justice.

The exploration of capabilities, recognition, and intersectional justice reveals areas for improvement in promoting multispecies justice in urban environments. Enhancing connections between humans and nature, as well as considering the wider geo-ecological context of CDMX beyond the city, can contribute to more just outcomes. To fully tap into the potential of urban gardens, it is imperative to perceive the city as a unified organism and grasp its intricate links to the surrounding environment, and to spread this awareness amongst citizens. Enhancing capabilities involves fostering greater interconnectedness, both within the city as well as in its wider surroundings, emphasizing the importance of considering the broader context of CDMX, akin to understanding the intricate dynamics of the Great Water Forest.

Active engagement and participation of the local community are crucial for realizing this vision and fostering sustainable urban ecosystems. Moreover, recognition entails acknowledging diverse facets of nature while striving to develop a shared framework of indicators to better measure ecological well-being.

Furthermore, the study reveals the significance of community involvement and interdisciplinary collaboration in promoting MSJ. Local communities emerge as key stakeholders in environmental governance, ensuring continuity and contributing to a sense of identity and belonging which us crucial to MSJ. Additionally, the research highlights the need for a paradigm shift in education towards experiential learning and hands-on approaches, both in schools and universities, to foster a deeper connection with nature.

Ultimately, the conclusion drawn from the analysis suggests the need for a paradigm shift in urban governance towards a more holistic and inclusive approach that acknowledges the interconnectedness of human and more-than-human worlds. By prioritizing the voices and needs of both human and non-human inhabitants, urban greening initiatives can promote a more equitable and sustainable coexistence in the city.

RQ2: How is multispecies justice governed in CDMX within the urban nature perspective?

The notion of multispecies justice in CDMX reflects a complex interplay of diverse perspectives and approaches towards governing nature. Disparities exist in the recognition of various forms of nature, indicating the need for a more coordinated and decolonial approach to governance. The research underscores the importance of integrating traditional indigenous knowledge into higher levels of governance to promote a more holistic and inclusive approach to ecological justice.

Whilst the Rights of Nature legislation serves as a promising framework to establish norms and values, coordinated action from all sectors of society is crucial for its effective implementation. In terms of legal practicalities, a nuanced approach of tailoring legislation to specific animal or species requirements proves more effective than relying on overarching and abstract conceptualizations of nature; concurrently, it is imperative to address the numerous contradictions inherent within existing legal frameworks. Furthermore, although legal restrictions set forth new benchmarks and can be good guiding principles for MSJ, they need to be coupled with wider societal changes to effectively address systemic injustices. While laws lay the groundwork for resistance, genuine transformative progress necessitates societal awareness and consensus and a unified effort to challenge current dominant speciesist norms.

The hybrid governance approach, emphasizing interdisciplinary collaboration and community participation, emerges as a potential solution to bridge the gaps between policy intent and on the ground realities in achieving multispecies justice. Moreover, recognizing the importance of local communities, embracing a decolonial approach, and integrating intersectional justice principles are essential for reevaluating nature and fostering a deeper connection between humans and the environment. Security and financing are also crucial factors to ensure the success of community-led initiatives. Moving forward, the city should adopt a pluriversal perspective, embracing multi and trans-disciplinarity as well as recognising and promoting the interplay between the diverse viewpoints on MSJ, and promoting collective efforts across various sectors to ensure a more just and sustainable urban environment for all species.

The holistic perspective of urban sustainability necessitates a deeper understanding of the city as an interconnected organism, where the balance between consumption and nutrient replenishment is crucial. Moreover, adopting the One Health analogy highlights the significance of promoting healthy food choices within urban environments, acknowledging the intricate relationship between human health and environmental well-being. In this regard, the intricate dynamics of the water and soil cycle emerge as pivotal considerations, underscoring the need for sustainable (waste) management practices to maintain ecosystem health.

Indicators, encompassing the health of soils, ecosystems, and biodiversity/species richness, serve as essential tools for assessing and monitoring the overall ecological integrity of urban landscapes, akin to the diverse microflora and bacterium within our own bodies, advocating for a comprehensive approach to ecosystem health evaluation. Establishing a common platform or arena for knowledge exchange and developing better indicators of MSJ can facilitate this collaborative effort, enabling stakeholders to collectively reimagine and revalue nature within urban landscapes.

Furthermore, fostering coexistence among diverse worlds within the city, necessitates identifying and bridging existing gaps through place-based strategies that cultivate a sense of belonging and interconnectedness among stakeholders. Additionally, recognizing the intrinsic value of mythology, language, and culture in preserving the human-nature connection, as exemplified by the revered status of the axolotl, underscores the importance of integrating

indigenous knowledge and value systems into urban environmental governance frameworks. Emphasizing the significance of local communities in driving environmental initiatives, particularly amidst governmental limitations and crises such as water scarcity, underscores the resilience and agency of grassroots efforts in effecting meaningful change.

Moreover, addressing the implications of urbanization and migration on local cosmovisions of nature underscores the imperative of reconnecting city dwellers with the physical land, for example through urban gardening, fostering a profound sense of stewardship and respect for the environment. Ultimately, embracing the physicality and presence of nature within urban landscapes underscores the experiential dimension of ecological consciousness, advocating for diverse green spaces and urban gardens that promote tangible interactions with the natural world.

Recognizing MSJ as a collective endeavour, involving collaboration across diverse sectors and stakeholders, underscores the need for interdisciplinary forums and transdisciplinary approaches to bridge gaps and foster inclusive decision-making processes. Highlighting the discourse on collaborative environmental governance at regional platforms like the IUCN conservation forum underscores the imperative of alliances among Latin American countries and the integration of civil, academic, and private initiatives alongside top-down approaches, reflecting a holistic approach to advancing MSJ in urban environments.

…

In conclusion, the thesis emphasizes the urgency of taking tangible actions to address ecological injustices in urban environments. It advocates for interdisciplinary forums and collaborative efforts among diverse stakeholders to bridge gaps in governance and promote a pluriversal approach to MSJ. Ultimately, the findings suggest that MSJ should be a collective endeavour, requiring coordination and cooperation across different sectors to ensure a harmonious relationship between humans and the more-than-human world. Reimagining urban nature as a harmonious integration with the living world suggests a departure from the traditional notion of balance towards embracing a harmonious dynamic interplay of ecosystems within cities. Urgency underscores the final message: action must be taken promptly, with tangible, real-world solutions. While there is no singular blueprint for addressing multispecies justice in urban environments, the imperative lies in collective action and proactive engagement. As we navigate the complexities of urban ecosystems, the act of moving forward, of living and adapting, as life and nature does, becomes our most potent means of realising meaningful change.

7.1.2 Policy Implications

In terms of practical suggestions, the findings of this study hold significant implications for both policymakers and practitioners involved in urban planning and environmental management. Firstly, fostering a multispecies justice (MSJ) perspective requires a holistic approach that acknowledges the interconnectedness between humans and the more-than-human world, as well as the interconnectedness of green spaces in and around the city. A key aspect in fostering this perspective lies in recognizing and nurturing connections between humans and nature, particularly through the lens of soil and food systems. Urban gardens, such as huertos, serve as crucial spaces for cultivating such connections, providing opportunities for local communities to engage with nature and participate in the co-creation of green spaces within the city.

From a legal perspective, more efforts need to be made to address the contradictions in the laws concerning urban nature. Also, there needs to be a more comprehensive approach regarding the security and financing needed to ensure the sustained success of grassroot community initiatives.

Also, while the current government in CDMX has shown awareness of the importance of including local communities in urban greening initiatives, there is room for improvement. A more decolonial approach needs to be taken to ensure that the perspectives and lives of indigenous and local communities are treated with full respect and dignity. The focus on trees and pollinators needs to be expanded to encompass a broader range of perspectives and disciplines, including agriculture, policy, and urban planning. Moreover, there is a need to prioritize the restoration of blue infrastructure, such as water systems and canals, alongside green infrastructure projects. This integration of different perspectives and disciplines is essential for fostering a sense of belonging and identity among urban residents, thereby promoting placemaking and enhancing community resilience.

Additionally, the study highlights the importance of creating "Third Spaces," such as nature spaces and animal sanctuaries, where diverse cosmovisions can be shared and ideas can cross-pollinate. This process of revaluation, changing value systems, and increasing awareness of our actions and their impacts is crucial for fostering a green transition in urban environments. Rather than attempting to return to a lost state, the focus should be on creating new relationships and forging connections between humans and the more-than-human world, allowing for the coexistence of diverse species within the urban landscape.

7.1.3 Areas and Recommendations for Future Research

In the academic realm, these findings underscore the need for further research and exploration into the complex dynamics of multispecies justice in urban environments. Future studies should delve deeper into the policy instruments required to effectively represent more-than-human interests, as well as understanding deeper what these are and how best to represent/interpret them and integrate them into urban planning and implementation processes. By expanding our understanding of these issues and working towards practical solutions, we can contribute to the creation of more just and sustainable urban environments for both humans and non-human beings alike.

The present study contributes to the existing body of literature by offering insights into the complexities of multispecies justice in urban environments, particularly within the context of Mexico City. By examining the intersection of human and more-than-human interests, the research sheds light on the need for a holistic approach to urban planning that recognizes the agency of nature and fosters meaningful connections between diverse stakeholders. Additionally, the study highlights the importance of adopting a One Health approach, while also acknowledging the role of anthropocentrism in shaping policy and discourse.

Moving forward, future research in this area could explore the implications of different classifications of natural areas on the agency and valuation of nature, as well as the tensions between traditional conservation efforts and the need for innovative approaches in urban green spaces. Also, more attention could be given to the blue spaces, habitats, and infrastructures and how they interact woth urban greening and MSJ. Methodologically, there is a need for improved information access and knowledge sharing platforms, such as urban living labs or common online platforms, to facilitate the exchange of best practices and lessons learned from various cities around the world.

Furthermore, in natural sciences, there is a pressing need to address gaps in understanding the impacts of invasive species on urban ecosystems and the potential for self-regulation within natural systems. Social science studies could then further theorise on how better to mitigate multispecies justice considering such findings. Future studies could also explore the concept of ecological transitions and future visions for Mexico City, with multispecies justice becoming

one dimension to critically reflect upon, perhaps even considering "futuring" as a new professional discipline which combines knowledge and perspectives from the natural and social sciences, under the lens of advancing multispecies justice. Ultimately, building bridges between different sectors, disciplines, and communities will be essential for advancing the goal of multispecies justice and creating more equitable and sustainable urban environments for all.

8 Bibliography

Alcántara-Ayala, I., Lucatello, S., & Rodríguez-Velázquez, D. (2023). Can we pull resilience from the rubble? Experiencing earthquakes in Mexico City. *Natural Hazards*. https://doi.org/10.1007/s11069-023-05924-z

Ambiental, C. (n.d.). *¡Por más mujeres polinizadoras!* [SEDEMA]. Retrieved 25 May 2024, from http://data.sedema.cdmx.gob.mx:8081/culturaambiental/index.php/opciones-de-cultura-ambiental/blog/mujeres-polinizadoras

Amorim-Maia, A. T., Anguelovski, I., Chu, E., & Connolly, J. (2022). Intersectional climate justice: A conceptual pathway for bridging adaptation planning, transformative action, and social equity. *Urban Climate*, *41*, 101053. https://doi.org/10.1016/j.uclim.2021.101053

Anguelovski, I., Brand, A. L., Connolly, J. J. T., Corbera, E., Kotsila, P., Steil, J., Garcia-Lamarca, M., Triguero-Mas, M., Cole, H., Baró, F., Langemeyer, J., Pulgar, C. P. del, Shokry, G., Sekulova, F., & Ramos, L. A. (2020). Expanding the Boundaries of Justice in Urban Greening Scholarship: Toward an Emancipatory, Antisubordination, Intersectional, and Relational Approach. *Annals of the American Association of Geographers*. https://www.tandfonline.com/doi/abs/10.1080/24694452.2020.1740579

Anima Mundi Law Initiative. (2021). *Rights of Nature Case Study Nature (Mexico City)*. http://files.harmonywithnatureun.org/uploads/upload1135.pdf

Apfelbeck, B., Snep, R. P. H., Hauck, T. E., Ferguson, J., Holy, M., Jakoby, C., Scott MacIvor, J., Schär, L., Taylor, M., & Weisser, W. W. (2020). Designing wildlife-inclusive cities that support human-animal co-existence. *Landscape and Urban Planning*, *200*, 103817. https://doi.org/10.1016/j.landurbplan.2020.103817

Arturo Escobar. (2018). *Designs for the Pluriverse*. Duke University Press. https://www.dukeupress.edu/designs-for-the-pluriverse

Athope, D. (2021). *Animism: A belief among some indigenous people, young children, or all religious people! | Damien Marie AtHope*. https://damienmarieathope.com/2021/04/animism-a-belief-among-some-indigenous-people-young-children-or-all-religious-people/

Australian Earth Laws Alliance. (n.d.). Bolivia—National rights of nature legislation. *Australian Earth Laws Alliance*. Retrieved 6 December 2022, from https://www.earthlaws.org.au/aelc/rights-of-nature/bolivia/

Ayala-Azcarraga, C., Diaz, D., Fernandez, T., Cordova-Tapia, F., & Zambrano, L. (2023). Uneven Distribution of Urban Green Spaces in Relation to Marginalization in Mexico City. *Sustainability (Switzerland)*, *15*(16). https://doi.org/10.3390/su151612652

Baumeister, H., & Hornberg, C. (2016). Gesundheitsförderliche Potenziale von Stadtnatur für jedermann. *Public Health Forum*, *24*(4), 261–264. https://doi.org/10.1515/pubhef-2016-2094

Bellamy, C. (2011). *Principles of Methodology: Research Design in Social Science*. SAGE Publications, Limited. http://ebookcentral.proquest.com/lib/lund/detail.action?docID=820054

Benton-Short, L., & Short, J. R. (2013). *Cities and Nature* (2nd ed.). Routledge. https://doi.org/10.4324/9780203103500

Beretta, I. (2012). Some Highlights on the Concept of Environmental Justice and its Use. *E-Cadernos CES*, *17*, Article 17. https://doi.org/10.4000/eces.1135

Bremer, L. L., Keeler, B., Pascua, P., Walker, R., & Sterling, E. (2021). Chapter 5—Nature-based solutions, sustainable development, and equity. In J. Cassin, J. H. Matthews, & E. L. Gunn (Eds.), *Nature-based Solutions and Water Security* (pp. 81–105). Elsevier. https://doi.org/10.1016/B978-0-12-819871-1.00016-6

Bulkeley, H., Schroeder, H., Janda, K., & Zhao, J. (2009). *Cities and Climate Change: The role of institutions, governance and urban planning*.

