



**UNIVERSIDADE ESTADUAL DE CAMPINAS
INSTITUTO DE FILOSOFIA E CIÊNCIAS HUMANAS**

NIKLAS WERNER WEINS

**ECOLOGICAL COMPENSATIONS IN THE PEOPLE'S REPUBLIC OF CHINA:
TOWARDS ECOLOGICAL CIVILIZATION?**

**COMPENSAÇÕES ECOLÓGICAS NA REPÚBLICA POPULAR DA CHINA: RUMO A
UMA CIVILIZAÇÃO ECOLÓGICA?**

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Tese apresentada ao Instituto de Filosofia e Ciências Humanas da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Doutor em Ambiente e Sociedade, na Área de Aspectos Sociais de Sustentabilidade e Conservação.

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Orientadora: Profa. Dra. Leila da Costa Ferreira

Co-orientadora: Profa. Dra. Simone Aparecida Vieira

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A Comissão Julgadora dos trabalhos de Defesa de Tese de Doutorado, composta pelas e pelos Professoras e Professores Doutores/as a seguir descritos, em sessão pública realizada em 14 de junho, considerou o candidato Niklas Werner Weins aprovado.

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DEDICATÓRIA

*This thesis is dedicated
To more dialogue, cooperation and peace,
To better understanding among the people,
To all those of you who work on it with me.*

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We live in times of unprecedented change under the looming climate emergency. While being the object of this thesis, this very crisis has also deeply affected how I approached the research for it. Sixty years ago Rachel Carson (1962) called the world's attention to massive species loss and deeply worrisome infringement of human activities on nature. Even though epidemics have happened in many parts of the Global South since, it was only through the COVID-19 pandemic that also the Global North had to come to a powerful (albeit much shorter) standstill due to unprecedented lockdowns. The uncertainties that globalization brought about for humanity's quest for living more sustainably that scientists warned about since the 1980s and 1990s (BECK, 1986; FERREIRA; VIOLA, 1996) had come to materialize. In a state of shock and in ways practically nobody had anticipated, the world had to stop and listen. Even though this resparked a public debate about reorienting our economies towards respecting planetary boundaries (ROCKSTRÖM et al., 2009), the hegemonic urge to "get back to normal" and not seize the moment for a radical change of the system was greater and soon many countries opened back up. Doing research on China in such times was challenging in a variety of ways. Doing this in Brazil was even more so. Except for the final months, my whole PhD overlapped with a negationist government that fought against not only environmental protection, but also against many social movements. Furthermore, in the initial months of that government, China was a particular target of aggression, racist hate and misinformation.

Having been born and raised in Germany's industrial heart, just a valley away from Friedrich Engels' house, my grandparents and parents raised me to always be curious about the world, its injustices, its languages and cultures in all their expressions. This doctoral research is the culmination of my interest in the possibilities of transforming our understanding of development and the central role that China will play globally in this process. As all the academics judging this thesis and all those in the process of doing a degree like this will know: a PhD means being surprised by one's field because it literally changes everything you thought you knew. In the times of COVID this got a completely new meaning. I had originally foreseen spending several months in Chongqing's

countryside, accompanying eco-compensation projects to get a better understanding of the involvement of different local actors and their understanding of the measures within the policies linked to Eco-Civilization. It took time for me to accept the limitations imposed on fieldwork in this time and I had to make the best out of the situation at hand. While it is surely frustrating to undertake a radical change of course, I was convinced that this topic was worth spending time on, so I decided to wait and hope for travel to China to be possible again. In early 2022 when COP15 was transferred to Canada, in therapeutic conversations with my supervisors, it doomed me that the long-awaited and so idealized fieldwork would not work out during the course of my PhD. Sticking to the approach and research questions may not have been the wisest decisions – but the amount of other doors that opened during this confusing time reaffirmed that it was defensible. This thesis emerged in a difficult time in modern Brazilian history, the Bolsonaro government, that destroyed years, decades of progress in democratic inclusion, environmental policies and Brazil's position in the global governance system. As this moment ends, relief and *leveza* return to our everyday lives, this journey ends and a new chapter opens that still has not revealed its outlines...

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ABSTRACT

Global environmental changes resulting from human activities affect societies in the Global North and the South unequally which makes it necessary to analyze opportunities and threats of adaptation strategies accordingly. The rapid economic and cultural changes that China, the world's most populous country, underwent in the twentieth century have led to many environmental problems to which its political leadership responded in 2007 by adapting the "Construction of an Ecological Civilization" as a utopian vision to be achieved until 2049. Since president Xi Jinping took office in 2013, the policy framework has also been guiding the country's approach to the integration of urban development and ecological management, in a new stage of implementing advanced environmental priority policies and, since 2017, their internationalization in global environmental governance. Ecological compensations are among these tools for risk mitigation and climate finance which offer an innovative approach to the integration of conservation and modernization, particularly in China's rapidly growing cities. In this thesis, I argue that China's Eco-Civilization offers a (non-Western) parallel with Beck's concept of metamorphosis, as the logic of social interaction is fundamentally changed in the face of global environmental risks. Exploring eco-compensation and international trade from a multi-level perspective, this thesis provides some evidence for the metamorphosis under Eco-Civilization. Challenging some of the dominant Western conceptions of nature conservation, China's approach domestically advocated a strong coordinating role to the central state to build this ecological utopia of harmony between humans and nature. Following Beck's theoretical assumptions, I present an analysis of China's environmental governance structures and a discussion on the roles of cities as political actors in the process of metamorphosis in Chongqing. This is followed by an empirical exploration of Chinese scientific, news and policy documents, in which the conflict between different land uses is highlighted in the local case study of the Southwestern city of Chongqing. The consequences beyond China's borders are discussed in chapters five and six, suggesting that Eco-Civilization represents an excellent base for the implementation of transnational eco-compensations in South-South cooperation among biodiverse countries. I conclude by highlighting some of the theoretical contributions that a more pluralized approach to China's environmental rise could bring to environmental sociology and environmental policies in Brazil.

Keywords: Environmental sociology; Environmental policy; Environment – Social aspects.

RESUMO

As mudanças ambientais globais resultantes das atividades humanas afetam de forma desigual as sociedades do Norte e do Sul Global, o que torna necessário analisar oportunidades e ameaças de estratégias de adaptação em conformidade. As rápidas mudanças econômicas e culturais que a China, o país mais populoso do mundo, sofreu no século XX, levaram a muitos problemas ambientais aos quais sua liderança política respondeu em 2007 adaptando a "Construção de uma Civilização Ecológica" como uma visão utópica a ser alcançada até 2049. Desde que o presidente Xi Jinping tomou posse em 2013, a estrutura política também tem guiado a abordagem do país na integração do desenvolvimento urbano e da gestão ecológica, em uma nova etapa de implementação de políticas ambientais prioritárias avançadas e, desde 2017, sua internacionalização na governança ambiental global. As compensações ecológicas estão entre essas ferramentas de mitigação de riscos e financiamento climático que oferecem uma abordagem inovadora para a integração da conservação e modernização, particularmente nas cidades chinesas em rápido crescimento. Nesta tese, defendo que a Eco-Civilização da China oferece um paralelo (não ocidental) com o conceito de metamorfose de Beck, pois a lógica de interação social é fundamentalmente alterada diante dos riscos ambientais globais. Explorando a compensação ecológica e o comércio internacional de uma perspectiva multinível, esta tese fornece algumas evidências para a metamorfose sob a Eco Civilização. Desafiando algumas das concepções ocidentais dominantes sobre a conservação da natureza, a abordagem da China defendeu internamente um forte papel de coordenação com o estado central para construir esta utopia ecológica de harmonia entre o homem e a natureza. Seguindo as suposições teóricas de Beck, apresento uma análise das estruturas de governança ambiental da China e uma discussão sobre o papel das cidades como atores políticos no processo de metamorfose em Chongqing. Isto é seguido por uma exploração empírica de documentos científicos, políticos e de notícias chineses, nos quais o conflito entre os diferentes usos da terra é destacado no estudo de caso local da cidade de Chongqing, no sudoeste do país. As consequências além das fronteiras da China são discutidas nos capítulos cinco e seis, sugerindo que a Eco-Civilização representa uma excelente base para a implementação de eco-compensações na cooperação Sul-Sul entre países biodiversificados. Concluo destacando algumas das contribuições teóricas que uma abordagem mais pluralizada da ascensão ambiental da China poderia trazer à sociologia ambiental e às políticas ambientais no Brasil.

Palavras-chave: Sociologia ambiental; Política ambiental; Meio ambiente – Aspectos sociais.

摘要

人类活动导致的全球环境变化对南北半球社会的影响不尽相同，对适应性战略的机会和威胁进行相应分析有其必要性。中国作为世界上人口最大的国家，在20世纪经历了经济和文化的快速变化，导致了许多环境问题，作为应对，2007年共产党领导人提出《生态文明建设》目标，提出了一个乌托邦式的愿景，并希望2049年前实现。自2013年习近平主席上任以来，在实施生态优先发展的新阶段，以及自2017年以来全球环境治理国际化进程中，该政生态文明制度体系也对中国城市发展和生态管理的整合方法起到了指导性作用。生态补偿是这些风险缓解和气候融资的工具之一，它为保护和现代化的融合提供了一种创新的方法，这在中国快速发展的城市中有着特别体现。在这篇论文中，我认为由于面对全球环境风险，社会互动的逻辑发生了根本性的改变，而中国的生态文明与贝克的蜕变概念提供了一个（非西方）平行。本论文从多层次的角度探讨了生态补偿和国际贸易，为生态文明下的蜕变提供了一些证据。中国的做法挑战了西方一些主流的自然保护概念，中国主张由中央政府发挥强有力的协调作用，建立一种人与自然和谐发展的生态乌托邦。根据贝克的理论假设，本论文表示了中国的环境治理结构的分析，并讨论了在重庆的蜕变过程中，城市作为政治角色的作用。然后表示在中文科学、新闻和政策文件的实证探索中，西南城市重庆的地方案例研究集中体现了不同土地使用之间的冲突。本文第五章、第六章讨论了中国边界以外及其跨过风险，表明生态文明为生物多样性国家之生态补偿南南合作的实施奠定了基础。最后，我强调了对中国环境崛起采取的多元方法可以为巴西的环境社会学和环境政策带来一些理论上的贡献。

关键字：环境社会学。生态补偿。生态文明。

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ABBREVIATIONS

BRI	Belt and Road Initiative
BRIGC	BRI Green Coalition
CAS	Chinese Academy of Sciences
CASS	Chinese Academy of Social Sciences
CBD	Convention on Biological Diversity
CCICED	China Council for International Cooperation on Environment and Development
CNKI	Chinese National Knowledge Infrastructure (中国知网)
COP	Conference of the Parties
CPC	Communist Party of China
ES	Ecosystem Services
EMT	Ecological Modernization Theory
EM	Ecological Marxism
FYP	Five-Year-Plan
GfG	Grain for Green
IEMP	International Ecosystem Management Partnership (UNEP)
IPBES	Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
ISA	International Sociological Association
IUCN	International Union for Conservation of Nature
LABGEC	Laboratory of Social Dimensions of the Global Environmental Changes in the Global South
LDA	Latent Dirichlet Analysis

MEE	Minister of Ecology and Environment (生态环境部)
MEP	Minister of Environmental Protection (环境保护部)
MNR	Ministry of Natural Resources (自然资源部)
NbS	Nature based Solution
NDRC	National Development and Reform Commission (发展改革委)
NFCP	Natural Forest Conservation Programme (天然林资源保护工程)
PES	Payment for Ecosystem Services
PRC	People's Republic of China
SARS	Severe Acute Respiratory Syndrome
SEPA	State Environmental Protection Administration
SLC	Sloping Land Conversion
SOE	State-Owned Enterprises
UN	United Nations
UNEP	United Nations Environmental Program
WUR	Wageningen University and Research

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1. INTRODUCTION

The world is living through times of unprecedented rapid change in the 2020s. The Covid-19 pandemic has not only disrupted our hyper-connected and hyper-specialized economic systems, but also “mondialized” social and cultural systems beyond our understanding. Many of the issues laid barren by the pandemic, however, come down to one connecting dimension those systems are directly and indirectly dependent on: the environment. Climate change has taken on a new dimension of social centrality, as a civilizational issue and is not simple about changing and extreme weather but about how social institutions respond to these changes and how we can create a kind of green modernity in which human activities are in harmony with nature (BECK, 2010a; FERREIRA, 2020a). This thesis is a contribution to the puzzle we are currently facing in terms of what “the meaning of the global events unfolding before our eyes” may be (BECK, 2016, p. 4). Through a critical application of his theory of the *Metamorphosis of the World* I want to call attention to the rapid changes unfolding in China’s environmental governance and suggest some implications for South-South cooperation with Brazil.

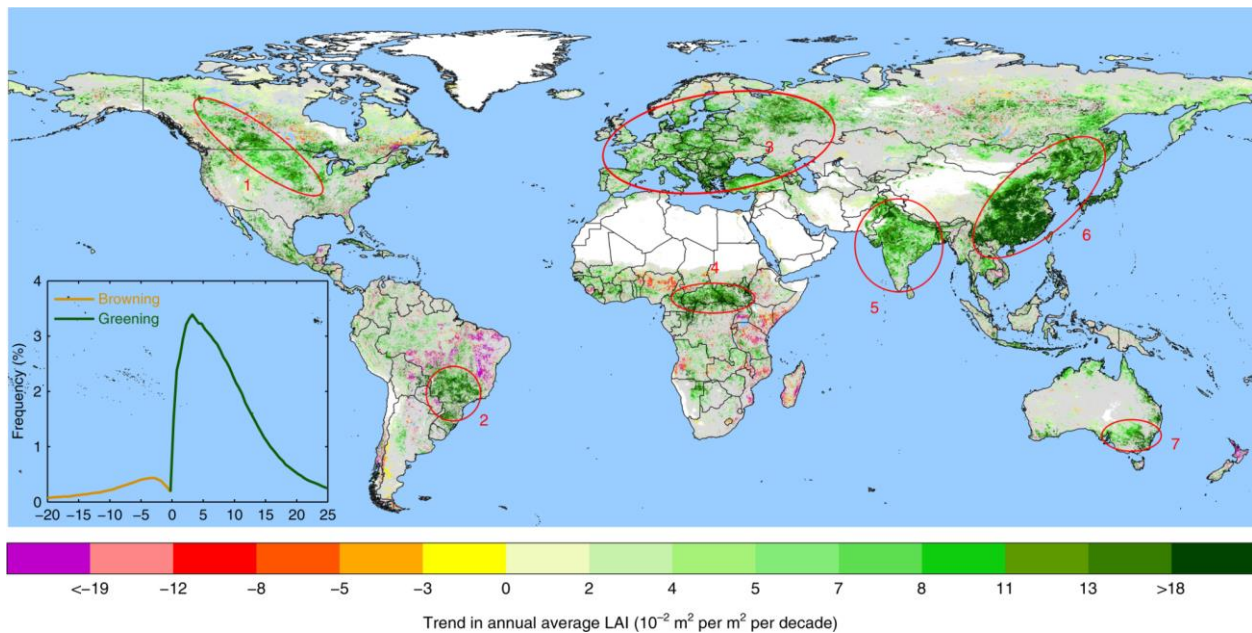
Saito (2023, p. 3) affirms that the rise in “wildfires, heatwaves and precipitation patterns shows how the ‘end of nature’ (FOSTER, 2020) dialectically turns into the ‘return of nature’; the earth and its limits are more and more tangible in such a way that humans can no longer control nature’s power”. Add to that mass extinction, plastic pollution, or fossil fuels and their lasting CO₂ emissions and the stage for glooming environmental catastrophe is set. This era is the Anthropocene, an era in the earth's history in which human impact on the environment becomes geologically visible. Expressed in a global climate emergency, extreme weather events which in former years used to be perceived as a problem of the Global South, have increasingly come to leave a kind of “anthropological shock” (BECK, 1987) on media audiences of rich countries, too.

The power of such shocking events and the pessimistic scenarios they provide us with, however, have not shown much effect on our capitalist development models, despite being repeated by finger-raising scientists over and over since at least the 1960. Despite all the evidence for the need for more “sustainability” being readily available at everyone’s fingertips, no clear change in a vision for the world we want to live in seems to have managed to convince broad parts of the global population. It seems to be

necessary to rethink not only the paralyzing facts of humanity's destructive forces unleashed in the Anthropocene. It seems that humanity needs new visions, new horizons, "new compasses" as the late sociologist Ulrich Beck (BECK, 2015; 2016) wrote in his final works on emancipatory catastrophism and the potential metamorphosis of the world due to exactly the bleak outlook of climate change.

And indeed, recently a few pieces of *positive* evidence can be added to the lists of environmental decay and catastrophes. The centrality of environmental issues is taking a hold of an increasing number of countries' development agendas. The Green New Deal in the world's biggest economy, the USA, and the European Union's response are the "developed" world's way of making use of the innovation potential that arise from increasingly necessary restructuring of extractive economies. This leadership is widely reported on by the powerful institutions and communication platforms of the Global North, often arguing that emissions are already in decline (but coming from very high levels) and downplaying historical emissions as facts that cannot be changed. When environmental issues in India, China, Indonesia or Brazil get attention from media in the Global North, it is all too often in an alerting tone about the responsibility of "bending the curve" of their still growing economies.

What has been receiving much less attention however, is that green development initiatives in the Global North are by far not the only transformative visions present on the world stage. Regardless of the continued associations between emerging economies' need for development with planetary limits and in the worst cases even Malthusian arguments against population growth, powerful alternative development patterns and positive future visions are also emerging in those parts of the world that suffered (and continue to suffer) from colonial exploitation.

FIGURE 1 – Map of trends in annual average MODIS LAI for 2000–2017

Source: Chen et al. (2019).

Here, I would like to highlight China's vision for “Constructing an Ecological Civilization” (Eco-Civilization) and the massive tree planting interventions taking place as part of this endeavor. Fifteen years after being picked up by the Communist Party of China’s (CPC) leadership as a central vision that recently made it into the country’s constitution, it is still presented in Western media as an “empty slogan” (THE GUARDIAN, 2021). As a case for the pluralization of environmental interventions (ZHU, 2022) it calls for new approaches in environmental sociology for a variety of reasons that have recently been well discussed in the area’s literature (ZINDA; LI; LIU, 2018). Albeit (or precisely because) of not being common knowledge on those two emerging economies, the authors of a 2019 *Nature Sustainability* article provocatively highlighted: “China and India lead in greening of the world through land-use management” (CHEN et al., 2019). The authors state that with only 6,6% of global vegetated area, China alone accounted for 25% of the global net increase in leaf area (CHEN et al., 2019, p. 122). In early 2023, the article had been cited more than 1,300 times, with responses discussing how these impressive land use changes had gone without much attention by the global community. Of course, an easy critique lies in the measuring and definition of what counts as “greening”. In the author’s methodology this was defined in terms of leaf area as observed in satellite

imagery between 2000 and 2017 and including agriculturally used land in both countries – a measure that in common Western understandings of environmentalism does not count as conserved land. Indeed, when consulting indices of biological diversity, many of the early monoculture plantations in the country’s northern anti-desertification project of the “Great Green Wall” (*sanbei fanghu lin* 三北防护林) are human-made green deserts without important functional diversity (JIANG, 2016). However, what we miss as a global community by categorically rejecting such significant human interventions, is a potential and hopeful redefinition of human-nature relations taking place. The complete absence of discussions on the Chinese case in standard literature on the ecology of Novel Ecosystems like Hobbs; Higgs and Hall (2013) on “Intervening in the New Ecological World Order” or Morse et al. (2014) on “Novel ecosystems in the Anthropocene” are unjustified and lack recognition of and discussion with what is going on in China. For this reason, this thesis aims to extend the reach of the environmental humanities on China’s eco-compensation policies.

The impressive transformation of China’s landscapes has been achieved through policies linked to the Sloping Land Conversion (SLC) and Grain for Green (GfG), the world’s biggest ecological restoration programs (DELANG; YUAN, 2015). All this is taking place under China’s Eco-Civilization. While obviously political slogans, just like the North’s Green Deal, can be seen as lip service to global or domestic calls for more responsible policies when it comes to the environment, what has been taking place in China under the umbrella of Eco-Civilization has to be recognized. The country’s “eco-restructuring” (ZHU; LO, 2022) in its national and local institutions can also be seen as a civilizational turn to the environment. This “Chinese version” of tree planting can be counted as an important example of massive anthropogenic ecosystem interventions that will outlast an eventual extinction or massive reduction of humanity. It also fits quite well into the spirit of Beck’s metamorphosis and of what we understand as the Anthropocene. But this transformation’s impacts may provide a more positive light on humanity’s future – at least from a carbon storage point of view.

Historical dimensions

FIGURE 2 – Great Yu Controls the Waters



Source: Silvério, 2012.

To better understand the context of the metamorphosing potential of Eco-Civilization, its origins have to be understood in Chinese terms, i.e. as part of its millennial history. The modification of ecosystems lies at the heart of the agricultural revolution and control over the elements is certainly an element that is key to many civilizations. In China, the beginning of its 4.000-year dynastic civilization begins with the story of Emperor Yu of the Xia Dynasty (SILVÉRIO, 2012 see Figure 2). Known as the Great Controller of the Waters (*da Yu zhishui* 大禹治水), his flood control systems justified his heavenly mandate (*ming* 命) to rule and unite the Chinese people under the "Laws of Nature established by Heaven" (SCHMITT, 2016, p. 82).

Only centuries after the emergence of the eco-centric Daoist philosophy (often understood as China's only indigenous religion¹) in the 4th century BCE, the

¹ For an in-depth discussion on Daoism as a religion vs. philosophy and its relation to the environment, see Lemche and Miller (2019).

environmental history of the middle imperial period (300-1300 CE) began to be marked by deforestation in the country's north and south alike (MARKS, 2017). In the 13th century, great parts of central China's landscape were deforested due to advances in waterways and rising demand in the coastal provinces. The results were increased floods linked to the loss of forest cover to which local populations in South Western China responded through the creation of speculative trading systems in timber market futures. It is from this time on that there are records of large scale tree planting (ZHANG M., 2017, 2021). Even though, during the successive Ming and Qing Dynasties, reforestation activities continued, forests suffered net losses until past the end of China's dynastic period (AHRENDTS et al., 2017). However, at the end of the Qing Dynasty and the beginning republican period, the traditional ancestry worshipping Tomb-Sweeping holiday on 12 March was converted into a National Tree-Planting in 1916. In a tumultuous time of surging rivalry between local warlords, communists and nationalists, historian Larissa Pitts (2019) suggests that this newly transformed holiday created a sort of "unity in the trees" which gave local elites the possibility to plead their allegiance with Beijing – first turning the environmental act of tree planting (种树 *zhongshu*) into a political one.

FIGURE 3 – “Make the motherland green – it is everybody's responsibility to take good care of trees!”



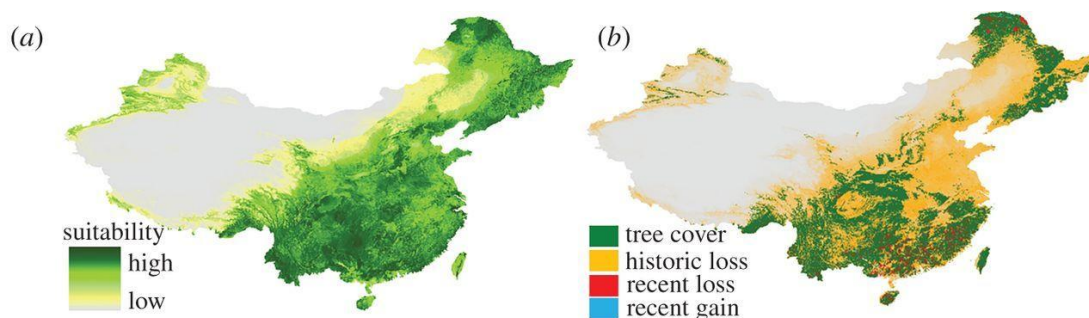
Source: Beijing Municipal Parks Office (1973).

In the People's Republic, tree planting continued and became a political act of the masses. One year after its founding, in the 1950s, chairman Mao Zedong initiated

large-scale afforestation programs to protect the North China Plain from advancing desertification (VIÑA et al., 2016). Both in the countryside and in cities, campaigns highlighted the collective responsibility for tree planting, as the example (Figure 3) of a 1973 poster by the Beijing Municipal Parks Office (1973) shows. “Make the motherland green” (*lvhua zuguo* 绿化祖国) “it is everybody’s responsibility to take good care of trees” (*aihu shumu, renren youze* 爱护树木, 人人有责).

It has to be mentioned though, that campaigns like this happened alongside massive tree cutting in other parts, especially the south and northeast of the country (AHRENDTS et al., 2017, see Figure 4). Shortly after Mao’s death in 1978, construction began on the largest and most ambitious tree-planting campaign in history: the Great Green Wall. In the following year, the National Congress also officially assigned March 12th as Tree Planting Day, an occasion at which “high ranking to low ranking government officials appear on TV to call for planting trees along roads, in parks and along rivers” (YU; LI; LI, 2006, p. 231).

FIGURE 4 – Tree cover (with a minimum of 50% crown cover) losses and population pressure. (a) Predicted historical tree cover distribution in China (approx. 8000 BCE; based on climatic suitability). (b) Tree cover in 2000 and recent losses and gains



Source: Modified from Ahrends et al. (2017).

Around this time, Soviet philosophers were debating their responses to the looming environmental crisis (FEDOROV, 1983) that had sparked a public debate in the West after the declarations of public figures like Rachel Carson (1962) and the Club of Rome (MEADOWS et al., 1972). To find ways to include (or re-center) environmental issues in socialist theory and reconcile what many saw as a sub-contradiction in socialist class struggle (FOSTER, 2000), the civilizational dimension of ecology was taken up in

Soviet literature on the issue. As climate scientist and one of the few Soviet members of the Club of Rome, Evgenii Fedorov, argued for a “both optimistic and prophetic”, almost techno-optimistic view on the nature-culture divide that assumed in its solution lay in the “unlimited power of science and technology” (LAJUS, 2020, p. 333). The emergence of what the group of intellectuals around Federov coined as “Ecological Civilization” in their anthology “Philosophy and Ecological Problems of Civilization” (URSUL, 1983) proposed a new stage in the development of socialism that, according to Lajus (2020) was a similarly successful technocratic project as the Anthropocene is today. The revolutionary idea of understanding harmony with nature as a civilizational stage that would be achievable in and through socialism, would justify the theoretical basis for modern day China’s “mechanistic approach” to ecology (RODENBIKER, 2019). Fedorov wrote (FEDOROV, 1983, p. 42):

For Marxian science harmonious organization is one of the conditions for moulding a man of a new type; Marxists define the term ‘ecodevelopment’ widely used in the West accordingly. By ‘ecodevelopment’ we mean rational development and the (shaping) of the environment in man’s interest. Maximum conformity of the environment shaped with our vital needs is the basic aim of an ecologically balanced strategy of development (FEDOROV, 1983, p. 42).

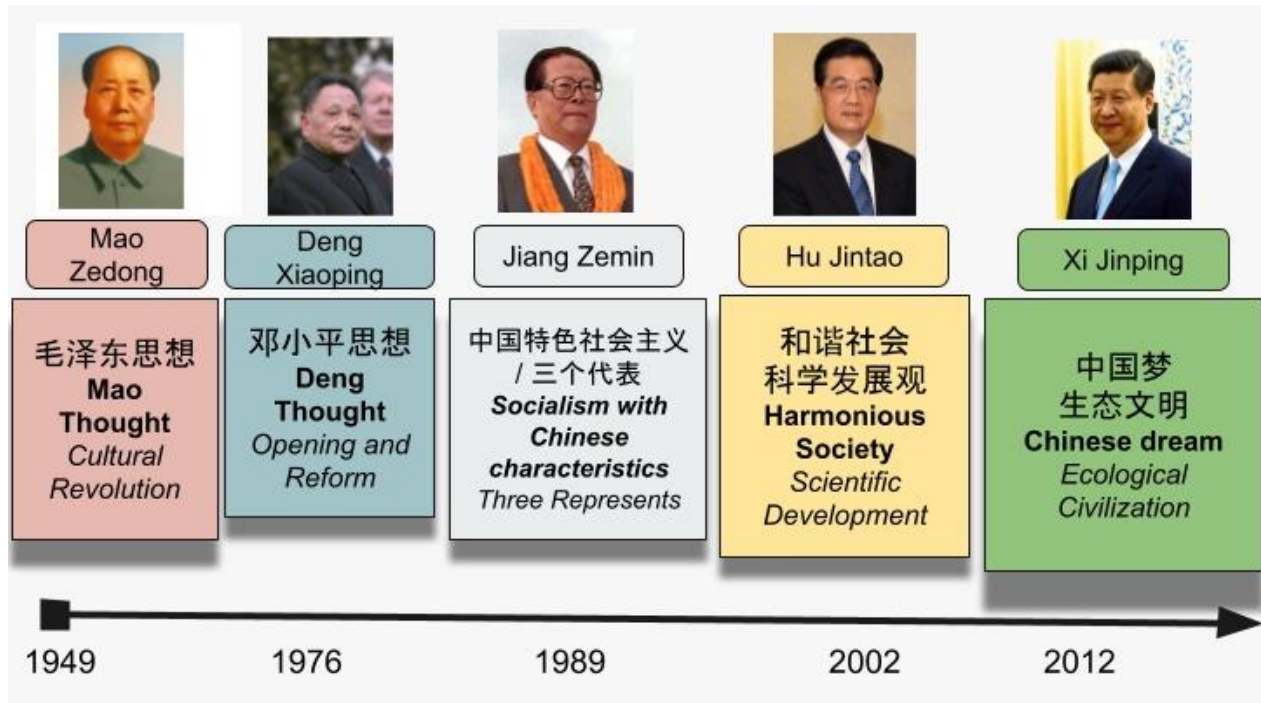
It is in this period that the theoretical underpinnings of the Chinese Eco-Civilization develop and translate into practice. A key figure in those early discussions is professor of agricultural economics Ye Qianji (叶谦吉) who taught at the agricultural department of Chongqing Central University and the economics department of Southwest University. His interpretations about the linearity of human development from barbarian and agricultural, over industrial to an ecological civilization that learns humanity’s coexistence with nature still form the basic understanding of CPC texts today (SCHMITT, 2016). Despite some unclarity about the exact transmission into the policy realm, Schmitt (2016) identifies an article by Wang Wenxue (WANG, 1997) about the role of ecological agriculture in supporting greening, anti-desertification and water projects as the beginning of the CPC’s interaction with the Brundtland report’s concept of sustainable development.

In the early 2000s under the leadership of Pan Yue (潘岳), deputy director of the SEPA and proponent of a green GDP in China, the CPC started to take up the language of Eco-Civilization and started harmonizing its ideas with party ideology

(GORON, 2018; PAN, 2006a). Embedding Eco-Civilization into a “unilinear evolutionary context [...] the Party was able to ensure that sustainable development could properly integrate within the rest of the CPC ideological canon” (SCHMITT, 2016, p. 79). In subsequent years, the concept expanded its reach into other areas. The harmonization of the ideological bases of Western ecological Marxism within Chinese Marxism was found in an ongoing dialogue within the party schools and with intellectuals abroad (FOSTER, 2017; WANG; HE; FAN, 2014). Ecological ideas and typically Chinese cultural elements were “indigenized” into the public discourse about Eco-Civilization. Drawing from Daoism, Chinese Shan Buddhism and Confucian texts the nature-culture links were skillfully woven into a - at times selective - narrative of historical continuation, of China as having been an “ecocentric” culture all along (HANSEN; LI; SVARVERUD, 2018). This way, the “environmental turn” presents a great opportunity to the CPC to rejuvenate and reorient its claim to lone legitimacy in times of ever harsher environmental challenges and diminishing economic growth (TENG; WANG, 2021).

Governance dimensions

FIGURE 5 – Guiding ideas and leaders in the People's Republic of China from 1949 to today



Source: Data from Shambaugh (2013). Own illustration

In the line of leadership ideologies, Eco-Civilization has taken a notably central role in president Xi Jinping's governance comparable to his preceding chairmen (Figure 5). When Mao Zedong thought (*mao zedong sixiang* 毛泽东思想) was central to justifying the Cultural Revolution, Deng Xiaoping thought was so for pushing for the infamous Opening and Reform of China in the 1980s. Due to the surge in its use, "Xi Jinping thought", similar to Mao and Deng's has been simplified at the 20th Party Congress in 2022 from its long forms "Thought on the Construction of an Ecological Civilization" (*shengtai wenming sixiang* 生态文明思想) and "Thought on Socialism with Chinese Characteristics for a New Era" (*xi jinping xinshidai zhongguo tese shehui zhuyi sixiang* 习近平新时代中国特色社会主义思想) have been shortened. This is significant because Xi's predecessors Jiang Zemin and Hu Jintao did not receive such recognition. The adoption of a leader's ideology is historical and has important implications for the "New Era of

Socialism with Chinese Characteristics” associated with Xi's rule which promises profound changes in the country's ideological orientation (JOHNSON, 2022; JONES, 2022). It therefore has to be understood in its global implications in much more detail than is currently the case in the literature (LIN, 2021; VILLA, 2022). While Hu and Jiang have not left traces of their names in the governance concepts of the PRC, Xi makes sure not to lose references to their concepts as they continue to make up the government's claim to legitimacy and representation of different factions (SHAMBAUGH, 2021). While the Three Represents, thought of as a response to the Tiananmen protests, “Socialism with Chinese Characteristics” remains a much cited description of the Chinese version of socialism, albeit (and necessarily) without a clear definition². Scientific Development (*kexue fazhan* 科学发展) is still regularly referenced in policies that regularly stress to be science-based (GORON, 2018).

Herein lies an interesting thread to follow for the theoretical analysis of this thesis: what Beck (1997) described as elements of “subpolitics” in modernity, the politicization of science and the scientification of politics, seems to find a perfect case in the governance concept of Ecological Civilization. The institutional restructuring under the Eco-Civilization doctrine goes far beyond discursive greenwashing and is significant on several levels (CHAN; XU, 2018). While those subpolitics apply to e.g. the case of centralization of regulatory powers (KOSTKA; NAHM, 2017) explored in Chapter 3 of this thesis, the unique interactions between science and politics in defining this “Chinese concept of sustainable development” (GORON, 2018) presents a challenge to Beck's theory, especially to elements about the role of the state (WEINS et al., 2023, see Chapter 2 of this thesis).

Barbi, Ferreira and Guo (2016)³ suggested a two-phase schematization of the uptake of environmental policies related to climate change in China. According to the authors, in the first phase climate change was still an issue that was dealt with apart from the political agenda (1992-2006). With heavily rising investments in science to combat the increasing number of extreme weather events at the beginning of the 2000s, an elaborate environmental expert system was formed with the different ramifications of the Chinese

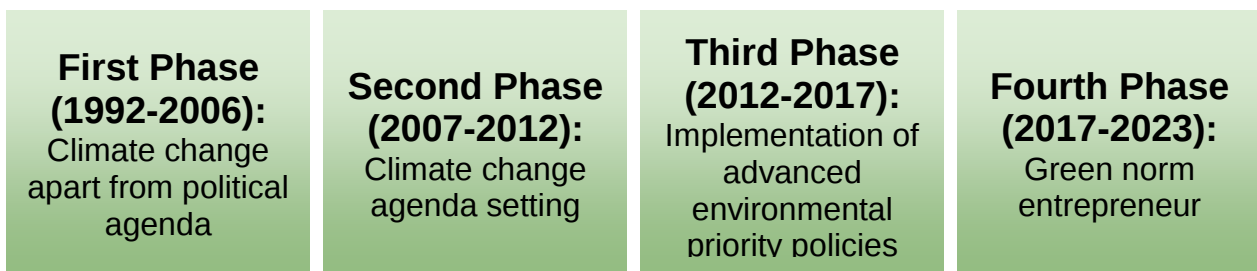
² Essentially referring to a wide array of possible characteristics the CPC decides to take up.

³ Result of FAPESP projects 14/03101-5 and 14/09533-4.

Academy of Science taking a more central role in the spirit of Hu Jintao's "Scientific Development" concept (LI; YANG; XIAO, 2016). In his extensive work on epistemic communities and the environment, Haas (1992, p. 8) affirmed that the "proliferation of government ministries and agencies to coordinate and handle many new tasks, regulation has become an increasingly important bureaucratic function, and the expertise required has extended to a wider range of disciplines than ever before". The much regarded case of climate change exemplifies how the expansion of ministries and expertization of politics unfolded and eventually complicated and even gridlocked the country's environmental governance system under what became known as "nine dragons managing water" (*jiulong zhishui* 九龙治水) (CHEN; XU, 2018).

Barbi; Ferreira and Guo (2016) suggest a second phase in which a climate change agenda is set (2007-2012). Its beginning coincides with the first mentions of the Eco-Civilization concept by president Hu Jintao and builds on the consolidation of monitoring systems, a number of revised environmental policies and the institutional elevation from the State Environmental Protection Administration (SEPA) to the Ministry of Environmental Protection (MU, 2018).

FIGURE 6 – Four phases of chinese climate governance



Source: Based on Barbi; Ferreira and Guo (2016) and Sun and Yu (2023), modified by the author.