Busà, A. (2022). Urban Greening and Green Gentrification. In R. C. Brears (Ed.), *The Palgrave Encyclopedia of Urban and Regional Futures* (pp. 2016–2022). Springer International Publishing. https://doi.org/10.1007/978-3-030-87745-3_163

Bush, J., & Doyon, A. (2023). Planning a just nature-based city: Listening for the voice of an urban river. *Environmental Science & Policy*, *143*, 55–63. https://doi.org/10.1016/j.envsci.2023.02.023

Bush, J., Hernandez-Santin, C., & Hes, D. (2020). Nature in Place: Placemaking in the Biosphere. In D. Hes & C. Hernandez-Santin (Eds.), *Placemaking Fundamentals for the Built Environment* (pp. 39–61). Springer. https://doi.org/10.1007/978-981-32-9624-4_3

Calderón-Gamboa, J., & Recinos, J. D. (2022). *Inter-American approaches to the protection of the right to a healthy environment and the Rights of Nature and potential contributions to the European human rights system in: Journal of Human Rights and the Environment Volume 13 Issue 0 (2022)*. https://www-elgaronline-com.ludwig.lub.lu.se/view/journals/jhre/13/0/article-p86.xml

Cambio Colectivo. (2023). *Cambio Colectivo*. Cambiocolectivo. https://www.cambiocolectivo.com

Canonico, G., Arthington, A., Mccrary, J., & Thieme, M. (2005). The effects of introduced tilapias on native biodiversity. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *15*. https://doi.org/10.1002/aqc.699

Carse, A. (2012). Nature as infrastructure: Making and managing the Panama Canal watershed. *Social Studies of Science*, *42*(4), 539–563. https://doi.org/10.1177/0306312712440166

Castillo, chilango-S. N. (2018, October 14). *La desigualdad se vive hasta en la cantidad de parques públicos*. Chilango. https://www.chilango.com/noticias/reportajes/desigualdad-en-el-espacio-publico-en-la-cdmx/

CDMX Animal Save. (n.d.). *CDMX Animal Save*. CDMX Animal Save. Retrieved 27 May 2024, from https://www.cdmxanimalsave.org

Celermajer, D., Schlosberg, D., Rickards, L., Stewart-Harawira, M., Thaler, M., Tschakert, P., Verlie, B., & Winter, C. (2021). Multispecies justice: Theories, challenges, and a research agenda for environmental politics. *Environmental Politics*, *30*(1–2), 119–140. https://doi.org/10.1080/09644016.2020.1827608

Centro de Estudios de Derecho Animal Argentina – Centro de Estudios de Derecho Animal Argentina. (n.d.). Retrieved 15 May 2024, from https://centrodeestudiosderechoanimal.com.ar/

Chao, S., Bolender, K., & Kirksey, E. (Eds.) (with Clark, M. L. (M L.), Govindrajan, R., Ihar, Z., Ishiyama, N., Lara, E., Lee, J. H., Lyons, K. M., Marder, M., Paredes, A., Perez, C. S., & Tallbear, K.). (2022). *The Promise of Multispecies Justice*. Duke University Press.

Chao, S., & Celermajer, D. (2023). Introduction: Multispecies Justice. *Cultural Politics*, *19*(1), 1–17. https://doi.org/10.1215/17432197-10232431

Chatzimentor, A., Apostolopoulou, E., & Mazaris, A. D. (2020). A review of green infrastructure research in Europe: Challenges and opportunities. *Landscape and Urban Planning*, *198*, 103775. https://doi.org/10.1016/j.landurbplan.2020.103775

Climate Emergency Declaration. (2024, April 22). *Climate emergency declarations in 2,356 jurisdictions and local governments cover 1 billion citizens—Climate Emergency Declaration*. https://climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens/

Climate Policy Lab. (2020, August 17). *Looking Toward the Past and Future for Sustainable Solutions to Mexico City's Water Crisis*. Climate Policy Lab. https://www.climatepolicylab.org/communityvoices/2020/8/12/looking-toward-the-past-and-future-for-sustainable-solutions-to-mexico-citys-water-crisis

CONSTITUCIÓN POLÍTICA DE LA CIUDAD DE MÉXICO (2017).

Cousins, J. J. (2021). Justice in nature-based solutions: Research and pathways. *Ecological Economics*, *180*, 106874. https://doi.org/10.1016/j.ecolecon.2020.106874

de Souza, D. T., & Torres, P. H. C. (2021). Greening and Just Cities: Elements for Fostering a South–North Dialogue Based on a Systematic Literature Review. *Frontiers in Sustainable Cities*, *3*. https://doi.org/10.3389/frsc.2021.669944

DGB Group. (2023). *The top 10 green cities in the world*. https://www.green.earth/blog/the-top-10-green-cities-in-the-world

Dorst, H., van der Jagt, A., Raven, R., & Runhaar, H. (2019). Urban greening through nature-based solutions – Key characteristics of an emerging concept. *Sustainable Cities and Society*, *49*, 101620. https://doi.org/10.1016/j.scs.2019.101620

Dr Christine Winter, University of Otago, Dr Sria Chatterjee and Paul Mellon, Centre for British Art, Dr Susan Reid, University of Sydney Department of Gender and Cultural Studies, Hayley Singer, University of Melbourne, Professor Danielle Celermajer (Chair), Sydney

Environment Institute, & Sydney Environment Institute. (n.d.). *Capitalism, Colonialism and Multispecies Justice* [Broadcast].

Earth Law Center. (n.d.). *Earth Law Center | Champions for the Rights of Nature*. Earth Law Center. Retrieved 15 May 2024, from https://www.earthlawcenter.org/mexico

Earthgonomic México. (n.d.). *Earthgonomic México, A.C. | Primer Voluntariado Ambiental con Vitalmex, 2024*. Retrieved 31 May 2024, from https://earthgonomic.com/blog/primer-voluntariado-ambiental-con-vitalmex-2024-6638f562cfd78

Earth.Org. (2022, August 21). *The World's 10 Greenest Cities in 2021*. Earth.Org. https://earth.org/the-worlds-greenest-cities-in-2021/

Environment, M. A. & Nature. (2022, August 2). *Global South and Global North: What Are They & What's the Conflict?* Utopia. https://utopia.org/guide/global-south-and-global-north-what-are-they-whats-the-conflict/

Escobar, A. (2015). *Transiciones*: A space for research and design for transitions to the pluriverse. *Design Philosophy Papers*, *13*(1), 13–23. https://doi.org/10.1080/14487136.2015.1085690

Federal Ministry for Economic Cooperation and Development. (n.d.). *A green infrastructure plan for Mexico City*. Retrieved 15 May 2024, from https://www.connective-cities.net/en/news/a-green-infrastructure-plan-for-mexico-city

Fieuw, W., Foth, M., & Caldwell, G. A. (2022). Towards a More-than-Human Approach to Smart and Sustainable Urban Development: Designing for Multispecies Justice. *Sustainability*, *14*(2), Article 2. https://doi.org/10.3390/su14020948

First International Forum for the Rights of Mother Earth. (2016). *First International Forum for the Rights of Mother Earth*. http://files.harmonywithnatureun.org/uploads/upload663.pdf

Folke, C., Polasky, S., Rockström, J., Galaz, V., Westley, F., Lamont, M., Scheffer, M., Österblom, H., Carpenter, S. R., Chapin, F. S., Seto, K. C., Weber, E. U., Crona, B. I., Daily, G. C., Dasgupta, P., Gaffney, O., Gordon, L. J., Hoff, H., Levin, S. A., … Walker, B. H. (2021). Our future in the Anthropocene biosphere. *Ambio*, *50*(4), 834–869. https://doi.org/10.1007/s13280-021-01544-8

Garcia Ferrari, S., Morales, E. R., & Bain, A. A. (2022). Mexico City—Ambitions and Challenges of Integrated Risk Management in a Fractured Urban Planning Context. *Earth Science, Systems and Society*, *2*, 10059. https://doi.org/10.3389/esss.2022.10059

García López, G. A., & Navas, G. (2019). Eco-Imperial Relations: The Roots of Dispossessive and Unequal Accumulation. In I. Ness & Z. Cope (Eds.), *The Palgrave Encyclopedia of Imperialism and Anti-Imperialism* (pp. 1–24). Springer International Publishing. https://doi.org/10.1007/978-3-319-91206-6_28-1

Global Legal Group. (2024). *International Comparative Legal Guides* (United Kingdom) [Text]. International Comparative Legal Guides International Business Reports; Global Legal Group. https://iclg.com/practice-areas/environment-and-climate-change-laws-and-regulations/mexico

Gobierno de la Ciudad de México. (n.d.-a). *Altepetl Initiative*. https://altepetl.cdmx.gob.mx/

Gobierno de la Ciudad de México. (n.d.-b). *Especies para suelo urbano*. https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.sedema.cdmx.gob.mx/storage/app/media/3-especies-para-suelo-urbano-1.pdf&ved=2ahUKEwiEtJWlrJCGAxXtL0QIHXb0CKkQFnoECBUQAQ&usg=AOvVaw0Fhlp5TriXD5b8oILx028P

Gobierno de la Ciudad de México. (n.d.-c). *SEDEMA Ministry of the Environment*. https://sedema.cdmx.gob.mx/

Grant, A., Millward, A. A., Edge, S., Roman, L. A., & Teelucksingh, C. (2022). Where is environmental justice? A review of US urban forest management plans. *Urban Forestry & Urban Greening*, *77*, 127737. https://doi.org/10.1016/j.ufug.2022.127737

Grineski, S. E., Clark-Reyna, S. E., & Collins, T. W. (2016). School-based exposure to hazardous air pollutants and grade point average: A multi-level study. *Environmental Research*, *147*, 164–171. https://doi.org/10.1016/j.envres.2016.02.004

Guevara, S., Laborde, J., & Center for Environmental Philosophy, The University of North Texas. (2008). The Landscape Approach: Designing New Reserves for Protection of

Biological and Cultural Diversity in Latin America. *Environmental Ethics*, *30*(3), 251–262. https://doi.org/10.5840/enviroethics200830331

Guibrunet, L., Sanzana Calvet, M., & Castán Broto, V. (2017). Flows, system boundaries and the politics of urban metabolism: Waste management in Mexico City and Santiago de Chile. *Geoforum*, *85*, 353–367. https://doi.org/10.1016/j.geoforum.2016.10.011

Harriet Bulkeley & Michele Betsill. (2005). *Rethinking Sustainable Cities: Multilevel Governance and the 'Urban' Politics of Climate Change* [Environmental Politics, 14:1, 42-63]. https://doi.org/10.1080/0964401042000310178

Hayhoe, K. (2023). *One Planet, Two Crises: Tackling Climate Change and Biodiversity in the Fight for Our Future*. Scientific American. https://www.scientificamerican.com/article/one-planet-two-crises-tackling-climate-change-and-biodiversity-in-the-fight-for-our-future/

Hidalgo, C. (2024, March 14). *Saqueo y sequía, los grandes problemas del agua: Pedro Moctezuma*. Grupo Milenio. https://www.milenio.com/politica/saqueo-y-sequia-los-grandes-problemas-del-agua-pedro-moctezuma