With this thesis, a third phase is suggested which coincides with Xi's ascend to power in 2012 that lasts to at least 2017. In line with the language that has emerged in local policy documents like Chongqing's Action Plan for Implementing Ecological Priority Green Development (CHONGQING, 2018), this stage is coined by the implementation of advanced "environmental priority" (*shengtai youxian* 生态优先) policies and clearly puts environmental issues at the heart of development policies. Another strong characteristic

of this phase is the restructuring and concentration of regulatory matters related to environmental issues in the Minister of Ecology and Environment (MEE, *shengtai huanjing bu* 生态环境部) and the Ministry of Natural Resources (MNR, *ziran ziyuanbu* 自然资源部) (WANG, 2018). Through this restructuring, important jurisdiction over policy aspects that were formerly spread in the ministry of housing, water or land use achieved an unprecedented degree of streamlining at the central level that overcame the “nine dragons” problem (CHAN; XU, 2018; GARCIA; CASTRO; WEINS, 2022). The reform does not only reflect on domestic policy though. In this third phase, the MEE takes a “cosmopolitan turn” getting active in global risk governance by taking on leadership in China’s foreign policy including the climate and biodiversity COPs (QI; DAUVERGNE, 2022b). Finally, following Sun and Yu’s (2023) analysis, we consider that the launch of the Green BRI marks a new phase in which China has become sufficiently confident and powerful in the global system to use the BRI (as well as other international institutions) to diffuse its own green norms, making it a “norm entrepreneur” (WEINS, 2015; WEINS; FERREIRA; FEODRIPPE, 2020).

Beck’s theory seems to offer a clear-cut explanation to the internalization and increasing centrality of environmental issues under Eco-Civilization in the face of the complex risks produced by its own (and global) institutions of government. Early literature on the ideas of risk society in China classified the country as a “developmental” risk society (ZHAO; HO, 2005) using this premise as a piece of evidence pointing to the inevitable downfall of the regime (THIERS, 2003). Others explored the implications of the transnationalization of China’s mounting environmental risks (STRAUSSMAN; ZHANG, 2001; WISHNICK, 2005), which materialized in the 21st century’s first epidemic with the outbreak of the Severe Acute Respiratory Syndrome (SARS) in China in 2003. The spread of international air travel through hubs like Hong Kong and Shanghai gave some space to the limits of risk governance beyond national borders for a short moment (even if attention was focused on East Asia and North America). The epidemic also sparked a sudden interest within the Chinese academic community in Beck’s theory, as the country’s entanglements with global risk society became empirically visible (ZHANG; ZHAO, 2011). The radical social and economic changes Chinese society had undergone, in fact, made China a particularly appealing case for exploring the complex and ever-increasing nature

of risks. As sociological investigations into the implications of risk society in China's "compressed modernity" grew, the framework has since been applied to issues of food safety, genetically modified organisms, nanotechnology, and other emerging environmental issues (TONG; ZHANG, 2020). Through these disparate applications, unique features of China's particular risk society – as well as any potential metamorphosis that might follow – emerged. Following his analysis of South Korea's complex risk society, for example, Chang Kyung-Sup (CHANG, 2017, p. 2) turned to the Chinese case and found that "the risk syndromes accompanying reforms to the socialist system, stacked on top of the risk syndromes carried over from the previous socialist era" have resulted in an extremely complex risk society. In other accounts, the political elements of "building a harmonious society" and the "scientific outlook on development" were examined. In an article in the journal *Marxism and Reality* (*makesi zhuyi yu xianshi* 马克思主义与现实) Zhang and Zhao (2011) discuss how risk society theories have become an object of political debate.

Going beyond the domestic sphere, discursive elements like the idea of a "Community of Human Destiny" (*renlei mingyun gontongti* 人类命运共同体), which is often referred to by Chinese leadership in international organizations, situates China within the broader world risk society (TONG; ZHANG, 2020; WU, 2018). The concept gives a response to a risk society "with Chinese characteristics" but aligns the implications of the theory with official CPC discourse to engage globally in the fight against climate change, a phenomenon considered a "component of a new set of contemporary environmental risks produced by the scientific and technological development process" (FERREIRA; BARBI, 2016, p. 686). Despite such wider harmonization and interaction with the theory though, Beck's more recent work is only indigenized in research to a certain degree and does not directly feed into governance ideas. In searches conducted throughout this research in both Western and Chinese scientific databases, the theory of metamorphosis

(*biantai lilun* 变形理论) has not had any visible impact on Chinese literature and few articles have been translated into Mandarin⁴.

One tool for risk mitigation that has been widely experimented with and that is taking a hold of global environmental policy debates are Payments for Ecosystem Services (PES), or, as they are commonly referred to in China: ecological compensation mechanisms (ECM). Based on the understanding that well-functioning ecosystems produce essential benefits to human economies and wider wellbeing, the idea of ecosystem services emerged in the 1980s and has today become the dominant way of defining human-nature relations in the global environmental policy arena (KADYKALO et al., 2019). PES policies became popular as the understanding of the need for carbon sequestration became scientific consensus as an important way to tackle global climate change. ECM can work on several levels, within countries and sub-national units of government or between countries. The idea of emissions trading has for long been a sought after but contentious issue between industrialized countries and the Global South as cross-boundary compensation made possible through global governance institutions like REDD (Reducing Emissions from Deforestation and Forest Degradation) offered funds but also demanded restrictions to land use (PETERSON et al., 2012).

While early theoretical references to the implementation of the idea of the internalization of externalities through markets goes back decades, the implementation of monetary valuation and compensation has been experimented with in practice only for around 25 years (DAILY et al., 2009; GÓMEZ-BAGGETHUN; MURADIAN, 2015; WUNDER, 2015). Costa Rica is widely regarded as the first country to implement policies for carbon storage, improving hydrological services through reforestation, the protection of biodiversity and landscape management that were built on existing legislation and financed in parts through a fossil fuel tax. Similarly, other countries of the Global South like Mexico, South Africa and Brazil established PES policies, even though most of these programs do not follow market logic but rather depend on state organization and payments (SCHOMERS; MATZDORF, 2013).

⁴ See e.g. a translation of Mythen (2018) "The metamorphosis of the world: society in pupation?" (*Shijie de tuibian: huatongzhong de shehui* 世界的蜕变：化蛹中的社会？).

While China is not an ideological pioneer in the implementation of market policies, in the study and implementation of ECM, the explicit recognition of the importance of the state in market-based environmental policies certainly lies closer to the global reality and its interpretation may turn out to set more realistic definitions for PES. Even though eco-compensation is not always clearly defined and its applications in China range from restoration of mining sites, payments to pastoralists and the conversion of farmlands, the vastly growing Chinese literature on the issue is shaping and “sinicizing” the concept. In a widely cited definition of ECM, Xiong and Wang (2010, p. 390) proposed to include in it any fiscal transfer measure that:

[...] increases the cost (or income) of damaging (or protecting) environmental actions through charge (or compensation), and encourage operators to decrease (or increase) due to the external non-economy (or external economy) brought from the damage (or protection) actions so as to achieve the objective of protecting resources.

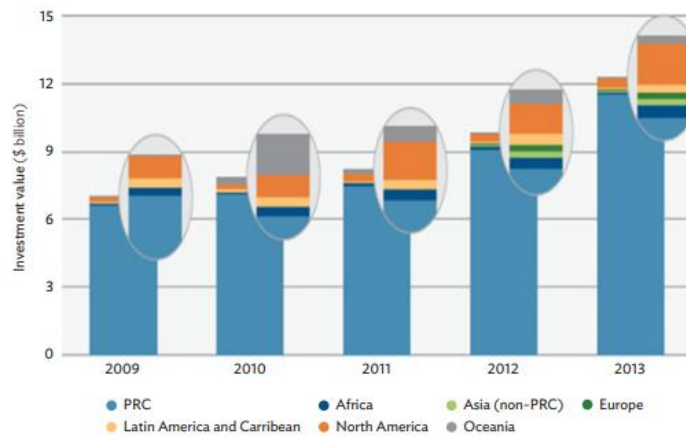
The overall objective of having resource protection as a unifying characteristic in parts justifies why ECMs are defined so much more broadly than PES and why measures implemented under the Natural Forest Conservation Programme (NFCP) and the massive Sloping Land Conversion Programme (later GfG) enter these definitions. In a recent report (OECD, 2020) that compiles the finance mobilized by ten large PES programs globally, China’s NFCP (USD 4.7 billion) and GfG (USD 4.9 billion) each outnumber the next biggest PES program, the US Conservation Reserve Programme, by at least a factor of 2.5 (see Table 1).

TABLE 1 – Finance mobilized by 10 large PES programs

COUNTRY	PROGRAM	YEAR INTRODUCED	FINANCE MOBILIZED (USD)
Australia	Environmental Stewardship Program	2007	USD 5.19 million annually (Ø 2007-17)
Brazil	Green Grants (Bolsa Verde)	2011	USD 33.8 million (Ø 2011-13)
China	Sloping Land Conversion / Grain for Green Program	1999	USD 4.9 million annual Ø (USD 69 billion by end of 2014)
China	Natural Forest Conversion Program	1998	USD 4.7 billion (in 2015)
Costa Rica	Pago por Servicios Ambientales	1996	USD 42.4 million (in 2012)
Ecuador	Socio Bosque	2008	USD 7.9 million annually
Mexico	Biodiversity PES	2003	USD 22.3 million (in 2016)
Mexico	Payment for Hydrological Environmental Services	2003	USD 28.2 million (in 2016)
United States	Conservation Reserve Program	1985	USD 1.8 billion (in 2015)
United States	Catskills	1997	USD 167 million annually

Source: OECD (2020), modified by the author.

From the table above, it becomes clear that the lion share of PES and ECM are targeted at forestry policies, due to the multiple ecosystem services forests provide. With benefits for biodiversity, water cycles and recreational benefits, among many more, forests also lie at the heart of several definitions of nexus approaches, particularly those that overlap with climate issues (see Chapter 2 of this thesis). An area in which China's ECMs stand out and take strategic importance are watershed services. A report by the Asian Development Bank (ADB, 2016) pointed out the massive investments in watershed compensation between 2009 and 2013 (Figure 7). In 2013, total government spending reached about USD 11.5 billion, which made China's ECMs account for 94% of all global investments in watershed services and more than 99% of such investments in Asia.

FIGURE 7 – Value of global investment in watershed services by region, 2009-2013

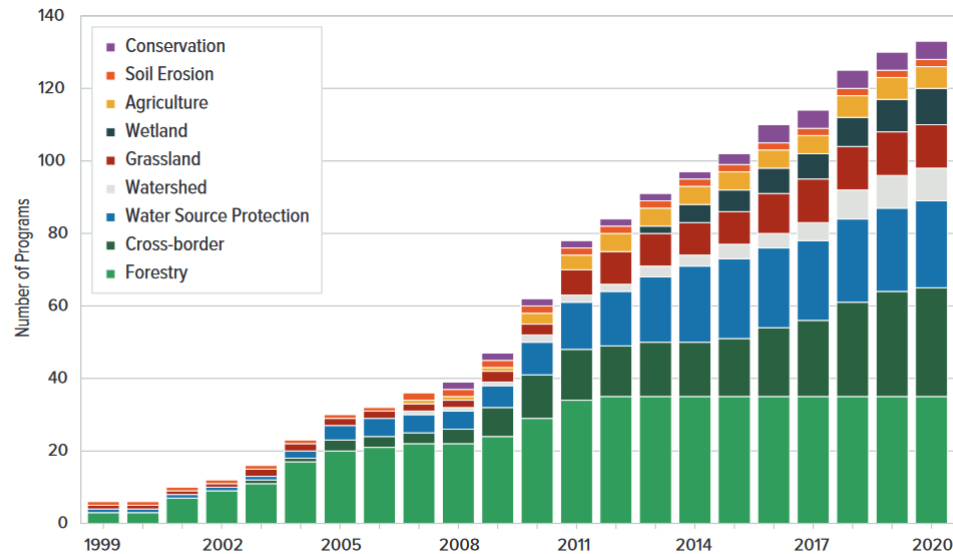
PRC = People's Republic of China.

Note: Based on 454 programs tracked, valued at \$12.3 billion in 2013.

Source: G. Bennett and N. Carroll. 2014. *Gaining Depth: State of Watershed Investment 2014*. Washington, DC: Forest Trends, p. 8. <http://www.ecosystemmarketplace.com/reports/sowi2014>

Source: ADB (2016).

With the overall rise in investments since 2007 in what Barbi; Ferreira and Guo (2016) defined as a second phase of climate change agenda setting in China's policies, there is also a notable diversification in ECMs taking place. While "mainstay of eco-compensation in China, in terms of total funding and impact, remains the large-scale land management and forestry programs introduced in response to the severe droughts and floods of the late 1990s" (WORLD BANK, 2022, p. 6), the number of forestry programs has remained stable and an increasing amount of water management and cross-boundary compensation can be noted. The report affirms that these programs do not only aim at aligning local actions to higher level policy goals through financial flows but now tackle specific implementation issues by promoting "knowledge transfer, shared monitoring systems, agreement on data, and basin management coordination across local jurisdictions" (WORLD BANK, 2022, p. 6). Chapters 3 and 4 of this thesis explore the different dimensions eco-compensations touch upon in the local case study of Chongqing to illustrate how the diversification of uses of eco-compensations reflects in local policy and stirs its use in the direction of local interests.

FIGURE 8 – Growth in eco-compensation programs by major program category

Source: Custom data collected by authors from a systematic review of available news, and academic and provincial government sources.

Note: The number of programs should be considered indicative rather than definitive given challenges in determining the precise "boundaries" of some programs (box 3.1).

Source: World Bank (2022).

This is indicative of some of the challenges in local implementation that have been faced by the Chinese PES and ECM programs. Even though the Chinese government has been following the scientific evidence that affirms that tree planting is a cheap and feasible way to combat climate change (BASTIN et al., 2019), it is by no means a simple solution (HOLL; BRANCALION, 2020). The impacts of the Grain for Green program which has converted over 17.5 million ha of agricultural land to forests is responsible for the impressive changes in landscape (presented in Figure 1) are visible not only in the frontier regions of Inner Mongolia or Xinjiang but all over the country (CHEN et al., 2019). Despite great progress in terms of the restoration of degraded ecosystems and the provision of ES critical to rural livelihoods, many sustainability and protected area programs have had limited contributions to the conservation of biodiversity (WU; KONG; JIN, 2019). Furthermore, the impact the transformation has had on the over 41 million households that have been affected by the program and its RMB 511 billion (USD 78 billion) investments since 1999.

On the one hand, these numbers can be interpreted as an evolution of China's polity towards the recognition of global environmental risk and a solid response to the effects the country's rapid development process has had on the natural environment. It

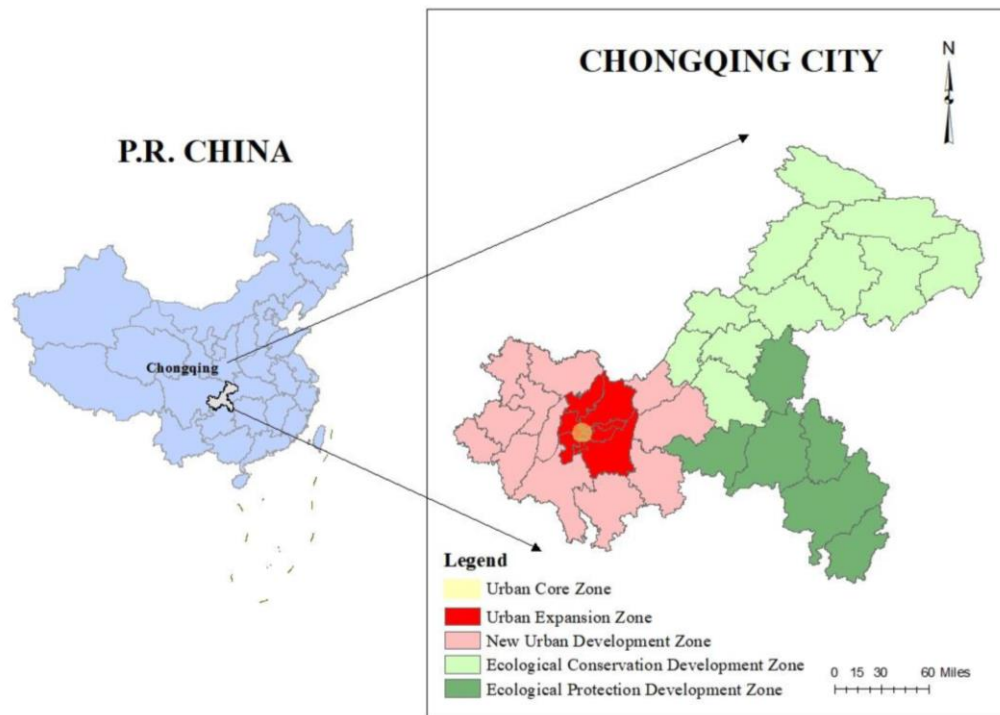
can, however, also be seen as a commodification of nature's functions into tradable ecosystem services, the ultimate expansion of capital onto the natural world, and a fetishization of a single exchangeable value of nature's multiple functions to the human (and non-human) world (KOSOY; CORBERA, 2010). It has to be recognized that historical social power relations shape the production of ecosystem services (BERBÉS-BLÁZQUEZ; GONZÁLEZ; PASCUAL, 2016) and that valuation and compensation of rural land happens in uneven ways in policies that are all too often centered on urban development (RODENBIKER, 2019). Widespread use of compensation makes it possible for urban dwellers, industries and policy-makers to adapt a simplified way of thinking that the wide availability of compensation opens: the consumability of nature. Unless the limitations of such a system are explicitly addressed and continue to follow a growth-based mentality, it risks perpetuating environmental problems and social inequalities.

On the other hand, the impressive growth in ECMs can point to ways of rethinking human-nature relations that, for one, recognize human dependence on nature and, further, the active role of humans in shaping existing and creating new ecosystems. These new imaginaries are encapsulated in the Chinese Eco-Civilization doctrine which aims to offer an imaginary for a new stage of human development, following agricultural and industrial civilization. While this next civilizational stage is presented as a leap only possible under the leadership of the CPC, its achievement coincides with the 100th anniversary of the PRC in 2049. In some ways, the utopian vision shows parallels with Beck's ideas about a metamorphosis, only in quite different conditions and much more programmatic and - much contrary to Beck's vision - with a strong state orchestrating such a transformation. Central elements of China's "metamorphosis towards an Ecological Civilization" take place in its relationship with the countryside and making wide use of communication technologies and opening up new agendas and priorities.

The phenomenon of global climate change presents immense challenges to the logic of current exploitative development models. But at the same time, as it exposes the complex risks it is producing, it is also rich in opportunities for subnational and local governments to act quickly and experiment with innovative ways to solve local challenges (MARTINS; FERREIRA, 2011). In China's complex degradations between provinces, cities and autonomous regions, the ways in which a city at the Southwestern development

frontier like Chongqing can respond to the possibilities and limitations of the Eco-Civilization doctrine is part of the discussions of this thesis (see Chapter 4). In a society whose “roots lie in the countryside” (FEI, 1992), the redefinition of the relations between the rural and the urban is a key question. This relation has already undergone radical changes since the country’s opening to the world as urbanization has been a strategic development objective driving economic growth in the CPC’s Five-Year-Plans that has contributed to sustained urbanization rates since about the year 2000. The possibilities of redefining the urban development model bears immense potential (QI et al., 2020) which the government recognized in its “New Type Urbanization” (*xinxing chen zhenhua* 新型城镇化) strategy as the country has entered an “era of secondary urbanization” (LIN, 2019; NDRC, 2019). Besides necessary changes in the mix and reductions in urban energy use, transport, and production, a significant change can be expected by the change in land use patterns.

FIGURE 9 – Chongqing administrative region



Source: Cheng; Xu and Li (2022).

At the country's southwestern development frontier, Chongqing, a municipality under direct control of the central government (*zhixiashi* 直辖市) has been experimenting with such an innovative large-scale policy for more than fifteen years. At the size of a small European country, Chongqing's roughly 82.000 km² cover biodiversity-rich mountainous landscapes but also house a population of over 31 million inhabitants. The city's planning zones foresee compact urbanization in the Western wing (urban core, expansion and new urban development zones) and two zones in its East for ecological conservation or protection (Figure 9). The latter areas will benefit from horizontal, i.e. same level (e.g. the district) payment schemes for conservation (*hengxiang shengtai buchang* 横向生态补偿) from within the municipality of Chongqing (CHEN et al., 2010; CHEN; YU; CHOGUILL, 2020; SHENG; QIU; HAN, 2020). While transferable development rights are not innovative *per se*, the commodification of land, as seen in many other cases throughout China (ZHANG; WU, 2017), happens in different ways due to fundamental differences in land tenure and use rights that date back to the communist rural communes. Chongqing's former experiments with tradable land rights tickets (*dipiao* 地票) did not make use of any type of PES but rather focused on issues around agricultural uses by the local communities. The newly implemented horizontal ECMS make it possible to establish connections between urban and distant rural districts based on the production of ecosystem services, making meta-couplings between the rural and urban areas visible (SILVA et al., 2021, see also Chapter 3.3.3).

Including conservation as an ever more important aspect of development, has led to a wide array of policies embracing "Nature based Solutions" (NbS). As no consistent standard for *juyu ziran de jie jue fangan* (基于自然的解决方案) exists in science or policy, the International Union for Conservation of Nature (IUCN) translated its global version into Chinese (IUCN, 2021) to which the Chinese MNR responded with a list of 10 nationally representative cases (CHINA, 2021). Among famous restoration and river basin management projects like Guanting Lake, Chongqing's "Urban Renewal" is the only urban NbS strategy considered of national importance. Setting its own interpretations of this new norm both domestically and internationally is of strategic importance (QI, 2021; WEINS;

FERREIRA; FEODRIPPE, 2020). However, as Qi and Dauvergne (2022b) point out, this NbS norm differs substantially in the two spheres. On the domestic level, NbS allows for continued green growth (WANG-KAEDING, 2021) especially through green infrastructure and large-scale NbS interventions (HANSEN; LI; SVARVERUD, 2018; WESTMAN; BROTO, 2018). NbS is an essential connector in highlighting the understanding of human dependence on nature with the CPC's ideological bases of Eco-Civilization. Zeng and Qin (2018, p. 21, *apud* QI; DAUVERGNE, 2022b) in an analysis of Xi's much recited "Two Mountain" discourse⁵ affirm that the language of NbS perfectly justifies the wide implementation of PES to transform "the positive spillovers of ecosystem protection into economic assets." Different from the coastal cities with their already higher average development indices, a city like Chongqing can only grow if its development model is decoupled from carbon-based energy. As discussed in Chapter 4.4, this is only possible through the wide use of NbS and eco-compensations.

Global environmental governance

When it comes to explaining China's environmental turn, both domestic and international factors play a role (KOŞAN, 2019). As a multilevel problem it relates not only to the local but also to global scales (FERREIRA; BARBI; BARBIERI, 2021). However, to find ways to solving some of the Anthropocene's complex transboundary environmental phenomena like climate change, the importance of international cooperation beyond national borders becomes increasingly clear as we live in what some authors refer to as "telecoupled" and "meta-coupled" systems (SILVA et al., 2021; LIU et al., 2018): Local ecological issues as well as national or subnational political decisions about them have been turned into global issues that connect systems that are apparently far apart. Consequences are not localized anymore and the societal forces necessary to change them in a desirable way reveal how deeply political socio-environmental issues have become (BUTTEL; TAYLOR, 1992; FERREIRA, 2006).

⁵ In reference to part of a speech by Xi Jinping in 2005, "lucid waters and lush mountains are gold and silver mountains" (lvshui qingshan jiushi jinshan yinshan 绿水青山就是金山银山) is commonly shortened to "Two Mountains" (liangshan 两山).

Before the emergence of the Eco-Civilization narrative on the world stage, China already played an important role on the side of the developing world. Defending the Global South's right to development, environmental protection was negotiable and not always a priority (GAO, 2018). Since the first Earth Summit in 1992, China, one of the world's biologically mega-diverse countries, has been engaged in dialogues on environmental matters within the three Rio conventions on climate change, biodiversity and desertification. When it comes to the outside perception of commitment to sustainability, however, its image abroad is most often still that of an environmental villain with images of cities covered in thick smog, dirty coal power plants and high levels of water contamination (ECONOMY, 2019). Its international position is changing drastically though, not least through the political construction of climate change as a matter of national security and regime performance legitimacy (TENG; WANG, 2021; ZHANG; ORBIE, 2021). When it comes to China's status as a, somewhat unique, developing country, its identity has already been changing in some policy areas over the last twenty years and this change has now reached the environmental sphere (BERSICK; GOTTWALD, 2021; ZHU, 2022).

While Chinese global environmental governance discourse up to the 2010s strongly emphasized the historical responsibility of developed countries to pay for mitigation measures, the geopolitical inwards orientation of the United States during the Trump era turned China into an important defender of multilateralism in the United Nations (UN), the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC) (ZHANG; ORBIE, 2021). This allowed for China's quick transformation from a "dead weight" at the UNFCCC 15th Conference of the Parties (COP) in Copenhagen to a recognized climate leader at COP21 in Paris (GAO, 2018). Zhang and Orbie (2021) point out that, on the one hand, this change was possible due to the alignment of science and politics under the CPC governance system. On the other hand, coalitions between government, (state) media and the epistemic community were key in shifting public support. The authors cite Giddens (2009) idea of "radicalism at the centre" to explain the active role "political leadership can play in promoting policies to address climate change while exerting steady efforts to shore up public and stakeholder support for them" (ZHANG; ORBIE, 2021, p. 8).

Albeit very slowly (given the urgency for action), different understandings of nature and our place as humans in it are also slowly finding their way into Western science and the institutions of global governance. Eco-Civilization in this structural shift represents an emerging model of non-Western human-nature relations and is the fruit of the pluralization of environmentalism on the global stage (ZHU, 2022). Having made it into the title of the 15th COP to the Convention on Biological Diversity (CBD) “Building a Shared Future for All Life on Earth” has gained more global visibility in the two-part event in 2021 and 2022, even if less than expected (WEI et al., 2021). China’s “environmental turn” is noticeable on several levels of its foreign policy (see Chapter 6 of this thesis). COP15, split into two parts because of Covid-19 restrictions, was a prime possibility for China to advance its image of a leader from the Paris Agreement into the sphere of biological diversity. The Kunming Fund, launched at COP15.1 in Kunming (practically without participants from abroad) could have turned out to be a key mechanism for advancing biodiversity finance needed to achieve the post-2020 Global Biodiversity Framework (COSTA, 2022). However, in the midst of geopolitical tensions between China, the US and Europe, it has been notably absent from the negotiations (ZHU; WEINS; CHEN, 2022).

As part of a cooperation between the Chinese Academy of Sciences (CAS) and the UN Environmental Program’s International Ecosystem Management Partnership (IEMP), Chinese stakeholders have managed to promote South-South cooperation on conservation, monitoring and Eco-Civilization building (CCICED, 2016; UNEP, 2016). But in the greater endeavor of what Wang (2012) called “creative involvement,” China has not only expanded its multilateral policy engagement in the institutions of the UN systems. There is also an increasing number of bilateral cooperation mechanisms for green development. Only four years after the Belt and Road Initiative (BRI) was launched, president Xi Jinping announced a BRI Green Development Coalition (BRIGC) which has contributed to diversifying its cooperation mechanisms, in particular towards the Global South where it sees potential for building its influence. The China Council for International Cooperation on Environment and Development (CCICED), China’s development cooperation agency in the shape of Western countries’ aid agencies, plays a key role in promoting the country’s role as “participant, contributor and leader of global ecological

civilization” (CCICED, 2019, p. 12). In these organizations’ materials and speeches, Eco-Civilization is surging more and more explicitly as a new development paradigm (PAN, 2020) and umbrella concept under which “NbS with Chinese characteristics” are set to play a prominent role (LUO, 2021).

It is not entirely clear yet what those Chinese characteristics are, and, even more than with the definition of Eco-Civilization, two central aspects of Chinese NbS can be traced: 1) a mechanistic understanding of ecology (as in the “construction” of an Eco-Civilization) and 2) a framing of nature-based infrastructure as key to green development (RODENBIKER, 2022). With China as a rising rival proponent of new norms, some are concerned about the direction NbS initiatives in the Global South will take when they are more “Chinese-style.” These approaches that “focus on exporting industrial scale forestry” (QI; DAUVERGNE, 2022b, p. 4) and other “large-scale Chinese state-backed interventions in Earth systems” (RODENBIKER, 2022, p. 8) may not prioritize a narrower approach to NbS (as advocated for by the West) and strict nature conservation or grass roots participation may be less of a priority.

In the promotion of these techniques, there are several key China-based and global institutions that will play a central role in promoting such a new norm of NbS (ZHU et al., 2023a). Among them are the above-mentioned BRIGC, the CCICED and the Kunming Biodiversity Fund on the China-based side and UNEP-IEMP, the IUCN-led NbS Asia Center and the FAO-China South-South Cooperation program. NbS (and practices that are likely to adapt the term retroactively) already play an important role in China’s environmental cooperation in Asia and Africa and are likely on the horizon in Latin America (ZHU et al., 2023a). The rapid uptake of NbS by Chinese leadership is certainly related to its great potential in promoting the Eco-Civilization doctrine globally through its experience with large-scale NbS interventions at home. A better understanding of Chinese eco-compensations and NbS policies will help countries from the Global South to make the best use of China’s environmental expertise and know what to demand for themselves as the country becomes an increasingly important player in the global environmental agenda. At a time when the globalization of Chinese standards seems to be “an unavoidable trend” (GLOBAL TIMES, 2020), the country’s global presence is also finding itself at a turning point. While moving away from the image of a heavy polluter, it is increasingly using its

soft power to add an environmental twist to these new norms. Zhu et al. (submitted manuscript) point out that there is a push from within the Chinese government to share globally the lessons learned from decades of experimentation with large-scale ecological projects to prevent desertification, flooding, and, most recently, climate change. These projects find strong resonance with the discourse of NbS, although they may push the term to its conceptual limits, blurring the boundaries between the natural and the engineered (YEH, 2022). While Chinese institutions, such as the MNR, have adopted IUCN's definition of NbS, there is advocacy from within China to expand the definition to be more open and inclusive, leaving room for all parties to explore precisely what the concept means to each and how they will choose to deploy it. It is precisely this exploration in which China is currently engaged, and with which China is helping other countries across the global South engage in as well.

Environmental sociology

The conceptualization of the times of change we live in can be manifold. They can be referred to as the Anthropocene (BERTULUCI; FERREIRA; SILVA JR., 2021), the postmodern era, or it can be questioned altogether if we have ever even been modern (LATOUR, 1993). Regardless of which of these categorizations one identifies oneself with, we should agree that existing theories barely manage to give us clear interpretations of our time and that new theories (or at least significant adjustments) are necessary. Globalization has complexified not only our economic relations but has profound impacts on social relations and, as it becomes increasingly clear, the relationship to our environment. Traditional social theories that offer explanations of modernity do not manage to satisfactorily explain the increasing centrality of environmental issues and that may be due to a range of issues.

Many existing theories in environmental sociology in Europe and the USA approach environmental issues through the reconciliation of capitalism (i.e. markets) with ecology. The most famous of these is Ecological Modernization theory (EMT) (MOL, 2006). This theory and its derivatives come with strong normative ideas about what development is and about how ideal state-market-society relations should be shaped. This ultimately influences the area of applicability for such theories. The emergence of China

as a non-liberal system that continues beyond the era of the Western strategy of “change through trade” (*Wandel durch Handel*) presents developments that EMT can only, in my view unsatisfactorily, explain as a “different mode” of modernization (MOL; SONNENFELD; SPAARGAREN, 2020). While analyses of the institutionalization of environmental issues in China have recognized the limitations of explaining environmental marketization under the CPC through EMT (LIANG; MOL, 2013), the centrality of the state is often downplayed to a degree that does not hold, especially in the era of recentralization of state power under Xi Jinping.

Another strand of popular theory are Marxists lines of thought. Despite their Western roots, Ecological Marxist (EM) theories which take the state as the central actor, find fruitful echoes in this critique of normative liberal state-market relationship. As discussed above, CPC cadres have embraced theories from this school of thought which in parts form the base for the proposed socialist Eco-Civilization (PAN, 2006b). To fit “Chinese characteristics” into a Marxist sociological theory, some authors (MERLE, 2004) even call for a proper Chinese sociology of Communism to study the “communist civilisation” (*gongchan zhuyi wenming* 共产主义文明). This is justified as China’s historical trajectory on its way to communism has shaped its institutions distinctly in central aspects, which cannot be explained by theories developed to explain social phenomena under capitalism. Certainly, such particularism plays well into the narrative of the uniqueness of the millennial Chinese civilization. However, in Wang, He and Fan’s (2014) interpretation, even EM can turn out as a double edged sword when it is used to criticize the flaws of foreign capitalist systems but does not address its own contradictions. The authors point out that EM still fails to convincingly explain the country’s current environmental crisis, i.e. how and why powerful interest groups allowed massive environmental consequences and the system continues to rely on growth. With the harmonization of EM and Eco-Civilization that has been taking place since its first mention by Hu Jintao, the new spark about environmental elements in Marxist theory has enabled “socialists to revive a realistic and inspiring vision of a future beyond capitalism” (GARE, 2012, p. 10).

In his critique of traditional social science theories, Ulrich Beck (1986) suggested that a new logic of social dynamics better explained what he described as “second modernity” in which the radicalization of modernity had turned distributional

conflicts so complex that traditional social theory cannot grapple with it anymore. At the outset of what he called “Second Modernity,” Beck (1986) suggested that it was complexification around risks that may constitute a new layer agglutinating social forces and redefining the economic and social logic of distribution of goods that had dominated our understanding of the world since the Industrial Revolution. The risk society paradigm that he later developed into a theory of *metamorphosis*, describes how in those radicalized forms of modernity, social change happens not through the reproduction of the existing social order but rather through its non-programmatic transfiguration. Metamorphosis (*Verwandlung*), presents a draft theory of global socio-environmental change in which “the understanding that and how we are becoming different is what metamorphosis is about” (BECK, 2016, p. 77).

In a highly uncertain, hyper-connected 21st century world society the recognition of the diversity of actors, interests and perspectives, globally and locally, is necessary for consensus-building about the distribution of (economic) *goods* and *bads* (side-effects) of modernity. In such a process, traditional politics as we know them disintegrate and new forms of politics emerge: hybrid subpolitics (BECK, 1997). Beck and others provided several empirical examples of different aspects of this theory (FAN, 2018; THIERS, 2003; ZHANG; ZHAO, 2011). To highlight the potentially transformative social forces unleashed through the new place environmental issues hold in the global energy transition, Ana María Vara (2015) discussed the possible horizon of equality the metamorphosis framework provided for the South American lithium controversies. In a recent application of the potential for *metamorphosis* in Martindale’s (2019) “Tasting the Cosmological Rift,” there is an excellent discussion about the potential of alternative food networks in China’s Eco-Civilization in “ruralizing” Western modernity and global capital through distinctive forms of cosmopolitanization. While making use of the theory, in these applications a critique of the paradigm emerged in the Global South. Many of Beck’s assumptions are based on Eurocentric norms and needed adaptation to cases like Mozambique, Brazil and China (FERREIRA; BARBI; BARBIERI, 2021). In China, for instance, the functioning of civil society in this multi-actor arrangement needs to be understood in the context of state-orchestrated citizenship which is only given space for

protest in areas that are not sensitive to the government's legitimacy (BARBIERI, 2020; TENG; WANG, 2021).

Such critiques may resurface some general questions about the applicability of Western theories to Chinese society, as the country defines its "Chinese characteristics" in an increasing number of fields, including philosophy and the social sciences (XI, 2016). While completely denying the value of Western theories for the analysis of Chinese society and governance would contradict various arguments brought forth in this thesis, I would like to advocate for a careful contextualization of sociological theories on China, especially when it comes to phenomena with historical dimensions (be they discursive or not). It is key to understand the origins and current context of Chinese sociological thought on the environment⁶.

During the Mao era, in 1957, during the "Hundred Flowers" campaign (*baihua qifang* 百花齐放), sociology was renounced as a bourgeois reactionary discipline, accomplice of imperialist forces. Sociologists like Fei Xiaotong (费孝通), once a central figure of Chinese sociology and member of the democratic league of China, were subject to severe public criticism and their sociological teaching and research was suspended (CHEN, 2018, p. 31; DWYER, 2012). Social science departments throughout the country were closed and lecturers sent off to the countryside to undergo a remediation by the CPC (QIN; FLINT, 2010). With the following dissolution of Higher Education System during the Cultural Revolution (1967-1976), the only intellectual activities left were Soviet-style ethnology, the census, rural research and social surveys (*shehui diaocha* 社会调查) as a form of "amateur sociology" for the collection historical materials about families, villages, communes and factories (WU, 2009). When Deng Xiaoping (邓小平) took over the country's leadership in 1978, he expressed the urgent need to recover the natural and social sciences as part of the "four modernizations" policy (Agriculture, Industry, Science and Technology, National Defense) that shaped important aspects of the socialist market economy in China to this day (CHEN, 2018, p. 31). With the objective of quadrupling GDP

⁶ Parts of this text were published in Portuguese in the proceedings of the 44th meeting of the Brazilian Association of Graduate Studies and Research in Social Sciences (ANPOCS) (WEINS; FERREIRA, 2020).

to make China a great world power by 2050, it was necessary to open the economy to the world to absorb foreign investments, technology and scientific ideas (HSÜ, 1990).