Home page | The Convention on Wetlands, The Convention on Wetlands. (n.d.). Retrieved 16 May 2024, from https://www.ramsar.org/

Instituto Municipal de Planeacion. (n.d.). *Implan*. Retrieved 29 May 2024, from https://www.implan.gob.mx/

Instituto Municipal de Planeacion Guanajato. (n.d.). *INSTITUTO MUNICIPAL DE PLANEACIÓN – DE GUANAJUATO*. Retrieved 29 May 2024, from https://www.implanguanajuato.gob.mx/

Interview with Mario Schjetnan, FASLA | asla.org. (n.d.). Retrieved 2 April 2024, from https://www.asla.org/ContentDetail.aspx?id=21716

Islas-Camargo, A., Bohara, A. K., & Ramos, J. M. H. (2022). Economic disparities in pollution-related mortality in three municipalities of the Metropolitan Area of the Valley of Mexico. *Atmosfera*, *35*(4), 755–779. https://doi.org/10.20937/ATM.52962

IUCN. (2023). *Cities and nature* [Resource]. https://www.iucn.org/resources/issues-brief/cities-and-nature

IUCN Forum. (2024). *Chapultepec Park in Mexico City to host 2024 IUCN Regional Conservation Forum for Mexico, Central America, and the Caribbean—News | IUCN*. https://iucn.org/news/202308/chapultepec-park-mexico-city-host-2024-iucn-regional-conservation-forum-mexico-central

IUCN Urban Nature Indexes: Methodological framework and key indicators - IUCN Urban Alliance. (2020, July 7). https://iucnurbanalliance.org/tools_and_resources/resource-1/

Jaynes, C. H. (2022, November 5). *10 of the Greenest Cities in the World*. EcoWatch. https://www.ecowatch.com/greenest-cities-in-the-world.html

John W. Creswell - Department of Family Medicine, University of Michigan & J. David Creswell. (2022). *Research Design*. SAGE Publications, Inc. https://us.sagepub.com/en-us/nam/research-design/book270550

Kato-Huerta, J., & Geneletti, D. (2022). Environmental justice implications of nature-based solutions in urban areas: A systematic review of approaches, indicators, and outcomes. *Environmental Science & Policy*, *138*, 122–133. https://doi.org/10.1016/j.envsci.2022.07.034

Kato-Huerta, J., & Geneletti, D. (2023). Analysing the treatment of environmental justice and nature-based solutions in the Urban Climate Action Plans of Latin American metropolitan areas. *Local Environment*, *28*(11), 1388–1409. https://doi.org/10.1080/13549839.2023.2221431

Katumo, D. M., Liang, H., Ochola, A. C., Lv, M., Wang, Q.-F., & Yang, C.-F. (2022). Pollinator diversity benefits natural and agricultural ecosystems, environmental health, and human welfare. *Plant Diversity*, *44*(5), 429–435. https://doi.org/10.1016/j.pld.2022.01.005

Kellogg, S. (2021). *Urban Ecosystem Justice: Strategies for Equitable Sustainability and Ecological Literacy in the City*. Routledge. https://doi.org/10.4324/9780367858711

Legal Definition of Ecocide. (n.d.). Ecocide Law. Retrieved 25 May 2024, from https://ecocidelaw.com/definition/

Lehmann, J., Bossio, D. A., Kögel-Knabner, I., & Rillig, M. C. (2020). The concept and future prospects of soil health. *Nature Reviews Earth & Environment*, *1*(10), 544–553. https://doi.org/10.1038/s43017-020-0080-8

Li, L., Cheshmehzangi, A., Chan, F. K. S., & Ives, C. D. (2021). Mapping the Research Landscape of Nature-Based Solutions in Urbanism. *Sustainability*, *13*(7), Article 7. https://doi.org/10.3390/su13073876

Lome-Hurtado, A., Touza-Montero, J., & White, P. C. L. (2020). Environmental Injustice in Mexico City: A Spatial Quantile Approach. *Exposure and Health*, *12*(2), 265–279. https://doi.org/10.1007/s12403-019-00310-2

Loorbach, D., Wittmayer, J. M., Shiroyama, H., Fujino, J., & Mizuguchi, S. (Eds.). (2016). *Governance of Urban Sustainability Transitions: European and Asian Experiences*. Springer Japan. https://doi.org/10.1007/978-4-431-55426-4

Mabon, L., Barkved, L., de Bruin, K., & Shih, W.-Y. (2022). Whose knowledge counts in nature-based solutions? Understanding epistemic justice for nature-based solutions through a multi-city comparison across Europe and Asia. *Environmental Science & Policy*, *136*, 652–664. https://doi.org/10.1016/j.envsci.2022.07.025

Macpherson, E. (2021). The (Human) Rights of Nature: A Comparative Study of Emerging Legal Rights for Rivers and Lakes in the United States of America and Mexico. *Duke Environmental Law and Policy Forum*, *31*, 327–377.

Mahady, J. A., Octaviano, C., Araiza Bolaños, O. S., López, E. R., Kammen, D. M., & Castellanos, S. (2020). Mapping Opportunities for Transportation Electrification to Address Social Marginalization and Air Pollution Challenges in Greater Mexico City. *Environmental Science and Technology*, *54*(4), 2103–2111. https://doi.org/10.1021/acs.est.9b06148

Maller, C. (2021). Re-orienting nature-based solutions with more-than-human thinking. *Cities*, *113*, 103155. https://doi.org/10.1016/j.cities.2021.103155

Martinez, D. J., Cannon, C. E. B., McInturff, A., Alagona, P. S., & Pellow, D. N. (2023). Back to the future: Indigenous relationality, kincentricity and the North American Model of

wildlife management. *Environmental Science & Policy*, *140*, 202–207. https://doi.org/10.1016/j.envsci.2022.12.010

Mascarenhas, M. (2021). *Lessons in Environmental Justice: From Civil Rights to Black Lives Matter and Idle No More* (First Edition, 1–0). https://doi.org/10.4135/9781544321974

Megha Polavarapu. (2023, October 12). *Mexico City's Forests: The Rise In Logging And Its Implications*. International Relations Review. https://www.irreview.org/articles/2023/10/11/mexico-citys-forests-the-rise-in-logging-and-its-implications

Mejía, M. A., Amaya-Espinel, J. D. (eds.). (2022). *BiodiverCities by 2030: Transforming Cities with Biodiversity*. Alexander von Humboldt Biological Resources Research Institute.

Menton, M., Larrea, C., Latorre, S., Martinez-Alier, J., Peck, M., Temper, L., & Walter, M. (2020). Environmental justice and the SDGs: From synergies to gaps and contradictions. *Sustainability Science*, *15*(6), 1621–1636. https://doi.org/10.1007/s11625-020-00789-8

Mexico announces 20 new protected areas despite budget cuts. (2024, January 25). Mongabay Environmental News. https://news.mongabay.com/2024/01/mexico-announces-20-new-protected-areas-despite-budget-cuts/

Mexico City Introduces New Environmental Legislation. (2024, March 21). Mexico Business. https://mexicobusiness.news/policyandeconomy/news/mexico-city-introduces-new-environmental-legislation

Mexico City water forest. (n.d.). Retrieved 15 May 2024, from https://wwf.panda.org/es/?204658/Mexico-City-water-forest

Mexlaw. (2017, August 18). The Ejido, a Mexican Concept Misunderstood by Foreigners. *MEXLAW*. https://mexlaw.com/ejido-mexican-concept-misunderstood-foreigners/

Moran, D., Kanemoto, K., Jiborn, M., Wood, R., Többen, J., & Seto, K. C. (2018). Carbon footprints of 13 000 cities. *Environmental Research Letters*, *13*(6), 064041. https://doi.org/10.1088/1748-9326/aac72a

Murray, M. H., Buckley, J., Byers, K. A., Fake, K., Lehrer, E. W., Magle, S. B., Stone, C., Tuten, H., & Schell, C. J. (2022). One Health for All: Advancing Human and Ecosystem Health in Cities by Integrating an Environmental Justice Lens. *Annual Review of Ecology, Evolution and Systematics*, *53*(Volume 53, 2022), 403–426. https://doi.org/10.1146/annurev-ecolsys-102220-031745

Myers Jr, O., Saunders, C., & Bexell, S. (2009). Fostering empathy with wildlife: Factors affecting free-choice learning for conservation concern and behavior. *Free-Choice Learning and the Environment*, 39–55.

Nagendra, H., Bai, X., Brondizio, E. S., & Lwasa, S. (2018). The urban south and the predicament of global sustainability. *Nature Sustainability*, *1*(7), 341–349. https://doi.org/10.1038/s41893-018-0101-5

Nature-based solutions—European Commission. (2023, July 10). https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en

Nesmith, A. A., Schmitz, C. L., Machado-Escudero, Y., Billiot, S., Forbes, R. A., Powers, M. C. F., Buckhoy, N., & Lawrence, L. A. (2021). Water, Air, and Land: The Foundation of Life, Food, and Society. In A. A. Nesmith, C. L. Schmitz, Y. Machado-Escudero, S. Billiot, R. A. Forbes, M. C. F. Powers, N. Buckhoy, & L. A. Lawrence (Eds.), *The Intersection of Environmental Justice, Climate Change, Community, and the Ecology of Life* (pp. 13–25). Springer International Publishing. https://doi.org/10.1007/978-3-030-55951-9_2

Nijhuis, S. (2022). Landscape-Based Urbanism: Cultivating Urban Landscapes Through Design. In R. Roggema (Ed.), *Design for Regenerative Cities and Landscapes: Rebalancing Human Impact and Natural Environment* (pp. 249–277). Springer International Publishing. https://doi.org/10.1007/978-3-030-97023-9_11

Nussbaum, M. C. (2009). Creating Capabilities: The Human Development Approach and Its Implementation. *Hypatia*, *24*(3), 211–215.

Ogunrinola, G. A., Oyewale, J. O., Oshamika, O. O., & Olasehinde, G. I. (2020). The Human Microbiome and Its Impacts on Health. *International Journal of Microbiology*, *2020*, 8045646. https://doi.org/10.1155/2020/8045646

Ortega Montoya, C. Y., López-Pérez, A. O., Ugalde Monzalvo, M., & Ruvalcaba Sánchez, M. L. G. (2021). Multidimensional urban exposure analysis of industrial chemical risk scenarios in mexican metropolitan areas. *International Journal of Environmental Research and Public Health*, *18*(11). https://doi.org/10.3390/ijerph18115674

Pallero, C., Barragán, J. M., & Scherer, M. (2018). Management international estuarine systems: The case of the Guadiana river (Spain-Portugal). *Environmental Science & Policy*, *80*, 82–94. https://doi.org/10.1016/j.envsci.2017.11.005

Panagopoulos, T., Sbarcea, M., & Herman, K. (2021). A biophilic mind-set for a restorative built environment. *Landscape Architecture and Art*, *17*, 68–77. https://doi.org/10.22616/j.landarchart.2020.17.08

Pauleit, S., Zölch, T., Hansen, R., Randrup, T. B., & Konijnendijk van den Bosch, C. (2017). Nature-Based Solutions and Climate Change – Four Shades of Green. In N. Kabisch, H. Korn, J. Stadler, & A. Bonn (Eds.), *Nature-Based Solutions to Climate Change Adaptation in Urban Areas: Linkages between Science, Policy and Practice* (pp. 29–49). Springer International Publishing. https://doi.org/10.1007/978-3-319-56091-5_3

Pelaez-fernandez, A., & O'Boyle, B. (2024, May 23). Reeling from one heat wave, Mexico awaits 'highest temperatures ever recorded'. *Reuters*. https://www.reuters.com/business/environment/reeling-one-heat-wave-mexico-awaits-highest-temperatures-ever-recorded-2024-05-23/

Petra Tschakert. (2020). *Full article: More-than-human solidarity and multispecies justice in the climate crisis*. https://doi-org.ludwig.lub.lu.se/10.1080/09644016.2020.1853448

Pineda-Pinto, M., Frantzeskaki, N. & Raymond, C.M. (2023). Senses of injustices-in-place: Nature's voice through Melbourne's environmental stewards | Sustainability Science. *Sustainability Science 18, 2469–2484*. https://doi.org/10.1007/s11625-023-01355-8

Pineda-Pinto, M., Frantzeskaki, N., Chandrabose, M., Herreros-Cantis, P., McPhearson, T., Nygaard, C. A., & Raymond, C. (2022). Planning Ecologically Just Cities: A Framework to Assess Ecological Injustice Hotspots for Targeted Urban Design and Planning of

Nature-Based Solutions. *Urban Policy and Research*, *40*(3), 206–222. https://doi.org/10.1080/08111146.2022.2093184

Pineda-Pinto, M., Frantzeskaki, N., & Nygaard, C. A. (2022). The potential of nature-based solutions to deliver ecologically just cities: Lessons for research and urban planning from a systematic literature review. *Ambio*, *51*(1), 167–182. https://doi.org/10.1007/s13280-021-01553-7

Portal Ambiental. (2024, February 29). *Crean en CDMX Banco de Germoplasma para proteger el patrimonio biocultural.* PortalAmbiental.com.mx. https://www.portalambiental.com.mx/sostenibilidad/20240229/crean-en-cdmx-banco-de-germoplasma-para-proteger-el-patrimonio-biocultural

Priya, A. (2020). Case Study Methodology of Qualitative Research: Key Attributes and Navigating the Conundrums in Its Application. *Sociological Bulletin*. https://doi.org/10.1177/0038022920970318

PROGRAMA ESPECIAL DE LA RED DE INFRAESTRUCTURA VERDE DE LA CIUDAD DE MÉXICO, SECRETARÍA DEL MEDIO AMBIENTE (2019).

Protecting Earth: If 'Nature Needs Half,' What Do People Need? (n.d.). Yale E360. Retrieved 15 May 2024, from https://e360.yale.edu/features/protecting-earth-if-nature-needs-half-what-do-people-need

Quinton, J., Nesbitt, L., & Sax, D. (2022). How well do we know green gentrification? A systematic review of the methods. *Progress in Human Geography*, *46*(4), 960–987. https://doi.org/10.1177/03091325221104478

Ramírez-Cruz, G. A., Mendoza-Hernández, P. E., Solano-Zavaleta, I., & Zúñiga-Vega, J. J. (2018). How widespread are nonnative species? Estimating habitat occupancy in an ecological reserve within a megacity. *Natural Areas Journal*, *38*(1), 68–87. https://doi.org/10.3375/043.038.0108

Rasanathan, K., & Pillay, Y. (2024). Can current interlinked crises stimulate the structural and policy choices required for healthy societies? *BMJ*, *385*, e075485. https://doi.org/10.1136/bmj-2023-075485

Raymond, C. M., Stedman, R., & Frantzeskaki, N. (2023). The role of nature-based solutions and senses of place in enabling just city transitions. *Environmental Science & Policy*, *144*, 10–19. https://doi.org/10.1016/j.envsci.2023.02.021

Ren, Q., He, C., Huang, Q., Zhang, D., Shi, P., & Lu, W. (2023). Impacts of global urban expansion on natural habitats undermine the 2050 vision for biodiversity. *Resources, Conservation and Recycling*, *190*, 106834. https://doi.org/10.1016/j.resconrec.2022.106834

Rigolon, A., Collins, T., Kim, J., Stuhlmacher, M., & Christensen, J. (2024). Does gentrification precede and follow greening? Evidence about the green gentrification cycle in Los Angeles and Chicago. *Landscape and Urban Planning*, *248*. https://doi.org/10.1016/j.landurbplan.2024.105095

Romero-Lankao, P., Qin, H., & Borbor-Cordova, M. (2013). Exploration of health risks related to air pollution and temperature in three Latin American cities. *Social Science and Medicine*, *83*, 110–118. https://doi.org/10.1016/j.socscimed.2013.01.009

Schaeffer, P., Loveridge, S., & Weiler, S. (2014). Urban and Rural: Opposites No More! *Economic Development Quarterly*, *28*(1), 3–4. https://doi.org/10.1177/0891242413520089

Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: Climate change and the discourse of environmental justice. *WIREs Climate Change*, *5*(3), 359–374. https://doi.org/10.1002/wcc.275

Science Direct. (n.d.). *Socio-Ecological System—An overview | ScienceDirect Topics*. Retrieved 30 April 2024, from https://www-sciencedirect-com.ludwig.lub.lu.se/topics/social-sciences/socio-ecological-system

Sekulova, F., Anguelovski, I., Kiss, B., Kotsila, P., Baró, F., Palgan, Y. V., & Connolly, J. (2021). The governance of nature-based solutions in the city at the intersection of justice and equity. *Cities*, *112*, 103136. https://doi.org/10.1016/j.cities.2021.103136

Sikorska, Daria, Piotr Sikorski, Piotr Archiciński, Jarosław Chormański, and Richard J. Hopkins. (2019). *Sustainability | Free Full-Text | You Can't See the Woods for the Trees: Invasive Acer negundo L. in Urban Riparian Forests Harms Biodiversity and Limits Recreation Activity: Vol. Sustainability 11, no. 20: 5838*. https://doi.org/10.3390/su11205838

Sin Maiz No Hay Pais. (n.d.). *CAMPAÑA*. Retrieved 15 May 2024, from https://sinmaiznohaypais.org/

Snodgrass, J. (2008). Indigenous Religions and Environments: Intersections of Animism and Nature Conservation [edited journal issue]. *Journal for the Study of Religion Nature and Culture*, *2*, 5–158.

Snowball Sampling. (2012, April 27). Division of Research and Innovation. https://research.oregonstate.edu/irb/policies-and-guidance-investigators/guidance/snowball-sampling

Soto-Montes-de-Oca, G., Cruz-Bello, G. M., & Bark, R. H. (2023). Enhancing megacities' resilience to flood hazard through peri-urban nature-based solutions: Evidence from Mexico City. *Cities*, *143*. https://doi.org/10.1016/j.cities.2023.104571

Speciesism | Animal Rights, Ethics & Philosophy | Britannica. (n.d.). Retrieved 16 May 2024, from https://www.britannica.com/topic/speciesism

Stearns, P. N. (2020). *The Industrial Revolution in World History*. Routledge.

Stone, C. D. (2010). *Should trees have standing? Law, morality, and the environment* (3rd ed). Oxford University Press.

Strohbach, M. W., Lerman, S. B., & Warren, P. S. (2013). Are small greening areas enhancing bird diversity? Insights from community-driven greening projects in Boston. *Landscape and Urban Planning*, *114*, 69–79. https://doi.org/10.1016/j.landurbplan.2013.02.007

Suzuki Shin'ichi. (2022, May 23). *Urban Forests: Restoring Nature Through the Miyawaki Method of Afforestation*. Nippon.Com. https://www.nippon.com/en/in-depth/d00789/

Syrbe, Ralf-Uwe, Ina Neumann, Karsten Grunewald, Patrycia Brzoska, Jiři Louda, Birgit Kochan, Jan Macháč, Lenka Dubová, Petr Meyer, Jan Brabec, and et al. (2021). Land | Free Full-Text | The Value of Urban Nature in Terms of Providing Ecosystem Services Related to Health and Well-Being: An Empirical Comparative Pilot Study of Cities in Germany and the Czech Republic. *Land 2021, 10(4), 341*. https://doi.org/10.3390/land10040341

Tang, M. C. (2021, January 20). In Mexico City biodiversity getting more room – and funding – to grow. *#ThinkLandscape*.

https://thinklandscape.globallandscapesforum.org/49440/how-mexico-city-is-embracing-biodiversity/

Tatham, C. (2023). A systematic literature review of Third Space theory in research with children (aged 4-12) in multicultural educational settings. *Pedagogy, Culture & Society*, *0*(0), 1–20. https://doi.org/10.1080/14681366.2023.2283798

Terry L. Cross. (1997). Relational Worldview Model. *Pathways Practice Digest*, *12*(4).

Thambinathan, V., & Kinsella, E. A. (2021). Decolonizing Methodologies in Qualitative Research: Creating Spaces for Transformative Praxis. *International Journal of Qualitative Methods*, *20*, 16094069211014766. https://doi.org/10.1177/16094069211014766

The 100 Climate-Neutral and Smart Cities by 2030—Eurocities. (2022, April 29). https://eurocities.eu/latest/the-100-climate-neutral-and-smart-cities-by-2030/

The Earth's sixth mass extinction? - Understanding Evolution. (2021, September 30). https://evolution.berkeley.edu/mass-extinction/the-earths-sixth-mass-extinction/

The Ecologist. (2020, November 6). *Rights of Nature in Ecuador*. https://theecologist.org/2020/nov/06/rights-nature-ecuador

Thiel, A. (2023). Polycentric Governing and Polycentric Governance. In F. Gadinger & J. A. Scholte (Eds.), *Polycentrism: How Governing Works Today* (p. 0). Oxford University Press. https://doi.org/10.1093/oso/9780192866837.003.0005

Thornhill, I., Hill, M. J., Castro-Castellon, A., Gurung, H., Hobbs, S., Pineda-Vazquez, M., Gómez-Osorio, M. T., Hernández-Avilés, J. S., Novo, P., Mesa-Jurado, A., & Calderon-Contreras, R. (2022). Blue-space availability, environmental quality and amenity use across contrasting socioeconomic contexts. *Applied Geography*, *144*. https://doi.org/10.1016/j.apgeog.2022.102716

To save the axolotl, Mexico looks to the past. (n.d.). Retrieved 15 May 2024, from https://www.conservation.org/blog/mexico-looks-to-the-past-to-save-the-axolotl

Toronto, C. E., & Remington, R. (2020). *A Step-by-Step Guide to Conducting an Integrative Review*. Springer Nature.

Toxopeus, H., Kotsila, P., Conde, M., Katona, A., Van Der Jagt, A. P. N., & Polzin, F. (2020). How 'just' is hybrid governance of urban nature-based solutions? *Cities*, *105*, 102839. https://doi.org/10.1016/j.cities.2020.102839

Tozer, L., Bulkeley, H., Kiss, B., Luque-Ayala, A., Palgan, Y. V., McCormick, K., & Wamsler, C. (2023). Nature for Resilience? The Politics of Governing Urban Nature. *Annals of the American Association of Geographers*, *113*(3), 599–615. https://doi.org/10.1080/24694452.2022.2130867

Tozer, L., Hörschelmann, K., Anguelovski, I., Bulkeley, H., & Lazova, Y. (2020). Whose city? Whose nature? Towards inclusive nature-based solution governance. *Cities*, *107*, 102892. https://doi.org/10.1016/j.cities.2020.102892

Tren Maya Tribunal 2023—Rights Of Nature Tribunal. (2024, May 9). https://www.rightsofnaturetribunal.org/tribunals/maya-train-tribunal-2023/

United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanization Prospects 2018: Highlights (ST/ESA/SER.A/421).

United Nations. (n.d.). *THE 17 GOALS | Sustainable Development*. Retrieved 15 May 2024, from https://sdgs.un.org/goals

United Nations. (2019). *Harmony with Nature | General Assembly of the United Nations*. https://www.un.org/pga/73/event/harmony-with-nature/

United Nations. (2020). *The Transformative Change We Need to Live in Harmony with Nature*. United Nations; United Nations. https://www.un.org/en/un-chronicle/title

Universitat Rovira i Virgili. (2023, April 25). *The URV is taking part in the United Nations Earth Assembly*. Diari Digital de La URV. https://diaridigital.urv.cat/en/the-urv-is-taking-part-in-the-united-nations-earth-assembly/

Urban Nature Atlas. (n.d.). *Traditional cultivation practices in Xochimilco borough | Urban Nature Atlas*. Retrieved 15 May 2024, from https://una.city/nbs/mexico-city/traditional-cultivation-practices-xochimilco-borough

Urquhart, C., Cheuk, B., Lam, L., & Snowden, D. (n.d.). Sense-making, sensemaking and sense making—A systematic review and meta-synthesis of literature in information science

and education: An Annual Review of Information Science and Technology (ARIST) paper. *Journal of the Association for Information Science and Technology*, *n/a*(n/a). https://doi.org/10.1002/asi.24866

U.S. Department of Agriculture, Animal & Plant Health Inspection Service, & Wildlife Services. (2019). *American White Pelicans*. https://www.aphis.usda.gov/sites/default/files/Pelicans_WDM_Technical_Series.pdf

Villaseñor, N. R., & Escobar, M. A. H. (2022). Linking Socioeconomics to Biodiversity in the City: The Case of a Migrant Keystone Bird Species. *Frontiers in Ecology and Evolution*, *10*. https://doi.org/10.3389/fevo.2022.850065

Wakefield, S. (2020). Making nature into infrastructure: The construction of oysters as a risk management solution in New York City. *Environment and Planning E: Nature and Space*, *3*(3), 761–785. https://doi.org/10.1177/2514848619887461

Wang, S., & Gu, K. (2023). An Enquiry into Planning for Justice. In S. Wang & K. Gu (Eds.), *Spatial Justice and Planning: Reshaping Social Housing Communities in a Changing Society* (pp. 19–34). Springer International Publishing. https://doi.org/10.1007/978-3-031-38070-9_2

Weller, R., Gouverneur, D., Drozdz, Z., & Ye, B. (2021). The Hotspot Cities Project: The case study of Bogotá 2050. *Journal of Landscape Architecture*, *16*(1), 76–89. https://doi.org/10.1080/18626033.2021.1948198

Wesche, P. (2021). Rights of Nature in Practice: A Case Study on the Impacts of the Colombian Atrato River Decision. *Journal of Environmental Law*, *33*(3), 531–555. https://doi.org/10.1093/jel/eqab021

Why There Is More Than One Reality: Introducing the Pluriverse. (2024, February 23). TheCollector. https://www.thecollector.com/introducing-pluriverse-multiple-realities/