When environmental sociology first emerged in the late 1980s, it initially had strong North American influence (BARBIERI; FERREIRA, 2017). The exchanges began earlier in the more consolidated fields of sociology, mainly through Chinese-Americans and in visits to conferences as well as dialogues between academics from the two countries that had established diplomatic relations in 1979. Chen (2018) highlights some Chinese sociologists like Bian Yanjie (边燕杰) at the University of Minnesota and Lin Nan (林南) at Duke, but also Americans like Andrew Walder at Stanford who contributed to the exchange of ideas and definition of the field in the post-Maoist period. In the beginning social research and policy studies were often repetitive and non-cumulative, while sociological theorizing was largely judged as “speculative” and “irrelevant” to empirical research (ZHOU; PEI, 1997).

In Chen’s (2018) analysis, there are now two main currents in Chinese sociology that on the one hand preached the need to learn from US sociologists to professionalize methods in order to achieve peer recognition. This position was especially advocated, and remains strong, in mainland China and in major institutions in Beijing such as the Chinese Academy of Social Sciences (CASS). On the other hand, especially in the territories that have had liberal democracies and more contact with Western ideas like Hong Kong, Taiwan, and to some extent Singapore, sociology is understood as a catalyst for societal problems. Some authors consider academics to be in “outsider” territories that can make more explicit criticisms without (many) consequences (CHEN, 2018, p. 118). This “public sociology of practice” based on Bourdieu focuses on social practice and class reproduction and deals mainly with labor studies from a Marxist perspective. It may seem counterintuitive that in academic institutions not under direct rule of the CPC a return to an understanding of communism as a civilizing order is advocated. In it China has developed differently from all other countries by having put into practice Marxist ideas, moving towards a “Communist Civilization” that is fundamentally different from the experience of others and therefore would need its own social theory (MERLE, 2004).

At Tsinghua University, one of the best in liberal arts studies in Asia, Sun (2008) and Shen (2008) spearheaded important critical research on rural migrant workers and the growing inequalities resulting from market transition. This bottom-up perspective was inspired by the work of Michael Burawoy. The work of Hong Kong based feminists (LEE, 1998; PUN, 2005) built on the foundations of Touraine's study of social movements and actions, but often argue that it is time to construct a Marxist sociology of its own, one with Chinese characteristics. These perspectives critical of the status quo of the CPC structures and with stronger theoretical interaction with the West are observed critically by Beijing and in the case of Sun Liping (孙立平) for example, involved public vilification, discrediting professors who publish such open questioning of the party (CHEN, 2018). The term "Chinese characteristics" was introduced into the CPC discourse when Deng announced the divergence from Maoism, stating that China was going to pursue a "Socialism with Chinese characteristics." The concept has remained relatively vague in the eyes of several authors, but in recent years it has been crystallized in many areas of knowledge (GORON, 2018; ORTS, 2003). This context helps us better understand the emergence and current trends of environmental sociology in the country.

At the point when environmental problems were identified as a threat to systemic stability and the legitimacy of the party, social research into Eco-Civilization began expanding rapidly (HONG, 2007; TENG; WANG, 2021). On a critical note, Pan and Ying (2012) identified the destruction of "natural communities" as the root cause of social instability. As a "floating population," rural workers were exposed to stark social inequalities that reflected in indices of social stratification and in an increasing rural-urban gap (FAN, 2013). Investigations into perceptions of environmental problems, the bases of environmental concern among its citizens and air pollution took center stage (XIAO; DUNLAP; HONG, 2013).

While Chinese theory-building around Eco-Civilization takes on a broader field of influence in the public sphere (GORON, 2018), quantitative indicators and rationalized tools are appearing (CHEN; SHI, 2022). While its international interactions and contributions in this area could be of wider interest, especially in the field of environmental sociology, this field still seems to be explored below potential (ZINDA; LI; LIU, 2018). As digitalization progresses rapidly in China, the role of communication technologies, through

e.g. online tools for tree-planting, are developing in new ways and influencing people's interactions with nature (CARTIER; TOMBA, 2012; CHINA DAILY, 2019).

Unfortunately, due to the far reaching impacts of the Covid-19 pandemic, the theoretical advances on the application of risk society in China and the emergence of newer theories in Chinese environmental sociology have been limited. For those reasons, the framework through which the presented phenomena were investigated in this thesis feed from the available theoretical work in environmental sociology and intend to reinforce the importance of more South-South dialogues in the field of environmental sociology, particularly on the implications and potentials for transformation Eco-Civilization brings in this regard.

Thesis overview

While the transformations towards a more central role for environmental issues are coordinated at the national level, it is necessary to view them from a multilevel perspective to understand the various stakeholders and their power configurations. In this thesis, I therefore looked at the international level as a frame in which the nation state excerpts its influence. The international level is where a lot of the political choices and discursive advances happen. However, it is necessary to study the impact that those decisions then have on local arrangements. Unfortunately, due to the restrictions imposed by the pandemic in 2020, it has not been possible to conduct field research in China to further deepen insights into a local arrangement. But, besides a more theoretical approach to the research as a whole, I have opted for a proxy through the automated content analysis of a body of research to collect primary data. This perspective on the local level is placed into context with the final two chapters of this thesis that look into the possible implications the national and international change of China's priorities – strongly shifting towards the achievement of “sustainable” development – have for my (new) home country and Latin America's biggest economy.

In this article-based thesis, the findings of four different articles are presented that pertain to China's rise in global environmental governance and the implications for sociological theory building under the conditions of the current global environmental crisis. First, I present the article “Ecological Civilization in the Making: the ‘construction’ of

China's climate-forestry nexus" published in *Environmental Sociology* in September 2022. This article sets the theoretical frame for this thesis and ventures into the role of forestry interventions in China's strategy and global ambition in becoming an Ecological Civilization.

In Chapter 3 "The role of cities in China's Ecological Civilization: on the way towards a green Chongqing Model?", the case study of Chongqing is presented in more detail. It lies at the intersection of political science and environmental sociology and looks at the sub-national level to illustrate the multilevel character of China's transformation under Eco-Civilization. The article sets out to better understand the different levels at which climate and biodiversity risks are negotiated and highlights the centrality of the CPC structures in the proposed transition. In this way, it shows how political direction continues to matter, despite Beck's predictions of dwindling importance of the nation state.

In the fourth chapter entitled "Ecological compensation mechanisms in China's Southwest: an automated topic model analysis to disentangle 'Chinese characteristics' of Payments for Ecosystem Services" I present an automated content analysis of 181 policy documents and scientific theses. This material builds on the political analysis (chapter 4) and analyzes in more detail which topics defined the implementation of ecological compensations mechanisms (ECMs) as an increasingly broad tool for advancing the sustainability policy agenda in the local case study of Chongqing.

Chapters 5 and 6 deal with the potential effects China's Eco-Civilization may have on the Global South. Through a broad investigation into investment and trade in Brazil-China relations, I point to the importance of this South-South partnership in promoting more sustainable practices and how China's "environmental turn" (or metamorphosis) towards an Eco-Civilization offer a possibility to many of its trade partners to demand higher environmental standards in the face of global risks. It also offers an aspirational reference point for global environmental governance. Finally, in Chapter 6, we zoom in on commodity trade between China and Brazil, to draw attention to the emerging possibility of transnational risk mitigation strategies through PES and EMCs. This chapter, as part of the discussions following Brazil's change in leadership towards a more China-friendly perspective, is being published as part of the book "China in Brazil".

To weave the findings and structured evidence of the different research outputs generated throughout the course of this PhD, the discussion in chapter 7 embarks on the discussion about a potential for metamorphosis of China's development model before concluding with final remarks of this thesis.

三株小杉树

年轻的杉树长满了嫩芽
嫩的好像要滴下水来
园里的草地露水很重
人走进的时候鞋子都湿了
草上的阳光早在露珠上
每颗露珠都在发亮
我摘了一颗杉树的果子
手上沾满了果子的芳香
艾青，一九五年七月

Três pinheiros-chineses⁷

Jovens pinheiros-chineses cheios de brotos tenros
Tão tenros que parecem aguados
Na grama do jardim muito orvalho
Molham os calçados as pessoas que entram
Sol da manhã no orvalho bate
Faz cintilar cada gota
Pego uma pinha
Minha mão retém o aroma do fruto
Ai Qing, Julho de 1954.

⁷ Poem from the bilingual version of Ai Qing's "Viagem à América do Sul", Editora Unesp, 2019. Chapter VI. Natureza & metamorfose: utopia transpácífica (六、自然与变形：快太平洋乌托邦).

2. ECOLOGICAL CIVILIZATION IN THE MAKING: THE “CONSTRUCTION” OF CHINA’S CLIMATE-FORESTRY NEXUS⁸

ABSTRACT

In the Anthropocene, debates about global climate risks have taken carbon as a measure of policy success, with land-based mitigation strategies like afforestation receiving particular scrutiny. While scientists and policymakers discuss forestry as a potential climate solution, China has been implementing massive forestry projects for decades, drastically transforming environments under the Ecological Civilization framework. This article showcases China’s globally emerging paradigm of Eco-Civilization and its implications for the climate-forestry nexus. Drawing parallels with Ulrich Beck’s concept of “metamorphosis” and Bruno Latour’s concept of “mutation,” we argue that China’s Eco-Civilization aspires to a fundamental transformation in worldview – but one that is promoted as distinctly non-Western. We use the case of forestry to illuminate the potentially unique features of Chinese environmentalism as encapsulated in Eco-Civilization. We find that Eco-Civilization affords a strong role for the central state in actively building and constructing an ecological future in which the natural and the socio-political are not considered separate. This is in contrast to certain Western visions of preserving nature from human encroachment through grassroots environmental movements. We conclude by highlighting the theoretical contributions more pluralized debates about China’s environmental rise could bring to environmental sociology.

Keywords: Ecological civilization; Forestry; Ecological compensations; Climate change; Risk society; Metamorphosis; China.

1. A civilizational turning point for debates about forestry

Defying scales, climate change links the mundane routines of billions of people across the globe with planetary environmental shifts that undermine future global stability. The sweeping global transformations required to address climate change necessitate a radical reorientation of practices and perceptions held by actors worldwide. Tackling climate change, in short, requires a complete reconfiguration of our understanding of the world and place within it – some might say, a metamorphosis. But not only does climate change require sweeping global transformation, it is also engendering such transformations, without any conscious intervention or programmatic change. As the late

⁸ This is an Author’s Accepted Manuscript of an article published by Taylor & Francis Group in Environmental Sociology on 24 Sep 2022, available online: <https://www.tandfonline.com/doi/full/10.1080/23251042.2022.2124623>. It is the result of BEPE grant 2020/13711-6 of the São Paulo Research Foundation FAPESP and has been elaborated in co-authorship with Annah Zhu, Jin Qian, Fabiana Barbi and Leila Ferreira.

Ulrich Beck paradoxically declared in 2015, “climate change is not climate change... it is a reformation of modes of thought, of lifestyles and consumer habits, of law, economy, science, and politics,” and in doing so, it provides “new orientations, new compasses for the 21st-century world” (79).

Such observations concerning the centrality of climate change are becoming more and more common in environmental sociology and beyond (NORGAARD, 2018). The potential of climate change to drastically transform our societal worldview (*Weltbild*) has been noted by many social scientists in the past decade. Bruno Latour (2017) coined the term the “New Climatic Regime” to refer to the radical repositioning of humanity with respect to the environment as a consequence of climate catastrophe. Once the most “natural” thing – a stable environmental backdrop along which human history develops – the climate, according to Latour, has now become a deeply political agent of change in and of itself. It is as if, Latour notes, “the décor had gotten up on stage to share the drama with the actors” (2017, p. 3). “From this moment on,” he continues, “everything changes” (3). Latour’s so-called “moderns” – those who, with the advent of science, began approaching the ecological as inert and aloof, who would have scoffed at the idea of the climate as a political realm – are now, because of climate change, undergoing a “profound mutation” in their relation to the world. Scholars agree: by fundamentally transforming our vision of the world and the place of humanity within it, the existential threat of climate change, literally “changes everything” (KLEIN, 2015). Concealed within this looming climate threat, however, is the potential to create “a vision of the future that goes beyond just surviving... a vision in which we collectively use the crisis to leap somewhere that seems, frankly, better than where we are right now” (7).

As different as these social theorists’ accounts of climate change may be, in all cases the threat of climate catastrophe is sowing not only environmental destruction and societal collapse, but also the seeds for its potential undoing through a transformation of worldviews. Also in all cases, however, the image of the world that is being transformed is Western. Latour’s New Climatic Regime is based on the reversal of distinctly Western philosophical tropes of the nature-culture divide that do not find resonance elsewhere across the globe (GARDES, 2020) and Beck’s metamorphosis may be “highly applicable, but to only Western nation-states” (HONEYBUN-ARNOLD, 2017, p. 178). The

conceptualization and deployment of these ideas remains largely limited to Euro-American geographies. Yet the threat of climate change is global and indeed inspiring distinct transformations in worldviews across the non-Western world. How, then, are non-Western *Weltbilder* transforming under the threat of global environmental collapse?

This article examines climate-induced metamorphoses in worldviews with a focus on China's climate-forestry nexus. Since the 2014 IPCC report, the climate-forestry nexus has become a heated debate in global climate science. While there are high degrees of confidence in the potential for carbon sequestration via large-scale tree planting and restoration, there are also clear warnings of associated risks: the permanence of planted forests as carbon sinks due to wildfires, the pressure on freshwater resources, the impacts to biodiversity, and the social impacts of engineering ecological interventions on such a vast scale (CANADELL et al., 2021). Despite controversies, this solution is proposed – and implemented – on a massive scale, most notably in China.

The debate over the role of forestry in climate mitigation strategies is both scientific and cultural, concealing within it a range of disparate worldviews. Beyond scientific questions of carbon storage, issues of forestry and land use more broadly elicit deeper cultural debates over preserving natural ecosystems versus engineering them anew. During the past decade, visions of what a forest is and what it is good for – pristine nature to be preserved or carbon stores to be ecologically engineered – have become a central pivot of climate change debates. To what extent, researchers now ask, can both objectives be maximized and what are their trade-offs? While not mutually exclusive, these objectives also do not entirely overlap. They entail fundamentally different visions of a forest as: (1) a space to be engineered in pursuit of a sustainable future or (2) a space to be preserved as untouched by humans. That is, they entail fundamentally different *Weltbilder* that may not be fully represented within current social science theories grappling with climate change.

As the debate over forests and climate rages on, China, meanwhile, is planting more trees than the rest of the world combined, nearly doubling its forest coverage since 1980 (ZINDA et al., 2017; OUR WORLD IN DATA, 2022). In addition to sheer quantity, China's brand of tree-planting rarely attempts to re-create "natural" pre-human

ecosystems and clearly skews toward one side of the preservationism-interventionism debate. Under the public pressure of being the world's biggest carbon emitter, these projects form a fundamental pillar in the country's dual carbon targets of reaching peak emissions by 2030 and carbon neutrality by 2060 (TENG; WANG, 2021). Recently, plans were announced to re-plant an area of land the size of Ireland each year for the next five years (XINHUA, 2021). This type of large-scale ecological engineering is among the most controversial.

In this article, we argue that China's artificial forest ecologies are representative of the country's wider ambition of building an Ecological Civilization (*shengtai wenming* 生态文明). We review the emergence of this term and how it relates to the country's massive forestry efforts executed over the past two decades. Ecological Civilization (Eco-Civilization) is best understood as a state-sponsored, socio-technical imaginary aimed at building a sustainable future, first domestically and now globally (HANSEN; LI; SVARVERUD, 2018). Initially coined by the German philosopher Iring Fetscher in 1978 and later picked up in Soviet Union Marxist philosophy, the concept has most recently been pioneered by the Chinese government as a distinctly Chinese approach to addressing environmental ills of modernity (LU, 2021). Through an analysis of Eco-Civilization and its evolution, grounded in the empirical case of forestry, we show how this concept is being pioneered by Chinese leadership as an alternative to Western environmentalism that has dominated the twentieth century.

The implications for environmental sociology are certainly profound (ZINDA; LI; LIU, 2018; DIETZ; SHWOM; WHITLEY, 2020). Precisely because of its non-Western branding, Eco-civilization offers an appeal to countries across the world attempting to stand apart from a history of colonialism continuing under the guise of neo-colonial environmental movements (KASHWAN et al., 2021). The concept's promotion at the global level may present new norms for global environmental governance (WEINS; FERREIRA; FEODRIPPE, 2020), new human-nature relations on the world stage (ZINDA; LI; LIU, 2018), and the pluralization of environmental approaches (ZHU, 2022). Indeed, the rising influence of non-Western countries poses challenges for sociological theories arising from largely Euro-American traditions (CHEN, 2018; ZINDA; LI; LIU, 2018). It is no

doubt time to rethink liberal environmental theories within the context of new global environmental players.

This article attempts such a rethinking to better understand China's globally emerging paradigm of Eco-Civilization as it pertains to the climate-forestry nexus. The article does not provide a systematic literature or policy review, but rather a theory-guided analysis of an emerging environmental paradigm which aspires to stand apart from certain facets of Western sociological theories of the environment. We argue here that (1) the logic of global forestry interventions is transforming through China's policies, potentially leading to a normalization of large-scale interventions, and (2) a strictly preservationist approach to forests is being challenged as a consequence. This has important implications for environmental sociology as the Eco-Civilization doctrine makes its way into global debates. Section 2 provides a short overview of the development of environmental sociology in China, with a focus on the rise of Eco-Civilization in Chinese environmental discourse and its growing global salience. Section 3 uses the empirical case of forests as a climate mitigation strategy, domestically and globally, to better illuminate the environmental approach encapsulated in Eco-Civilization and its attendant controversies. Section 4 combines theory and empirics, demonstrating how, in aspiring to offer an alternative model for environmentalism globally, China's Eco-Civilization paradigm may challenge Western orthodoxies.

2. From risk management to civilization building

Environmental sociology in China is "well afoot" (ZINDA; LI; LIU, 2018, p. 868), with the country's quantitative, qualitative, and conceptual contributions to the field mounting (LI, 2019). Despite these recent developments, China's early encounters with environmental sociology – as well as sociology more broadly – were more limited (HUA; FLINT, 2009). Take for example, Beck's theory of risk society, the precursor to his later metamorphosis theory. Since it was first conceptualized within the context of the industrialized Global North, this theory did not gain early interest from the Global South, including China. First engagements with risk society in the 2000s classified China as a "developmental" risk society (ZHAO; HO, 2005), exploring the implications of the transnationalization of China's mounting environmental risks (WISHNICK, 2005). Western

observers used this premise as evidence pointing to the inevitable downfall of the communist regime and the liberalization of the country (THIERS, 2003).

Others pointed to China's potential for "ecological modernization," a term theorized in a Western context but also applied by Chinese scholars (MOL, 2006; ZHANG; MOL; SONNENFELD, 2007). Ecological modernization did not necessarily imply the country's liberalization, but a modernization on its own path "with Chinese characteristics" that departed significantly from that of liberal, capitalist societies. Indeed, the continued prevalence of elements such as a strong centralized state, little transparency, a "very particular market system, and little room for bottom-up civil society," make China's modernization trajectory unquestionably distinct from Western approaches (LIANG; MOL, 2013).

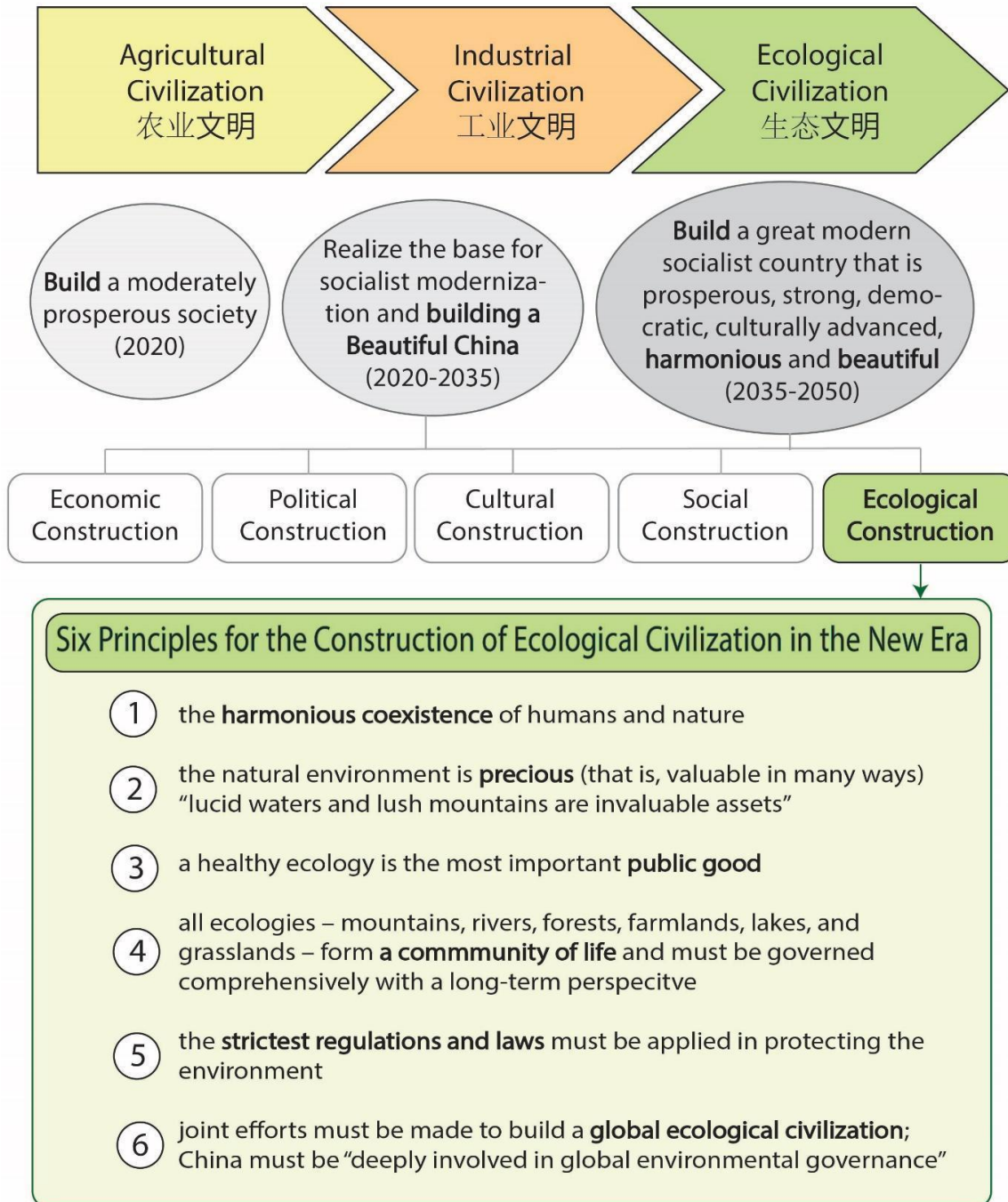
Notably, the 2003 SARS epidemic sparked interest in risk society (*fengxian shehui* 风险社会) within Chinese academic literature (ZHANG; ZHAO, 2011). The country's radical social and economic changes around that time made it a particularly appealing case for exploring the theory in a non-Western setting. As sociological investigations into China's "compressed modernity" grew, risk society has since been applied to issues of food safety, genetically modified organisms, nanotechnology, and other emerging environmental issues (TONG; ZHANG, 2020). Through these disparate applications, unique features of China's particular risk society – as well as any potential metamorphosis that might follow – emerged. Chang (2017), for example, found that "the risk syndromes accompanying reforms to the socialist system, stacked on top of the risk syndromes carried over from the previous socialist era," have resulted in an extremely complex risk society.

FIGURE 1 – Publications containing “Eco-Civilization” (*shengtai wenming* 生态文明) and “Risk society” (*fengxian shehui* 风险社会) in logarithmic scale. Publications in Chinese language on Eco-Civilization rose starkly into the 10,000s after the uptake of the paradigm in political discourse in 2007, publications about risk society arose in greater numbers around the year 2000 closely following indexed English language publications. The search was performed in the database of the Chinese National Knowledge Infrastructure (CNKI) on 27 May 2021.



Like the concept of risk society, Eco-Civilization retains Western roots, yet it has been taken up within Chinese discourse far more substantially (see Figure 1). Although not itself a sociological concept, the term has crucial implications for how China engages with the field of environmental sociology. Eco-Civilization has become the broad rhetorical and policy umbrella under which all environmental initiatives in China are situated, from national parks to carbon markets. Originating from a Soviet Marxist-Leninist concept posing ecology as part of a mature socialist future (FEDOROV, 1983), Eco-Civilization is now almost exclusively associated with China (FOSTER, 2017). Beginning in 2007, President Hu Jintao made the “Construction of an Ecological Civilization” (*shengtai wenming jianshe*, 生态文明建设) a central long-term goal of the country. This promotion culminated in 2018 under President Xi Jinping, when the concept was written into the Chinese constitution as the fifth and final pillar of “Socialism with Chinese Characteristics” (Figure 2).

FIGURE 2 – Political principles guiding the “Construction of an Ecological Civilization”. At the top, Eco-Civilization is represented as a new stage of civilizational development. Below this, the government’s three goals for building Chinese society by 2020, 2035, and 2050 are reached through a “five-sphere integrated plan” (five pillars) or five “constructions” (HUANG; WESTMAN, 2021), the last of which – ecological construction – involves six principles as outlined by Xi Jinping at the National Conference on Environmental Protection in 2018 (YANG, 2021). Figure conceptualization: Annah Zhu.



Eco-Civilization is one in a long series of “civilizations” (*wenming* 文明) that are unique to Chinese politics (HUANG; WESTMAN, 2021). China’s broad historical trajectory when conceptualized from the vantage of Eco-civilization can be summarized as a transition from “primitive civilization” to “agricultural civilization” to “industrial civilization” and now onto an “ecological civilization” (YANG, 2020; ZHANG M., 2021). This broad trajectory supersedes other minor civilizational episodes – the “spiritual civilization” of the Mao era, the “materialist civilization” of the Deng era (DYON, 2008) – but in all cases culminates in a contemporary civilization that is *ecologized*. That is, Chinese society as envisioned by the government is “built on a positive foundation of the cycles of the ecosystem” (LIU, 2013). The aspiration, as enumerated through the rhetoric of Eco-Civilization, is neither to control nor conquer nature, but rather to adhere to its rules and rhythms in order to realize shared prosperity (ZHANG M., 2021).

The deployment and significance of Eco-Civilization has undergone a fundamental shift since President Hu began popularizing it in 2007. Its first usages at that time were almost in a defensive or shameful manner, recognizing that environmental health was key to the country’s prosperity and headed in the wrong direction (WANG; HE; FAN, 2014; ZHANG Y., 2021). The term was more about mitigating risks of burgeoning pollution. Since President Xi took office in 2013, the usage of Eco-Civilization shifted. Along with Xi’s presidency, the term has penetrated all of Chinese society, from the Communist party’s highest summits to the lowest cadres (SCHMITT, 2016; POW, 2018; PAN, 2020). Now, more than shame or remorse, Eco-Civilization is a marker of pride domestically and globally. It has become a vision for realizing “a community of a shared future for mankind” (*renlei mingyun gongtongti* 人类命运共同体), one of China’s long-standing foreign policy goals (WU, 2018; TONG; ZHANG, 2020). Eco-Civilization has become so influential, it has instigated the expansion of this foreign policy goal to include not only all *mankind*, but *all life on Earth*, as taken up in the title of Convention on Biological Diversity’s 15th Conference of the Parties (CBD COP15; for which, China is the host), challenging all parties to position themselves towards this idea (WEI et al., 2021). In this way, Eco-Civilization is distinctly Chinese, but gaining global salience. It is “increasingly

presented not only as a response to environmental degradation in China, but as a vision for our global future” (HANSEN; LI; SVARVERUD, 2018, p. 195).

There is much debate over whether Eco-Civilization is actually being realized – if human-nature relationships are in fact changing to achieve a relative harmony – or if it is merely rhetorical greenwashing with little substance. Our goal is not to demonstrate whether and to what degree greenwashing and rhetorical flourish are at play, but rather to argue that the most important feature of Eco-Civilization as highlighted by Chinese leadership is that it is distinctly Chinese. Although resembling sustainable development or EMT as pioneered in Europe and the US, Eco-Civilization deliberately distances itself from Western social theories, drawing on philosophical foundations of Confucianism, Daoism, and Chinese strains of Ecological Marxism (WANG; HE; FAN, 2014; PAN, 2006; GARE, 2016). The concept, as promoted by the Chinese government, provides a uniquely Chinese critique of modern civilization (FOSTER, 2017), condemning international carbon politics, denouncing ‘ecological imperialism’ (HUAN, 2017), and providing a utopian vision of the advance of civilization from industrial to ecological, with China leading the way.

Eco-civilization is thus unique as a *global* environmental discourse because it is presented as a largely non-Western response to the global environmental crisis. As a new global environmental phenomenon (MA; WEI, 2021), Eco-Civilization has been included in the Post-2020 Global Biodiversity Framework and is increasingly exported alongside China’s Belt and Road Initiative (ZOU et al., 2017; BUCKLEY, 2021; LU; HARLAN, 2021), placing China in a leading role in navigating global issues such as climate change (BARBI; FERREIRA; GUO, 2016). Making it into the agendas and titles of international fora like the CBD COP15 and the Erhai Forum (*erhai luntan* 洱海论坛), Eco-Civilization is starting to reach far beyond the borders of China. This is the first time that a deliberately non-Western environmental discourse is making its way to the global level.

3. Forestry with Chinese characteristics

The case of the climate-forestry nexus – in particular China’s large-scale reforestation and eco-compensation efforts – offers rich empirical terrain for exploring the global implications of Eco-Civilization. Large-scale tree planting, including reforestation, afforestation, and ecosystem restoration, has become one of the hottest and most controversial topics in global climate debates over the past five years. A 2019 article sparked much of the controversy, suggesting that planting 0.9 billion hectares of forest globally is one of the cheapest and most feasible means of combating climate change in light of massive political barriers to reducing fossil fuel consumption (BASTIN et al., 2019). Media coverage of the study notes that large-scale tree planting is not just one climate change solution, but “overwhelmingly the top one,” with “mind-blowing potential” to reduce emissions (CARRINGTON, 2019).

Building on this enthusiasm, there is currently a wave of commitments by governments and companies to contribute to climate-related projects that halt forest loss or degradation and promote afforestation. Following the UNFCCC and Kyoto protocol, the signatories of the Bonn Challenge committed to restoring 350 million hectares of forest land until 2030, sequestering 13-26 gigatons of CO₂ (IUCN, 2020). In 2020, the World Economic Forum launched the 1t.org platform and raised the 2006 ambition of planting one billion trees to one *trillion* trees. Elite billionaires across the world are also joining in. The founder of social news site Reddit, Yishan Wong, has launched the startup “Terraformation”, conducting experiments with new ways of massive tree planting to terraform deserts into forests. Alibaba founder Jack Ma’s low-carbon lifestyle app, “Ant Forest,” based on planting trees in exchange for low-carbon points earned by its users, won the Champions of the Earth award (UNEP, 2019).

Controversies surrounding this type of large-scale tree-planting to mitigate global warming abound. While some studies contest the sequestration potential of such projects, emphasizing potentially adverse biodiversity and social impacts (HUA et al., 2016; DELANG, 2019, ZENG et al., 2020), others affirm the beneficial climate mitigation impacts of tree planting already underway (LEWIS et al., 2019; TONG; ZHANG, 2020; ZENG et al., 2020; ZHU et al., 2020). Much of this controversy has played out in relation to China, the country engaging in such tree-planting projects at the largest scale.

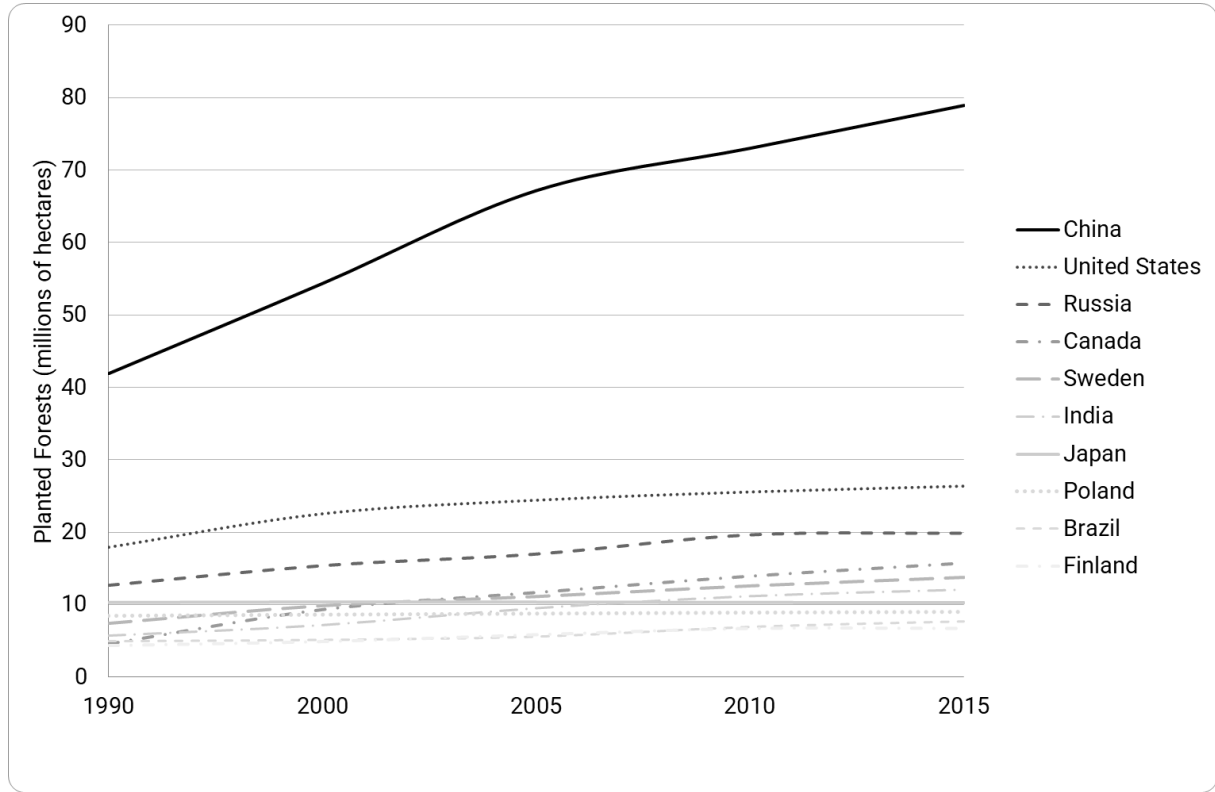
3.1 China's carbon forests

Tree planting in China is perhaps the longest-standing environmental tradition, dating back centuries and revived since the 1980s. In the thirteenth century already facing a largely deforested landscape, residents in southern China initiated large-scale reforestation projects alongside a sophisticated system of speculative trading in timber market futures (ZHANG M., 2021). Reforestation schemes continued on and off throughout the Ming and Qing Dynasties, but not enough to cover losses, with net forest coverage declining well into the 20th Century (AHRENDTS et al., 2017). Since the founding of the People's Republic in 1949, planting trees has become the most-featured environmental activity of China's leaders. In the 1950s, Mao Zedong initiated large-scale afforestation programs (alongside massive tree cutting in other parts of the country) to protect the North China Plain from advancing desertification (VIÑA et al., 2016). Shortly after Mao's death, construction began on the largest and most ambitious tree-planting campaign in history: the Great Green Wall, spanning all of northern China and including territories overlapping today with Alipay's Ant Forest. Beginning in 1999, the world's largest ecological restoration project – the nationwide Grain-for-Green (also known as “returning farmland to forests,” *hui geng huanlin* 退耕还林) program – was spearheaded across the country and continues, like the Great Green Wall, to this day.