Wittman H. (2011). Food Sovereignty. *Environment and Society*, *2*(1). https://www.berghahnjournals.com/view/journals/environment-and-society/2/1/air-es020106.xml

World Health Organization. (2024). *One health*. https://www.who.int/health-topics/one-health

Wyborn, C., Montana, J., Kalas, N., Davila, F., Clement, S., Izquierdo-Tort, S., Knowles, N., Louder, E., Balan, M., Chambers, J., Christel, L., Deplazes Zemp, A., Forsyth, T., Henderson, G., Lim, M., Martinez-Harms, M., Merçon, J., Nuesiri, E., Pereira, L., & Wood, S. (2020). *Research and action agenda for sustaining diverse and just futures for life on Earth. Biodiversity Revisited*. https://doi.org/10.13140/RG.2.2.12086.52804/2

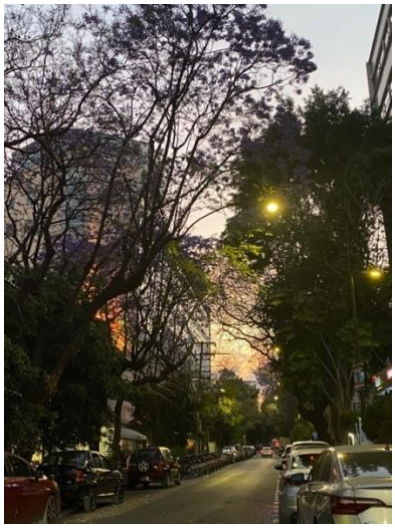
Xian, Z., Nakaya, T., Liu, K., Zhao, B., Zhang, J., Zhang, J., Lin, Y., & Zhang, J. (2024). The effects of neighbourhood green spaces on mental health of disadvantaged groups: A systematic review. *Humanities and Social Sciences Communications*, *11*(1), 1–19. https://doi.org/10.1057/s41599-024-02970-1

ZERO KM FOOD. (2014, January 15). *Sustainability Network*. https://sustainetwork.wordpress.com/2014/01/15/zero-km-food/

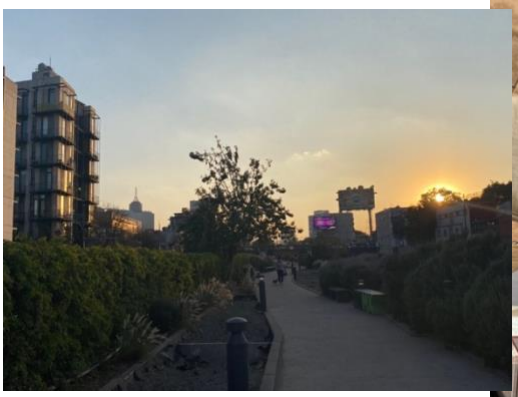
9 Appendix

9.1 Appendix I: Photos from field observations

a) Green Spaces between roads and the 'Sembrando Parques' initiative, Periferico 'Green Walls'

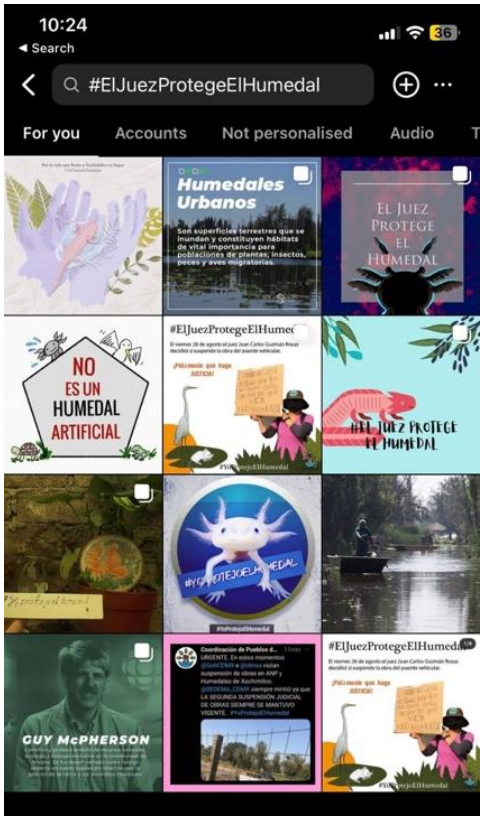



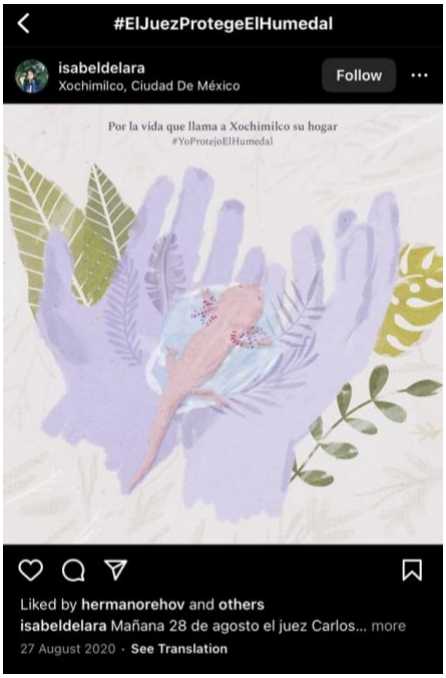


b) Polluted ravine

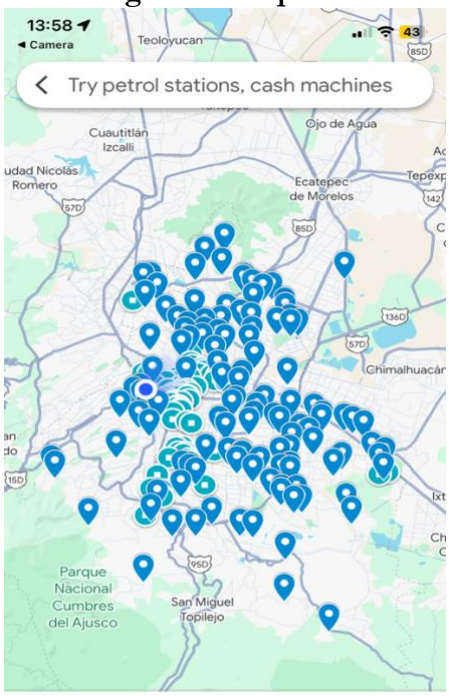
c) Social media campaign #eljuezprotegeelhumedal (Instagram)



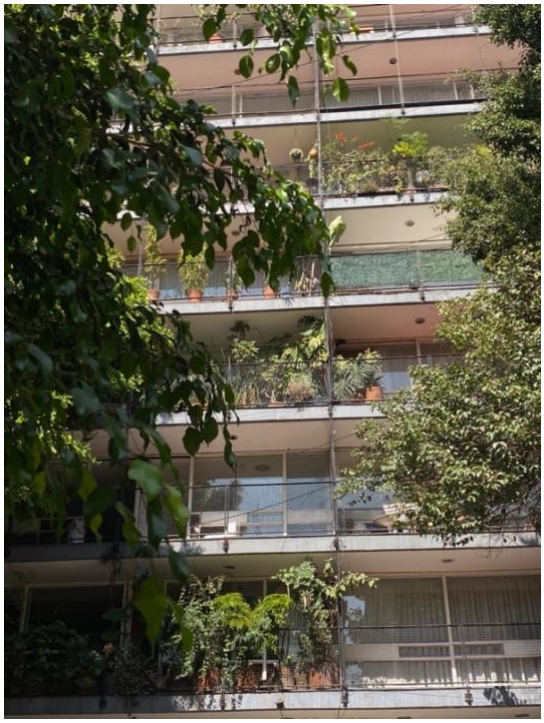


d) Sin Mais No Hay Pais

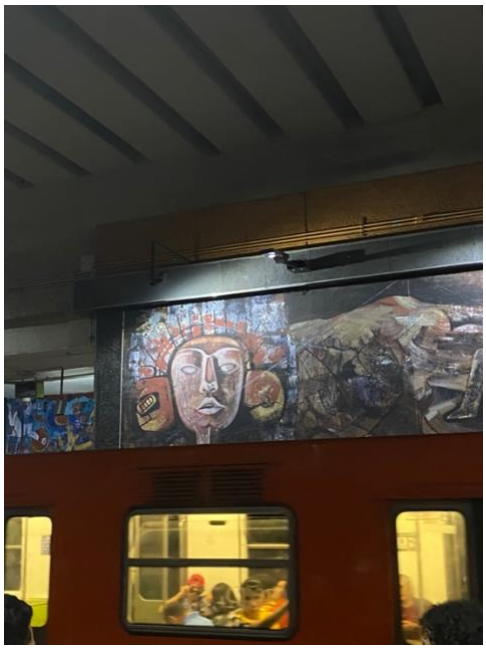
e) Screenshot of map of urban agriculture spaces shared at the IUCN forum

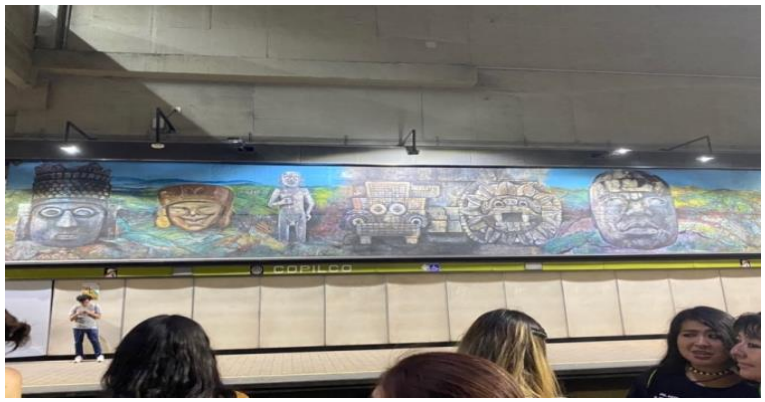


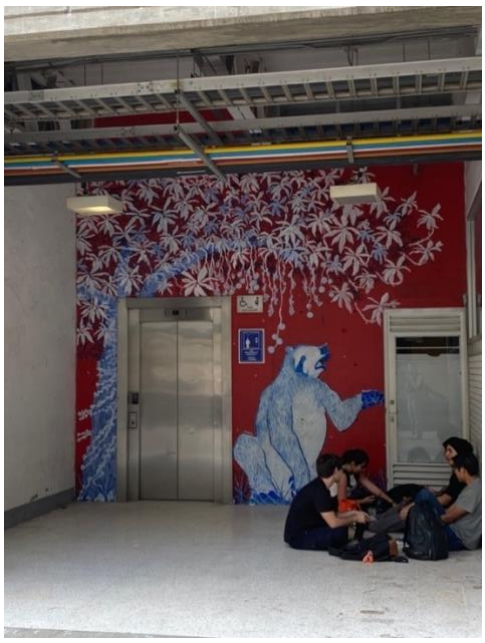
f) Balconies full of plants



g) Representations of nature and indigenous themes around the city – murals and street art







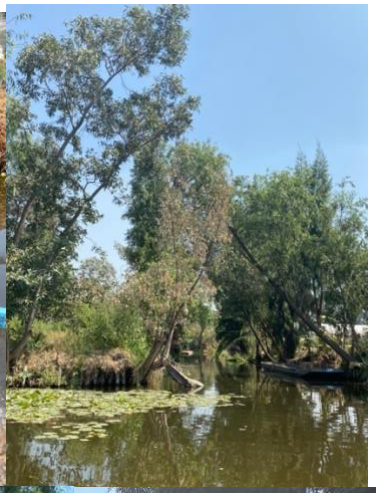
h) The Axolotitlan museum and artwork



i) Views of the city from Bosque del Agua

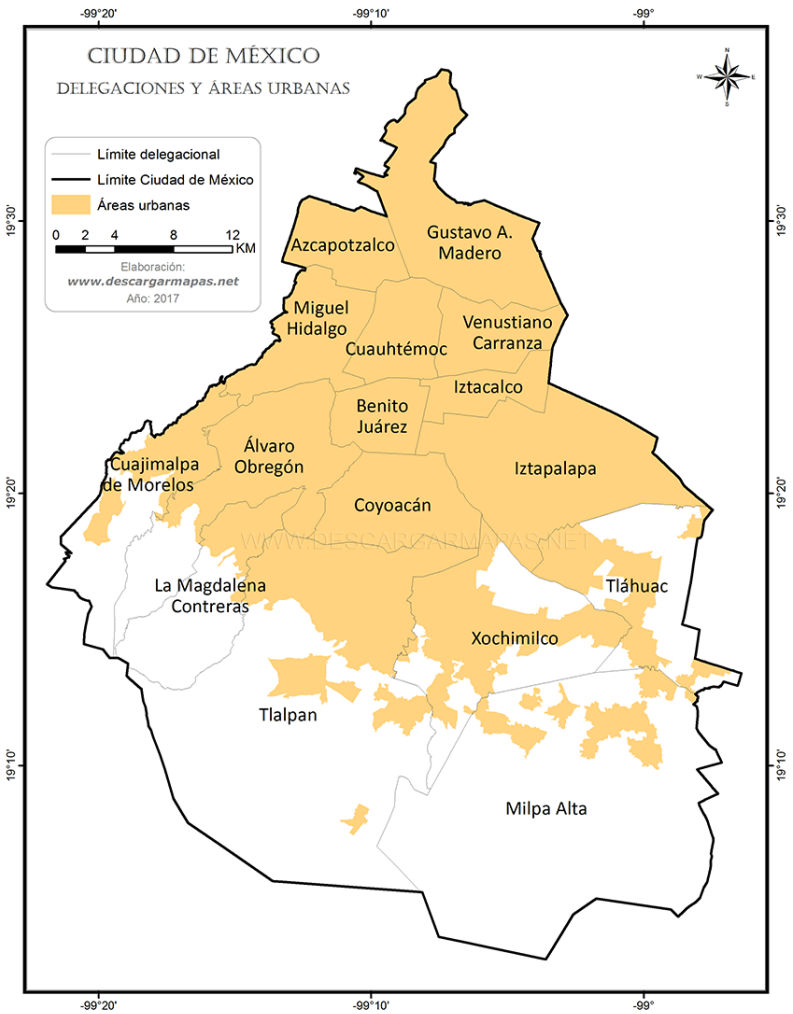

j) Free seed campaigns on the street and guerilla gardener

k) Compost making in Xochimilco



l) Milpa Alta and nopal monocultures

9.2 Appendix II: Map of CDMX; *Source: Mapa de delegaciones y áreas urbanas de Ciudad de México | DESCARGAR MAPAS. (n.d.). Retrieved 30 May 2024, from https://descargarmapas.net/mexico/ciudad-de-mexico/mapa-ciudad-de-mexico-delegaciones-area-urbana*