In the past two decades, these massive efforts have begun to pay off. Net forest coverage has nearly doubled from 115 million hectares in 1981 to 220 million in 2020 (ZINDA et al., 2017; OUR WORLD IN DATA, 2022), leaving the country with more planted forests than any other in the world – greater than the next top ten tree-planting countries combined (Figure 3). In net terms, by 2015, China had by far the highest net forest coverage increase of any country (Figure 4) and is the leading contributor to “global greening” trends over the past two decades, enhancing vegetation cover over an area equal to a quarter the size of the Amazon (FAO, 2019; CHEN et al., 2019). China's former goal of nationwide forest cover of 23% by 2020 (VIÑA et al., 2016) has been reached according to official data (STATE COUNCIL INFORMATION OFFICE, 2020). New reforestation and ecological restoration targets have been set in the latest five year plan (2021-2025), including re-greening an area of land the size of Ireland annually (ZASTROW, 2019). It is further expected that China's hosting of CBD COP15 (the first

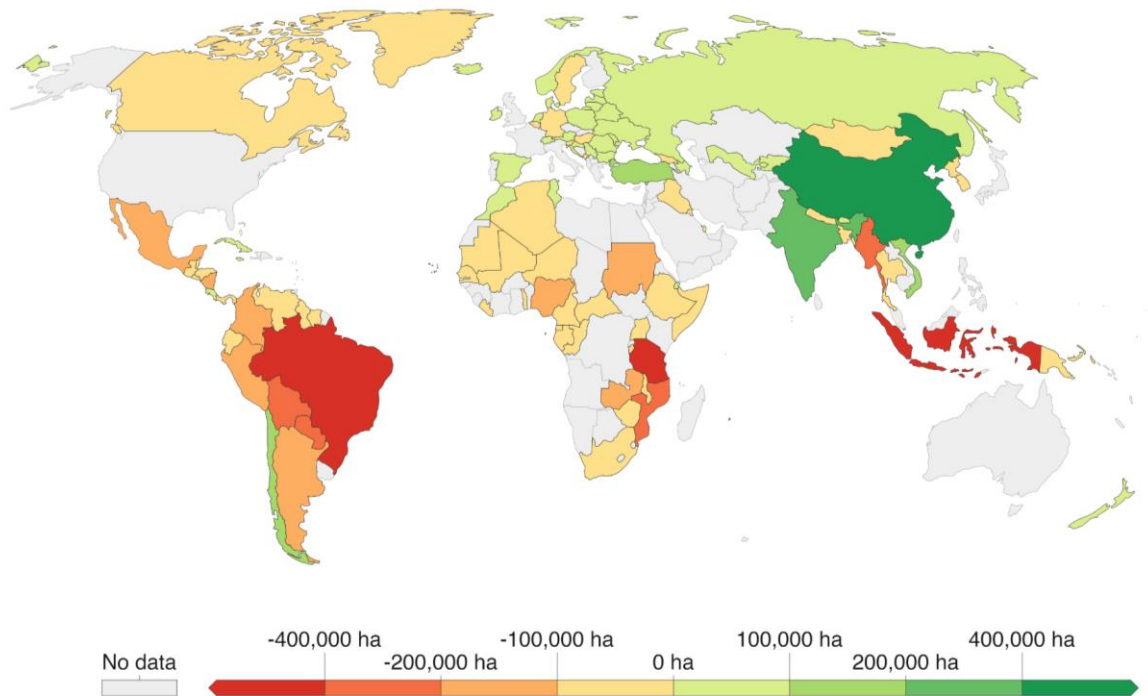
round of which was held remotely from Kunming, while the second round will be held in Montréal, Canada in December 2022) will catalyze the country's support for the 30x30 commitment, strengthening their land-based climate approach domestically and globally.

FIGURE 3 – Top 10 contributing countries to planted forest coverage (in hectares) from 1990 to 2015



Source: FAO (2019).

FIGURE 4 – Net change in forest area, 2015. Specifically, forest expansion (either through afforestation or natural expansion) minus deforestation



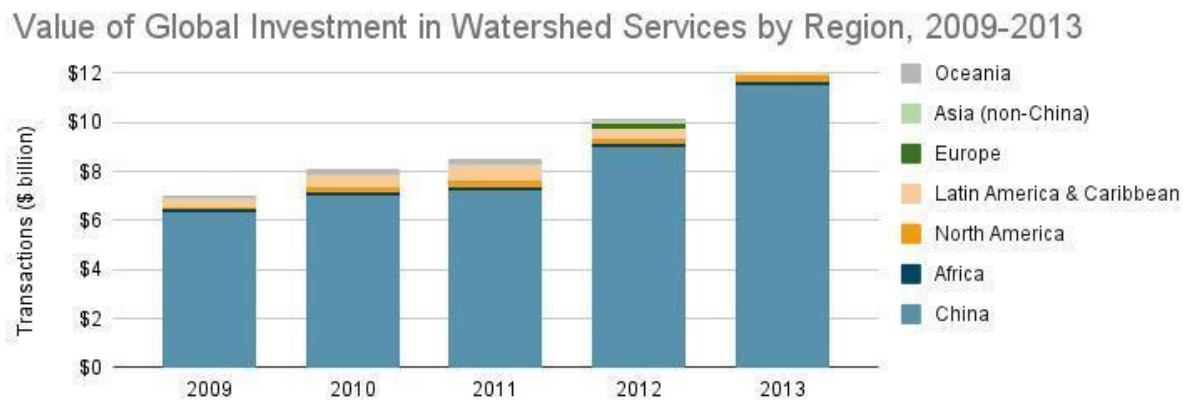
Source: Our World in Data, using data from FAO, CC BY.

Eco-compensation mechanisms (*shengtai buchang* 生态补偿) are one of the primary policy vehicles for tree-planting in China. Different from many other countries, eco-compensations in China are framed as public regulations and paid for by local and central state institutions (XIONG; WANG, 2010; SCHOMERS; MATZDORF, 2013). Compensation can be paid by the state or to the state (the constitutional owner of natural resources) by companies, individuals or groups for damage caused to natural resources. These can include, for example, forest harvesting, mineral exploitation, or the compensation and resettlement of individuals from ecologically sensitive areas by the state (WANG et al., 2020). Despite controversies and protests in such interventions, the Chinese scientific community has a much less politically challenging role and focuses on technical debates rather than questioning the social justice of state actions (TEETS et al., 2021).

An increasingly enthusiastic tone is not only found in Chinese but also noteworthy in English language publications in international journals. Compensation can be monetary or in-kind, but planting trees is a primary feature of nearly all. While in 1999

there were only eight eco-compensation projects, this number increased to 47 in 2008 (BENNETT; CARROLL, 2014). According to a 2016 study by the Asian Development Bank (ADB, 2016), China is overwhelmingly the largest investor in watershed services, of which investments in forestry are the most common (Figure 5).

FIGURE 5 – Value of Global Investment in Watershed Services by Region, 2009-2013. Based on 454 programs tracked, valued at \$12.3B in 2013



Source: ADB (2016).

China's Grain-for-Green program provides a prime example of eco-compensations involving tree-planting. Aiming to re-green large swaths of the country through a better integration of ecological and socioeconomic programs (DELANG; YUAN, 2016), this massive program is responsible for the conversion of more than 13 million hectares of farmland to forest or grassland between 1999 and 2019, involving 41 million households (CHEN, 2020). In some places, especially those with higher proportions of inclined territory, such as Yunnan, the Grain-for-Green program is responsible for re-greening more than 42% of former farmlands (WANG et al., 2017). This has significantly changed the sectoral distribution of local economies and reduced dependency on urban wage labor (UCHIDA; ROZELLE; XU, 2009), shifting policy priorities towards forestry and creating unforeseen changes in people's relation to forests (YAN, 2019).

3.2 Critiques of China's approach

Media coverage and academic literature are rife with critiques of China's tree-planting and ecological compensation schemes (YAN, 2019; ZASTROW, 2019). Some of these are applicable to large-scale ecological interventions across the board, Chinese and otherwise (LEWIS et al., 2019, CANADELL et al., 2021); others are targeted specifically at the social and political aspects of China's approach (LUOMA, 2012; JIANG, 2016). There is clear evidence of many constructed forests simply not surviving or worsening water scarcity (CAO et al., 2011, LUOMA, 2012). Especially in the north, some consider efforts to green the desert "foolish" (ZASTROW, 2019, p. 474). Is it time to "take down the 'Great Green Wall'" (JIANG, 2016) and rethink the risks of creating novel human-made ecosystems whose future consequences we cannot foresee? Or are such works of ecological engineering the way out of the current climate crisis?

The complete failure of many of China's early initiatives is widely attested to in the West, and even acknowledged within the Chinese scientific community (CAO, 2008; YE, 2013). More recently, however, practices have moved away from monocultures toward various forms of vegetation regrowth (YE, 2013). In certain regions, there have been clear successes. The rehabilitation of the Loess plateau and forestry projects surrounding Beijing are the most commonly cited examples (WU; KONG; JIN, 2019). The net carbon sinks of Southeastern China's newly planted forests have also increased substantially (TONG; ZHANG, 2020), and satellite imagery from the north demonstrates vegetation increases in line with government statistics (NIU et al., 2019). In terms of net increases in carbon sinks via forestry, China is among the highest globally (WANG et al., 2020).

Beyond climate mitigation, additional critiques abound – mostly coming from outside Chinese academia and media. In terms of biodiversity conservation, China's forests have been called "green deserts," with few native species (BEISER, 2018). The new tree cover, critics observe, has "little to do with nature" and "cannot be considered 'forests' in the sense of preserving biodiversity" (MARKS, 2017). Indeed, critics question if it is possible to call such rampant tree planting *environmental*.

Beyond environmental issues, lie the social and political critiques. As with all targets in China – economic or environmental – forestry targets are achieved by imposing

ambitious goals at the top, while lower-level provincial, municipal, and scientific bodies scramble to deliver results on the ground. This can lead to massaging the statistics to misleadingly demonstrate results or taking extreme measures that limit local practices in favor of tree growth. Agriculture and grazing activities that contribute to desertification are strictly prohibited, so much so that entire populations might be relocated or made sedentary (ZHANG, 2018). While there have been efforts to address data misreporting and increase the local benefits of projects (such as by planting species with market value), the generally non-participatory approach of abiding by top-down mandates is likely to persist. These social and political critiques of large-scale tree planting apply to many countries, but are most vociferously raised in relation to China.

Within China, however, the debate over large-scale tree planting is less likely to focus on the social justice impacts or ulterior political motives of the projects, but rather their ramifications e.g. for national food security. Indeed China's artificial forests have become so extensive that in 2020 the State Council issued a policy prohibiting the "non-agriculturalization" of cultivated land in order to ensure the country's grain supply (STATE COUNCIL, 2020). Referred to colloquially as "returning forests to farmland" (*tuilin huangeng* 退林还耕, or freely translated to "Green for Grain," indicating a partial reversal of the Grain for Green program, *tuigeng huanlin* 退耕还林, of two decades earlier), this policy seeks to ensure that certain prime arable land is not converted to decorative or non-grain producing purposes (including growing seedlings and fast-growing forests), thereby maintaining an arable land redline similar to the country's ecological redlines (XU et al., 2018).

4. "Constructing" an Ecological Civilization

China's forestry projects, as criticized as they may be, are unparalleled around the world. Whether considered a success or failure, no other country is pursuing such initiatives in a comparable way or at a comparable scale. These efforts are not only unique to China, but indicative of the country's broader approach to the environment as embodied in the paradigm of Eco-Civilization. Prioritizing large-scale building and construction at the hand of a strong state, China approaches the natural environment as not necessarily

distinct from politics and the built environment. The country's large-scale forestry projects prioritize active building and ecological engineering over preserving natural ecosystems. In these initiatives, ecology is not considered, as Latour (2017) notes, simply a "term to designate the beings of nature considered from afar, through the shelter of bay windows" (i.e., the "decor" that surprisingly gets up on stage in Western climate imaginaries, as noted in the introduction). Rather, ecology, as evidenced by China's approach to forestry and Eco-Civilization more broadly, is an active realm of governance.

Referred to in Mandarin as 造林 *zaolin* (literally "producing/building" forests) or 森林建设 *senlin jianshe* ("forest construction"), forestry in China has little to do with nature. Although uncommon in the West, the use of the terms "building" or "constructing" (*jianshe* 建设) when it comes to ecosystems is quite common in political discourse in China, not only for forests but many activities in addition to the environmental. As written into the constitution, Chinese environmental governance aims to "construct an Ecological Civilization" and "build a beautiful China" (MARINELLI, 2018; see Figure 2).

To Western ears, such building and construction when it comes to the environment appears as a type of green-washing. Compare these slogans, for example, to the (largely Western) charge to "save the planet" or the declaration that "nature needs half." They differ at every step: building and constructing versus saving and preserving, China and civilization versus nature and planet.

This linguistic difference hints at the underlying assumption that the "eco-environment" (*shengtai huanjing* 生态环境) from a Chinese perspective is, unproblematically and unsurprisingly, a product of both human and natural processes. The shock and uproar that climate change has caused in the Western imaginary – "metamorphosis" in the words of Beck; "a profound mutation in our relation to the world" in the words of Latour – is perhaps not as stark when it comes to the Chinese imaginary. When Latour refers to "the moderns," who consider the natural and the socio-political (e.g., climate and governance), as discrete, he is referencing the birth of a specifically Western brand of dualistic thinking that has been disrupted by climate change. "The Anthropocene," "geohistory," "tipping points," he notes, all transgress this duality between

the natural and the social, forcing contemplation of how ecologies and climates are in fact socio-political realms. Within this mindset, the ecological “construction” that China has been doing for decades, if not centuries, takes on new significance.

In many ways, large-scale tree planting in China is no different than the country’s large-scale urbanization (REN, 2011): impressive feats of engineering the landscape to Chinese standards at the hand of a strong central government. The ecological environment is seen as a type of infrastructure to be engineered alongside the build environment. In this view, it is indeed difficult to call such tree planting efforts “environmental” from a conventional Western perspective that privileges the environment as separate from the human. Yet, these massive state-led projects are in fact quintessential examples of Chinese environmental governance deployed toward the aim of establishing an Eco-Civilization. Not at all preservationist or grassroots, Eco-Civilization involves the melding of human intention and large-scale ecological processes at every step of the way (LI, 2019).

Over the years, sustainability improvements have been made to China’s forest-building endeavors: using more bushes and shrubs than trees as the water table requires, not planting monocultures to avoid susceptibility to diseases, choosing species with economic as well as environmental benefits (ZINDA et al., 2017), even cordoning off large areas to regrow by themselves through a system of “ecological red lines” (XU et al., 2018). But recreating natural landscapes is not, and has never been, the primary goal. Large-scale tree planting projects, like the Great Green Wall, the Grain-for-Green program, or Alipay’s Ant Forest, are not geared toward preserving nature, but rather tackling the extreme environmental threats of desertification, flooding, and climate change. Their aim, whether successfully achieved or not, is to quite literally *build* a sustainable future – that is, a future in which China will persevere and prosper despite existential threats like climate change.

The state-led transformation of the landscape associated with China’s forestry efforts has become one of the most tangible symbols of the country’s national transformation toward Eco-Civilization. It is one of the few highly visible material changes the country can point to in order to demonstrate the scale and complexity of its new global vision. Leveraging human ingenuity and political will to construct or build new ecologies –

that is combining social and environmental agencies – does not pose the same contradiction in China as it does when approached from a Western preservationist perspective. The radical repositioning with respect to the environment that Latour, Beck, and others propose as a consequence of climate change – “metamorphoses” or “profound mutations” – are perhaps not quite as radical, or at least proceed differently, in different cultural and political milieus. This is something that requires more nuanced social theorizing. “Greenness” and its attainment, it turns out, are in many ways culturally construed (PASCUAL et al., 2021; ZHU, 2022).

The role of the state in governing the melding of social and ecological agency that we will increasingly witness in decades to come also requires more nuanced theorizing. As a concept grounded in Chinese terms, Eco-civilization raises doubts over the emergence of societal transformations or “metamorphoses” that lack all central planning and are based not on states, but a vague “global cosmopolitanism” that transcends state authority (BECK, 2007). In the case of China, the state is a driving proponent, making methodological nationalism appear more salient than assumed by Western theory (and for Western contexts). Yet, despite China’s “nationalist twist,” the state can only push the paradigm of Eco-Civilization so far. It remains to be seen how this heavily promulgated concept will be received and evaluated by the Chinese population at large (HANSEN; LI; SVARVERUD, 2018). While the state has set China on the path toward constructing an Eco-Civilization, what precisely that construction entails as it reverberates throughout the country in practice and everyday life, discursively and materially, remains to be seen.

5. Conclusion: how influential will China’s approach be?

In global environmental debates, China is both the leading environmental threat and an emerging environmental leader. The country is by far the largest carbon emitter, but also the largest contributor to renewable energy and electric vehicles. It is the biggest threat to forests globally, yet the leading contributor to global greening within its own borders over the past two decades. Through tree-planting, China has become the largest carbon sink via land use globally. While the country’s environmental digressions have

been publicized for decades, its environmental initiatives are only recently gaining recognition, and even then, they remain highly controversial.

Eco-Civilization is not (yet) a clearly defined agenda, certainly due to its purposefully open-ended utopian character. As an environmental worldview, Eco-Civilization is more about differentiating itself from Western influence than remaining internally consistent (BOUGHEN, 2021). Consequently, doubts arise over whether the paradigm is more rhetoric than reality, more strategic than genuine (LI; SHAPIRO, 2020). Is Eco-Civilization simply a consequence of international pressure or a guise for consolidating political control? Similar questions arise when it comes to China's massive reforestation efforts. Is all this tree planting about preserving the environment or rather engineering ecosystems anew with little concern for "nature"? We suggest here that this may be the wrong question facing our engagement with Eco-Civilization as an object of study in environmental sociology. The more interesting question at hand is not whether Eco-Civilization is genuine or sincere, but rather: What vision of an environmental future is this new global paradigm conjuring and how might it be different from Western visions of the past decades? Impervious to the clear divide between the natural and the socio-political that structures modern Western thought, Chinese leadership approaches the ecological as an active realm of governance, ripe for the type of "construction" or "building" that we are likely to see far more in decades to come.

When discussing Eco-Civilization, then, it is useful to move beyond the common trap of understanding China as either an environmental threat or leader – a "good" or "bad" environmental player. Neither particularly good nor bad, China's emerging environmentalism retains cultural underpinnings not shared by such Western movements dominating the twentieth century. China's large-scale forestry projects reflect the country's unique environmental aspirations tied to national pride. They are hoped by the Chinese government to embody a type of "environmentalism with Chinese characteristics" or "Sinicization" of environmentalism (WANG-KAEDING, 2018), presenting new norms in environmental governance that may soon structure global debates (WEINS; FERREIRA; FEODRIPPE, 2020). More and more, conflicting environmental aspirations – engineering a balanced ecology versus preserving untouched ecosystems – will play out at the global level, and Eco-Civilization will feature heavily in the debate. Environmental sociology has

much to unveil about China's Eco-Civilization and should not turn a blind eye to this discussion if we are to recognize the manifold ways in which environmentalism is pluralizing globally.

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3. THE ROLE OF CITIES IN CHINA'S ECOLOGICAL CIVILIZATION: ON THE WAY TOWARDS A GREEN CHONGQING MODEL?⁹

ABSTRACT

Global environmental changes in the Anthropocene have started to deeply affect social and political organization. In China, the environmental crisis, caused by a host of complex factors in its modernization process and its integration into the capitalist global economy have led to the "Construction of an Ecological Civilization" being added as the fifth pillar of "development with Chinese characteristics." This doctrine increasingly frames not only environmental, but also economic policy and spatial planning. As cities play a special role in climate change adaptation, they have become a central field of power struggles in the 21st century. While the national Eco-Civilization rhetoric allows for a certain degree of autonomy in some of the decisions related to local interests, we argue that the case of the directly-administered municipality (zhixiashi 直辖市) of Chongqing, the world's largest municipality, occupies a special position as a central node for the development of the country's Western region. Chongqing's modernization process is closely tied to national interests and, as such, should play both an exemplary role but also needs to represent its own development needs as it tackles significant rural-urban disparities. This article proposes an analysis of the central-local relations in environmental policies in Chongqing under the Eco-Civilization framework and discusses how the city navigates its model character for the central government with its local interests.

Keywords: Center-local relations; Ecological civilization; Environmental policies.

1. Introduction

Much of the literature in political science relies on an unquestioned acceptance of the neoliberal capitalist state as an ideal type. State practices are often minimized, which is a challenge when studying cases from the Global South like China. For an analytical treatment of state-scale and city-state relations in China, we must consider its specific territorial state relations of scale and contemporary state practices (CARTIER, 2004). Even though de- and recentralization of control over cities has been observed in imperial China, cities used to be mainly political centers where commercial classes played a less predominant role than in Europe (FEI, 1992; ZHAO, 2015). Since the Opening and

⁹ A shortened version of this paper was written in co-authorship with Leila da Costa Ferreira and Valeriano Mendes Ferreira Costa and is currently under review. Parts of this text will be published in Portuguese in a book currently organized by the Grupo Brasil China at Unicamp. Some theoretical reflections resulting from this chapter have been published in Ferreira and Barbi (2023).

Reform (*gaige kaifang* 改革开放) policies of President Deng Xiaoping (邓小平), local governments in China have been given much greater decision-making powers in all spheres of political, economic, financial, cultural and social life (HONG, 1999). Much of the power that was centralized in the Maoist era has been delegated from the national government to provincial-level administrative units and from the provinces to the respective sub-provincial units. Because of their economic power and political connections to central and provincial authorities, large cities within a province are usually the first to harness the benefits of political and economic decentralization. While the state is clearly active at the national level, it is not scale-specific and there are territorial dimensions to its authority expressed in its administrative organization (HUTCHCROFT, 2001).

A thought-provoking case study of one of China's most unique administrative units are the country's municipalities under direct control by the central government (*zhixiashi* 直辖市). Beijing, Shanghai, Tianjin and Chongqing carry this specific status due to national economic and political importance. The biggest and only inland one of the four, is the South Western city of Chongqing (重庆). Chongqing's history spans from a wartime capital in the 1940s, over to a (controversial) model period under a more left-leaning faction within the Communist Party of China (CPC). With a territorial extent of roughly the size of Austria, and a population of more than 32 million, it is the most populous municipality in the world (ROAST, 2019). Along with the city's "sister-foe" Chengdu, the two agglomerations have been seriously affected by their remote geographic locations in the Sichuan Basin for decades, influencing their ability to attract foreign investment and promote foreign trade (CHUNG, 1999). With the elevation of its political-administrative category as the fourth municipality under direct control by the central government, Chongqing has become a driver of development in the West of the country and a testing ground for new policies (SUN; TANIGUCHI, 2015). Nowadays, situated at the start of terrestrial and shipping routes linked to the Belt and Road Initiative (BRI), it has regained importance in strategic economic policies. Nonetheless, the megacity remains very little explored in the academic literature (HIDALGO MARTINEZ; CARTIER, 2017; KANAI; GRANT; JIANU, 2018; ROAST, 2019).

As China's global economic importance grows, however, environmental considerations have recently risen in importance, making Chongqing an excellent case study of socioeconomic and environmental pressures (YU et al., 2015). As concerns about environmental issues climb up the ladder of political priority around the world facing a global climate emergency, China has embraced this agenda both internationally and domestically (FERREIRA; BARBI, 2016; HANSEN et al., 2018; QI; DAUVERGNE, 2022). This is conducted under the umbrella doctrine of "Ecological Civilization" (Eco-Civilization), a concept that tries to carefully balance environmental elements in China's millennial history (PAN, 2016) with global sustainability debates, in a non-liberal context, presenting it as the hallmark of a non-Western, Chinese approach and theory to human-nature relations (HANSEN et al., 2018; WEINS et al., 2023), a sort of *sustainability with Chinese characteristics* (ASH, 2006; GORON, 2018).

Environmental politics are thus starting to take on greater importance in the peripheral but increasingly interconnected Chongqing. The city is now part of national programs for energy efficiency, air pollution and water-saving (ADB, 2022), it has districts that are part of the national forest cities (ZHANG et al., 2021), and it has transformed parts of its rural territory under the world's largest ecological restoration program, Grain for Green (DELANG; YUAN, 2015). Social inequality and rural-urban integration - both core topics of the Chongqing Model - are also a central challenge for national greening initiatives under Eco-Civilization (LORD, 2018).

This article proposes to analyze recent changes in China's administrative and environmental governance structure. Considering environmental issues as the most important challenges of the 21st century globally, it has also become a decisive factor for the CPC's performance legitimacy and regime stability as extreme weather events (DONNELLON-MAY, 2022; FERREIRA; BARBI, 2016; HU, 2018; TENG; WANG, 2021). For pursuing the questions raised in this paper, we collected relevant literature from the past thirty years and accessed current government sources. Through documentary analysis of these sources, we highlight the special role of Chongqing as the youngest of the four municipalities under direct central government control in its environmental policy strategy.

The interactions analyzed here highlight the importance of understanding Chinese political-economic evolution in its differentiated geographic context, as each administrative unit develops within its own historical path and responds strategically to the joint demands of national governance and the reproduction of transnational capital (LIM; HORESH, 2017). The methodology adopted here draws on a broad body of literature on China's governance, recent peer-reviewed journal articles, scientific books, as well as government sources.

Drawing on some ideas suggested by Hardoy; Mitlin and Satterthwaite (2001); Barbi and Ferreira (2017) and Beck (2016), we draw attention to the increased importance of cities as political actors in the climate change agenda. The research questions that guide this paper revolve around three central aspects: How does Chongqing's territorial organization allow it to experiment with new environmental policy? To which extent does its special administrative status aid in the decentralization or recentralization of control over specific policies in the country's west? Within the project of Building an Eco-Civilization, can Chongqing be seen as a leading model that spreads central CPC ideas into the Western region or does its administrative status give it power over balancing local interests with Beijing's?

In the next section, we review the specific literature on municipalities under direct control of the central government and provide a historical and administrative contextualization. In section three we discuss some reforms relevant to environmental and urban policies in the case of Chongqing. The fourth section briefly discusses how the city is adapting in its transition from a former model of "red" policies to the ideals of "green" urban development under president Xi's 2049 utopia of constructing an "Eco-Civilization". We conclude by questioning the lack of studies on center-local relations on environmental policies and the eventual importance that Chongqing may come to possess within the Chinese development model.

2. Historical and administrative context

When studying continental-sized countries with a long cultural history, as is the case of China, it is necessary to recognize the historical contexts in which its institutions emerged. Territorial extension and the diversity of population, culture, economy, and the environment also demand specific functions for different territorial units. According to a 1994 World Bank study (DILLINGER, 1994), 63 out of 75 developing and countries in transition with more than five million inhabitants were reported to transfer political power to units of local government. East Asian governments were particularly enthusiastic about decentralization. Approximately 70% of total spending was allocated at the subnational level in China, 66% in India, 60% in Japan, and 45% in South Korea and Vietnam (RAMESH, 2013).

In China, the definition of subnational territories is not constitutionally guaranteed as in other countries. In contemporary China, the state retains the authority to establish new cities, expand, merge, and even eliminate existing ones. This practice has significant implications for geographically directed economic development and the governing power of these entities. Territorial strategies for managing urban sprawl in China are tied to the rationalization of government administration and the organization of capital investment through continued economic growth. They are negotiated within the political system of the complex framework of the dual party-state structure and, according to Cartier (2015), decided through non-transparent processes by the central government. Throughout its imperial history, there was a strong subordination to the emperor's mandates. To this day, the associated division and distribution of power and this ultimate decision-making instance of the central power manifests itself in the administrative structure of the People's Republic of China (PRC), proclaimed in 1949. According to Article 30 of the Constitution of the People's Republic of China (*zhonghua renmin gongheguo xianfa* 中华人民共和国宪法) of December 4, 1982, adopted at the Fifth Session of the Fifth National People's Congress, there are three basic levels in Chinese administration:

The imperial history of more than 3,000 years had, like other monarchies in the world, a strong and unquestionable acceptance of the emperor as the last instance and central element of its governance. To this day, the associated division and distribution of

power and this ultimate decision-making instance of the central power manifests itself in a very interesting way in the administrative structure of the People's Republic, proclaimed in 1949. According to Article 30 of the Constitution of the People's Republic of China (*zhonghua renmin gongheguo xianfa* 中华人民共和国宪法) of December 4, 1982, adopted at the Fifth Session of the Fifth National People's Congress (PEOPLE'S REPUBLIC OF CHINA, 1982), there are three basic levels in Chinese administration:

1. Provinces (*sheng* 省)
2. Autonomous regions (*zizhiqu* 自治区) and
3. Municipalities or prefectures under direct administration of the Central Government (*zhixiashi* 直辖市).

As defined by the constitution, the provinces and autonomous regions in turn are subdivided into autonomous prefectures (自治州 *zizhi zhou*), counties (县 *xian*), autonomous counties (自治县 *zizhi xian*) and municipalities (市 *shi*) respecting the great differences that existed between size and power of the counties of which these regions are formed today. The counties and autonomous counties (县、自治县) are further separated into rural areas (乡 *xiang*), minority rural areas (民族乡 *minzu xiang*), and districts (镇 *zhen*). Heberer and Derichs (2008) further highlight the realities of administration which are not addressed by the national constitution, such as sub-districts, administrative villages, communes, and neighborhoods with their respective committees. Furthermore, it has to be emphasized that the definitions of what constitutes as urban are highly disputed and undergoing unprecedentedly rapid transformations (HU, 2022).

The focus of this paper is on high-level urban categories, which were changed outside the constitution. For example, in 1994 sub-provincial cities were added to reflect their provincial or regional importance. As of March 1997, when Chongqing was elevated to the status of a city under direct control of the central government, there were only 15 such sub-provincial cities, which were also called prefecture-level cities, and four independent city-counties, whose name is also translated as municipalities under direct

control by the local government. Literally they are directly (直 *zhi*) controlled or governed (辖 *xia*) cities (市 *shi*), thus: *zhixiashi* (直辖市), cities under direct (central) control. Three of the four *zhixiashi* are important economic and political centers of the country: the national capital Beijing, its port city Tianjin and the international trading city Shanghai. Chongqing is the only inland of the four and was separated from Sichuan province in 1997, around the time of the world's largest hydroelectric power plant, the Three Gorges Dam, was built. The four municipalities "constitute important sites in the national space economy" and are therefore under direct governance of the State Council as provinces (HIDALGO MARTINEZ; CARTIER, 2017, p. 209). Three of the four *zhixiashi* are important economic and political centers of the country: the national capital Beijing, its port city Tianjin and the international trading city Shanghai. Chongqing is the only inland of the four and was separated from Sichuan province in 1997, around the time of the world's largest hydroelectric power plant, the Three Gorges Dam, was built. The four municipalities "constitute important sites in the national space economy" and are therefore under direct governance of the State Council as provinces (HIDALGO MARTINEZ; CARTIER, 2017, p. 209; LENG, 2009).

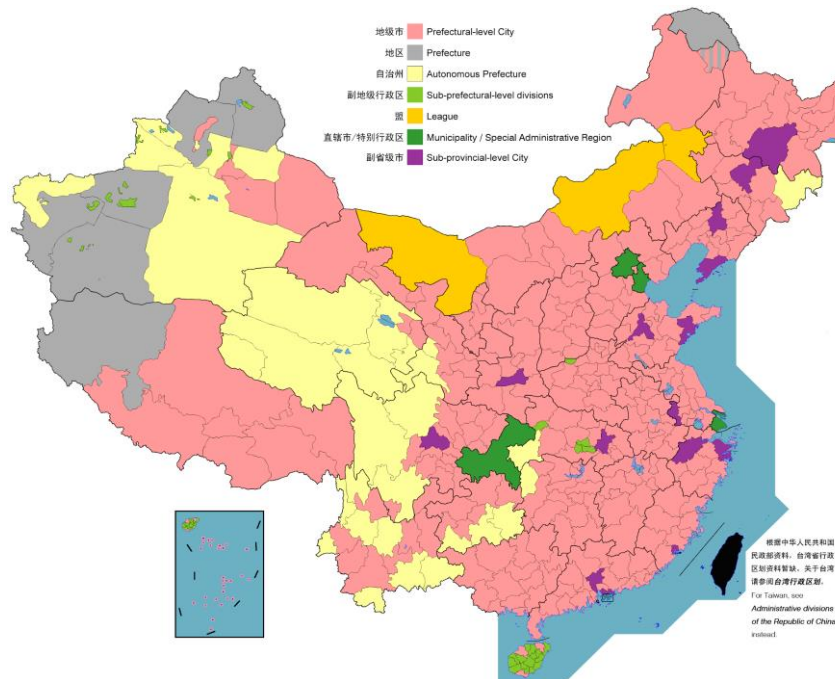
The two most important categories of municipality are mostly concentrated in the coastal part of the country, reflecting a large regional imbalance (CAO et al., 2012). Figure 1 shows the four municipalities under direct control in green and the sub-provincial cities in purple. Chongqing stands out both for its size, which at ca. 82,000 km² is almost 14 times the size of Shanghai, and for its location as the only one in its category in the interior and southeast of the country. It is two to three times the size of the other three provincial-level cities (Shanghai, Tianjin, and Beijing) combined and larger in area than China's two smallest provinces Hainan and Ningxia¹⁰ (FITZGERALD, 2002).

Landry (2008) states that throughout the 1980s there were drastic changes regarding the division of distinctive policies for urban and rural spaces as defined by the constitution. The renewed attractiveness of cities as centers of economic reform following Deng Xiaoping's "Reform and Opening" in the 1980s caused many rural areas to see it as

¹⁰ Not including Taiwan, a territory historically disputed between the CPC and the Guomindang National Party (GMD) which claims it as the Republic of Taiwan.

an opportunity to join the new urban areas that were being redefined at that time (SHIRK, 1993). Chongqing's extraordinary size can certainly be understood within this trend.

FIGURE 1 – Division of the different levels of prefectures in the People's Republic of China. Highlighted here are cities under control of the central government (green) and sub-provincial cities (purple)



Source: ASDFGH (2011).

The administrative subdivision of more powerful cities is common throughout the world and has far-reaching consequences for the construction of local identities and citizenship. The "top-down categorization practices [shape] new processes of identification and group formation among categorized populations" into their respective administrative categories (VETTERS, 2007, s. p.). In this process, considerations about a change in the administrative status of an entity are based on a change in its importance within the nation's politics, assessing its peculiarities in relation to national identity and other entities with similar political, economic, or cultural importance.

A good example of this is the creation of sub-local political bodies in urban municipalities in many Western European countries, where the attempt to find the balance between integration and local differentiation can be seen (BÄCK et al., 2005). In the words of Hutchcroft (2001, p. 45) the dilemma lies in "how to shape political-administrative

systems in ways that promote both the values of local governance and the goals of the national community." In the case study here, in autonomous municipalities and municipalities under direct control by the central government, the relative differentiation and prioritization of two similar cities in a region can significantly influence the competition between them.

Cartier (2011) points to the conjunctures of recent decentralization and recentralization and their connection with urbanization through the establishment of new cities. Through them, the central government orchestrated the decentralization of economic power in association with planned urbanization as the basis of domestic growth. Heider; Rosenfeld and Kauffmann (2018) highlight the importance of the administrative status of public sector activities that are often neglected in the economic approaches used to analyze the driving forces behind urban growth. In addition, the aforementioned cultural factors are entailed. Hong (2002) draws attention to the phenomenon of local residents of Chongqing, who, after formation of the municipality following separation from Sichuan province, quickly no longer considered themselves Sichuanese, and were urged to speak Mandarin instead of their Sichuanese dialect by the new "proximity" to Beijing within the category of a city directly controlled by the central government (HONG, 2002, p. 43).

As pointed out by Dillinger (1994), the worldwide trend of national governments handing over power to local entities at the end of the 20th century was quite strong. However, as in Europe decentralization in the process of European integration has gone through several phases, the peak of research on related phenomena has past (LÖHMUS, 2008). The trends of this happening in waves of stimulating decentralization or recentralization are also found in other parts of the world and often cities are a driver for these movements. In the case of China, Chung and Lam (2004) state that in the early 2000s, 70% of administrative entities were already under the governance of some kind of urban regime, as the overall trend was stimulated by political plans and urbanization.

Hart (2019) defines some key features for understanding environmental politics within center-local relations. Within the unitary structure, the executive, legislative, and judicial branches are understood as components of a single unified body, with vertical (tiao 条) and horizontal (kuai 块) lines of authority, forming the tiaotiao kuaikuai (条条块块) system. Vertical lines of authority imply that national ministries are mirrored by their

counterpart organizations at the provincial, municipal, district, prefectural, and village level. Horizontal lines of authority mean that each of these levels of government raises taxes, sets budgets, and assigns personnel at its own tier. According to Hart (2019, p. 6) the kuai structure with independent tax, budget, and staff authority creates a tension between the central leadership and the local implementation of policy at the subnational level.

Accordingly, Cartier (2004) states that for the Chinese case, the political boundary and the formation of administrative territories at different levels of its territory are fundamental elements both of former imperial as well as contemporary state practice. They make the territorial administrative classification (xingzheng jibie 行政级别) or level (dengji 等级) especially important (MA, 2005). In comparative research, it can be stated that the state periodically changes the criteria for defining administrative units, especially cities, as mentioned above, in order to promote specific political and economic goals.

2.1 Decentralization and the growing autonomy of municipalities

It can be said then that cities were the big winners in the political-administrative, economic, and therefore decentralization process in China. Especially concerning sub-provincial cities, powers were handed back to the provinces after three decades of strong centralization during the initial years of the People's Republic and its centralizing political campaigns. The distribution of these sub-provincial cities (Figure 1) is striking with six of them located in the eastern part of the country (Nanjing, Hangzhou, Jinan, Qingdao, Ningbo, Xiamen), four in the northeast (Shenyang, Dalian, Changchun, Harbin), two in the south (Guangzhou, Shenzhen) and one each in the center (Wuhan), southeast (Chengdu) and northwest (Xi'an) (CAO et al., 2012).

The trend of "countryside turns into city" (di gai shi 地改市) and "cities managing counties" (shi guan xian 市管县) began on the coast in Jiangsu province in 1983. The reforms changed the ranking of counties downward from municipalities, which paradoxically decreased local autonomy because of the greater forces at this level (LANDRY, 2008). The new municipal leadership system (re)ignited a number of border

conflicts between cities and counties (LIU, 1996). The number of new municipalities created between 1990 and 2003 because of spatial reorganization can be seen in figure 2 by Landry (2008). A strong concentration can be noticed practically all along the coast from the south to the northeast, but also in the center in the year 1990 and an "interiorization" of this process until the year 2003 (indicated by lighter shades of gray).

FIGURE 2 – Creation of new municipalities between 1990 and 2003



Source: Landry (2008).