9.3 Appendix III: TABLE of DEFINITIONS for the Conceptual Framework

Adapted from the glossary of (Chao et al., 2022), unless mentioned otherwise in table

Concept	Definition	Place in Thesis Framework
Multispecies justice	Multispecies justice insists on the need to account for other beings, with their own radically diverse life projects, capacities, phenomenologies, ways of being, functionings, forms of integrity, and relationalities. Here, human and nonhuman animals, species, microbiomes, ecosystems, oceans, and rivers – and the relations among and across them – are all subjects of justice. Consequently, multispecies injustice comprises all the human interruptions of the functioning of this broad array of relations. (Celermajer et al., 2021)	Overarching conceptual idea to bridge the human (social) and non-human (ecological) in the concept of environmental justice, inspired by frameworks which underline our interconnectedness like One Health and Socio-Ecological-Systems (SES)
More-Than-Human / Non-human beings	Used to denominate the non-human life forms as mentioned above – animals, plants, ecosystems, soils, river, etc.	Concept, Lens

Relational worldview *NB this worldview is complex and difficult to theorise/write about, being more of an embodied experience and dependant on the specific culture, but these are just a few ways to explain the concept as it stands in this thesis*	Sometimes called the cyclical worldview, finds its roots in tribal cultures. It is intuitive, non-time oriented and fluid. The balance and harmony in relationships between multiple variables, including spiritual forces, make up the core of the thought system. Every event is understood in relation to all other events regardless of time, space, or physical existence. Health exists only when things are in balance or harmony.(Terry L. Cross, 1997) Other examples of related concepts are: Kincentricity –which is "a view of humans and nature as part of an extended ecological family that shares ancestry and origins" (Senos et al., 2006, 397). Under this worldview, agency is extended to many parts of a socioecological system, including wildlife that can at times serve as teachers and elders (Bhattacharyya and Slocombe, 2017 in Martinez et al., 2023)	Concept, Lens
Intersectional justice	Intersectionality is a core conceptual lens to understand how various forms of social inequalities and vulnerability interconnect and overlap with each other. In the context of justice in climate change, intersectionality is increasingly being applied to examine the overlapping and interdependent systems of disadvantage and oppression that restrict people's adaptive capacity and create new or exacerbate existing social-ecological vulnerabilities (Djoudi et al., 2016; Kaijser and Kronsell, 2014). (from (Amorim-Maia et al., 2022)	Lens
Intergenerational justice	Concerned with the scope and nature of relations, responsibilities, and obligations as these manifest across different generations. It demands that institutions consider the potential impacts of their actions on the well-being of future human and other-than- human generations and their duties and responsibilities to generations past.	Lens

Decolonial approach ***NB there are many ways to decolonise research, this is just one example***	Decolonizing research means centering concerns and world views of non-Western individuals, and respectfully knowing and understanding theory and research from previously "Other(ed)" perspectives (Battiste, 2000; Datta, 2018; Smith, 2012 in (Thambinathan & Kinsella, 2021)). The critical pedagogy of decolonization consists of transforming our colonized views and holding alternative knowledges. (Thambinathan & Kinsella, 2021)	Lens
Capabilties justice	How humans, nonhumans and ecosystems' integrity and capacities are sustained to ensure a flourishing life (Fulfer 2013, Schlosberg 2013). Ecological capabilities are a critical dimension of ecological justice. They are the elements that enable life to function in a state of wellbeing, not only for individual species, but ecosystems or ecological entities (Kortetmäki 2017, Schlosberg 2007). It is about ensuring that capability thresholds for human and nonhuman individuals and systems allow both to flourish (Nussbaum 2006, Fulfer 2013). An ecological justice approach, however, would ideally procure the enhancement of capabilities by adding more value through the fair allocation of multiple ecological functions and benefits to those indi- viduals or systems are devalued or degraded. This can be done by not only ensuring access to healthy habitats, but also taking actions that create opportunities for flourishing and cultivate spaces for choice that allow life to flourish (Nussbaum 2006). (Pineda-Pinto, Frantzeskaki, Chandrabose, et al., 2022)	Theory

Multi-level, polycentric, and hybrid governance	Taking a multilevel governance perspective entails engaging with the multiple tiers of government and spheres of governance through which urban sustainability is being constructed and contested. […]a polycentric model in which multiple overlapping and interconnected horizontal spheres of authority are involved in governing particular issues (Harriet Bulkeley & Michele Betsill, 2005) Likewise, 'polycentric governance allows one to bring together multiple actors engaged in the provision and consumption of collective goods', and 'the interplay of multiple interdependent but autonomous individual and collective, public, private, and civil society actors operating on and across different scales'(Thiel, 2023) Hybrid governance refers to 'a type of governance where policy makers collaborate with non-public actors such as businesses, citizens and NGOs'(Toxopeus et al., 2020).	Theory All these concepts are interrelated and overlap, the main aspect I am using is that these theories acknowledge that governance of urban nature occurs at various levels and numerous stakeholders are involved in decision making, maintenance, and management of urban nature, and are thus implicated in MSJ in the city
One Health Approach (OH)	One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. (Harriet Bulkeley & Michele Betsill, 2005)	Inspired by how this theory connects the human and non-human This approach comes from epidemiology and pathology, and was popularised after the Covid-19 zoonotic pandemic

Socio-ecological systems (SES)	The socio-ecological system is understood according to the concept defended by Ostrom (2009) and defined by Martín-Lopez et al. (2012) as bio-geo-physical units that are associated with one or more social systems delimited by stakeholders and institutions (Glaser et al., 2008). Formal and non-formal institutions regulate relationships within the social system and between the social and natural system. (Pallero et al., 2018)	Inspired by how this theory connects the human and non-human This approach comes from ecology, yet usually does not delve into the justice aspect, which this thesis does
Ecologically Just Cities Framework	Demonstrates how the needs and capabilities of nonhuman nature can be embedded within transitions to multi- and interspecies relational futures that regenerate and protect urban social-ecological systems.(Pineda-Pinto, Frantzeskaki, Chandrabose, et al., 2022)	Inspired by the application of these concepts and solutions to specific cities
Environmental justice	Aims to counter and redress the various forms of environmental discrimination that cause marginalized and racialized communities to bear the disproportionate burden of environmental harms, such as vulnerability to air pollution and water contamination and exposures to hazardous waste and toxic chemicals.	Theory expansion the thesis expands on the meaning of EJ, to include the non-human in the definition of 'marginalised communities'
Social Justice	Involves the fair and egalitarian treatment of all members of a given society in relation to questions of equity, access, well-being, participation, and rights. Movements for social justice are particularly concerned with achieving recognition, remedy, and redress for segments of society who are systematically marginalized.	Theory expansion Thesis wants to bridge the social and ecological forms of environmental justice
Ecological justice	Calls for recognition of other species as legitimate bearers of rights and recipients of resources. It seeks to develop institutional arrangements that can accommodate the claims and affordances of diverse creatures within its decision-making processes.	Theory expansion Thesis wants to bridge the social and ecological forms of environmental justice

Related concepts mentioned in thesis	***Whilst aware that all these forms of justice play into multispecies justice, and they will be mentioned in the thesis, the primary focus will be on MSJ as it is the least developed of them all***
Climate Justice	Foregrounds the disproportionately severe social, economic, health, and intergenerational impacts of climate change on vulnerable human groups. Advocates for climate justice suggest that functioning environments are a necessary condition for the fulfilment of other, intersectional justices like environmental justice, social justice, and racial justice.
Distributive justice	Classically concerned with the distribution of benefits and burdens within society. Some approach this model with strict egalitarian principles, while others attend to how context governs the distribution of wealth and welfare. Emerging theories of bioproportionality expand the subjects of distributive justice beyond the human to affect an equitable partitioning of planetary resources across different species.
Participatory justice	Demands the equal, inclusive, and transparent participation of all parties in the development, enactment, and governance of justice-related institutions and practices. This framework addresses the challenge of reconciling disparate and often conflicting interests, values, and beliefs in achieving agreement over what counts as justice.
Procedural Justice	Involves due processes. Some believe that simply following the correct procedure results in an equitable outcome, regardless of whether distributive or restorative justice has ultimately been achieved.
Recognition Justice	Attends to how different beings gain or lose standing as a result of structural, institutional, cultural, legal, and economic regimes and attendant hierarchies of worth. It involves recognizing that past and ongoing legacies of unequal treatment, discrimination, and exclusion continue to produce just conditions of life for some and not others.

9.4 Appendix VI: Systematic Literature Review: SCOPUS Search Strings

NB author also used 'OR' in most cases, but these were the original search strings

Search String	**Total Publications**	**Notes/ Filtered Publications**
TITLE-ABS-KEY (justice AND urban AND nature)	712	
(TITLE-ABS-KEY (justice AND urban AND nature)) AND (social AND justice) AND (urban AND greening)	181	
(TITLE-ABS-KEY (justice AND urban AND nature)) AND (social AND justice) AND (urban AND greening) AND (landscape AND approach)	140	
more AND than AND human AND justice AND urban AND nature	26	
(TITLE-ABS-KEY (justice AND urban AND nature)) AND (social AND justice) AND (urban AND greening) AND (landscape) AND (multispecies)	10	This was a bit more focused, so I expanded it to MTH
(TITLE-ABS-KEY (justice AND urban AND nature)) AND (social AND justice) AND (urban AND greening) AND (landscape) AND (more AND than AND human)	98	Here I sorted it by relevance to the search string
TITLE-ABS-KEY (multispecies AND justice)	134	
TITLE-ABS-KEY (multispecies AND justice AND urban)	15	Very new and emerging field, earliest article was 2018
(TITLE-ABS-KEY (justice AND urban AND nature)) AND (urban AND greening) AND (landscape) AND	**98**	Here I sorted it by

(more AND than AND human) AND (environmental AND justice)		relevance to the search string **80 articles**
TITLE-ABS-KEY (multispecies AND justice AND urban AND planning)	5	Repeated articles
TITLE-ABS-KEY (multispecies AND landscape AND urbanism)	5	Repeated articles
TITLE-ABS-KEY (multispecies AND justice AND urban AND nature)	7	**3**
TITLE-ABS-KEY (urban AND nature AND mexico AND multispecies)	0	
TITLE-ABS-KEY (environmental AND justice AND mexico AND city)	56	14 about Mexico City specifically 7 of these about pollution exposure 2 about the socio-economic status and access to nature
TITLE-ABS-KEY (urban AND nature AND mexico AND more AND than AND human)	43	4
TITLE-ABS-KEY (multispecies AND justice AND urban)	15	

TOTAL	1545	**Articles Used: 140**

9.5 Appendix V: NBS studies in Urbanism, 2015-2020; Source: (Li et al., 2021)

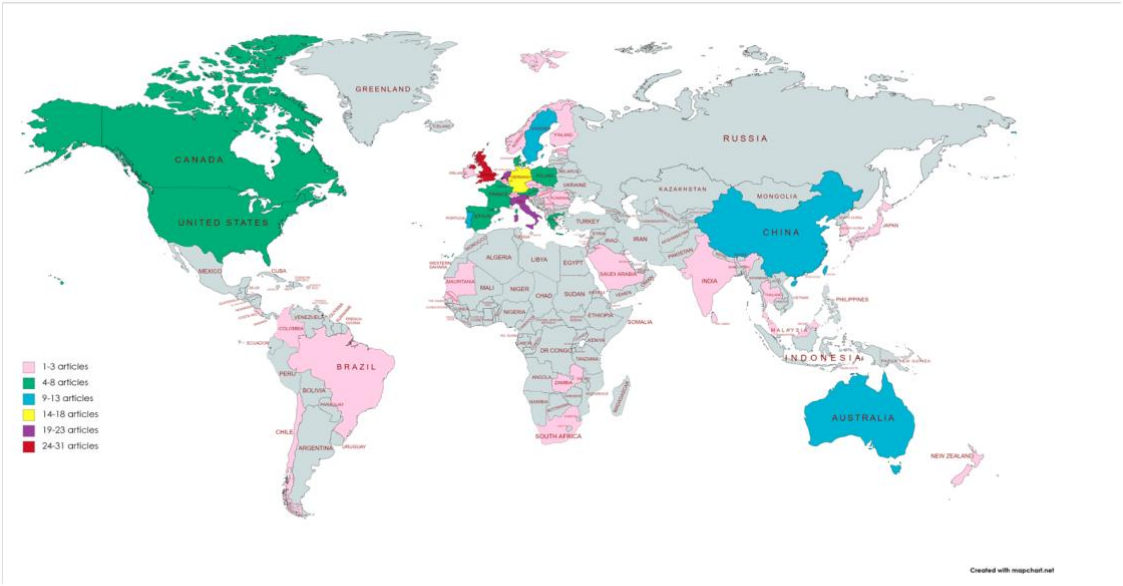


Figure 4. Contribution of global geographic scope to scientific papers (reviews and research articles) on NBS studies in urbanism by title search between 2015–2020 (For interpretation of the references to color in this figure legend. The grey color means no literature within that country identified for this review) (Source: authors).

9.6 Appendix VI: Interviewees/ People

- Animal Rights Activist (ARA)
- Animal Rights Lawyer (ARL)
- Axolotl Sanctuary Founder (ASF)
- Environmental NGO founder (NF)
- Law Maker (LM)
- Landscape Architect (LA1, LA2)
- MGR - Marina Garcia Robles, current director of SEDEMA (2019-2024)
- Nature Conservationist (NC1, NC2)
- Traditional Agriculturist (TA1, TA2, TA3)
- Urban Planner (UP1)
- Youth Initiative Founder (YIF)

9.7 Appendix VII: Interview Consent Form

JUST URBAN TRANSITIONS AND MULTISPECIES JUSTICE IN URBAN GREENING INITIATIVES

THESIS PURPOSE

The pursuit of sustainable urban development transcends geographical boundaries, prompting a critical exploration of justice in relation to (urban) nature. By adopting a case study approach, this research delves into the complexities of urban greening, within the urban landscapes of Mexico City, Mexico, and Genoa, Italy. The primary aim of this thesis is to assess the contribution of urban greening to multispecies/ecological justice within these urban settings. It will generate knowledge about urban greening that goes beyond traditional academia and Western perspectives, placing a strong emphasis on incorporating practitioner perspectives, local community knowledge, Global South perspectives, and raising awareness of more-than-human life in urban environments. By exploring notions of multispecies justice in these different cities and understanding their practical visions for its realization, the research aims to provide valuable insights for promoting multispecies justice in a practical manner.

As part of this study, you have been identified as a relevant expert and/or practioner.

INTERVIEW CONSENT FORM

This form is to ensure that you have been given information about the *Just Urban Transitions and Multispecies Justice in Urban Greening Initiatives* thesis project conducted by Anastasia van der Meer. This form gives you the opportunity to confirm that you are willing to take part in this research. For all activities below, please indicate which applies to you:

☐	I have been **familiarised** with the project, I have had the possibility to ask questions and I have received satisfactory answers to my questions
☐	As a research participant, I am aware of my **right to withdraw participation** at any time
☐	I give my consent that the interview can be **audio- and/or video**-recorded, transcribed, and analysed
☐	I understand that the results of the research will be presented so that **no information can be traced to me personally**
☐	I give my consent that a record of my interview can be **safely stored** for future reference

Note: Your participation is voluntary. As an interviewee, you do not have to answer all the questions that are asked; you reserve the right to refuse or cease participation in the interview process without stating your reason and may request to keep certain materials confidential.
Please, sign below to confirm your consent:

	Participant(s)	**Researcher(s)**
Name(s)		Anastasia van der Meer
Signature(s)		
Date(s)		

TRANSICIONES URBANAS JUSTAS Y JUSTICIA MULTIESPECIES EN INICIATIVAS DE VERDE URBANA

PROPÓSITO DE LA TESIS

La búsqueda de un desarrollo urbano sostenible trasciende las fronteras geográficas, lo que impulsa una exploración crítica de la justicia en relación con la naturaleza (urbana). Al adoptar un enfoque de estudio de caso, esta investigación profundiza en las complejidades del enverdecimiento urbano, dentro de los paisajes urbanos de la Ciudad de México, México y Génova, Italia. El objetivo principal de esta tesis es evaluar la contribución de la ecologización urbana a la justicia ecológica/multiespecífica dentro de estos entornos urbanos. Generará conocimiento sobre la ecologización urbana que va más allá de la academia tradicional y las perspectivas occidentales, poniendo un fuerte énfasis en la incorporación de perspectivas de los profesionales, el conocimiento de las comunidades locales, las perspectivas del 'Sur Global' y la sensibilización sobre la vida más que humana en los entornos urbanos. Al explorar las nociones de justicia multiespecie en estas diferentes ciudades y comprender sus visiones prácticas para su realización, la investigación tiene como objetivo proporcionar conocimientos valiosos para promover la justicia multiespecie de una manera práctica.

Como parte de este estudio, usted ha sido identificado como un experto y/o profesional relevante.

FORMULARIO DE CONSENTIMIENTO PARA LA ENTREVISTA

Este formulario es para garantizar que se le haya brindado información sobre el proyecto de tesis Transiciones urbanas justas y justicia multiespecie en iniciativas de ecologización urbana realizado por Anastasia van der Meer. Este formulario le brinda la oportunidad de confirmar que está dispuesto a participar en esta investigación. Para todas las actividades a continuación, indique cuál se aplica a usted:

☐	Me he familiarizado con el proyecto, he tenido la posibilidad de hacer preguntas y he recibido respuestas satisfactorias a mis preguntas.
☐	Como participante de la investigación, soy consciente de mi derecho a retirar mi participación en cualquier momento.
☐	Doy mi consentimiento para que la entrevista pueda ser grabada, transcrita y analizada en audio y/o video.
☐	Doy mi consentimiento para que la entrevista pueda ser grabada, transcrita y analizada en audio y/o video.
☐	Doy mi consentimiento para que un registro de mi entrevista se pueda almacenar de forma segura para referencia futura.

Nota: Su participación es voluntaria. Como entrevistado, no es necesario que responda todas las preguntas que se le hagan; usted se reserva el derecho de rechazar o dejar de participar en el proceso de entrevista sin indicar el motivo y puede solicitar mantener ciertos materiales confidenciales.
Por favor, firme a continuación para confirmar su consentimiento:

	Participante(s)	**Investigador(es)**
Nombre(s)		Anastasia van der Meer

Firma(s)		
Fecha(s)		

9.8 Appendix VIII: Interview Guide

N.B. ***this interview guide provides general themes/topics of discussion, and is subject to change depending on context and participant input. Not all questions will be asked and there are no right/wrong answers, as the objective is to understand different perspectives and opinions. //*** ***Esta guía de entrevista proporciona temas generales de discusión y está sujeta a cambios según el contexto y las aportaciones de los participantes. No se harán todas las preguntas y no hay respuestas correctas o incorrectas, ya que el objetivo es comprender diferentes perspectivas y opiniones.***

Interview Briefing (0-3min)

- The purpose of this research is to assess the contribution of urban greening to multispecies/ecological justice.

- I aim to generate knowledge about urban greening that goes beyond traditional academia and Western perspectives, placing a strong emphasis on **incorporating practitioner perspectives, local community knowledge, Global South perspectives, and raising awareness of more-than-human life in urban environments**. By exploring notions of multispecies justice in these different cities and understanding their practical visions for its realization, the research aims to provide valuable insights for **promoting multispecies justice in a practical manner.**
- As part of this study, you have been identified as a relevant expert and/or practitioner.

• El propósito de esta investigación es evaluar la contribución del enverdecimiento urbano a la justicia ecológica/multiespecífica.
• Mi objetivo es generar conocimiento sobre ecologización urbana que vaya más allá de la academia tradicional y las perspectivas occidentales, poniendo un fuerte énfasis en incorporar perspectivas profesionales, conocimiento de la comunidad local, perspectivas del Sur Global y crear conciencia sobre la vida más que humana en entornos urbanos. Al explorar las nociones de justicia multiespecie en estas diferentes ciudades y comprender sus visiones prácticas para su realización, la investigación tiene como objetivo proporcionar conocimientos valiosos para promover la justicia multiespecie de una manera práctica.
• Como parte de este estudio, usted ha sido identificado como un experto y/o profesional relevante.

Participant Introduction/Background

1. Could you please introduce yourself and tell me about your job/occupation/project, and how it relates to urban greening/planning/nature conservation in/around the city?

Introducción/antecedentes del participante
1. ¿Podría presentarse y contarme sobre su trabajo/ocupación/proyecto y cómo se relaciona con la ecologización/planificación/conservación de la naturaleza urbana en/alrededor de la ciudad?

History and Evolution

1. How have green areas in the city developed over the past 20 years?
2. Did anything significant change in the city/in your work/in urban planning when CDMX declared the Rights of Nature in its constitution in 2017?
3. What are the main sustainability challenges the city is facing? What do you think are the best ways/methods to handle these? *Smog and air pollution + water shortages in CDMX*

Historia y Evolución
1. ¿Cómo se han desarrollado las zonas verdes de la ciudad durante los últimos 20 años?
2. ¿Hubo algún cambio significativo en la ciudad/en tu trabajo/en la planificación urbana cuando la CDMX declaró los Derechos de la Naturaleza en su constitución en 2017?
3. ¿Cuáles son los principales desafíos de sostenibilidad a los que se enfrenta la ciudad? ¿Cuáles crees que son las mejores formas/métodos para manejarlos? Smog y contaminación del aire + escasez de agua en CDMX

Nature in and around the City

1. What is the biodiversity/flora/fauna in and around the city? (*Awareness of other species*) To what extent are their needs and capabilities considered in urban planning? To what extent are they part of urban life?

2. Which species/ecosystems are important to you personally? Which of these are important for urban life/survival?
3. Why do you think nature is important for the challenges the city faces?
4. Who has access to nature in the city? What kind of 'nature' is accessible?
5. How is human-nature conflict handled in urban areas?

Naturaleza en la ciudad y sus alrededores

1. ¿Cuál es la biodiversidad/flora/fauna en la ciudad y sus alrededores? (Concienciación sobre otras especies) ¿En qué medida se consideran sus necesidades y capacidades en la planificación urbana? ¿En qué medida son parte de la vida urbana?
2. ¿Qué especies/ecosistemas son importantes para usted personalmente? ¿Cuáles de estos son importantes para la vida/supervivencia urbana?
3. ¿Por qué crees que la naturaleza es importante para los desafíos que enfrenta la ciudad?
4. ¿Quién tiene acceso a la naturaleza en la ciudad? ¿Qué tipo de "naturaleza" es accesible?
5. ¿Cómo se maneja el conflicto entre humanos y naturaleza en las áreas urbanas?

Greening Plans

4. What kind of impact have the new greening plans (2019-24) had on the city? Have they changed the city? If yes, in which way?
5. In your view, how does the new green plan (of CDMX/Genoa) change greening/nature of the city?
6. To which extent does the plan consider access to nature for diverse population groups?
7. To what extent is flora and fauna considered?

Planes ecológicos

4. ¿Qué tipo de impacto han tenido en la ciudad los nuevos planes verdes (2019-24)? ¿Han cambiado de ciudad? En caso afirmativo, ¿de qué manera?

5. En su opinión, ¿cómo cambia el nuevo plan verde (de CDMX/Génova) el carácter verde/naturaleza de la ciudad?

6. ¿En qué medida el plan considera el acceso a la naturaleza para diversos grupos de población?

7. ¿En qué medida se considera la flora y la fauna?

Ecological Sensitivity and Design in (Green) Urban Planning

1. To what extent is the natural landscape considered in city planning? Has there been a change, and why?
2. To what extent does urban greening facilitate the connection and coexistence with other species?

Sensibilidad ecológica y diseño en la planificación urbana (verde)

1. ¿En qué medida se tiene en cuenta el paisaje natural en la planificación urbana? ¿Ha habido un cambio y por qué?