Once they became hierarchically dependent on cities, counties lost most of these boundary battles and were even absorbed as urban districts in many counties. The counties were often merged with city governments, and in areas where counties were established within a prefecture at the regional level, the city was elevated to a full-fledged municipality, which represented a promotion of all local government and Party officials. Landry (2008) mapped total numbers and showed how the number of counties (prefectures) decreased dramatically from 1977 to 2003 and the number of municipalities increased steadily. Chung and Lam (2004) state that even though the policy caused considerable resentment among county and city leaders at first, it clearly increased enthusiasm for reform among the municipalities by reducing the complexity of layers. This greatly increased the power of urban centers and their influence over rural areas, an aspect very relevant to the predominantly rural case of Chongqing.

2.2 Municipalities under direct control of the central government

To understand the dynamic relationships between the scales of the municipality and the center, we need to have a clear concept of the social processes between them, how they transcend and recreate them. Harvey (1996) suggests that a perspective on scale does not assume that processes necessarily move up and down a territorial hierarchy, but rather recognizes that social processes can move unevenly across a space and sometimes "leapfrog" scales. This would be a "dialectical relationship of dynamic and irregular interrelationships within and between scaled processes" (MA; WU, 2004, p. 22). It helps to understand that the category of province in China emerged during the Han dynasty, but it was not until the Yuan dynasty that it came close to functioning as it does today. In the Qing-Ming period politico-administrative units based on kingships were formulated that approximate several of today's provinces. During the nationalist period of the *Guomindang* (国民党), the provinces had very little authority due to political instability caused by local warlords and the ideas of cultural modernization that had a strong central state as an ideal (FITZGERALD, 2004).

Under CPC rule after 1949, the "local" resurfaced with the establishment of the grassroots (working) units (*jiceng danwei* 基层单位), in which the smallest lower-level units were used by the Party for mass mobilization (CARTIER, 2004). To this day, the use of terms from that time referring to center (*zhongyang* 中央) and regional/local (*difang* 地方) remains prominent in party rhetoric. In June 1954, 11 of the 14 municipalities existing at the time were reduced to sub-provincial cities; many of them became provincial capitals, and only Beijing, Shanghai, and Tianjin remained as municipalities.

Considering the growing importance of cities within China's economic opening after Mao Zedong's death in 1978, the interests of local leaders, especially the local CPC secretaries, it was an important achievement for Chongqing to have achieved special status because, the CPC definition is relatively broad and would leave room and arguments for many other cities to move up in administrative level. The normative translation of provincial level cities in China would be "municipalities," which conveys characteristics of large cities and metropolitan regions in capitalist economies (CARTIER,

2015). But according to this definition a city under direct control of the central government is "a large city with a relatively concentrated population and a particularly important position in politics, economy and culture" (PEOPLE'S REPUBLIC OF CHINA, 2013). However, authors such as Hong (2002) ironize this definition, within which Chongqing would not be the first candidate for promotion to such a category, claiming that "Chongqing walks like a province, quacks like a province, but calls itself a municipality".

According to Cartier (2015), in theory and practice, the directly governed municipalities Beijing, Shanghai, Tianjin and Chongqing, unconditionally accept the unified leadership of the central government, which means that the CPC's national committees and government bureaucracies hold the power to guide, change or nullify the decisions taken by the city government. One of the most emblematic cases of this power was exercised in 2012 when the central government removed Chongqing's party secretary at the time, Bo Xilai (薄熙来), and subsequently investigated and reorganized the whole of Chongqing's local government. Another – much less emblematic and controversial – case was a reform in 1999 to adapt to the general reduction of personnel, within which the four municipalities had to accept cuts in offices or departments, reducing them from 61 to 45 (CHAO, 2003, p. 40). Cartier (2015) states that such factors cannot be left unconsidered when discussing Shanghai as a 'municipality' or as a 'global city' like any other, as it hides the fact that the city executes urban and economic development plans under the authority and designation of the central government, and is constantly subject to interventions by the central government that would be practically politically unquestionable.

This has led to some comparative debates questioning Chongqing as a point of reference. Other cities, such as the “neighbor” and former administrative headquarters of Chengdu, at the time when it was still part of the province of Sichuan, and the economically powerful Guangzhou¹¹ as its model competitor (HONG, 1999; LIM; HORESH, 2017). Especially compared to the latter, the contestation of internationalized neoliberal policies of the free market played a relevant role in understanding Chongqing's

¹¹ The Guangzhou model is known for its reliance on the liberal-market ideal, as it benefited from its geographic proximity to Hong Kong following pro-market and international trade policies as part of Deng's Opening and Reform.

importance as an arm of the central state in the west of the country today. Since economic opening, market policies in general have led to less state regulation, driving competition and economic restructuring across large growth poles, industrial districts and city-regions. However, the modes of “nationally based production have been dismantling into multi-scale arenas and towards a complex reconstitution of state activity at various scales” (MACLEOD; GOODWIN, 1999 *apud* CARTIER, 2004).

Promoting the status of Chongqing was certainly not the only proposal under consideration. An alternative suggestion was to divide Sichuan (四川) into two new provinces, called Chuandong (川东) and Sanxia (三峡), and make Chongqing a sub-provincial level capital of a new province (CHEN et al., 1997). It would include ten of the poorest counties in eastern Sichuan and western Hubei (湖北), merging the cities of Wanxian (万县), Fuling (涪陵) and Qianjiang (潜江) (FITZGERALD, 2002; HONG, 2002). However, this proposal was not authorized, mainly so as not to create a precedent for other provinces to start dividing into many smaller units and thus jeopardize central fiscal forecasts.

Another reason against establishing a new province instead of Chongqing as a municipality in its current form was the cost of establishing the necessary bureaucratic apparatus. Fitzgerald (2002, p. 3) suggests interpreting Beijing's decision to create a city in place of a province as a sign of the growing central concern that provinces could emerge as the main beneficiaries of the intensification and reordering of the state in the market economy that was unfolding in the 1990s to the point of threatening central government authority, and assuming that cities could eventually pose a less serious threat to central power. Whether the experiment intends to serve as a model for the displacement of the province as the place with the greatest concentration of territorial administration remains to be seen. In line with Mai and Francesch-Huidobro (2014), we argue that environmental governance has shown to be an interesting field for exploring such implications.

FIGURE 3 – Hierarchical power structure of local actors in environmental governance

Source: Modified, based on Ran (2017).

By definition, in municipalities the highest government official is the mayor, who is also a delegate in the legislature of the National People's Congress and at the same time Deputy Secretary of the CPC Municipal Committee. However, the highest administrative authority in the municipality belongs to the CPC Municipal Committee Secretary or Party Secretary (EATON; KOSTKA, 2014; RAN, 2017, see Figure 3). Thus, the power of the party is very closely linked to the central organs of the party.

Chongqing plays an important role in the representation of this power far from the center but at the same time it is an opportunity for its distribution and territorialization in the west of the country. As an entity that has had several attempts to break away from Sichuan, it was a favored candidate for this position. Resuming the idea of a

modernization project guided by a strong state that goes back to the Guomindang regime, we argue here that, within the current policies that have taken environmental issues as a central pillar, Chongqing is reviving its almost missionary role within the western development strategy, as an agent that promotes modernization under the “Eco-Civilization” doctrine.

It is widely understood that Chinese projects of the Belt and Road Initiative (BRI) are closely linked to other central government goals and the consolidation of Beijing’s power within its borders and beyond. New infrastructure but also aligned urbanization projects have an important place within this strategy. Even though environmental issues often conflict with those projects abroad (ASCENSAO et al., 2018), the domestic promotion of Eco-Civilization has seen a rise of eco-development associated with the reordering of local policy priorities away from purely economic growth. With the emergence of new “eco-cities” and new guidelines for inspection, nature protection through “ecological redlines” (XU et al., 2018), and increasing evidence of zero-tolerance for violation of central directives (KOSTKA; NAHM, 2017; POW, 2018), the unfolding of this duality in a municipality under direct control of the central government like Chongqing promises to set urban development in a new direction.

3. Case study: local environmental politics in Chongqing

3.1 The entwinements of national administration and local governance

Since the country's entry into the global capitalist system under Reform and Opening, the relaxation of strict adherence to Maoist ideology allowed for political and economic decentralization. For many Western observers, these developments, along with the demise of the Soviet Union, were seen as a sign of the ultimate success of the liberal democratic model and even the “end of history” (FUKUYAMA, 1989). However, these theses have been increasingly challenged by academics both within and outside of China (MAYER, 2018). Especially since Xi Jinping’s rise to power in 2012 and his project to reinforce China’s strengthened self confidence on the world stage, as embodied in the Chinese Dream (zhongguo meng 中国梦) have fed this narrative. Downie (2014, p. 40) asserts that the “Chongqing Dream” (chongqing meng 重庆梦) is another piece of evidence of the reinvention and evolution of a type of “Socialism 3.0” that overturns

Fukuyama's thesis. Afterall, it seems to point to a “federalism, Chinese style” that has been in development for long (MONTINOLA; QIAN; WEINGAST, 1995).

Environmental issues have not traditionally been part of the Chinese political agenda (FERREIRA, 2017). In 1972, China sent a delegation to the first United Nations Conference on the Human Environment (Rio-92), after which the National Leading Group on Environmental Protection was created. Two years after this international insertion created the conditions for the formal foundation of the first national environmental NGO (HASE UETA et al., 2018; MU, 2018). The first but only environmental legislation in the Mao era was a constitutional amendment in 1977 which guaranteed that “the state protects the environment and natural resources against pollution and other harm”. A lead group was consolidated in 1988 in the State Administration for Environmental Protection (SEPA). Since the early years of the CPC's rule, the National Development and Reform Commission (NDRC) and its respective entities mirrored at the provincial and local levels have played a key role in strategic development reforms defined by the central committee (BLUEMLING; MOL, 2013). In the first ten years of Reform and Opening, legal foundations of environmental protection were successively created throughout the 1980s (MU, 2018). In 1998, one year after heavy floods had devastated the south and a severe drought had affected the Yellow River in the north (DELANG; YUAN, 2016), SEPA was elevated to the ministerial level. After another ten years, environmental governance was established at the highest political level in China, with the Ministry of Environmental Protection in 2008. In 2018 this ministry would further concentrate a wide range of regulations in the Ministry of Ecology and Environment, making it the most powerful in the history of modern China (CHEN; XU, 2018; HART, 2019).

In the period of 1993-97, fiscal reforms made China one of the most decentralized countries in this respect (SHIRK, 1993; HSU, 2011). Despite recentralization in some aspects of fiscal regime, financial management, foreign trade, and personnel management, the system can at least be seen as a “combination of fiscal semi-decentralization, administrative semi-authoritarian, and political personnel system” (MU, 2018, p. 2). De- and recentralization, or “letting go” and “tightening” the grip of the CPC's central power is a regular phenomenon, known as fang shou (放收) in Chinese (KOSTKA; NAHM, 2017). Within China's regionally decentralized authoritarian system,

local governments play an extremely important role. The 1994 reform strengthened the central government's financial ability to provide public goods, including ecological restoration and environmental protection (LIANG; MOL, 2013). Even though more laws were created in the 2000s that responded to the emerging problems of air pollution, growing problems with urban solid waste, desertification and the need for reforestation, China's decentralized administrative structure has all too often been inadequate to respond effectively to environmental problems because of the priorities of incentives (KOSTKA; MOL, 2013). Fiscal structure and staff performance evaluation systems for long provided poor incentives for enforcement and contributed to a widespread evasion of environmental laws at the subnational level (KOSTKA; NAHM, 2017; MU, 2018). In 2003, the central government of Hu Jintao had proposed the concepts of "Scientific Development" (kexue fazhanguan 科学发展观) and "Harmonious Society" (hexie shehui 和谐社会), emphasizing sustainable development based on science and the harmonious relationship between man and nature (MU, 2018). This inefficient environmental governance structure was reflected in the central governance structure that influences local environmental governance, the Ministry of Environmental Protection (MEP). In the 40 years it took to conquer fragmented areas of environmental regulation, this "toothless tiger" (wuya laohu 無牙老虎) needed stringent reformulation that was finally put into practice under the MEE in 2018 (CHAN; XU, 2018).

With the emergence of the concept of Scientific Development, and the formal recognition of climate change by the government in this period, one of the issues that witnessed the most reform and material transformation was the energy sector (FERREIRA, 2017). In the late 1990s there were a multitude of projects for decentral implementation of hydroelectric power plants, followed by many small hydroelectric power plants that began the transformation of the energy matrix. Several of the largest hydroelectric dams in the world today are in China and Brazil, two "hydroelectric powerhouses"; the Three Gorges Dam, the largest of which is in Hubei with its reservoir extending all the way to Chongqing (CHEN, 2014). Institutional reform to guide this transition created the National Energy Administration in 2008, replacing the National

Energy Bureau which sought to reform the highly dispersed energy management in China (PEOPLE'S REPUBLIC OF CHINA, 2008).

In the year 2012 Xi Jinping (习近平) took office as the president of the PRC. Starting from a re-established role in the world as a great power, Xi asserts various policies and values more assertively. The beginning of this phase is marked by the definition of the Chinese Dream (zhongguo meng 中国梦) that conveys China's new confidence to be a middle-class country, respected by the world but the foundation of its own values. At the opening session of the 19th Communist Party Congress, at the very beginning of his remarks, Xi drew on the ideas of "Eco-Civilization" (shentai wenming 生态文明) and China's role in combating climate change as well as the urgency for action:

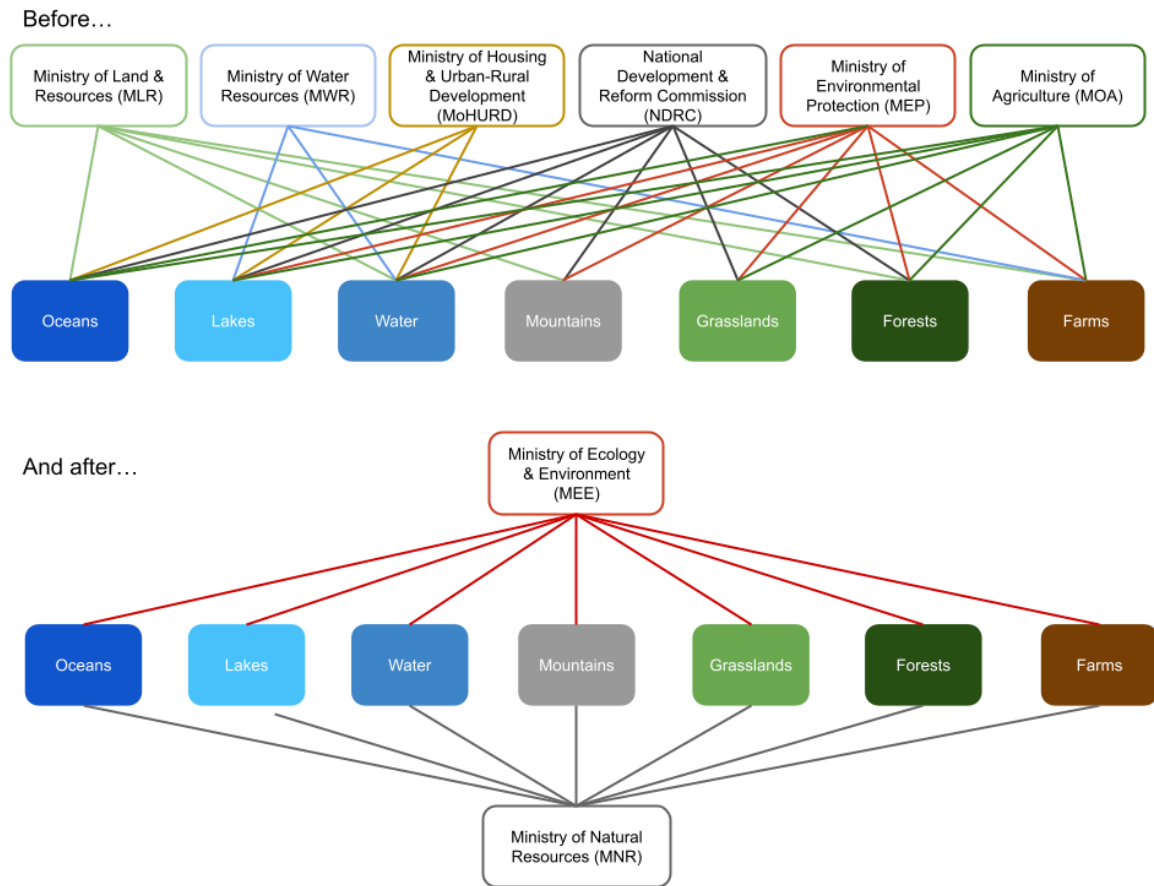
Taking a driving seat in international cooperation to respond to climate change, China has become an important participant, contributor, and torchbearer in the global endeavor for ecological civilization" and "Any harm we inflict on nature will eventually return to haunt us..." (HUANG; LAHIRI, 2017, p. 2).

Prior to Xi's speech Eco-Civilization was already adopted in the party constitution and since then phrases that make recognition of the environmental consequences of the development model of past years and call to "promote ecological progress" have been common in public speeches inside and outside of China (PARR; HENRY, 2016). In addition to the focus on research on Eco-Civilization is encouraged the use of concepts such as ecosystem services and natural capital (GORON, 2018). One of Xi's most frequently quoted lines, and one that discursively justifies institutional reordering, is the statement "lucid waters and lush mountains are invaluable assets" (lùshui qingshan jiushi jinshan yinshan 绿水青山就是金山银山), alluding to the high economic value of intact ecosystems (PEOPLE'S REPUBLIC OF CHINA, 2015; RAN, 2017; XI, 2017a). Responsibilities in the governance structures over natural resources and ecosystems, however, had become widely dispersed. Due to this situation, known informally as "nine dragons ruling the waters" (jiulong zhishui 九龙治水), natural resource governance saw the most changes in its structure in 2018 (WANG, 2018). The impact of Eco-Civilization could already be seen in stricter legal measures such as a 2014 guideline from the Ministry

of Environmental Protection to outline so-called "Ecological Red Lines" (shengtai baohu hongxian 生态保护红线 or sanxian yidan 三线一单) to delineate areas restricted from any development (CAO; PENG; LIU, 2015; XU et al., 2018).

In recent years, the balance of power between central and local governments has again been decisively shifted towards the center, as Xi has removed powers and competencies from local governments, introduced new oversight practices and sanctions, and signaled a zero-tolerance approach to non-compliance with central directives, sending thousands of local officials to prison (KOSTKA; NAHM, 2017). Following the 19th National Congress of the CPC in 2017, the central government decided to reorganize ministries in the spring of 2018, creating the Ministry of Ecology and Environment (MEE) and the Ministry of Natural Resources (MNR) as successors to the MEP. The new MEE took over responsibilities of the National Development and Reform Commission (NDRC) for climate change and carbon mitigation, and functions of the former Ministry of Water Resources (GARCIA; CASTRO; WEINS, 2022), making it the ministry responsible for implementing high level governance agreements like the Paris Agreement (HART, 2019).

Chan and Xu (2018) compiled the changes in this major reordering in the environmental field in modern China. Figure 4 (below) shows the six main ministries linked to environmental regulation and the seven areas in which they operated before the reform, where the regulation of e.g. carbon monoxide and carbon dioxide pollutants had been scattered across up to four different ministries. With the reallocation of all matters related to climate change from the MEP and NDRC into the MEE, these matters are in one body for the first time.

FIGURE 4 – Restructuring of environmental ministries in 2018

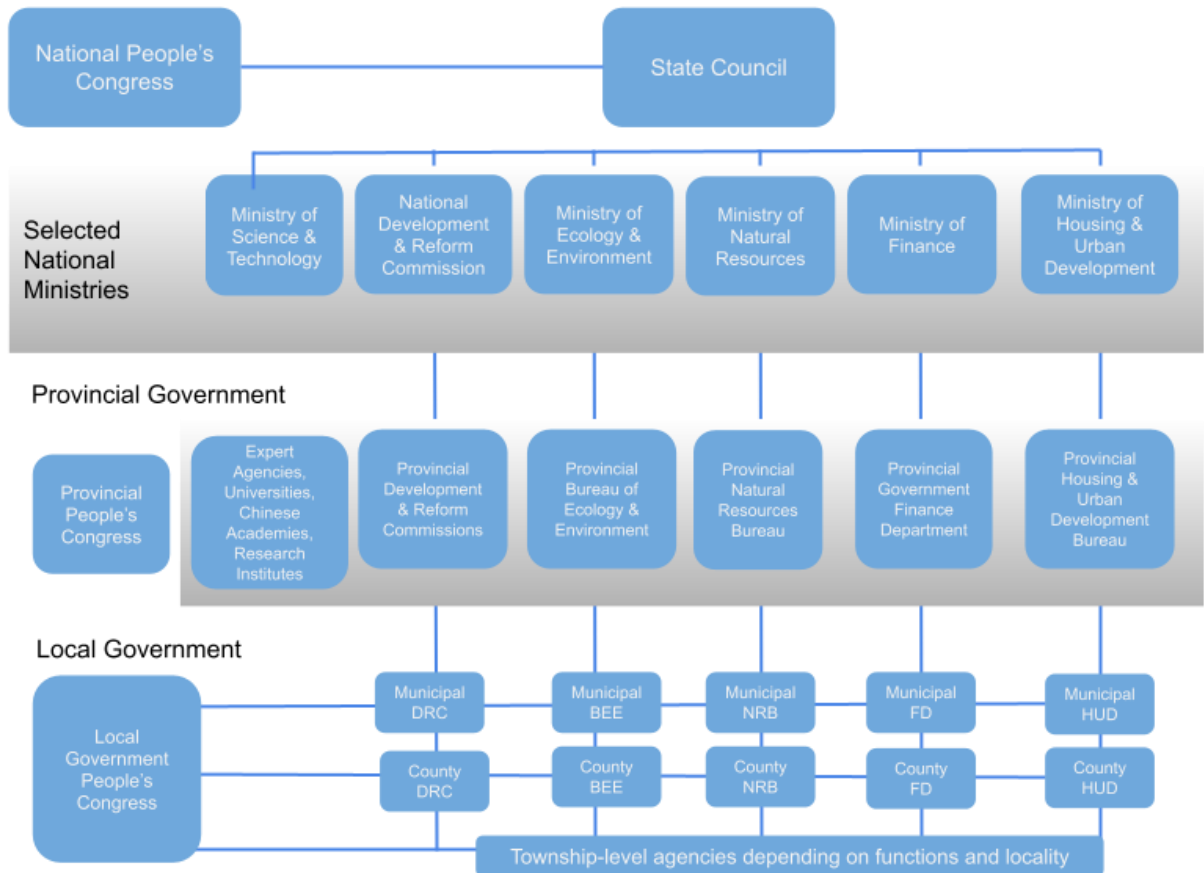
Source: Based on Chan and Xu (2018).

This reordering follows the directives of the “five-sphere integrated plan” with its five pillars or “constructions” in economic, political, cultural, social and, most recently, ecological aspects of a mature socialist society in China (HUANG; WESTMAN, 2021; WEINS et al., 2022). In his widely regarded 2016 book on Eco-Civilization, Professor Pan Jiahua (潘家华) of the Chinese Academy of Social Sciences, devotes an entire chapter to “Harmonious Urbanization,” in which it is stated that urbanization in the “New Era” will no longer follow the paradigms of industrial civilization. According to the author, China must “define and regulate the country's urbanization process from the broad macroeconomic perspective of society, economy, resources, and environment” (PAN, 2016, p. 76).

A specific feature of Chinese policies lies in the campaigns and the slogans to guide national guidance and which are executed and repeated from presidential speeches

all the way down into the most local level of CPC governance, the neighborhood committees (HANSEN; LIU, 2017). These can be understood as macro-level guidance not targeting specific types of policy but as merely playing a role in raising individuals' and industries' awareness of environmental protection and/or holding government organizations accountable for environmental governance (MU, 2018). Especially since Xi's rise to power, and during the heyday of the Chongqing model, these campaigns have increased. Especially after his reelection for a third term in 2022, this trend reminds observers of Maoist-style mass mobilizations that take Xi's book "The Governance of China" as a basis similar to Mao's "red bibles" (CUI, 2011; LIM; HORESH, 2017; WASSERSTROM, 2018).

The streamlining, prioritization and increase in efficiency of environmental institutions and their plans also entails a recentralization of regulatory powers. Hart (2019, Figure 6 below) shows the updated organization of the administrative structure for the governance of climate issues. The tiaotiao kuaikuai (条条块块) system describes the way national institutions are mirrored locally. When considering the fields relevant to climate governance, the provincial and municipal bureaus of ecology and environment are now present alongside e.g. the previously much more central and autonomous development and reform commissions, showing a mirroring of environmental issues at every level of governance in China (Figure 5).

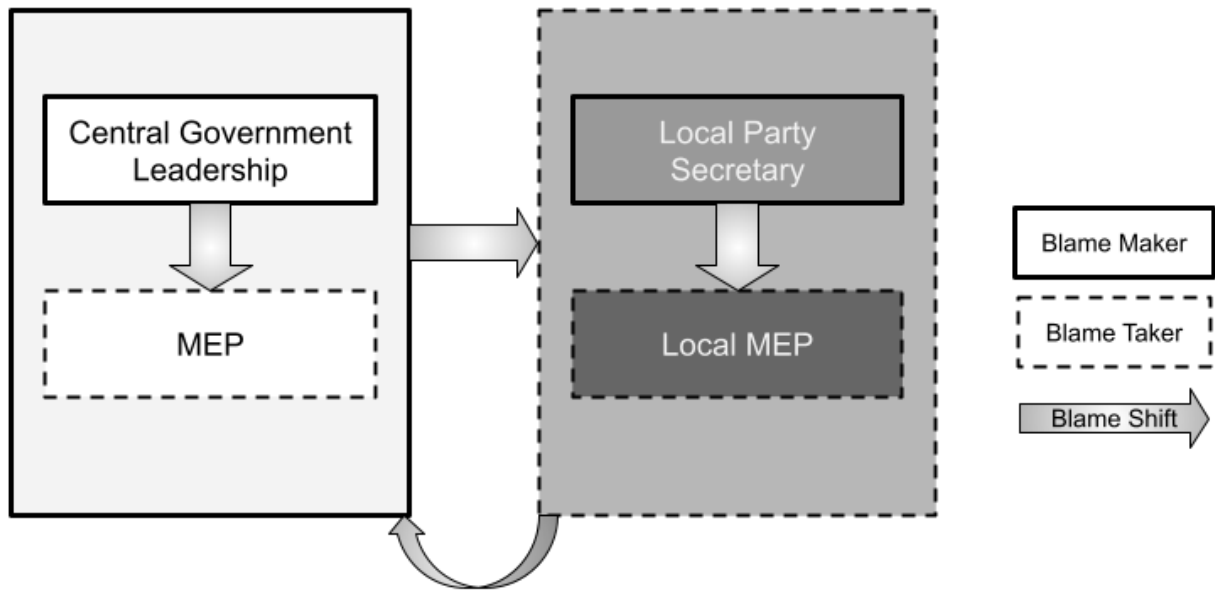
FIGURE 5 – Selected national ministries and respective sub-national agencies

Source: Modified based on Hart (2019).

Within the decentralized governance structure, the central government has historically exercised top-down control over the appointment and promotion of subnational officials. At the same time, much of the business of government has been delegated to subnational levels, which are responsible for providing public services, enforcing laws and regulations, and implementing national legislation (HEBERER; SCHUBERT, 2012; KOSTKA; NAHM, 2017). Some authors show that increased central control does not always result in the reprioritization of tasks, such that environmental interests triumph over economic priorities when the two are in conflict. Van Rooij et al. (2017) show that in wealthier localities, where economic interests and environmental concerns are more likely to overlap and more resources are available for enforcement, localities responded to central government control with better regulation. On the other hand, changes in bureaucratic discretion through the introduction of minimum penalty amounts, the use of

central government enforcement campaigns, and the establishment of branches of the National Environmental Protection Agency (SEPA) to oversee environmental enforcement have had little effect in poorer jurisdictions, where economic interests continue to take precedence over environmental concerns.

FIGURE 6 – Blame shifting between central and local actors in China



Source: Based on Ran (2017).

Other authors have found that under increasing pressure to meet environmental targets and improve outcomes, local authorities engage in structurally consistent patterns of blame shifting (see Figure 6) (RAN, 2017). Hart (2019) suggests that goals or targets can be classified in terms of priority as merely "guidance targets" (zhidao xing 指导性 / yiban zhibiao 一般指标), mandatory "hard indicators" (ying zhibiao 硬指标), and "veto-powered indicators" that are mandatory and carry penalties for not achieving them (yipiao fojue mubiao 一票否决目标). Local Party cadres concerned about promotion due to the inability to achieve certain environmental targets set by the MEE (or former MEP) are likely to point the finger at local environmental protection bureaus (EPBs), which often have limited authority and financial resources and are therefore easy

targets in the "chain of responsibility" of China's broader environmental governance system. They, in turn, will blame the MEP for setting unattainable targets within organizational and budgetary constraints (RAN, 2017).

3.2 Chongqing's strategic importance for the national expansion of Eco-Civilization

Situated on the banks of the red Sichuan Basin, one of the most agriculturally rich and prosperous regions during the imperial era, Chongqing lies in the mountains confluence of the Yangtze and Jialing rivers. Known for its hot and humid climate it is one of the "three furnace cities" on the Yangtze (san da huolu 三大火炉). This factor plays into the highly politically sensitive issue of food security, as the city has to balance the different land uses (industrial, urbanization, conservation) with uncertainties of extreme weather events that are becoming increasingly frequent (CHEN; YU; CHOGUILL, 2020). During its time as the war capital of the Guomindang, Chongqing was separated for the first time from Sichuan province, corresponding with its growing political and economic power. It had an exceptionally rapid industrial relocation that meant that by 1940, more than 90 percent of the factories in Sichuan had been relocated to Chongqing (ZHOU, 1989). Therefore, in the following years, the city quickly rose to a leading position in China's modern military, chemical, metallurgical, engineering and energy industries with a strong financial position, second only to the Japanese occupation of Shanghai (HAN; WANG, 2001).

However, this economic and industrial miracle was not long lived. Only two years after the end of the war, in 1947, almost half of the factories that had left the coastal cities for Chongqing were shut down, and 90 percent of the local engineering industry ceased operations. On the other hand, this rapid local economic and social decline created a strong anti-nationalist sentiment, especially among urban citizens, and young people, students and university professors, which shortly after provided a favorable political environment for the Communist takeover (HONG, 1999). The openness to communist campaigns in Chongqing can be seen in actions such as the "Sing red, attack black" campaign (changhong dahei 唱红打黑) (CARTIER; TOMBA, 2012). For Hong Lijian (1999) it is key to understand Chongqing's lagging-behind its arch-rival, Chengdu, despite having more preferential policies and a better geographical location. The author points to

important facets of center-local and intra-provincial dynamics related to local economic development.

After the declaration of the People's Republic in 1949, one of the top priorities of the Beijing government was to modernize the country. According to Han and Wang (2001), despite the departure of many enterprises, Chongqing maintained a strong industrial base and infrastructure. The city maintained the Southwest Bureau and the CPC's Southwest Military and Political Committee and was even once elevated to the status of a municipality under direct control by the central government by 1954 (WANG, 2001, p. 116; HONG, 2002, p. 41). The Great Hall of the People in Chongqing that was built between 1951-54 represents the political importance that was given to the city, as it is a smaller replica of the Temple of Heaven in Beijing.

For the sake of national defense - and contrary to what would be a beneficial strategy in economic terms at the time - in the 1960s and 1970s the Chinese government devised the regionalization project of the "Three Fronts" (sanxian jianshe 三线建设) to direct the distribution of industrial resources (MEYSKENS, 2015)¹². In 1964 and 1965, more than 60 state-owned enterprises under 15 branch departments of the central government moved their factories from 12 cities and provinces (e.g. Beijing, Shanghai, Nanjing, Liaoning) to Chongqing. With 46,000 workers migrating to the city and 200 key projects set up, the "Third Front" helped Chongqing build its economic infrastructure and become the largest industrial base in Western China (HAN; WANG, 2001).

Chung (1999) suggests that, firstly, Chongqing's growth was in tune with Beijing's control of the city, while periods of decentralization generally worked against Beijing's interests. The post-Mao era, characterized by extensive decentralization, placed Chongqing in an extremely disadvantageous position, while Chengdu reaped a windfall profit from Sichuan's economic management. Second, despite Beijing's considerable investments in Chongqing, its heavy reliance on defense industries prevented it from producing a positive impact on the overall urban economy. Third, despite the growing power of the sub-provincial cities, Chongqing did not prove equal to Sichuan, which

¹² The coastal area and border regions of the Sino-USSR border formed the *First Front*, considered the most risky area for industrial location if the US or USSR initiated an attack. The mountainous areas in Sichuan, Guizhou, Yunnan provinces, and others formed the "Third Front," which was considered the safest zone for industries in war (HAN; WANG, 2001; HONG, 2004; SUN; TANIGUCHI, 2015).

wanted to provide more support to its capital, Chengdu. The road leading to the eventual separation began in the 1980s, when the central government granted Chongqing the status of a separate planning city, restoring the position of the early 1950s and 1960s. It was only after reaching a revenue-sharing agreement with Beijing that Sichuan accepted economic and financial separation from Chongqing. With this agreement, starting in 1984, Chongqing would hand over 50.5% of its annual revenues to the central government, pass on 12.5% to Sichuan as central financial subsidy, and keep 37% for itself (HONG, 2002). According to official statements, the central government established Chongqing Municipality for three main reasons (PEOPLE'S REPUBLIC OF CHINA, 2009):

1. To make full use of Chongqing's geographical advantages, to play a role in the development of the southwest and to boost the development of the Upper Yangtze River regions;
2. To help resolve the difficulties of Sichuan's overly large population and administrative divisions, which have given rise to the current management and development situation, and
3. Because it is conducive to the construction of the Three Gorges Project and the completion of its resettlement tasks.

For Roast (2019), the decision to separate Chongqing from Sichuan province in 1997 and establish it as a directly controlled municipality centered mainly around the strategic management of the Three Gorges dam. The flooding of the Yangtze River resulted in the displacement of more than one million people, most of whom were resettled in the Chongqing municipality (HONG, 2004). Around 2000, the national policy agenda shifted to focus on regional inequality and rural poverty, and a series of policies aimed at promoting the economic development of China's interior were beneficial to Chongqing (LI; WEI, 2010).

In the early 2000s, the government launched three regional development policies for ten years: 1) the minor program of the Rise of Central China Plan (zhongbu jueqi jihua 中部崛起计划), 2) the Northeast Area Revitalization Plan (zhenxing dongbei lao gongye jidi 振兴东北老工业基地), and 3) the Great Western Development Strategy (xibu dakaifa 西部大开发) (CHUNG; LAI; JOO, 2009). In 2000 the last of these three

helped again drive an influx of central state investment and preferential policies to promote growth in western regions, including Chongqing (HONG, 2004).

Since the programs entered the responsibility of Xi Jinping's tenure, the president did not miss the opportunity to praise the three plans in his work report to the 19th National Congress to highlight the improvements in socioeconomic indicators in the western region that had long suffered from great disparities compared to the eastern seaboard:

We will devote more energy to speeding up the development of old revolutionary base areas, areas with large ethnic minority populations, border areas, and poor areas. We will strengthen measures to reach a new stage in the large-scale development of the western region; deepen reform to accelerate the revitalization of old industrial bases in the northeast and other parts of the country; help the central region rise by tapping into local strengths; and support the eastern region in taking the lead in pursuing optimal development through innovation (XI, 2017b).

Walcott (2007) draws attention to the establishment of the office of the Leading Group for the Development of the Western Regions under the State Council in Chongqing. Because of these favorable conditions, the inflow of investment from territories outside the PRC with strong ties to mainland China began to rise and companies from "Greater China" (Hong Kong, Taiwan, Singapore) settled in, constructing new offices (HONG, 2002). Domestic companies based outside Sichuan also increased their visibility in the region by acquiring declining local state-owned enterprises that presented interesting investment opportunities. Furthermore, fiscal transfers from the central government spiked from RMB 27.48 billion in 2005, the transfers rose to 318.69 billion in 2015 (HIDALGO MARTÍNEZ; CARTIER, 2017). This is indicative of the city's growing importance for national development policies. Part of this budget rise was due to experiments in urban-rural integration after 2007 and its elevation to a national central city (guojia zhongxin chengshi 国家中心城市) in 2011.

In 2007, Chongqing began to receive much attention for its experiments with more radical development policies, proposed by a group of the new left faction of the CPC closely linked to Chongqing's party secretary at the time, Bo Xilai (薄熙来). Lanting (2016) suggests that this is the most radical shift in Chinese politics to date. In response to the development model of Guangdong province, where the role of the market and entrepreneurs has grown far more expressive since Reform and Opening, the "Chongqing

Model" (chongqing moshi 重庆模式) is often characterized by a focus on the active role of the state and redistribution. Following a television debate between the CPC secretaries of Chongqing and Guangdong, the dispute between the models became known as the Chinese "cake debate" (dangao lun 蛋糕论), which diverge on 1) the more egalitarian distribution of the cake and 2) "making the cake grow" (CARTIER; TOMBA, 2012).

The political praise Bo received for the urban transformation as mayor of Dalian (1993-2000), led to his appointment as CPC secretary of Chongqing (BO; CHEN, 2009). He brought to the new megacity his "strategy of creating an urban landscape designed to impress" investors (CARTIER; TOMBA, 2012, p. 38). An aggressive landscaping was applied to the famous "city of hills" leaving Chongqing's highways lined with ginkgo trees, which were now described as a "unique feature" of the local environment (GUO, 2012). Ten billion yuan (\$1.5 billion) were spent on urban afforestation in 2010 alone. Bo's rhetoric had the hallmarks of a Maoist-era political campaign or voluntarist movement: Chongqing was to "plant trees equivalent to ten years in one year, trees equivalent to 100 years in ten" (CARTIER; TOMBA, 2012, p. 38). Guo (2012) suggests that the return to the red classics at that time helped fill a spiritual void, which also explained the academic interest that followed after Bo's removal as mayor in a scandal that attracted much international attention (BO; CHEN, 2009). While Tsinghua University's *Modern China* journal dedicated an entire issue devoted to the merits of and dialogues about the Chongqing Model (HUANG, 2011), international news outlets, in reference to the Mao-era campaigns called it the end of "another Cultural Revolution" (ALJAZEERA, 2013).

Regardless of the controversies, the Chongqing Model brought two competing faction views in the CPC and among its cadres back to the forefront of political life. While socioeconomic issues were at the heart of this debate, environmental issues started to rise in priority as the Eco-Civilization doctrine gained traction (WANG; HE; FAN, 2014; LI; SHAPIRO, 2020). Eaton and Kostka (2014) in their findings from interviews with CPC cadres suggest that behavior and priorities (economic or environmental) and their long- or short-term visions are often tied to individual political ambitions within the party's complicated and opaque career ladder. The career of secretary is very tempting, as low-profile projects commonly do not attract attention for excellence in political leadership.

Political messages emphasize that leaders internalize thinking beyond the individual. The saying "success need not be realized in my tenure" (gongcheng bubi zai wo renqi 功成不必在我任期) preached in the Guangdong party committee, highlights the importance of long-term success and well-implemented projects. Chinese environmental authoritarianism certainly enables "eco-elites" to enjoy greater freedom of action due to their relative autonomy from interest groups and the assurance of secure positions in power. However, the rush to the next inauguration (gan renqi 赶任期) is identified by the authors as a critical factor that could undermine the sustainability of the policies to be implemented to build the Eco-Civilization.

3.3 Towards a model for the Western region based on Chongqing?

For several observers, the Chongqing experiment highlighted the possibility of integrating issues of socioeconomic development through rural-urban integration as well as the co-development of public property and private enterprises. Practices of sending cadres to work, live, and eat together with peasants, re-registering rural migrant workers as urban residents, singing the famous "red songs" within Bo Xilai's campaigns, and providing public housing for low- and middle-income people, the Chongqing Model arguably played an important role in revitalizing the CPC's relationship with countryside people in the country's west (CUI, 2011). In terms of environmental policies, after the end of its Model period (2007-12), Chongqing was again less prominent when it came to model projects and experiments. But in terms of its significance in the Chinese national context, it remains less present in publications than what one would expect comparing it to similar cities (KANAI; GRANT; JIANU, 2018).

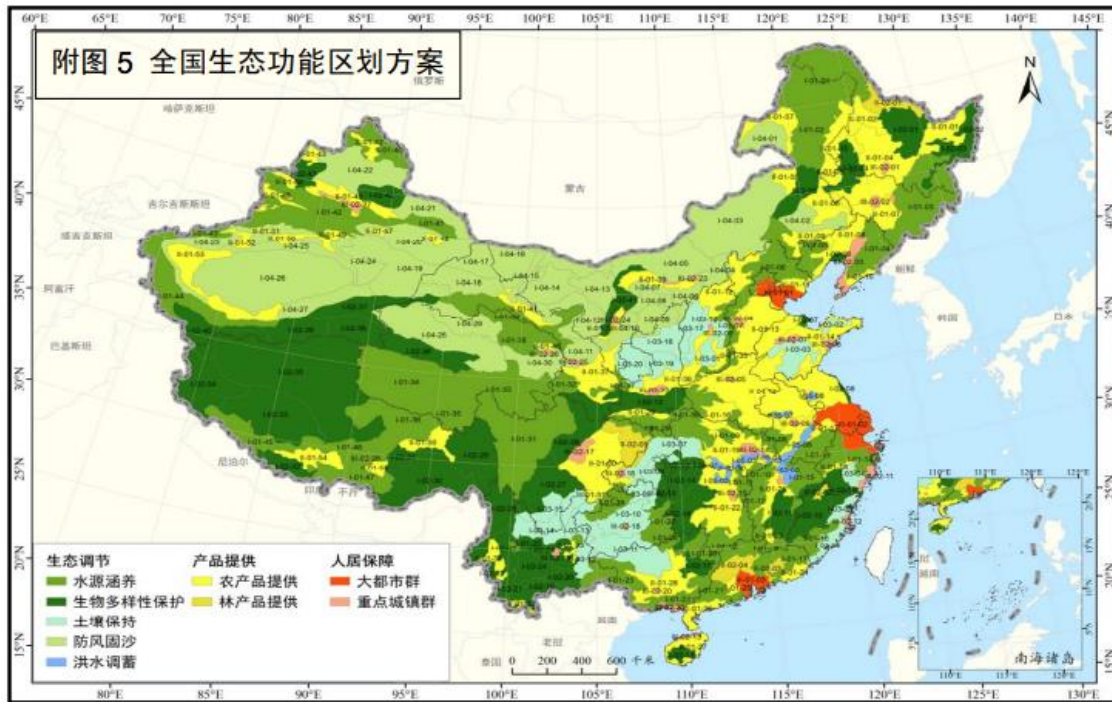
A 2019 World Bank report presents the challenges in different development scenarios for Chongqing until 2035 and in its title suggests the shift "away from quantity to quality to build sustainable cities in China". While the report focuses its suggestions on urban mobility and urban compacting of spatial patterns on its way to becoming a global city, it also recognizes the importance of the city's experiments in rural-urban integration. The socioeconomic pressures connected to the unusually rapid urbanization in Chongqing bring about hefty pressures on the environment that need to be counterbalanced with policies that prioritize environmental concerns (YU et al., 2015).

As part of programs like the national water-saving cities (ADB, 2022), energy efficiency, air pollution, national forest cities (ZHANG et al., 2021), and the world's largest national ecological restoration program, the Grain for Green program, Chongqing has made efforts to bring down per capita resource use and raise vegetation cover in response to mounting environmental risks (DELANG; YUAN, 2016). These “advanced environmental priority policies” (PINOTTI; WEINS; ESTEVO, 2021) come at a more advanced stage of China's economic development and capital accumulation, which allows the central government to deprioritize “GDP at all costs” as a driver of growth for peripheral regions like Chongqing, even against the interests of local industries and political elites (EATON; KOSTKA, 2018). These therefore push for a stronger decoupling of economic growth from environmental impact. It can be seen in the country's economic five-year-plans that the NDRC and its local mirrored entities (according to the tiaotiao kuaikuai 条条块块 system) bet on technological change for such a decoupling from a wide array of environmental pressures since the 10th and 11th five-year plans (YU et al., 2017) and have consolidated all the way into the current 14th Five-Year-Plan (2021-2025).

With president Xi's announcement of a Zero-Carbon goal for 2060, the need for green (low-carbon) development while still maintaining urban growth to hold its promise of “moderate prosperity” is a major challenge recognized in the 14th five-year-plan and emerging 2035 visions (BAXTER; ZHE, 2019; TENG; WANG, 2021). The Net Zero announcement in 2020 has already led to a flurry of actions by local governments on decarbonization. Achieving this goal, however, will not be possible without offsetting emissions through carbon markets and emission trading schemes (MALLAPATY, 2020).

Experience with such schemes has been in the making for years. A national pilot program for carbon emissions trading was launched in 2011 by the NDRC in Beijing, Shenzhen, Shanghai, Guangdong, Tianjin, Hubei and Chongqing (HART, 2019).

FIGURE 7 – National Ecological Function Zoning. Colors denote different ecological functions (greens = ecological functions, yellows = forest and agricultural land, red/orange = urban settlements and uses



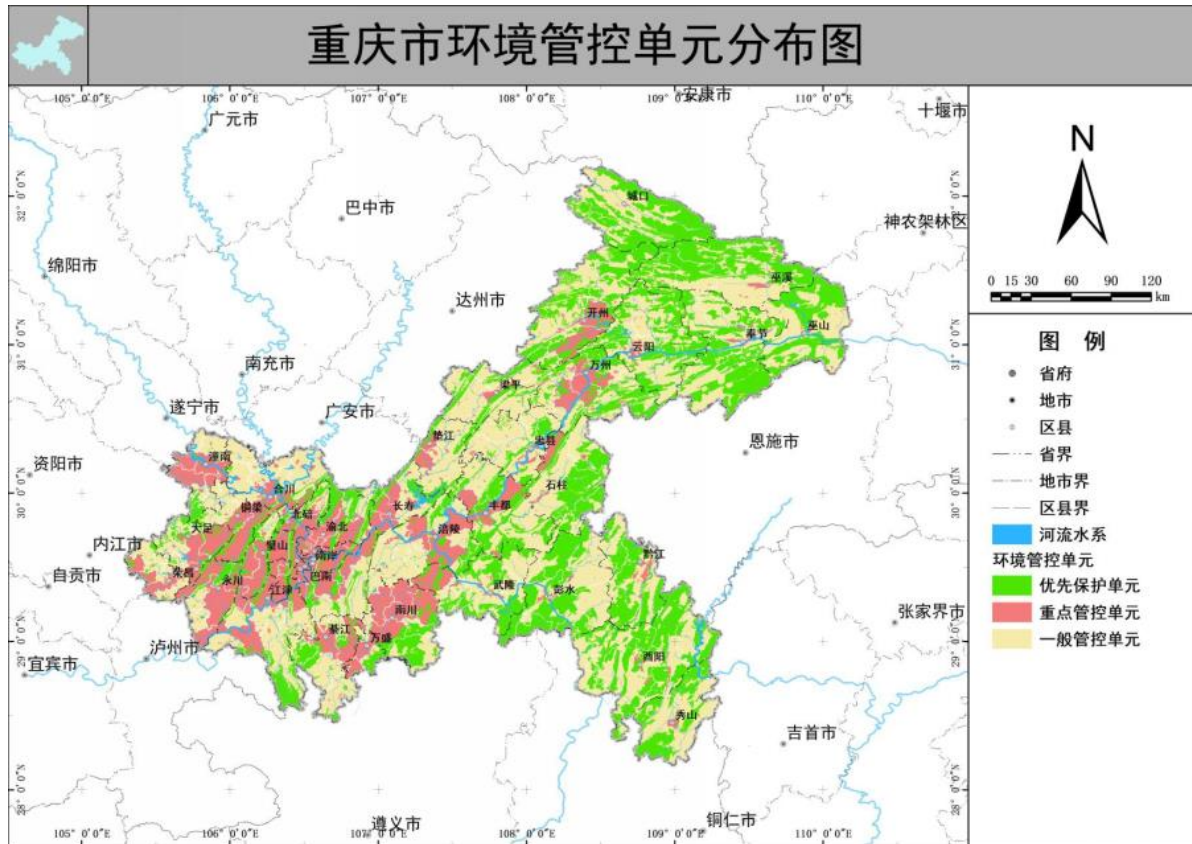
Source: China (2015) and Gordon (2019).

A look at China's current national zoning elaborated by the Ministry of Environmental Protection and the Chinese Academy of Science (CHINA, 2015) illustrates the challenges in balancing land use for urban, agricultural and protection functions (see Figure 7). The NDRC zoning law defined four different land use categories: development-optimized, development-prioritized where “conservation redlines” are drawn, and development-restricted as well as development-prohibited zones (ADB, 2016; EATON; KOSTKA, 2018; XU et al., 2018). The three great agglomerations (dark red) defined as irreversible urban occupation lie in the Pearl River Delta (Guangzhou, Hongkong), the greater Shanghai region (including Wuxi, Suzhou) and the greater Beijing capital region (jingjinji 京津冀) – the latter two of which are municipalities under direct control of the central government. Other cities (light red) like Chengdu, Wuhan and Chongqing are defined as spatially much more restricted “key urban agglomerations” (重点城镇群 zhongdian chenzhen qun). Agricultural and forestry production are defined in yellow and key ecological function zones (in green and blue) as restricted development zones and

“ecological redlines” that prohibit practically any industrial and urban development (CAO; PENG; LIU; XU et al., 2018; GORDON, 2019).

It is in the definition of these ecological redlines that the reach of top-down mechanisms shows its limitations (EATON; KOSTKA, 2018). To facilitate their conservation, ecological compensation subsidies (shengtai buchang 生态补偿) are applied by the central government that are constantly increasing and diversifying (YU et al., 2022; WORLD BANK, 2022). Ouyang et al. (2019) calculated that the budget for ecological compensations until 2017 had “grown tenfold, to 62.7 billion RMB (US\$9 billion)” and the “central government [had] spent over 300 billion RMB (US\$43 billion) on ecological transfer payments” (OUYANG et al., 2019, p. 185). These budgetary changes were accompanied by arguably the most significant changes in environmental policy under the reform frame of Eco-Civilization: local cadre evaluation criteria. While these criteria had been based on GDP for decades, this focus has been loosened, in some cases of environmentally important zones even abolished completely, giving much higher performance in air and water quality, changes in forest coverage and biodiversity indicators (EATON; KOSTKA, 2018, p. 789). This has been implemented e.g. through a unique institutional innovation of a system of Forest, River and “Lake Chiefs” in which cadres are responsible for a specific forest or water body’s health and punished or promoted depending on environmental indicators (DONNELLON-MAY, 2022).

In the quest for putting Eco-Civilization into practice, the definition of indicators and practices in line with this doctrine started to appear on a broader scale only as recently as 2021 (CBCGDF, 2021). Local governments have been working towards defining such characteristics and applied to be model cases (CHEN; SHI, 2022). Chongqing, with its municipality status and huge territorial dimensions is uniquely positioned in this policy field as it has executed policy experiments not only with top-down (vertical) but also with horizontal eco-compensation payments (i.e. between administrative units on the same level within the municipality) (ADB, 2016). On the basis of the municipal zoning laws, compensation can be used for already consolidated urban land or land planned to be occupied in the effort of urbanizing Chongqing’s population of over 32 million (HIDALGO MARTÍNEZ; CARTIER, 2017; BAO; LI; LIZIERI, 2019).

FIGURE 8 – Distribution map of environmental management and control units in Chongqing

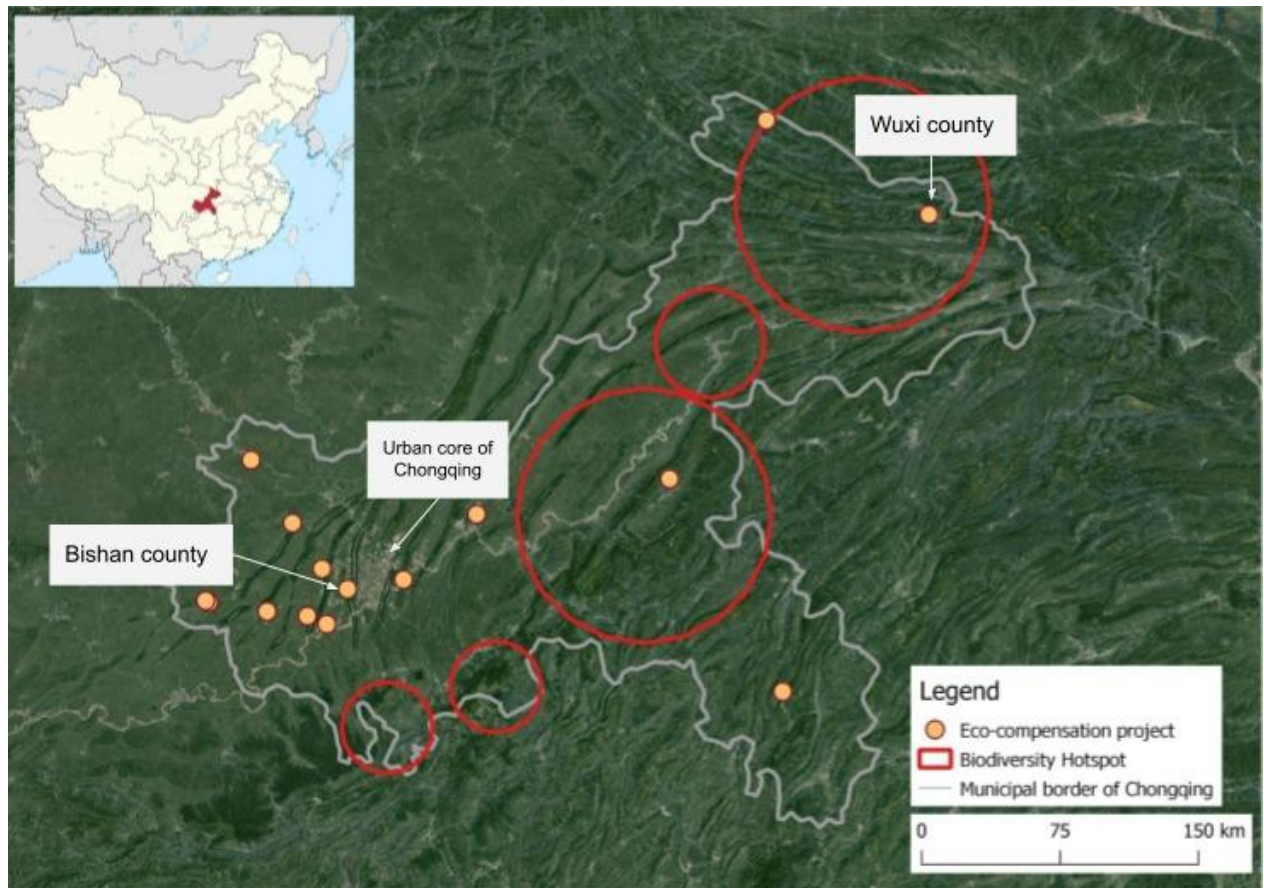
Source: Chongqing Municipal People's Government (2020).

In Chongqing's urban zoning, there are three categories for urban expansion around the urban center and two ecological conservation zones which cover over half of its territory (CHENG; XU; LI, 2022). The environmental zoning further foresees three categories of conservation control: general control (beige), key control (red), and priority conservation (green) which can be seen in Figure 8. On the one hand, this zoning limits the potential for significant expansion of green areas in the Western parts of the municipality allocated to urban occupation, especially those in the hilly landscape West of the center that are priority conservation zones. On the other hand, the conservation zones in the mountainous north and south East of its territory remain thinly settled, facilitating the expansion of protected areas around biodiversity hotspots through the possibilities provided by eco-compensation, transferable development rights (dipiao 地票) within its municipal borders (CHEN; YU; CHOGUILL, 2020). This would help the municipality of 82

km² achieve its ambitious goal of raising forest cover to 55% and complying with the national goals while allowing for urban growth in the Western regions.

Even though Chongqing already has a population of over 32 million, most of it still formally resides in its rural areas, holding rural household registration (hukou 户口). As an important source of migrant workers, the municipality has set out to liberalize this system much more rapidly than elsewhere in the country - however with mixed results (HU, 2022). A study by Thünken (2020, p. 326) found that “[new] urbanites hold onto their land use rights, hence land will not be freed up for other uses, be it urban construction or for farming. This could create problems in regard to food supply and national food self-sufficiency.” Based on her fieldwork, Lord (2021, p. 1699) affirms that “environmental projects often build on difference and fuel uneven development”.

FIGURE 12 – Biodiversity hotspots and selection of urban and rural compensation projects
Illustration by the author based on Chen et al., 2010 and author’s mapping of local policies



One of the limited urban districts to which this may apply in Chongqing, is Bishan (璧山区) at the Western outskirts of the city's urban core (Figure 9). After a period of GDP growth rates that exceeded the municipal average of 14% between 2009 and 2017 (BAO; LI; LIZIERI, 2019), Bishan's growth rate was still at 4.8% in 2020 (YU et al., 2022). It now has ten priority protection zones covering 25.9% of its territory (CHONGQING MUNICIPAL PEOPLE'S GOVERNMENT, 2020), has implemented its river chief system, publicly naming the officials responsible for different environmental areas (BISHAN DISTRICT PEOPLE'S GOVERNMENT, 2022; YU et al., 2022). Bishan's initiatives to put Eco-Civilization into concrete policies include the definition of ecological redlines, the delineation of new protected areas, more efficiency in resource consumption and use, the implementation of green accounting, waste disposal strategies and environmental education campaigns (YU et al., 2022).

In their monthly analyses of the CPC mouthpiece People's Daily, the China Media Project (CMP, 2022) finds an increase in the use of language that signals loyalty (biaotai 表态) to the central government. These can also be found increasingly in speeches of local politicians and communication vehicles like popular newspapers. One of Bishan district's appointed river chiefs, for example, stressed the importance of denouncing environmental pollution as "Bishan has put ecology and green development as its top priority" (BISHAN DISTRICT PEOPLE'S GOVERNMENT, 2022). By referring to "the most important foundations of Chinese sustainable development" (CHONGQING MORNING NEWS, 2021) as encapsulated in "Xi Jinping thought on the Construction of an Ecological Civilization" (LIN, 2021) local cadres stress their loyalty to following central government directives in their policy initiatives.

Forestry, the most common eco-compensation (ADB, 2022), plays an increasingly critical role in this endeavor, also as an important means of climate change mitigation (AN, 2021; WEINS et al., 2022). Thus, as higher level policy goals are raised in this direction, urban districts are also demanded to further their commitments to green development. Following a 2021 agreement with Wuxi county (巫溪县), situated at a distance of 380 km in the northeast of Chongqing, Bishan agreed to pay an annual 37.5 million yuan (5 million Euros) to the rural district for maintaining an area of 10 km² of forest

area (PEOPLE'S DAILY, 2020). The binding character of the agreement with Wuxi and the "monthly checkups for yearly pay" (BISHAN DISTRICT PEOPLE'S GOVERNMENT, 2022) give the urban Bishan district considerable leeway in the control of other districts' land use.

4. Discussion: from red to green Chongqing?

This article set out to discuss the importance of cities in China's quest to become an Eco-Civilization until 2049. Since the wave of decentralization in the late 1990s and early 2000s, cities around the world and in China have come to play an increasing role as political actors (CHUNG; LAM, 2004). At the same time, environmental issues have become a central theme in which the urban agenda advances significantly more rapidly than at the national level (HARDOY; MITLIN; SATTERTHWAITE, 2001; BARBI; FERREIRA, 2017). Sociologist Ulrich Beck (2016) suggested that as global environmental risks increase, a kind of "emancipatory catastrophism" would position cities as "cosmopolitan actors," giving them a key role in the reorientation of politics around climate change issues as cooperation beyond the nation state is required. While there is an increasing amount of evidence for such developments (BARBI; MACEDO, 2019), this prediction based initially on Eurocentric observations (BECK; GRANDE, 2010) applies only to a certain degree to Chinese cities, as the case of Chongqing shows. We reviewed recent literature on China's political-administrative and economic organization in relation to its cities (CHUNG, 1999; FITZGERALD, 2002; CHEN, 2014; CARTIER, 2015; HIDALGO MARTÍNEZ; CARTIER, 2017). The work of Carolyn Cartier and her colleagues on cities and their territorial organization provide a critical analysis of the categories and terms in their original language. Such work based on primary sources is essential to understanding the nuances of Chinese political organization and it still lacks attention in global and especially Brazilian political science literature.

Cartier and Tomba suggested (2012, p. 35) that we would see Chongqing turn from "Red to Green". Indeed, since its infamous period from 2007-2012 as a model for "red" policies among the new left of the CPC, Chongqing has had to adapt this orientation to the ideals of "green" development represented in Xi Jinping's "Construction of an

Ecological Civilization”. Since Xi Jinping Thought¹³ (xi jinping sixiang 习近平思想) has been written into the CPC constitution in a historical adoption of a leader’s ideology that has previously only been given to Mao and Deng, the New Era of Socialism with Chinese Characteristics associated to his rule promises profound changes in the country’s ideological orientation (JOHNSON, 2022; JONES, 2022). In the face of stronger nationalism, local cadres seem better advised to follow Xi Jinping’s “important instructions” (zhongyao zhibiao 重要指示) and not embark on any opposing adventures that may catch the attention as much as secretary Bo Xilai’s Chongqing Model (CMP, 2022).

We aim to discuss the implications of the unique political structure of this municipality for its environmental policies. Having explored the Chinese historical-administrative context and questions about issues of municipal autonomy and links and contradictions with the category of municipality under direct control of the central government, we return to the questions of local autonomy in policy experiments. Within the central government project of Constructing an Eco-Civilization, could Chongqing become a leading model that spreads central CPC ideas to the Western region or does its administrative status give it enough power over balancing its local interests and needs with Beijing's?

At least as a regional development model, we argue here that Chongqing does maintain a leading role for the interiorization of central policies such as Eco-Civilization. In the current political climate, its approach may even find more followers in the country’s Western region. As one of China’s key localities, the Chongqing government is usually represented in the Politburo, the country’s most important decision making body. Chongqing’s Party Secretary Chen Min’er (陈敏尔), a “Politburo veteran” (EVANS; WANG, 2022) therefore continues to have a “direct line to the central authorities” (LAFARGUETTE, 2011, p. 64) which gives him considerable leeway in adopting innovative policies and greater freedom in raising and disbursing funds. During its

¹³ Shortened at the 20th Party Congress in 2022 from “Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era” (xi jinping xinshidai zhongguo tese shehui zhuyi sixiang 习近平新时代中国特色社会主义思想).

Chongqing Experiment, local elites tested grounds for several policies beyond state and market solutions (referred to as the “Third Hand”) like the radical prioritization of social housing and unconventional policies for rural-urban migration. However, due to the city’s “constraints and particularities [...] it would be risky to see it as a model for the rest of China” (LAFARGUETTE, 2011, p. 64).

While the autonomous experiments of the Chongqing model may be over, the emphasis on the balance of social factors such as trust, sense of community and social protection can still be found as priorities in the city’s current “urban renewal” policy (DU; DU; WANG, 2022). This may have translated over from the social policies during the Chongqing Model and which Xi Jinping - as a competing faction of the CPC – emphasized since his rise to power so as not to lose local and popular support in the context of high rural-urban inequality. As a pole for resettlements after the construction of the Three Gorges Dam and the recent liberalization of its hukou system, policy issues of migrant workers – largely still unaddressed at the national level – Chongqing may be able to translate some “red” elements from its past into its “green” future under Eco-Civilization and serve as a references to other Chinese cities (ROAST, 2019; DU; DU; WANG, 2022; HU, 2022).

The decision-making autonomy of municipalities under direct control by the central government generally remains in balance in line with their national importance. However, in the case studied here, especially as in the Chongqing model, there was too independent (extravagant and even radical) execution of such policy experiments. In the opinion of some observers this derailed the experiment and justified intervention by the central power. While this kind of intervention is facilitated by Chongqing's special status, it seems that the low de facto political representation of inland provinces until a few years ago also had a role to play (SAICH, 2010). Undoubtedly, its strategic location in the western development plan also makes it a vector for directing policy guidance (SUN; TANIGUCHI, 2015). Its integration into the Yangtze River Economic Belt and the China-Europe corridor further highlight its importance for the central government and explain why radical experimentation was not desired anymore.

While political organization in China is well explored in the literature, we see a lack of up-to-date studies on issues related to center-local relations, especially paying

attention to the current phase of recentralization (fang 放). With a degree of decentralization far above the Asian average, further exploration of the effects of recent reforms are needed, updating surveys such as Ramesh's on decentralization in Asia (2013). Important analytical contributions on reforms in domestic environmental policies are still rare in peer-reviewed literature (HART, 2019; HEGGELUND, 2021). Kostka and Nahm (2017) suggested that in its current configuration the system may encourage "selective implementation" of national initiatives and cause local governments to focus their efforts on the goals they consider to be the implicit priorities of their superiors, and, most likely, sidelining inconvenient environmental reforms. Eaton and Kostka's (2014) considerations about the level of cadres in relation to their short terms of office stresses dimensions of the political-administrative system that could not be taken into account here, but which contributed significantly to a better understanding of local mechanisms in complex analyses of center-local relations in China. With its special emphasis on the issue of solving concrete challenges at the local level, and the difficulty of meeting goals at higher levels of governance, Ran Ran's (2017) research on the politics of blame in Chinese environmental governance provides excellent structural explanations. This could cause a "false recognition of policy performance" which means (in reference to the quote from Xi, 2017a) that cadres will only "want golden and silver mountains, not wanting clean water and green mountains" (zhiyao jinshan yinshan, buyao lüshui qing shan 只要金山银山,不要绿水青山) under the umbrella of Eco-Civilization.

Overall, the case of Chongqing is still greatly understudied in various aspects ranging from economic, political, cultural and environmental issues (KANAI; GRANT; JIANU, 2018). There are noteworthy and comprehensive contributions such as those by Hong Lijian (1999; 2004), Sun Yanwei and Yoji Taniguchi (2015), which show the historical continuity of Chongqing in its oscillating economic and industrial development. Briefly after its demise in 2012, studies on the Chongqing Model showed encouraging diversity. In relation to urban development, there is little research that manages to account for political and sociological connections. Roast's work (2019; 2020) provides rich reflections on the implications of urban development within narrower individual settings and the wider macro-political landscape. The contradictions of the Chongqingnese model

between rapid modernization and urbanization become evident in contrast to agricultural realities, in migratory dynamics, and the (re)development of the municipality to an industrial base. Major challenges in central-local relations under the Eco-Civilization policies lie in variables that can only be uncovered through fieldwork – a research method that has been practically impossible for non-Chinese researchers since the outbreak of the Covid-19 pandemic in 2020.

More attention needs to be paid to the spatial implications of five-year plans that are already much more than mere text documents on strategic industrial development (LI, 2011). Seeing the trend of recentralization in combination with the recent 14th five-year plan shows more and more tools of spatial regulation. Expanding on its former role in the “Development of the West” strategy, Chongqing may turn out to be a faithful ally of the central government in the Southwestern regions for nationally implementing Eco-Civilization standards. We argue here that the particular direct intervention facilitated through the governance mode of municipalities under direct control by the central government will help the diffusion of central power. Lim and Horesh (2017) suggest that the CPC’s attempt to share greater power and benefits (*fangquan rangli* 放权让利) in the 2000s generated a positive feedback loop: localized initiatives stretch centrally defined parameters, reinforce inter-regional variations, and consequently improve central control. Lately, this regulatory approach has again come to define what Deng’s administration called “feeling the stones as you cross the river” (*mozhe shitou guohe* 摸着石头过河). In the year of the 20th People’s Congress however, this pragmatic “crossing of the river” appears to have a particular focus on strong environmental regulations and an emphasis on the importance of Xi Jinping’s thought and the leadership role of the central government, showing less and less room for local experimentation.

This calls into question what kind of green transformation is seen in Chongqing and in China more broadly. A decade ago, when China started to institutionalize environmental issues and investments more broadly, a more liberal and cosmopolitan approach for its cities seemed to emerge as climate change became a more global issue (FERREIRA; BARBI, 2016). Tyfield (2016, p. 307) argues that while a possibility for “Chinese (neo-Confucian) cosmopolitanism” existed, it has to take into account the

“power-relational landscape of a specific domain of cosmopolitized socio-technical change so as to assist active participation of diverse parties, and not just given dominant agencies, in the construction of emerging futures.” Under the vastly different geopolitical circumstances before the outbreak of the pandemic in 2020, the author saw the risk of frustrating such theoretical endeavors of “Confucian cosmopolitanism and ecological civilization” as the “constitutively un-cosmopolitan project of Chinese civilizational nationalism under authoritarian CPC leadership” (TYFIELD, 2016, p. 307) jeopardize such expectations for bottom-up and multi-stakeholder construction of urban environmental agendas. Chongqing’s green transformation seems to be rather motivated by performance legitimacy anchored in its commitments to Zero-Carbon goals (TENG; WANG, 2021).

The case of Chongqing further illustrates a central issue in the environmental critique of economic policies: growth. While GDP has taken a less prominent role in policy discourse, it is still a constitutive element of Eco-Civilization (HANSEN et al., 2018). Environmental interventions such as ecological restoration and forestry projects “form a fundamental pillar in the country’s dual carbon targets” (WEINS et al., 2022, p. 2). With huge potentials for carbon mitigation, especially in forests in remote areas, the rapidly growing Chinese carbon markets need to secure untapped sinks beyond easily accessible large-scale projects for which protected areas like those in Chongqing’s huge municipal territory will be key. If the reliance on isolated “model character” projects and technical solutions continues without tackling distributional issues and degrowth, Eco-Civilization will only turn into a beacon of green capitalism (KOTHARI; DEMARIA; ACOSTA, 2014). Furthermore, with its innovative use of EMC and high tree planting ambitions, Chongqing could plead its allegiance with Beijing – in ways historian Larissa Pitts (2019) suggested as a “unity in the trees” – revealing the deeply political intertwinements of local environmental politics with central policies. Recent evidence suggests that while strict management policies like “ecological redlines” are important, these areas will need to be expanded to reach environmental targets (ZHU; HASHIMOTO, 2021). Depending on global leaders’ commitments at the 15th COP of the Convention on Biological Diversity

under China's presidency, an ambitious "30x30 goal¹⁴" could be adopted, making land use and conservation a more central policy priority. For this, a wider implementation of Nature-based Solutions (NbS) will be necessary. Chongqing's urban renewal strategy (Chongqing chengshi gengxin 重庆城市更新) is among ten national model cases of "NbS with Chinese characteristics" presented by the Ministry of Natural Resources after the launch of a Mandarin version of the global standard by the International Union for Conservation of Nature (IUCN) (SOHU, 2021). The Chongqing case has already pointed towards the importance of inclusion in NbS interventions (XIANG; WANG; DENG, 2017). However, some authors argue that the CPC's use of such a NbS rhetoric domestically has only "grafted the [...] concept onto existing environmental policies with no substantial changes to practices or outcomes" (QI; DAUVERGNE, 2022b, p. 2).

5. Conclusion

As environmental problems are institutionalized as increasingly central policy issues, cities – often the prime emitters – have come to play a central role in implementing solutions to the climate crisis. However, cities are not merely demanders for mitigation but also political actors in pioneering policies and experimenting with innovative arrangements that would not be possible at the national level. China's case challenges some assumptions about liberal democratic political organization as the norm. The country's centralized but multi-layered governance system has produced categories that are not comparable with many other countries.

The case presented here highlights Chongqing's role as a political entity that, in times of decentralization, was allowed to follow radical social policies and now, under recentralization of power to Beijing is turning into a vassal of the central government. This recentralization coincides with increasing political attention to environmental issues which aids in the territorialization of its new Eco-Civilization doctrine. While a certain "greening" of the Chongqing Model is taking place, we argue that the reasons for this development do not necessarily lie in local motivations but are rather external, as local cadres align their priorities with CPC language. However, there seems to be some evidence of a focus

¹⁴ The goal for the CBD/COP15 foresees the conservation of 30% of land area by 2030, creating a biodiversity goal similar to the 1.5C goal in the UNFCCC.

on elements that have made it over from the Chongqing model (or even pre-date it) that stress social factors and that are being expressed in local environmental policies. As such, theoretical predictions about cities like Chongqing as independent actors to advance sustainability agendas does not apply.

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早发白帝城 (zaofa baidi cheng), is a poem written by famous Tang Dynasty writer Li Bai (李白) in the spring of 759 in Kuizhou (夔州), present day Chongqing



Source: Sohu (2017). Available in:
https://www.sohu.com/a/206041389_648975

早发白帝城
朝辞白帝彩云间,
千里江陵一日还。
两岸猿声啼不住,
轻舟已过万重山。
李白

4. ECOLOGICAL COMPENSATION MECHANISMS IN CHINA'S SOUTHWEST: AN AUTOMATED TOPIC MODEL ANALYSIS TO DISENTANGLE "CHINESE CHARACTERISTICS" OF PAYMENTS FOR ECOSYSTEM SERVICES¹⁵

ABSTRACT

Ecosystem Services (ES) have been widely incorporated into Chinese environmental governance through valuation and the recognition of widespread ecological risks under the "Ecological Civilization" paradigm. New environmental governance arrangements are facilitated through integrated systems of horizontal compensation between distant districts to provide development rights for ongoing urbanization processes. These most often involve forestry as a multi-dimensional climate-friendly solution. We conducted a machine-assisted analysis of scientific publications (theses and articles), policy documents and news coverage from the Chinese National Knowledge Infrastructure (CNKI) dealing with Chongqing's eco-compensation mechanisms to explore which contexts eco-compensations are applied in and which policies they are accompanied by. The analysis, following the methodology proposed by Schadeberg et al. (2023), provides a broad overview of the contents of 181 documents on eco-compensations in Chongqing and the connections between different aspects of the topic. The results show that, while eco-compensations in Chongqing are most frequently linked to eco-development issues, related topics like water resource management, tourism and agricultural practices may need more exploration. For instance, the conversion of arable land is an important topic, as conserved areas compete with infrastructure development zones and urbanization in a frontier region that still expects considerable consolidation of its urban population. We take this as an indicator for the importance and increased reliance of China's still growing Western metropolises as a frontier of debates about a new "green" development mode in line with the central government's vision for an Eco-Civilization. This study is the first to apply automated text analysis to explore eco-compensation policies in Chongqing, a rapidly urbanizing megacity in Southwest China. It reveals the complex trade-offs and challenges of balancing ecological conservation and economic development in a frontier region under the Eco-Civilization paradigm. Our descriptive document analysis and automated analysis provide a base for further exploration and field research to explore several aspects that have been opened with this article.