2. ¿En qué medida el verde urbano facilita la conexión y convivencia con otras especies?

For Urban Planners:

1. How do you integrate ecological considerations into urban planning processes?
2. What strategies do you employ to ensure equitable access to green spaces and environmental amenities across different socio-economic groups?
3. How do you balance the need for urban development with the preservation of natural habitats and biodiversity?
4. Can you describe any specific urban greening projects or initiatives you have been involved in that aim to promote ecological justice?
5. How do you incorporate community input and local knowledge into urban planning decisions related to environmental justice?
6. What policies or regulations do you think are necessary to advance ecological justice goals in urban areas?
7. How do you address concerns about gentrification and displacement in the context of urban greening and environmental improvements?
8. In what ways do you think urban planning can contribute to fostering a sense of environmental stewardship and ecological awareness among city residents?

Para planificadores urbanos:

1. ¿Cómo se integran las consideraciones ecológicas en los procesos de planificación urbana?

2. ¿Qué estrategias emplea para garantizar el acceso equitativo a espacios verdes y servicios ambientales en diferentes grupos socioeconómicos?

3. ¿Cómo se equilibra la necesidad de desarrollo urbano con la preservación de los hábitats naturales y la biodiversidad?

4. ¿Puede describir algún proyecto o iniciativa específica de ecologización urbana en la que haya participado y que tenga como objetivo promover la justicia ecológica?

5. ¿Cómo se incorporan los aportes de la comunidad y el conocimiento local en las decisiones de planificación urbana relacionadas con la justicia ambiental?

6. ¿Qué políticas o regulaciones cree que son necesarias para avanzar en los objetivos de justicia ecológica en las áreas urbanas?

7. ¿Cómo aborda las preocupaciones sobre la gentrificación y el desplazamiento en el contexto de la ecologización urbana y las mejoras ambientales?

8. ¿De qué manera cree que la planificación urbana puede contribuir a fomentar un sentido de gestión ambiental y conciencia ecológica entre los residentes de la ciudad?

Urban Nature Governance

1. Who is involved in Urban Greening? Who takes the decisions? Who implements them?
2. How is political affiliation linked to urban greening goals and aspirations?
3. Is indigenous/local knowledge included in decision-making processes? What notions of ecological justice are represented/enacted?
4. How can new ideas (of justice) be integrated into the planning and implementation of NBS projects in urban environments?
5. In your view, what does a just urban green transition entail? Who do you believe should be involved in shaping and implementing these transitions? Who may be currently excluded from the process?

Gobernanza de la naturaleza urbana

1. ¿Quién participa en la ecologización urbana? ¿Quién toma las decisiones? ¿Quién los implementa?
2. ¿Cómo se vincula la afiliación política con los objetivos y aspiraciones de ecologización urbana?
3. ¿Se incluyen los conocimientos indígenas/locales en los procesos de toma de decisiones? ¿Qué nociones de justicia ecológica están representadas/promulgadas?
4. ¿Cómo se pueden integrar nuevas ideas (de justicia) en la planificación e implementación de proyectos SbN en entornos urbanos?
5. En su opinión, ¿qué implica una transición verde urbana justa? ¿Quién cree que debería participar en la configuración e implementación de estas transiciones? ¿Quiénes pueden estar actualmente excluidos del proceso?

Socio-Cultural Perceptions on Ecological Justice

1. How do you perceive the relationship between urban development and the conservation of natural ecosystems within the city?
2. In your opinion, what are the key ecological justice issues facing urban environments today?
3. How do you believe urban greening initiatives can address social and environmental inequalities in the city?

4. Can you share any examples of successful collaborations between conservation efforts and urban planning that promote ecological justice?
5. How do cultural attitudes and community values influence conservation practices and plans in urban areas?
6. What role do you see for community engagement in fostering ecological justice in urban environments?
7. How can indigenous knowledge and traditional ecological practices contribute to urban conservation efforts and promote ecological justice?

8. Are you familiar with the concept of ecosystem/animal/multi-species justice? If so, what is your opinion on this framework and its relevance to urban planning and conservation efforts?
9. What are your thoughts on the idea of nature having inherent rights? Do you believe it is important to legally recognize and protect the rights of nature in urban settings?

Percepciones socioculturales sobre la justicia ecológica

1. ¿Cómo percibes la relación entre el desarrollo urbano y la conservación de los ecosistemas naturales dentro de la ciudad?

2. En su opinión, ¿cuáles son los problemas clave de justicia ecológica que enfrentan los entornos urbanos hoy en día?

3. ¿Cómo cree que las iniciativas de ecologización urbana pueden abordar las desigualdades sociales y ambientales en la ciudad?

4. ¿Puede compartir algún ejemplo de colaboraciones exitosas entre los esfuerzos de conservación y la planificación urbana que promuevan la justicia ecológica?

5. ¿Cómo influyen las actitudes culturales y los valores comunitarios en las prácticas y planes de conservación en áreas urbanas?

6. ¿Qué papel ve para la participación comunitaria en el fomento de la justicia ecológica en los entornos urbanos?

7. ¿Cómo pueden los conocimientos indígenas y las prácticas ecológicas tradicionales contribuir a los esfuerzos de conservación urbana y promover la justicia ecológica?

8. ¿Está familiarizado con el concepto de justicia ecosistémica/animal/multiespecífica? Si es así, ¿cuál es su opinión sobre este marco y su relevancia para la planificación urbana y los esfuerzos de conservación?

9. ¿Qué piensas sobre la idea de que la naturaleza tenga derechos inherentes? ¿Cree que es importante reconocer y proteger legalmente los derechos de la naturaleza en los entornos urbanos?

9.9 Appendix IV: Reach out letter/message

ENGLISH Subject: Invitation to Participate in Thesis Interview

Dear Sir or Madam,

I hope this message finds you well. My name is Anastasia van der Meer, and I am currently a Masters student of Environmental Sciences, Policy, and Management at Lund University working on my thesis. I am reaching out to you because of your expertise and experience

in Urban Planning, Green Infrastructure/ Landscape Architecture, Nature-Based Solutions/ Multispecies Justice/ Environmental Justice.

The focus of my thesis is environmental and multispecies justice in Urban Green Transitions, specifically evaluating to what extent the landscape approach to urban planning/greening and inclusive Nature Based Solutions might foster a more harmonious cohabitation of humans and the natural world. My case study cities are Mexico City and Genoa (Italy), a comparison which will bring to light many interesting aspects and insights of different approaches to Urban Green Transitions.

The primary aim of the thesis is to generate knowledge about urban greening/landscape architecture/ Nature-Based Solutions that goes beyond traditional academia and Western perspectives, placing a strong emphasis on incorporating practitioner's experiences, local community knowledge, 'Global South' perspectives, and raising awareness of more-than-human life in urban environments. The project also addresses the research gap related to legal instruments and policy tools necessary for effective representation of nature in urban environments, which is especially compelling given that Mexico City is one of the few cities in the world that legally recognised the rights of nature.

The anticipated findings of this research hold the potential to bring to light novel ideas and visions regarding green urban planning, offering alternative perspectives on just governance of nature in urban environments. By delving into diverse notions of utilizing and coexisting with nature, the study may unveil innovative and more inclusive approaches to urban nature management.

These findings are particularly relevant to urban planners as well as NBS/green infrastructure professionals, who can benefit from new perspectives and practices. The insights generated can be crucial for the local communities residing in these cities, contributing to enhanced representation, and fostering a deeper understanding of justice dimensions within urban greening. Hopefully, this will facilitate interspecies cohabitation as well as the improvement of the human-nature connection in urban environments.

Your work in Green Infrastructure Planning has caught my attention, and I believe that your insights would greatly contribute to the depth and quality of my research.

I am seeking to conduct interviews with professionals and experts in the field to gain a comprehensive understanding of environmental justice in green urban planning. Your perspective would be invaluable in shaping the narrative and enriching the analysis.

The interview/talk would take approximately 45 minutes to an hour and can be conducted at a time and place convenient for you. I will be in Mexico City from the 11th of March until the 7th of April and can visit you at any time. Alternatively, if you prefer an online interview through Zoom, I can also arrange that.

I assure you that all information shared during the interview will be handled confidentially, follow all research ethics procedures, including consent forms, and you will always retain the right to withdraw your participation or remain anonymous.

Additionally, your participation will be acknowledged appropriately in my thesis, and I will be infinitely grateful for your time and insights.

If you are available and willing to participate, please let me know your availability or suggest a time that suits you best. Additionally, if you have any questions or would like more information about my research, feel free to ask.

I appreciate your time and consideration, and I am looking forward to the possibility of including your valuable insights in my thesis.

Thank you for your attention, and I hope to hear from you soon.

Best regards,

Anastasia van der Meer

SPANISH

Espero que este mensaje te encuentre bien. Mi nombre es Anastasia van der Meer, y actualmente soy estudiante de Maestría en Ciencias, Políticas y Gestión Ambiental en la Universidad de Lund, donde estoy llevando a cabo mi tesis. Me comunico contigo debido a tu experiencia y conocimiento en Planificación Urbana, Infraestructura Verde/Arquitectura del Paisaje, y Soluciones Basadas en la Naturaleza/Justicia Multiespecie/Justicia Ambiental.

El enfoque de mi tesis es la justicia ambiental y las multiespecies en Transiciones Verdes Urbanas, evaluando específicamente en qué medida el enfoque paisajístico en la planificación urbana/verde y las Soluciones Basadas en la Naturaleza (SBN) inclusivas podrían fomentar una convivencia más armoniosa entre los humanos y el mundo natural. Las ciudades de mi investigación son la Ciudad de México y Génova (Italia), realizando una comparación que resaltará muchos aspectos e ideas interesantes de diferentes enfoques hacia las Transiciones Verdes Urbanas.

El objetivo principal de la tesis es generar conocimiento sobre la planificación urbana verde/arquitectura del paisaje/Soluciones Basadas en la Naturaleza que vaya más allá de las perspectivas académicas tradicionales y occidentales, haciendo hincapié en la incorporación de experiencias de profesionales, conocimiento de la comunidad local, perspectivas de "Global South" y razonamiento de la vida más allá de lo humano en entornos urbanos. El proyecto también estudia la relación con instrumentos legales y herramientas de política necesarias para la representación efectiva de la naturaleza en entornos urbanos, lo cual es especialmente relevante dado que la Ciudad de México es una de las pocas ciudades en el mundo que reconoce legalmente los derechos de la naturaleza.

Los hallazgos anticipados de esta investigación tienen el potencial de presentar ideas y visiones innovadoras sobre la planificación verde urbana, ofreciendo diversas perspectivas sobre la gobernanza justa de la naturaleza en entornos urbanos. Al explorar diversas formas de utilizar y coexistir con la naturaleza, el estudio puede revelar nuevos enfoques, siendo más inclusivos para la gestión de la naturaleza urbana.

Estos hallazgos son particularmente relevantes para urbanistas y profesionales de la infraestructura verde/Soluciones Basadas en la Naturaleza, que podrían beneficiarse de nuevas perspectivas y prácticas. Las percepciones generadas pueden ser cruciales para las

comunidades locales que residen en estas ciudades, contribuyendo a una representación mejorada y fomentando una comprensión más profunda de las dimensiones de justicia dentro de la planificación urbana verde. Con suerte, esto facilitará la convivencia entre especies y la mejora de la conexión entre humanos y naturaleza en entornos urbanos.

Tu trabajo en Planificación de Infraestructura Verde ha llamado mi atención, y creo que tus perspectivas y conocimientos contribuirían enormemente a la profundidad y calidad de mi investigación.

Estoy buscando realizar entrevistas con profesionales y expertos en el campo para obtener una comprensión integral de la justicia ambiental en la planificación urbana verde. Tu perspectiva sería fundamental para dar forma a la narrativa y enriquecer el análisis.

La entrevista/charla tomaría aproximadamente de 45 minutos a una hora y puede realizarse en un momento y lugar conveniente para ti. Estaré en la Ciudad de México desde el 11 de marzo hasta el 7 de abril y puedo visitarte en cualquier momento. Alternativamente, si prefieres una entrevista en línea a través de Zoom, también puedo organizarlo.

Te aseguro que toda la información compartida durante la entrevista se manejará de manera confidencial, seguirá todos los procedimientos éticos de investigación, incluidos los formularios de consentimiento, y siempre conservarás el derecho de retirar tu participación o permanecer en el anonimato.

Además, tu participación se reconocerá adecuadamente en mi tesis, y estaré infinitamente agradecida por tu tiempo y aportes.

Igualmente, si estás disponible y dispuesto/a a participar, me puedo adecuar al momento que te sea conveniente. Además, si tienes alguna pregunta o deseas más información sobre mi investigación, no dudes en preguntarme, por favor.

Aprecio tu tiempo y consideración, y espero con interés la posibilidad de incluir tus valiosas perspectivas en mi tesis.

Gracias por tu consideración y quedo pendiente de tu respuesta.

Atentamente,

Anastasia van der Meer