Keywords: Ecosystem services; Ecological civilization; Conservation; Development, ecotourism.

¹⁵ This chapter is based on a data analysis conducted by Amanda Schadeberg and is currently being finalized as an article in co-authorship with A. Schadeberg and A. Zhu.

1. Introduction

The recognition of the importance of Nature's Contributions to People, commonly referred to as Ecosystem Services (ES) has made cities important demanders for benefits such as carbon sequestration and storage, air filtration and water infiltration (KROLL et al., 2012; WU; KONG; JIN, 2019; WU et al., 2019). Payments for ES (PES) and ecological compensation mechanisms (ECM), as they are widely labelled in China (YU et al., 2020), involve not only the protection of existing forests but also investments in planting new trees. Since the country has started heavily catching up with its environmental policies, China has conquered the number one spot for countries planting trees to combat climate change, fundamentally changing the way environmental politics are carried out (BENNETT, 2009; DELANG; YUAN, 2015; FAO; UNEP, 2020; YU et al., 2020). Those practices are not only important in Chinese policy, but increasingly have implications for global environmental governance (ZHU, 2022).

Since the announcement of its dual-carbon goal – a carbon-peak by 2030 and carbon-neutrality by 2060 – compensation has played a much bigger role (TENG; WANG, 2021). The government's push for more ambitious targets is evidenced by recent announcements that peak carbon could be reached as early as 2027 (LIU, 2021). The phenomenon of tree-planting represents, like few others, the archetype of human intervention in the Anthropocene (REYNOLDS, 2021). However, while the conversion of sub-utilized slope lands and deserts into forests or farmlands has great potential for mitigating the effects of climate change, it also poses complex risks (ANDEREGG et al., 2020; CHEN et al., 2015).

In China, all this is being framed under the umbrella paradigm of “Constructing an Ecological Civilization” that nowadays frames all things environmental from carbon markets and national parks, to research calls and local policies throughout the country. As a “Chinese concept of sustainable development” (GORON, 2018), it claims a distinct approach to human-nature relations that expressly does not aspire to be a “green industrial civilization” but rather a new stage in the development of Chinese socialism (ZHANG, 2021). Chinese authors, like the concept's political creator Pan Jiahua (2016) and political theorists like Liu Xiaoying (2013, p. 185) affirm that Eco-Civilization is “built on a positive foundation of the cycles of the ecosystem” and carefully situates human-

nature relations in Chinese culture as having always been ecocentric (HANSEN; LI; SVARVERUD, 2018). Regardless of the critiques, the concept is already shaping China's "pathways to sustainability" in a way that differs from the global context (GEALL; ELY, 2018). As part of the "Western development strategy" in the Communist Party of China's (CPC) 9th Five-Year-Plan, the compensation for ES to their impoverished providers is crucial and plays a wider role in the country's national development strategy (ZHANG, 2021).

The topic of PES and ECM is especially relevant when it comes to China's Western region, where many cities continue to grow at high rates and still manage to structurally adjust development patterns in their urbanization trajectories (GUAN et al., 2018). While cities on the East coast have already started to implement population limits, the Southwestern metropolis of Chongqing is also unique in its governance structure as a city-province under direct control of the central government (*zhixiashi* 直辖市), which makes its policy experiments and adoption processes unique. In this article we explore the topics linked to different dimensions of development in the implementation of compensation mechanisms involving PES in Chongqing. First, we present a brief discussion about PES in China and then conduct a directed topic analysis of 181 scientific, policy and news documents to analyze which different policy dimensions are being taken into account.

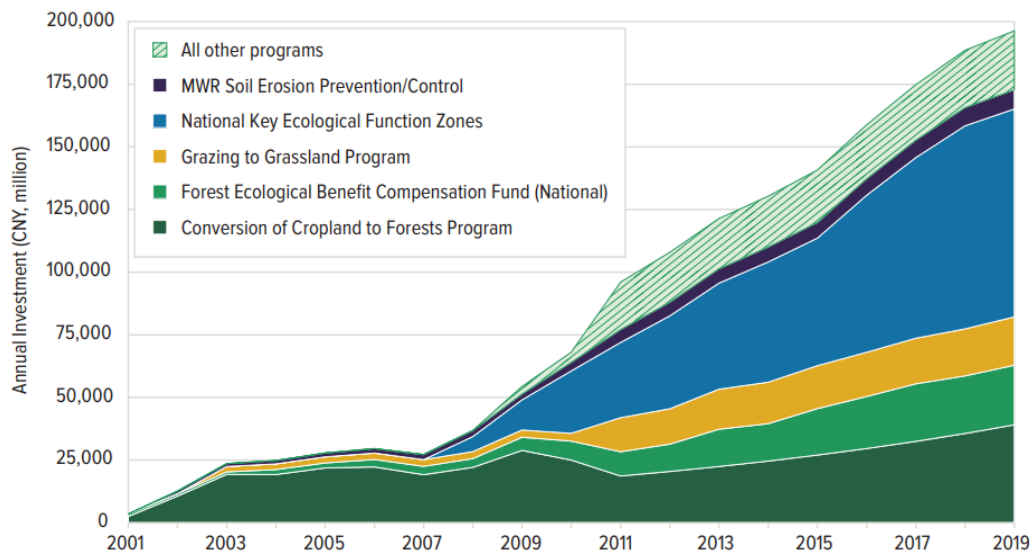
2. Eco-compensation at the frontier of an Eco-Civilization

Despite great progress in terms of the restoration of degraded ecosystems and the provision of ES critical to rural livelihoods, there are critiques in the literature about China's sustainability and protected area programs having had limited contributions to the conservation of biodiversity (JIANG et al., 2019; WU et al., 2019; YIN; WANG; LIU, 2021; ZHANG et al., 2017). A successful example, however, is PES, a mechanism which has been growing in China like in few other countries (ADB, 2016; YU et al., 2020). Its initial uptake in research and policy two decades ago mostly emphasized provisioning and regulating services but has been embedded with other social aspects and policies (JIANG, 2017). While both the terms PES and ecological compensation are used in the international literature led by Chinese authors, within China "eco-compensations"

(*shengtai buchang* 生态补偿) has been far more common. This broader label combines the market rhetoric of PES with strong state interventions and coordination. For not being purely market-driven but also embedded into wider public policies, there have been experiments, e.g. with horizontal (cross-border) eco-compensation among municipalities and districts which present an interesting case for the theoretical problem of internalizing environmental externalities territorially (SHENG; QIU; HAN, 2020).

Since the end of the 1990s, the Chinese government has been rolling out the national Grain for Green (GfG) program which is now the world's largest ecological restoration and rural development program (DELANG; YUAN, 2015). While compensation mechanisms are being implemented, making use of eco-compensation on a huge scale, ever stricter conservation policies are being rolled out and increasing pressures on land (HU et al., 2021). Recent policy initiatives for conservation like the delineation of ecological redlines and the system of national parks, are part of a national strategy that aims to raise the percentage of protected areas (CHEN; LI, 2023; HE et al., 2018; JIANG et al., 2019; XU et al., 2018). While conservation areas have grown in number and size though, controversial discussions about land use for food security are reemerging, particularly after the experience of municipal and national lockdowns during the Covid-19 pandemic (KONG, 2014; LUGO-MORIN, 2020; YAO et al., 2020).

FIGURE 1 – Annual investments by China's eco-compensation programs



Source: World Bank (2022).

Eco-compensation programs in China have skyrocketed since the late 2000s when the Communist Party of China (CPC) adopted its Ecological Civilization doctrine as a development objective until 2049. A recent report by the World Bank (2022) compiled the different programs that incorporate eco-compensation and points towards a clear diversification of areas in which compensation is being utilized. While forestry has been the major category from the start, cross-border and watershed protection programs have increased significantly over the past ten years. Compensation for the provision of highly demanded ES is being recognized increasingly as indispensable for economic development and quality of life. While new policies like the National Key Ecological Function Zones are receiving more investments overall, the Conversion of Cropland to Forests Program, also known as Grain for Green (GfG), is the longest standing program that makes use of ECMs (Figure 1). As this analysis shows, it continues to direct the scientific debates about how compensation should be executed.

As the country continues to urbanize at record rates, its border regions rely on continued growth (RODENBIKER, 2019). Big urban agglomerations like Shanghai, Beijing and Guangzhou are reaching capacity and setting restrictions to internal migration to manage their urban and environmental challenges (ZHANG; YU; CEN, 2019). The Chengdu-Chongqing agglomeration in Southwestern China plays an important role in both the domestic Yangtze River Economic Belt and the expansion of the Belt and Road Initiative to Southeast Asia and the Western regions (particularly Tibet and Xinjiang). Chongqing, is an understudied city in urban globalization research (KANAI; GRANT; JIANU, 2018) and represents an instigating case of the evolution of eco-compensation in China's national development and urbanization strategies. At almost the size of Austria (82,400 km²), the municipality under direct control of the central government has sustained fast economic development over the past 20 years while also emphasizing urban-rural integration (BAO; LI; LIZIERI, 2019). An important reason for this is the strategy to become a logistics, rail and civil aviation hub. The impressively rapid expansion of its public infrastructure network between 2007 and 2017 accounted for 25% of its GDP (BAO; LI; LIZIERI, 2019, p. 165). Chongqing is currently the only province in China with a worsening water-economic performance, presenting a 19% fall in water use per RMB10,000 GDP but an 8% increase in wastewater discharge for the unit. This was because its total

wastewater discharge increased by 34% from 1.5 billion tons in 2015 to 2.0 billion tons in 2017 (HU; TAN; XU, 2019).

At the same time, within the GfG program, an action plan for Priority Green Development (2018–2020) foresaw a total of 17 million acres (ca. 70 km²) of forest plantation to increase Chongqing's forest coverage rate to 55% by 2022 (CCICED, 2022, p. 201). ECMs are a key tool to finance less developed districts' forestry endeavors and change their economic and emissions structures. A study using ecological network analysis by Zheng et al. (2021) has shown how structural changes in Chongqing have affected carbon emissions in the multiscale economies of its surroundings and Chen et al. (2020) point out how this has had drastic effects on the environmental carrying capacity under the evolution of land use. Furthermore, demands for further infrastructure development enter in conflict with the newly prioritized conservation initiatives (CHEN et al., 2022).

The above mentioned conservation redlines constitute an intricate example in Chongqing. A study by the Hong Kong based NGO Crossborder Environment Concern Association (WEI, 2020) found that the conflict between infrastructure expansion and conservation areas led to the highest amount of infringements of the defined redlines of any province in China. Even with suitable compensation, this data calls for a closer investigation of the justifications for the application of such measures in Chongqing.

3. Data & methods

We conducted an automated content analysis to identify the main topics present in the discussion about eco-compensation in Chongqing. As data source we used the Chinese National Knowledge Infrastructure (CNKI¹⁶), the Chinese equivalent to Web of Science or Scopus with the terms “Chongqing ecological compensation” (chongqing shengtai buchang 重庆生态补偿). From the search conducted in November 2020, we obtained 120 documents, from which duplicates and documents with no mention of Chongqing or eco-compensation were excluded. We then complemented this corpus with

¹⁶ CNKI (Zhongguo zhiwang 中国知网) is the de facto monopoly company composing journal searches in China.

relevant policy documents from the author's archive and central and local government websites. The final analysis of a total of 181 documents included 117 scientific (MA and PhD theses, peer-reviewed journal articles), 30 news documents listed in CNKI as well as 34 policy documents and development plans related to eco-compensations in Chongqing.

The dataset contained documents published between 2004-2022 with a total of 2,096,504 tokenized words that we extracted from the 181 documents. The smallest contained 247 (text126) and the biggest 129,570 words (text81). After standardization and cleaning the documents ranged from 210 (text126) to 90,705 words (text81). We used the R package *tm* (version 0.7-8) to remove common stopwords from the corpus which reduced the total amount of words in our dataset to 1,541,865. We used the methodology proposed by Schadeberg et al. (2023) and adopted it for Chinese language contents. As the software packages are generally programmed for alphabet-based languages, the specifics of using them for Mandarin posed some additional challenges (WELBERS; VAN ATTEVELDT; BENOIT, 2017).

We separated the document sources into three main categories: scientific, policy and news. Among the 117 scientific documents, there were 71 peer-reviewed articles and 46 theses. Besides three local universities (Southwestern 西南大学, Chongqing University 重庆大学 and the Chongqing Municipal Party School 中共重庆市委党校), theses also came from Zhongnan University of Economics and Law, China University of Geosciences, China University of Political Science and Law, Chinese Academy of Forestry, Minzu (Ethnic Minority) University of China, Beijing Forestry University and Huazhong Agricultural University.

The 33 policy documents include central and local policies, ranging from plans (规划 and 方案), communiqués (公报), statements (意见) to notifications (通知) on implementation. Besides the Central Government (中共中央) and the State Council (国务院), the policy documents were issued by the Ministry of Environment (环境保护部), the Ministry of Land and Resources (国土资源部) and the Chongqing Municipal Government

(重庆市政府). The covered topics include mostly environmental protection regulations, agricultural reform and urbanization issues.

The 31 news items that are registered in the CNKI database were mostly published in local Chongqing newspapers, like the Chongqing Daily (重庆日报), or central government news agencies, like the People's Daily (人民日报) or Xinhua (新华网). The news sources often focus on specific examples of eco-compensation projects in Chongqing and present exemplary cases of advances in the “deeping” of market reforms and the implementation of environmental policies in the spirit of Eco-Civilization.

The automatic content analysis suggested an optimum at either four or 13 distinct topics (T) through a Latent Dirichlet Analysis (LDA) Tuning Plot (see Appendix 1). In order to allow for the consideration of more refined categories, we opted for 13T to enable a broader range of topics and keywords to show their representation, relation and impact in the dataset.

4. Results

The analysis conducted here showed that most of the analyzed material centers around the two central topics of territorial economic development and the governance of eco-compensation mechanisms. The language of Eco-Civilization plays a central role in the documents. For instance, references to President Xi's speech “lucid waters and lush mountains are invaluable assets” (绿水青山就是金山银山) are common throughout the data and are especially present in the news items that work as a form of discursive coupling of local projects to the national imaginary of Eco-Civilization (SCHMITT, 2016). For instance, an image-rich article on the front page of the Chongqing Daily from January 2020 (Figure 2) affirms that Chongqing's "green water and green mountains" are gradually becoming "golden mountains and silver mountains" in its “strive to build an important ecological barrier in the upper reaches of the Yangtze River” (CHONGQING DAILY, 2020).

FIGURE 2 – Images from Chongqing Daily coverage

Source: Chongqing Daily (2020).

These images evoke a utopian vision of scenic beauty, agricultural production and human care for nature in which children and a happy rural population living in harmony with nature are shown as examples of how to realize the CPC's vision for Eco-Civilization. These images are often produced with popularizable scientific facts and laden with policy messages, as Hansen; Li and Svarverud, (2018) show in their critical analysis of the sociotechnical imaginary of Eco-Civilization. These three topics are recurring in the analyzed data, as the word cloud, topic model and a contextualized analysis of these topics show below.

4.1 Word cloud

When analyzing the roughly 1.5 million character dataset, “ecological development” is the central topic. Figure 3 shows the 100 most recurring terms with a minimum of 1,000 appearances in the data and within seven automatically generated color-coded categories. The central grey pattern holds the two terms ecological (shengtai 生态) and development (fazhan 发展) which are at the heart of the ECM debate in Chongqing. Around it lie the three terms compensation (buchang 补偿), eco-compensation (shengtai 生态补偿) and economy/economic (jingji 经济) in beige, as well as the three terms environment(al) (huanjing 环境), area/territory (diqu 地区) and research (yanjiu 研究) in green. Around the center, there is a more complex purple pattern that centers around seven terms that could be described under the category of resource governance and growth (clockwise): area (quyu 区域), construction (jianshe 建设),

government (zhengfu 政府), arable land (gengdi 耕地), protection (baohu 保护), advance/execute (jinxing 进行) and resources (ziyuan 资源).

FIGURE 3 – Word cloud containing 100 central terms with a minimum occurrence of 1.000 times



The second most comprehensive category (blue) contains seventeen terms that can be broadly linked to national-scale environmental issues and their solutions. Under this category, there are three main topics: China (zhongguo 中国, woguo 我国, guojia 国家), environmental problems (e.g. liuyu 流域, senlin 森林, shengtai huanjing 生态环境, wenti 问题) and their solution (e.g. tuigeng huanlin 退耕还林, biao zhun 标准, jiazhi 价值, jizhi 机制, fenxi 分析). The largest category in the word cloud (orange) contains 63 different terms which can be broadly categorized into four umbrella topics: 1) local conditions (difang 地方, chongqing 重庆, shengtai xitong 生态系统, nongcun qingkuang 农村情况, shui ziyuan 水资源, wuran 污染), 2) techniques and actions (moxing 模型, shixian 实现, fangshi 方式, guanli 管理, xietiao 协调, huanjing baohu 环境保护, tigong 提供, lüyou 旅游), 3) finance (shichang 市场, jiaoyi 交易, chengben 成本, zijin 资金) and 4) political aspects (guihua 规划, falü 法律, wanshan 完善, kaifa

开发, zhili 治理, guanxi 关系). There is also an outlier category (turquoise) with eight terms that do not show any clear relations to the other categories in the data: process (guocheng 过程), circumstances (qingkuang 情况), surface (mianji 面积), model (moxing 模型), industry (gongye 工业), ecological tourism (shengtai lüyou 生态旅游), work (gongzuo 工作) and cooperation (hezuo 合作).

The word cloud reflects the contents of the documents that focus on eco-compensation in Chongqing and helps to highlight the centrality of “ecological development” in the application of the policy in this context. Beyond the importance of economic factors in eco-compensations, the use of mechanistic language like the “construction” of forests as a political project is an aspect consistent with research into social aspects of conservation and environmental sociology in China (QIN et al., 2020; QIN; FLINT, 2010; RODENBIKER, 2019; WEINS et al., 2023).

4.2 Topic model

In order to get a better overview of semantic relations in the dataset, we opted for conducting an automated topic model. The Latent Dirichlet Analysis (LDA) Topic Model of the 181 analyzed documents suggests 13 topics (T, see appendix 1). We freely labeled the terms under the following headings based on the driving term in each topic to establish thematic coherence based on the 10 most common terms in each of them (see appendix 2/3 for details):

- T1 Water resource management
- T2 Governmental leadership in environmental governance
- T3 Economic development in the Southwest
- T4 Agricultural practices and problems
- T5 Compensation for conservation of arable land
- T6 Farmland and Grain for Green
- T7 Economic and eco-development in Chongqing
- T8 Ecological compensation
- T9 Ecological construction & development
- T10 Natural resources and Grain for Green

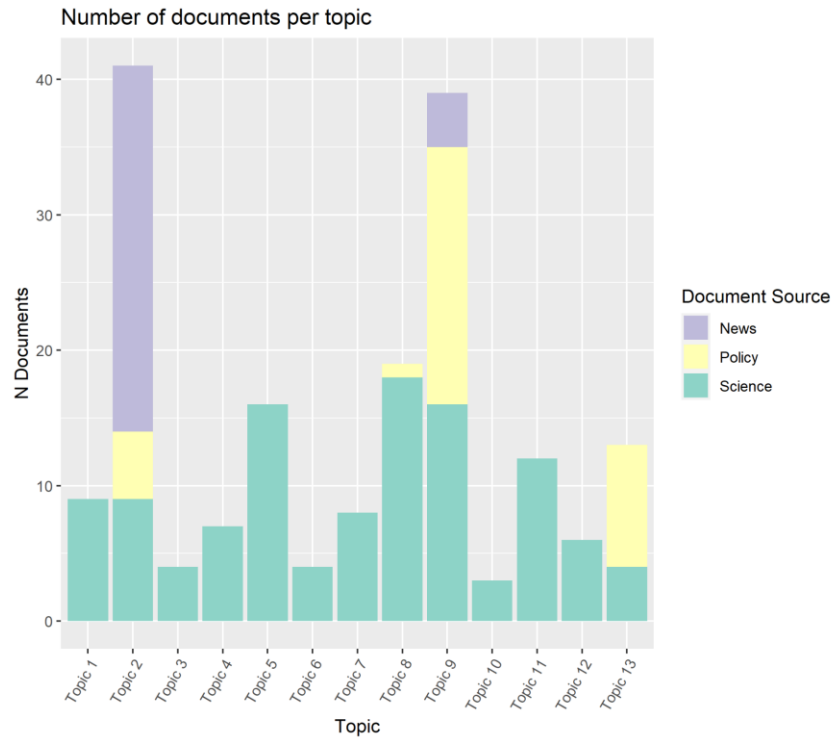
T11 Values of forests & arable land

T12 Ecotourism

T13 Villages & the “Retire-1-receive-2” policy

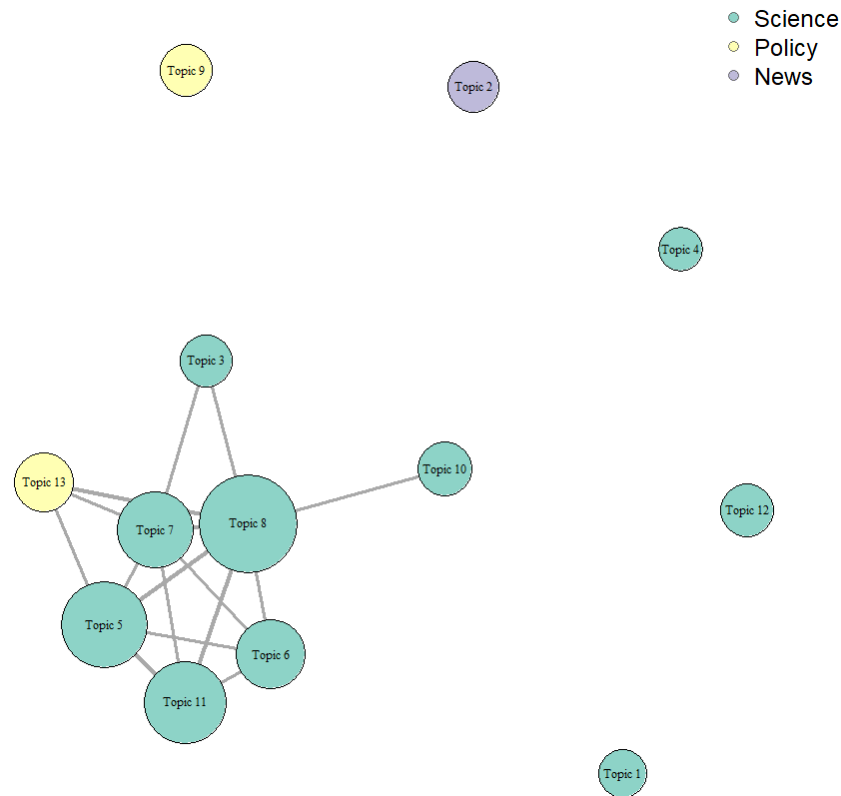
In each of the 13 categories, one to three keywords “drive” the topic’s composition, i.e. the specific meaning(s) contribute(s) to a coherent combination with the following 9 words. As expected, the most clear driving term in the dataset is “eco-compensation” with T8 showing the strongest coherence about this policy tool. Eco-compensation also appears among the most common connected terms in T11 which deals with values, T5 dealing with arable land, T6 on farmland in the GfG, as well as, to a lesser extent in T4 on agricultural practices and T2 on governmental leadership in environmental governance. The second strongest driving term in the data is the GfG (*tuigeng huanlin* 退耕还林) which is defining for T6 and T10 (Natural resources and GfG). Following this, the terms development (T3), tourism (T12) and villages (T13) define the data on eco-compensations in Chongqing.

For the visualization of the composition in terms of their dominant data sources (Figure 4) and the relations among the topics, a network of meaning (Figure 5) was created in R. Figure 4 clearly shows the presence of scientific documents (green) in all of the 13 generated categories which is due to their dominance in absolute numbers (65% of the dataset). Policy documents (yellow) which make up 18% of the dataset appear in four of the categories: T9 on Ecological construction and development, T13 on Villages & the “Retire-1-receive-2” policy, T2 on Governmental leadership in environmental governance and a small part of T8 on eco-compensation. With 17%, news documents make up the smallest part of the data, and are present only in T2 and T9 from which a clear emphasis of government institutions (T2) and the language of “construction” (T9) can be read. With around 40 documents each, those two categories are also the most extensive, followed by less than half the number of documents in the third-biggest category with 19 documents.

FIGURE 4 – Topic distribution per document source category

When laying out the topics in a semantic “network of meaning” (Figure 5), a cluster of five central, three closely connected and five outlier topics becomes visible. Inside of them, only one central topic is dominated by data from a different source than scientific data: T13 on the “Retire-1-Receive-2” policy¹⁷. As could be expected, T8 (eco-compensation) is the topic with the highest degree centrality of seven and T7 (eco-development in Chongqing) the second with six connections. With a total of five connections, T5 (Compensation for conservation of arable land) is the third most connected topic. With four connections T6 (Farmland and GfG) and T11 (Values of Forests & Arable land) are part of the central thematic nucleus of the network of meaning.

¹⁷ The terms two (*liang* 两) retire one (*yitui* 一退) in T13 are a shortening of the 6th and 7th most common terms in this topic and refer to the “Retire one, Receive two” policy (*yitui lianghuan* 一退两还). For more information on these policies see Jia (2011) and Huang (2008).

FIGURE 5 – Network of meaning

With three connections and as the only centrally connected topic composed mainly of policy documents, T13 deals with villages and the “Retire-1-Receive-2” policy (HUANG, 2008). With two (T3) and one (T10) connections to the central topics 8 and 7, Economic development in the Southwest (T3) and Natural resources and GfG (T10) show less connections within the analyzed text data.

Among the five outlier topics T4 (Agricultural practices and problems) and T1 (Water resource management) are made up of a relatively small amount of text and refer to specific environmental challenges described in their respective documents. Surprisingly among the outliers, the two most voluminous topics, T9 (Ecological Construction & Development) and T2 (Governmental leadership in environmental governance) hold the only topic made up mostly by news documents (T2) and the second biggest topic made up of policy documents. T12 is an interesting outlier that deals with the topic of Ecotourism. In the different configurations generated for this analysis, this topic also appears as central in a less complex LDA model of only 4, instead of 13 topics. This finding is surprising as

it did not appear in the consulted literature on eco-compensation policies. It can be explained by the diversification of functions used for ECM and the possibilities for economic growth that lie in ecotourism as opposed to traditional industrial development for the region.

5. Discussion

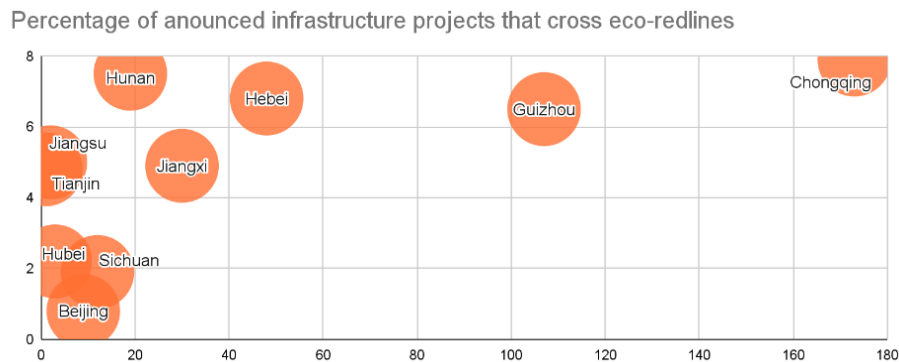
The above results provide an overview and structure of a rich body of literature on eco-compensations in Chongqing. Here we will discuss and contextualize these results in the literature on eco-compensations and environmental governance in China. We also want to situate the endeavors happening in Chongqing in the context of a greater “eco-restructuring” (ZHU; LO, 2022) taking place under Xi Jinping’s Eco-Civilization doctrine that situates sustainable or “eco-development” as the way forward in a region that on the one hand, holds important provisioning and regulatory ecosystem services and on the other needs to significantly raise overall development indicators according to the CPC’s Five Year Plans.

To solve such tensions, eco-compensations offer a possibility for achieving both market growth and environmental protection. However, these marketization trends have to be observed closely to understand whether or not they contribute to a genuine change in the logics associated with broader concepts of development and human-nature relations. For instance, Wang et al. (2017 *apud* QI; DAUVERGNE, 2022) pointed out that policies to move toward Eco-Civilization focus more on realizing and capitalizing upon the economic benefits of conservation and market mechanisms for ES, especially for tourism, agriculture, fisheries, and resource extraction industries. This is particularly important for environmental justice aspects like the role of peasant populations in EMCs, as historical dimensions and power relations in the production of ES, especially in the context of rapid urbanization, play a decisive role (BERBÉS-BLÁZQUEZ; GONZÁLEZ; PASCUAL, 2016; HAUSKNOST; GRIMA; SINGH, 2017; WEINS; SILVA; GADDA, 2018).

With the recently declared Kunming-Montreal goals of the Convention on Biological Diversity, area-based conservation will be at the heart of this dispute. Many of the notable efforts by local and national governments to reach higher percentages of protected areas have been facilitated by ECMs. However, as these mechanisms also

serve as policy support, it is worth pointing out that a growing part of the policy debates about conserved areas has been calling out the potential conflicts in terms of conservation land uses as food security is reemerging as a central topic in the times of isolationism, the pandemic and looming geopolitical rivalries and territorial disputes (KONG, 2014; LUGO-MORIN, 2020). In her commentary, Liu (2023) points out that the first policy statement this year (STATE COUNCIL OF THE PEOPLE'S REPUBLIC OF CHINA, 2023), has once again centered on food security and the three issues of agriculture, the countryside, and farmers which have been central issues since at least 2004. According to a publication in the Chinese Journal of Science (*Zhongguo kexue bao* 中国科学报) once China reaches its planned urbanization rate of 70% in 2030 the loss of high-quality arable land will be at around about 13,300 of its current total of 440,000 km² (TANG, 2020). Given this context, it is unsurprising that the central agglomeration in our model outcomes revolve around topics directly connected to arable land and farmland (T5, Compensation for conservation of arable land, T6 Farmland and GfG, T11 Values of Forests & Arable land). Arable land is an issue that is increasingly recognized as central in the eco-compensation debate, in particular in regions that are still under the spatialized influences of urbanization (LI et al., 2020).

FIGURE 6 – Development threatens China's nascent eco-redline system



Source: Wei (2020), compiled by Crossborder Environment Concern Association.

The rapid changes in land use from arable to urban is another aspect central to our case study of Chongqing. Land that is set aside for conservation, sustainable use or minimal human interference, also has to compete with areas for infrastructure

development. As Chongqing has had strong and steady growth rates due to its strategic position for the development of China's West, not all conservation redlines are possible to be met. In a dataset compiled from local departments of Ecology and Environment (see Figure 6), Wei (2020) pointed out how Chongqing and its southern neighboring province of Guizhou are the administrative units with the highest infringement rates of linear infrastructure projects on ecological redlines. No evidence could be found however, on the role of ECMs and their influence on compliance with this policy. The national importance of hotspots like the southwestern mountain ranges in achieving national goals for protected areas makes frontier territories like Chongqing a hotspot for possible tension as they are caught in between demands for sustained economic growth.

The most unexpected result that came from this analysis in both a prior 4-topic categorization and the final 13T distribution, is that ecotourism (T12) is strongly linked to eco-compensations in Chongqing. Ecotourism is on the rise globally but gets special significance in China in the late 2010s and even more with the Covid-19 pandemic in May 2020 when the country announced reorienting its economy to a system of “dual circulation” (*guonei guoji shuang xunhuan* 国内国际双循环) to be less vulnerable to external shocks, maintain capital flows within its borders and contribute to more equitable wealth distribution between Western and Eastern regions (YANG et al., 2022). The potential for ecotourism as an aspect of ECMs is hinted at in the data analyzed here. However, in a study of the political ecology of forestry Zhu and Lo (2022, p. 7) point out that “although eco-tourism was promoted as a key sector in the post-logging era, it has provided limited job opportunities and economic benefits thus far.” If compensation values were properly adjusted, ECMs may offer a part of the solution.

Another issue central to several of the 13 topics lies in issues related to water resource management. Besides T1 where “water resources” are the driving term, watersheds as a unit of analysis are also dealt with in T2 on Governmental leadership in environmental governance, T4 on Agricultural practices and problems, and T8 Ecological compensation. This is relevant especially for perspectives of ECMs in providing “financial support for ecological protection and water quality management, and provide incentives to align local government actions with overall basin goals” (World Bank, 2022, p. 63). Thereby, the strong connection to water resources which has been a central topic of

forestry and EMC since the first projects in the early 2000s (DELANG; YUAN, 2015; YU et al., 2020).

Consistent with the context, there is a strong overall focus on rural areas in Chongqing's ECMs. It appears clearly in T4 (Agricultural practices and problems), T6 (Farmland in Grain for Green) and T13 (Villages & the “Retire-1-receive-2” policy). As eco-compensation in a mountainous terrain like Chongqing’s focused first on retreating cropland on unproductive slopeland, specific problems arose which are dealt with in some of the analyzed documents. When it comes to rural and agricultural policy issues, T13 stands out as a topic based mostly on policy documents and connected to the central cluster in this dataset (see Figure 5).

In terms of the effects of ECM on ES and biodiversity conservation, Hua; Xu and Wilcove (2018) point to the challenge of not only converting agricultural land into new forests but also conserving the dwindling amount of native forests. With an understanding of the place of humans in ecology under Eco-Civilization that diverges from rather dominant concepts (WEINS et al., 2023), biodiversity conservation seems to be taking a backseat with no mentions of the term in the outputs of this analysis. While framings like ES facilitate the conveyance of the important values protected ecosystems provide (as discussed in T11), they also risk overly abstracting the complex interactions behind them and treat them as production input. This is in line with what Rodenbiker (2019, p. 235) called a “mechanistic approach to ecology” which he sees “embedded within urban planning and socio-environmental management.” Such an underlying understanding is also indicative of what is being increasingly labeled as Nature based Solutions (NbS), among which large-scale afforestation, green financing, flood controls, and ecotourism projects feature in large scale, infrastructure-like green interventions (QI; DAUVERGNE, 2022). It remains to be seen whether “Chinese style” NbS emerge from these practices inside the country or outside its borders (ZHU et al., 2023).

Finally, the short and limited analysis conducted here provides an important overview of central topics at the science-policy interface and the geographical frontier of ECMs in China’s Southwest. While the automated content analysis could not point out categorical differences in the country’s approach to ECM, it has managed to highlight important topics like the overall eco-development paradigm these mechanisms are

increasingly part of. Also, the analysis could point to the importance of topics like arable land, the GfG, water resources and eco-tourism.

6. Conclusions

In the face of global and national challenges to achieve environmentally sustainable economies, eco-compensation is becoming a popular tool to implement and expand activities that can contribute to the dual carbon goals announced by president Xi Jinping in 2020. The analysis following the methodology proposed by Schadeberg et al. (2023) provides a broad overview of the contents of 181 documents on eco-compensations in Chongqing and the connections between different sub aspects of the topic. This mostly descriptive analysis provides an excellent base for further exploration and needs to be complemented by field research to explore several aspects that have been opened with this article.

This initial mapping of topics surrounding eco-compensation in Chongqing not only contributes to the better understanding of how these policies are well situated and connected to other social and development policies but also confirms the centrality of the state in such policy arrangements. While environmental issues in China's West are becoming more central and are connected to a wider array of development policy, these priorities are not necessarily fruit of complex multi-stakeholder negotiations, but rather the result of a highly state-orchestrated development process under the "Construction of an Eco-Civilization."

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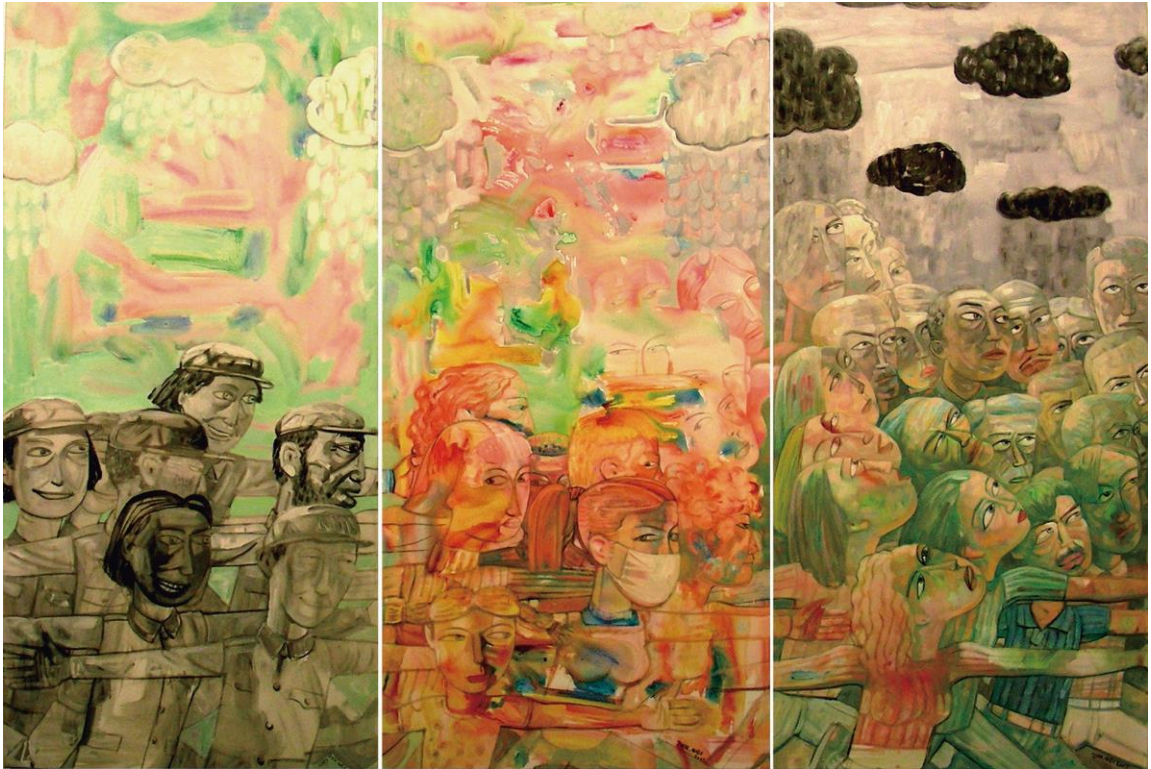
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5. CHINA'S ENVIRONMENTAL TURN AND THE IMPACTS ON INVESTMENT AND TRADE IN BRAZIL-CHINA RELATIONS¹⁸

ABSTRACT

In the last decade, China has consistently promoted a greener stand in its national and international policies. An embodiment of this new position, is the idea of Ecological Civilization, which can be understood as a socio-technical imaginary of a sustainable eco-socialist future under the leadership of the Chinese Communist Party. This environmental turn has also potential to affect China's bilateral relations: as the country moves toward a greater role in global environmental governance, it may require its partners to do the same. In this chapter we analyze how China's environmental turn may affect the Sino-Brazilian relationship in two key areas: Foreign Direct Investment (FDI) and Trade. Brazil is currently the main recipient of Chinese FDI in Latin America and China has been its largest trade partner since 2009. In both areas, the Asian country is far more relevant to the Brazilian economy than the opposite. We argue that this scenario may create both opportunities and challenges for Brazil if China decides to demand a greener stand of its partners. On the one hand, the Sino-Brazilian relation could thrive under a renewed alliance for the environment, fostering closer ties between two of the most biologically diverse countries in the world. On the other hand, China's increased pressure towards a strict implementation of environmental policies may be difficult to comply with for the Brazilian government, which in the past four years has been undermining Brazil's traditionally well-structured and robust environmental legislation. Our aim in this chapter is to identify the main opportunities and challenges and suggest new pathways for future research.

1. Introduction

Since the first Earth Summit in 1992, Brazil and China, as two biologically mega-diverse countries, have been engaged in a dialogue on environmental matters and have both been active in the three Rio conventions on climate change, biodiversity and desertification. When it comes to the outside perception of commitments to sustainability, however, China's image abroad is most often still that of an environmental villain with images of cities covered in thick smog, dirty coal power plants and high levels of water contamination (ECONOMY, 2011). In overcoming these problems, Beijing has been recognizing the ever more urgent need to act on environmental protection and has taken

¹⁸ This is an Author Accepted Manuscript of the chapter: "China's environmental turn and the impacts on investment and trade in Brazil-China relations" authored by Niklas Werner Weins, Talita de Mello Pinotti, Jefferson dos Santos Estevo, published in "How China Is Transforming Brazil", edited by Mariana Hase Ueta, Mathias Alencastro and Rosana Pinheiro Machado, 2023, Palgrave Macmillan, reproduced with permission of Springer Nature Singapore Pte Ltd. https://doi.org/10.1007/978-981-99-3102-6_8.

it on as a civilizational task within its ideal of building an Ecological Civilization (Eco-Civilization).

While the practical effects of the environmental reforms can already be felt domestically, China's overseas operations are only starting to mirror this trend. In this chapter, we consider the impacts that the renewed emphasis on the environment in China may have on its relations with Brazil. In the second section of this chapter, we examine the most recent developments in Chinese policies with respect to the environment to discuss how they are reflected in its outward engagement through overseas investments. In section three, we evaluate the current environmental impacts China has on Brazil, both in terms of Foreign Direct Investment (FDI) and Commercial Relations, and reflect about the prospects of Eco-Civilization changing the outlook on Brazil's bleak stage of policy support and responsibility for environmental concerns during the past Bolsonaro government.

2. China's environmental turn

China's turn to its civilizational relation to the environment has become a central and ever more pressing issue for Beijing. Due to the rising number of extreme weather events and environmental incidents in China at the turn of the millennium, there has been increasing recognition of the need for a more comprehensive understanding of development that goes beyond economic growth. This has led to several unprecedented experiments in environmental policies, e.g. massive forestry interventions in the "Great Green Wall" project to combat desertification, and the conversion of sloping lands and unproductive croplands to forests to reduce erosion (DELANG; YUAN, 2016, p. 19). Also, new social institutions like River and Forest Chiefs were created to commit local politicians to environmental policies (WANG; WAN; ZHU, 2021).

Global climate change and biodiversity loss have come to be understood as a serious threat, which has made not only domestic environmental policies but also the international commitment to the planet an increasingly prominent concern for leaders of the Communist Party of China (CPC) (TENG; WANG, 2021, p. 142). With China presiding the fifteenth Conference of the Parties (COP15) of the Convention on Biological Diversity

(CBD) in 2022¹⁹, there has been more international attention to its environmental policies. One example is the Ecological Conservation Redlines program (hongxian 红线): instituted experimentally at the beginning of the 2000s, it promotes an integrated approach to climate and biodiversity protection on multiple levels of government and is a promising policy draft for long-term low-emission development strategies (SCHMIDT-TRAUB et al., 2021, p. 4). While China's international engagement along the Belt and Road Initiative (BRI) has raised concerns about environmental and social impacts (YANG et al., 2021, p. 1525), their complex integration with other development policies and the country's aspirations to become a model of an Eco-Civilization, also present an unprecedented opportunity for the standardization of environmental impact assessments and an overall raise of minimum standards, in Chinese projects abroad such as the BRI (ASCENÇÃO et al., 2018, p. 208).

China's vision of "Building an Eco-Civilization" has received relatively little attention abroad (VILLA, 2022). Yet, it has created hopeful expectations of the country becoming a (long awaited) environmental leader for the developing world (GEALL; ELY, 2018, p. 6). Eco-Civilization is best understood as a "socio-technical imaginary" of a sustainable eco-socialist future under the leadership of the CPC (HANSEN; LI; SVARVERUD, 2018, p. 195) and, was enshrined in the CPC's party constitution in 2012 and in the national constitution in 2017. Since its first prominent political uptake in 2007 by then president Hu Jintao, it has been evolving while going global as a reference for environmental politics and practices (HANSEN; LI; SVARVERUD, 2018, p. 199).

The guiding principle for the CPC's sustainable socialist society has been categorized in different ways and with different degrees of external criticism or enthusiasm. While it is mostly referred to as a general environmental governance framework, academic and activist literature more often refers to it as an eco-socialist blueprint, while Western academia and media often coin it bluntly as a "misleading propaganda ploy" (CHEN; ZHAO, 2022, p. 195). Its potential has often been neglected by

¹⁹ COP15 is China's second time hosting a major environmental COP of the Rio Conventions since COP13 of United Nations Convention to Combat Desertification in Ordos in 2017. The second part of COP15 took place in December 2022 in the CBD secretariat's city of Montréal due to the continued pandemic situation in China until late 2022.

the international discussion about China's "environmental governance" storyline²⁰, failing to portray the complex changes happening in the country (CHEN; ZHAO, 2022, p. 196). While there is recognition in both academic writing and the media that "China will play a much bigger role in international environmental governance", this is often mixed with fear and perceptions of a strategic threat based on the idea that there will be "a much stronger push from Beijing for their environmental agenda to be adopted by the rest of the world". This is expressing a fear in currently dominant countries that they will lose their ability to influence the way in which environmental policies are negotiated and to define sustainability. Commonly, Eco-Civilization has therefore been deemed an "empty slogan" by Western media (GREENFIELD; NI, 2021) and often linked to the performance legitimacy of the CPC's rule (TENG; WANG, 2021, p. 148).

Domestically, China is also reviewing its longstanding emphasis on development over environmental protection. Its most recent 14th Five-Year Plan (2021-2025) has, for the first time, not defined a GDP growth goal, focusing on the decarbonization of the energy sector, sustainable electrification, fuel change, carbon sequestration and the management of energy demand (UNGARETTI, 2021). Two central aspects are quality growth and dual circulation - the move away from heavy reliance on exports, foreign technology and resources. For reaching its national and international sustainability commitments, the government's focus lies on lowering energy and carbon intensity per GDP unit (-13,5% and -18% respectively, compared to 2020) and moving to more renewable energies to peak its carbon emissions before 2030 and become carbon-neutral by 2060²¹. Wang and Hu (2021) in an analysis of 129 Chinese and Latin American think-tanks state that this has generally been seen as opening up new possibilities for cooperation.

Less attention has been given to China's contribution to greening trends and its commitment to forest cover for carbon sequestration (CHEN et al., 2019). While only raising its target by one percent to 24,1% in the current plan, its centrality at COP15's

²⁰ Chen and Zhao (2022, p. 205) affirm that "English-language media have framed Ecological Civilization following their orientalist and Cold-War inspired boilerplate narrative of China being a country constrained by structural limits and lack of transparency."

²¹ According to a recent government study, this may even already happen by 2027 (CCTV, 2022, CHEN et al., 2022).

negotiations about a “30x30” target²² contributed to making this a more central feature of Eco-Civilization (SCHMIDT-TRAUB et al., 2021; SHANAHAN, 2021). As a natural consequence, these new trends in China will have direct and indirect consequences for its international partners, but it is still unclear how they will specifically impact them. In the case of the entrance of Brazil’s new president Lula da Silva, the statements about renewed cooperation have emphasized the environment as one key area of cooperation (CARBONBRIEF, 2023; CEBC, 2023).

A study by Wang and Zadek (2016, p. 31) affirms that while publications on China’s environmental impacts in English and Spanish often point out negative impacts, “Chinese academia, NGOs, media and legal documents [...] focus on discussing the successful cases and providing recommendations/guidelines for Chinese companies to reduce negative environmental footprints in the future”. In a joint communiqué by the National Development and Reform Commission (NDRC), the Ministry of Foreign Affairs (MFA), the Ministry of Ecology and Environment (MEE), and the Ministry of Commerce (MOFCOM) on Green Development in the BRI, many of the environmental risks in Chinese overseas investments are openly recognized (CHINA, 2017; STATE COUNCIL, 2017). However, the tone continues to be non-judicial, making use of non-binding language like with the “encouragement to follow ” international standards. For example, section 2.2 of the document states:

[...] encourage enterprises to abide by international economic and trade rules and the ecological and environmental protection laws, regulations, policies and standards of the host country, attach great importance to the ecological and environmental protection demands of local people, strengthen the construction of enterprise credit systems, prevent ecological and environmental risks, and ensure the safety of the ecological environment (CHINA, 2017)²³.

At the second Belt and Road Forum for International Cooperation in 2019, the BRI International Green Development Coalition (BRIGC) launched and published its first project baseline study report in 2020 (BRIGC, 2020) to define sustainability criteria for overseas projects. Furthermore, a risk screening tool for overseas investments is currently

²² Commitment to 30% conserved land and/or marine areas by 2030.

²³ From the original passage 2.2 总体要求（二）基本原则：推动企业遵守国际经贸规则和所在国生态环保法律法规、政策和标准，高度重视当地民众生态环保诉求，加强企业信用制度建设，防范生态环境风险，保障生态环境安全。（translation by the authors).

being developed by the International Environmental Cooperation Center (IECC) of the MEE and the Paulson Institute (PAULSON INSTITUTE, 2022). At the present moment, however, criteria for overseas investments are still “mostly voluntary in nature so long as firms comply with host country regulations”, with government encouragement to invest in clean energy (GALLAGHER; QI, 2021, p. 260). It does not however “restrict or prohibit investment in carbon-intensive [...] investments, revealing a clear discrepancy between policy for domestic and overseas investment” (ibid.).

Understanding the Chinese stand on the environment and especially the impacts of its growing interest in mainstreaming the environmental perspective in its national and international policies is key to any country that wants to build a stronger and greener relation with the Asian country. The direction of China’s domestic, as well as its international embrace of environmental issues, suggests that, as it emerges as a seller of new environmentally sustainable technologies on a lucrative market, it also comes in with the necessary policy ideas on the protection of biodiversity and willingness to mitigate unavoidable environmental impacts. While not denying the terrible environmental externalities of its direct and indirect presence in Brazil, we would like to highlight the possible positive side-effects of Chinese engagement in Brazil under its Eco-Civilization and argue here that a better-informed Brazilian perspective of the risks and possibilities in its relation to China could help raise environmental standards. Eco-Civilization in particular presents us with a formidable argument to demand such a change, as it becomes a guiding principle for China's international relations and actions overseas. In the following sections we will highlight the main areas in which China's economic policies and its environmental turn may affect Brazil the most: investments and trade.

3. A greener China and its impacts on Sino-Brazilian relations

3.1 Chinese investment in Brazil: environmental risks and opportunities

Since the 1990s, the progressive reduction of barriers to FDI around the world created new, more diverse choices for investors: they could choose e.g. recipients that offered conditions more aligned with the investor's interests, such as fewer taxes, more or less qualified labor, political alignments, etc. In that sense, environmental concerns

would also start to drive the choice of where to invest, either by choosing countries more or less committed to the environmental agenda.

The consolidation and advancement of environmental commitments in the international system, with instruments such as the 2030 Agenda for Sustainable Development and the Paris Agreement, made it an imperative for recipient countries to ensure that FDI is allocated in a way to reinforce national pledges and policies. For example, many countries have created stricter environmental legislation that are now also applied to FDI in potentially polluting sectors, such as mining, energy and infrastructure. Nevertheless, the literature on the issue still lacks a clear consensus on the correlation between FDI and environmental protection, pointing out both positive and negative impacts (PAIXÃO; NOGUEIRA, 2016, p. 56-62; ZHUANG et al, 2021). The main hypotheses to both positive and negative impacts are highlighted in Table 1 below²⁴:

²⁴ It is important to emphasize that most of these hypotheses were elaborated, or indeed explored, in view of a considerable difference between the environmental development of the investor and the recipient country. This is because, to a large extent, the studies developed in the 1990s focused on traditional North-South cooperation, which foresees a hierarchy among the agents involved: a more technologically and economically advanced country from the Global North provides resources to a less advanced country from the Global South. It is also assumed that the investor countries have more developed environmental legislation than the countries receiving FDI. While there is a strong rhetorical commitment to social and environmental sustainability in the Global North's engagement in the construction of socio-environmental standards and product traceability, their actual impact has been minor and actions have often been inconsistent (BRAD et al., 2018).

TABLE 1 – Main hypotheses on the relationship between Foreign Direct Investment and Environment

Hypothesis	Characteristics
Pollution Haven	To reduce costs, investors tend to allocate FDI in countries or regions with less environmental restrictions, creating pollution and degradation havens.
Pollution Halo	FDI can foster the diffusion of more advanced environmental technologies and practices, which ultimately contribute to a greener development in the recipient country. In this scenario, it is assumed that the origin of the FDI presents more advanced environmental practices than the ones present in the recipient location.
Scale effect	FDI can scale up production in the regions or sectors where it is allocated, naturally increasing pressure on the environment.
Race to the bottom	When FDIs prioritize weaker environmental legislation to choose their destination, potential recipients start to compete to offer less restrictions, jeopardizing environmental concerns.
Political Influence	By bringing in more advanced environmental practices, foreign companies can exert positive influence on the policy making of local environmental rules and norms.

Source: Created by the authors with the information from Paixão and Nogueira (2016, p. 48-53) and Zarsky (1999, p.56-62).

When it comes to its FDI policies, China stresses its commitment to win-win partnerships, the opportunities that lie in strengthening South-South cooperation and its non-interference in domestic affairs. In this modality, the involved actors often have closer levels of development or similar historical experiences, such as a lagging industrial or agricultural base. Therefore, the emphasis on South-South cooperation does not involve the idea of hierarchy in the sense of reproducing a successful model, but rather the sharing of technologies, financing, and knowledge (UN OFFICE FOR SOUTH-SOUTH COOPERATION, 2022), which can suggest a reinterpretation of the pollution halo hypothesis (see Table 1). Furthermore, FDI based on South-South cooperation is not tied to conditions related to the implementation of specific policies, whether fiscal, social, or environmental. Priority is given to national models and legislation, so that financing follows the environmental rules of the destination country, fostering national ownership and often avoiding negative impacts, as predicted by the pollution haven hypothesis (ABDENUR, 2017, p. 175-179; HOCHSTETLER; INOUE, 2019). In addition, FDIs guided by the

framework of South-South Cooperation focus on fostering national capacities and strengthening the autonomy of the states receiving the investments. This cooperation modality proposes, above all, the horizontal exchange of experiences.

By choosing to advance South-South cooperation to direct its investments, China has become an attractive partner for countries with governments which traditional donors and investors have shied away from due to e.g. human rights concerns, often filling a void left by other partners (BRÄUTIGAM, 2011, p. 760-762). Independent of the country investors are from: when it comes to environmental impacts, currently the reality is that the host countries' domestic policies matter most and influence how investors enter a country (ABDENUR, 2017). As shown in the case of trade deals, Milani and Chaves (2021, p. 7-16) hold that the economic and development motivations of the EU (but also China's) have undermined the power of climate norms, the effectiveness of environmental regulation and compliance with human rights protection in Brazil (MILANI; CHAVES, 2021, p. 15-16). However, there has been growing evidence of sharing of technical experience and commitments to joint positions on environmentally responsible investments (MORAN; KOTSCHWAR; MUIR, 2012; LU et al., 2021, p. 13-18) though skepticism remains about China's "real" intentions - especially in North Atlantic media and academia (EMMANUEL, 2021).

Until 2020, 47% of all Chinese resources directed to Latin America were destined for Brazil, making it the region's main recipient. In 2019, the amount reached US\$ 7.3 billion, but fell to US\$ 1.9 billion in 2020, a movement that was also reflected in other regions due to the Covid-19 (CARIELLO, 2021, p. 47-48). Investments (2007-2020) were distributed among the sectors of electricity (48%), oil and natural gas (28%), minerals (7%), manufacturing industry (6%), and infrastructure (5%) (CARIELLO, 2021, p. 14-18). The impacts, however, differed according to the sector: in the electricity sector, FDI resulted from acquisitions of companies that already had hydroelectric plants, instead of channeling new resources to solar and wind energy and fostering the advancement of green energy in Brazil. Chinese state oil companies acquire exploration fields, previously exclusive to Petrobras, which may bring new investments but also negative impacts. Regardless, both were opportunities for Chinese companies to expand business globally,

in a country that needs and demands such investment (MOREIRA; ESTEVO; THOMAZ, 2021, p. 242-248).

In infrastructure, however, projects such as the Belo Monte energy transmission line and two unfinished ones, the Ferrogrão railroad and the Port of São Luís, Maranhão, raise contradictory concerns. Despite fulfilling central functions in improving regional integration, they cross fragile biomes and areas close to environmental and indigenous reserves, which could generate negative impacts by creating the above-mentioned scale effect (ABDENUR; FOLLY; SANTORO, 2021). Chinese companies report to still be unaccustomed (*shuitu bufu* 水土不服) to Latin American environmental and labor policies and their awareness of corporate social responsibility often does not meet the needs of communities which has undoubtedly weighed on the perceptions of Chinese engagement in the region (GUO, 2016, p. 48-54; YANG et al., 2021). Most of these projects, in different sectors, are connected to the need of increasing Brazilian exports to China, by building logistical infrastructure.

3.2 Consequences of the commercial relations between China and Brazil

While China has been the biggest trading partner for Brazil for more than a decade and there has been a strategic partnership since 1993, Brazil is only its 10th most important trading partner. The economic relationship between Brazil and China has intensified considerably in the last fifteen years, especially during Lula da Silva's administration (2003-2010). Since then, Brazilian exports to China have been focused on primary products: oil, iron ore, soy, beef and cellulose – all with considerable environmental impacts (MACFARQUHAR; MORRICE; VASCONCELOS, 2019, p. 1-3; CHAN; ARAÚJO, 2020; ABDENUR; FOLLY; SANTORO, 2021, p. 15-27; MILANI; CHAVES, 2021, p. 10-14). Oil and derivatives in their production and subsequent consumption, increase greenhouse gas emissions, contributing to climate change. Iron ore exploitation is highly soil degrading and produces environmentally hazardous waste. In some cases, deforestation is a result of the expansion of agribusiness, especially aimed at beef and soy exports.

The primary goods exporting model carries environmental impacts from consumer into producer countries. In Brazil, this is especially caused by the agribusiness

in two environmentally sensitive regions: the Cerrado and the Amazon. In practice, it is often left to the importing countries to decide about demanding minimum standards, not the exporter (MILANI; CHAVES, 2021, p. 16). Some European countries regularly criticize deforestation in Brazil, especially France and Germany (CASARÕES; FLAMES, 2019, p. 9). From China, there is no such criticism at this point, as domestic matters do not concern its diplomacy or even Chinese companies. This silence stems from non-intervention in domestic affairs, one of the main defining characteristics of Chinese diplomacy and South-South cooperation (LAZZERI, 2019; MILANI; CHAVES, 2021, p. 3). The Chinese diplomat and minister-counselor in Brazil, Qu Yuhui, in an interview about the worsening of deforestation said: "Brazil has been consistent in protecting the environment. I am not the one who recognizes it, but the Chinese authority recognizes it. The environmental criteria are very strict in Brazil [...]".

Even though Brazil does have robust environmental legislation, in recent years, there have been constant attempts to flexibilize those laws (MENEZES; BARBOZA JR., 2021, p. 10-11). China increased soybean imports from Brazil, even more so after the economic clashes with the US, another major partner, from which China buys soybeans. The central point in this demand is in the territory for plantation, which has expanded into areas of environmental preservation. Until 2006, this expansion occurred mostly in the Amazon region, but because of the Soy Moratorium, deforestation from this crop has been largely reduced. The idea was an embargo on soy grown in environmental protection areas, preventing deforestation, along with other public policies, such as strengthening inspection authorities (HOCHSTETLER, 2017, p. 7-8). This scenario, with the reduction of deforestation in the Amazon, lasted until 2014, with a sharp increase since 2017. In 2021, the historically highest deforestation peak was reached with values close to those in 2005 (INPE, 2022). With the moratorium, a part of the production moved to another essential biome, the biodiverse Cerrado savanna, which does not encompass such special protection like the Amazon (LAHSEN; BUSTAMANTE; DALLA-NORA, 2016, p. 5). Deforestation and environmental degradation in this region are on the rise, reaching their highest value since 2015. Most exported soybeans came from Cerrado which spans the four states Maranhão, Tocantins, Piauí and Bahia, a region called MATOPIBA (TRASE, 2019; CHAN; ARAÚJO, 2020, para. 10; RAJÃO et al., 2020, p. 25-26).

According to a study by Trase (2019), of all Brazilian soybean exports between 2013 and 2017, 42% were destined for China, 28% for domestic consumption and 15% for Europe. According to the authors, soybeans exported to China come from several municipalities, but mostly from the south of Brazil. A smaller portion, around 8%, is associated with the MATOPIA region, the main planting area connected to Cerrado deforestation. The biggest buyer in this region is Europe. According to the authors, if China really wanted to avoid importing soy cultivated in deforestation areas, it would have to make sure its imports come from outside the MATOPIA region (TRASE, 2019; LAZZERI, 2019, para. 6). Deforestation is the main source of GHG emissions in Brazil and most of the emissions are linked to exports. According to Rajão et al. (2020, p. 248) “All economic partners of Brazil should share the blame for indirectly promoting deforestation and GHG emissions by not barring imports and consuming agricultural products contaminated with deforestation, illegal or not”.

Another essential export product is beef for which Brazil is the largest exporter in the world. It is also the biggest exporter of soybeans, and demands for meat and leather, both of which are produced in Brazil, have increased globally. Here, Chinese demand is a major recent growth factor, which also stimulates the advance of production in conservation areas. Livestock in the Cerrado and Amazon, cause an increase in GHG emissions, losses of biodiversity, slave labor and conflicts over land (TRASE, 2020, p. 1-10). We would like to emphasize that importers should more routinely consult if the products are related to deforestation and if this is a requirement. In the case of cattle, it is difficult to trace the entire production chain, but some slaughterhouses, especially the larger ones, indicate the origin of their products, which guarantees environmental compliance to exporters. Large exporting meatpackers, such as JBS, Marfrig and Minerva, are signatories of the G4 Agreement on not purchasing products from areas of the Amazon that were deforested after 2009, which, to a certain extent, guarantees the importer that there is some type of monitoring of the origins of export products in the Amazon region (MACFARQUHAR; MORRICE; VASCONCELOS, 2019, p. 1-5; MILHORANCE, 2020; TRASE, 2020, p. 1-13).

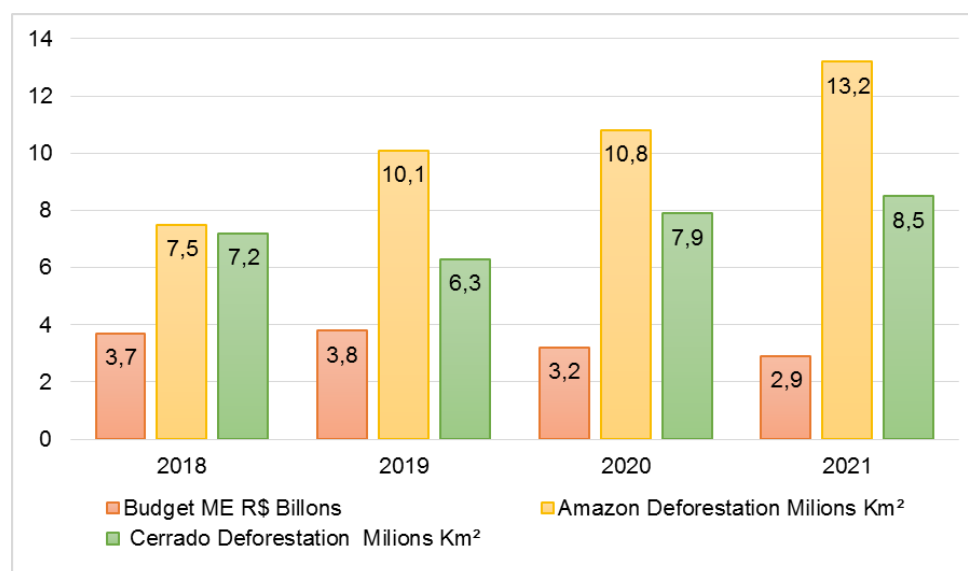
Cattle exports come from several slaughterhouses in different locations in Brazil. However, it is from the Cerrado that around 50% of China's imports occur. As seen

above, this increasingly degraded biome does not receive much attention or concern in the media. According to Milhorance (2020, para.7), half of the slaughterhouses authorized by China are located in this biome, but the approval is not related to environmental issues or embargoes, only to sanitary reasons. There is currently no concern or demand for cattle without environmental standards, which do not cause deforestation. In a 2019 (p. 1-9) study, Macfarquhar; Morrice and Vasconcelos indicate that none of the main importers of meat and leather in China has a policy against deforestation. Thus, in the analysis by Milhorance (2020, paragr. 16) “[...] while environmental destruction in Brazil has featured on the political agenda in the US and Europe, China has remained relatively quiet”.

Despite the increase in demand, Brazil can achieve a production concerned with deforestation and does so in parts already. Control is possible, as has been done with the Soy Moratorium since 2006. However, for meaningfully advancing on this issue, national policies to control deforestation are indispensable: in Brazil, the legislation exists, it needs to be complied with and monitored, reducing deforestation is beneficial for the country, and most producers understand this (RAJÃO et al., 2020, p. 246-248). However, the opposite has actually occurred, since the second Rousseff administration (2014-2016), with great pressure from the so-called Ruralist Caucus²⁵, for the reduction and weakening of environmental laws, for the benefit of parliamentarians and agribusiness groups they connected with. After her impeachment, Michel Temer took office in 2016 with the support of this caucus, which was essential for him to staying in power. In exchange, the ruralist caucus was rewarded with measures of environmental flexibility. The scenario changes under President Jair Bolsonaro, who is openly opposed to environmental protection and influenced by a parliament closely linked to agribusiness and its caucus (HOCHSTETLER, 2021, p. 561-565).

Protection demands investments and State structure. In recent years, the budget earmarked for the Ministry of the Environment (ME) environmental protection has been reduced (see Figure 1), which makes enforcement impossible and increases environmental crimes.

²⁵ or *Ruralist Bench*, from Portuguese *Bancada Ruralista*.

FIGURE 1 – ME Budget and Deforestation Amazon and Cerrado (2018-2021)

Source: Created by the authors with the information from Brasil (2022) and INPE (2022).

As argued before, the main exports from Brazil to China are products with a high degree of environmental degradation. Soy imports are concentrated in the southern region, with no impact on the regions most affected by deforestation, the Amazon and Cerrado, as shown in Figure 1 (TRASE, 2019, p. 1-2). Beef and leather come from these regions, especially from the second, with less international prominence. The largest portions of slaughterhouses are able to trace the origins of the animals, which can help control imports (MACFARQUHAR; MORRICE; VASCONCELOS, 2019, p. 1-9; TRASE, 2020, p. 1-13). China and its importers can access data on the origins of soy and cattle, so that it does not contribute to deforestation, even more so with growing demand. However, what happens in Brazil are attempts to loosen environmental laws, and to explore territories for agribusiness. In the last two governments, especially the current one, environmental protection suffered its biggest blows, which is not a cause of China in the country, but a government policy. Brazil has good environmental legislation. In general, Brazilian environmental problems are due to the lack of supervision, resulting from the reduction of investments, as seen in the figure above. China contributes indirectly, with its imports of primary products, all of which have environmental impacts, but which are not directly carried out by Chinese companies. For China to become a global leader in sustainability and combating climate change, a more robust stance will be needed, with embargoes against products that cause deforestation.

4. Conclusions

The world must undergo urgent transformations and find solutions to global environmental problems that do not respect borders. In this endeavor, China's successful domestic results in recent years could inspire other countries to take similar measures. In the words of President Xi: "Humankind should launch a green revolution and move faster to create a green way of development and life, preserve the environment and make Mother Earth a better place for all" (XI, 2020, s.p.). As China's model of growth at all costs has proven unsustainable, the country has undergone significant domestic transformations in environmental preservation in its quest for becoming an Eco-Civilization. The ideas, policies, and technologies that encompass this process can be expected to influence regions China interacts with, as it raises its efforts to mitigate environmental risks. While it will take the country years to mitigate its burdening environmental problems, its leaders continue to indicate new, more ambitious goals for a better and cleaner future, in which the reduction of social, economic and environmental risks is central.

To Brazil, the relationship with China is of paramount importance, both in terms of investments and bilateral trade. Despite the diplomatic frictions in the current government, the commercial side has continued due to its strong economic complementarity. Exports from Brazil to China continued and large state-owned companies continued to enter key sectors of the Brazilian economy, such as energy.

As highlighted in sections three and four on trade and investment, advances in environmental protection are still needed in Brazil to mitigate risks. Under the current president Bolsonaro environmental protection measures have been weakened by cutting the ME's budget and encouraging the increase in deforestation in key regions for the national and global environment, Cerrado and Amazon.

Albeit Chinese diplomacy and South-South cooperation do not intervene in other states' domestic affairs, China can cooperate on a global environmental agenda through its commercial relationships by demanding environmental minimum standards such as those it is implementing domestically. Brazil could be an excellent starting point for such overseas initiatives, despite the current federal government's efforts that made the country lose its historical position as a cooperative leader in environmental

negotiations. Both the Bolsonaro government's domestic and international actions present a drastic break with the country's decade-long environmental governance efforts.

Rosito (2020) suggests that the issue of the environment is one of the main challenges to be addressed in the Sino-Brazilian relationship: both from the individual perspectives, since Brazil and China still need to advance environmental preservation, as well as from a bilateral perspective, since the cooperation of both emerging powers within the framework of South-South cooperation would allow for the consolidation of environmental standards that are more aligned with the interests of developing countries, being beneficial for both. In terms of FDI, it would be possible to test new practices and environmental commitments that would allow both sides to avoid some of the hypotheses presented in Table 1, reducing the negative effects on the environment and amplifying their positive impacts.

Schmidt-Traub et al. (2021, p. 3-4) argue that some countries generate environmental impacts on their exporters, especially when it comes to commodities, and that thus, joint policies, agreements and innovative ideas to reduce impacts on production should be encouraged. We have here presented possible implications for Brazil-China relations. The increased production to meet Chinese demand for soy and beef is surrounded by a wide array of environmental and social problems. Importers can partly trace products to their origins to make sure they are not causing deforestation. An embargo on products that may jeopardize the environment is essential, eliminating those producers who do not follow the law (RAJÃO, et al, 2021, p. 1-4). Some cattle importers in China are already seeking to align with these practices, but are still at an early stage (TRASE, 2020, p. 11-12). A positive example came from COFCO International, which will adopt until 2023 the tracking of the supply of soy from Brazil which could be an important step towards advancing commitments to halting deforestation in areas such as the MATOPIBA.

Cooperation between Brazil and China can advance the adoption of environmental practices, solutions and policies, using successful actions in both countries for a commercial relationship with the lowest environmental impact possible. Brazil has good environmental legislation, but needs improvements in enforcement and not relaxed protection. However, the current government and the Ruralist Caucus managed to

advance in their strategic projects, the result being an increase in deforestation. These are related to trade with China, cattle and soy exports. We would like to suggest here that China can contribute to more sustainable practices through import control and attention to its investments, both in the environmental and social areas.

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Metamorphosis II (*shuibian* II 蜕变II), 2022, Painting, Oil on Canvas, ARTL Gallery



Source: Wei, Yangyang (魏阳阳). Available at: <https://www.artsy.net/artwork/wei-yangyang-wei-yang-yang-shui-bian-ii>.

6. GREENING COMMODITY TRADE BETWEEN CHINA AND BRAZIL: NEW PERSPECTIVES ON THE ROLE OF PAYMENTS FOR ECOSYSTEM SERVICES IN SOUTH-SOUTH COOPERATION²⁶

ABSTRACT

In this article, we focus on the environmental impact of Sino-Brazilian agro-food chains and the opportunities to apply Payments for Ecosystem Services (PES) to make the trade relationship of the two countries more sustainable. Virtual water and compensations as environmental aspects in trade between the two countries have been considered in the literature. We discuss the possible implications and sustainability perspectives cross-border compensation could have on the Sino-Brazilian trade relation. Resource scarcity could interfere as a significant risk factor in the production and supply of products, which in turn affects a wider range of businesses. Since the commodity boom of the 2000s, the main Brazilian exports to China have come from agribusiness, especially soy for animal breeding which represents 64 billion USD (43%) of that trade. Data on virtual water in exports can help to reveal the major remittance of water from Brazil to China as a proxy. Besides the environmental impacts of externalities that have been discussed by a wide body of literature, this article discusses the potential of business research to also encourage environmental protection, fostering in this way a more sustainable and long-term oriented understanding of business opportunities and planning. While Sino-Brazilian trade relations prosper, the two countries also want to foster sustainability, Brazil under its newly elected Lula government and China under its long-term Ecological Civilization paradigm. We explore how environmental sustainability interferes in trade among the two countries, relating conservation and resource management to seek for new solutions that enable more conscious decisions based on long term opportunity costs of alternative business investments in the region. We suggest international Payments for Ecosystem Services and forest certificates could function as ecological compensation and risk mitigation strategies taking entire food chains as a measure to think about compensating consumption. Those considerations follow the assumption of China's increasing leadership role as a global economic and environmental actor.

Keywords: Commodity trade; Sustainability; Payments for ecosystem services; Risk; China; Brazil; Latin America; Agribusiness.

²⁶ This thesis chapter is the updated version of discussions within the Fudan Latin American University Consortium (FLAUC). Its 2019 conference was canceled after the *Estallido Social* protests in Chile and the resulting papers are being published as a book collection. The book chapter co-authored with Augusto Schmidt and Mariana Hase Ueta is in press at Ediciones UC.

1. Globalized environmental impacts and local implications

Before the Covid-19 pandemic, the global economy saw impressive growth that lasted for decades. Through specialization, free trade agreements, and the international division of labor, international trade skyrocketed. It is common nowadays to have products from all over the world, such as kiwis from New Zealand, wine from South Africa, and electronics from China at the reach of consumers in every urban supermarket. This is true not only for the industrialized economies of the Global North but increasingly as well for the Global South, where middle classes are thriving like South Africa, Brazil, China and India (LI et al., 2013). Cooperation among emerging economies like the BRICS is on the rise and exchanges between them become ever more common, complexifying the international environment (DWYER, 2015). In this increasingly globalized world, however, consumers are more and more spatially separated from the goods they consume, affecting their consciousness about the production conditions and externalities of the products they consume. This is especially true for animal products (HASE-UETA, 2019), which make up an ever-increasing part of the diets of a growing part of the world population (WORLD BANK, 2014).

The underlying questions we pose here concern the practical implications of this issue. Are governments, consumers or industries, responsible for incorporating these environmental externalities? What role does the scientific community play in informing about the risks? Which changes in business practices need to occur for the system to change towards a more sustainable model that manages to account for those complexities, and which information could facilitate this process? We focus on the Brazil-China trade connections to approach those questions within the sociological framework of the Risk Society.

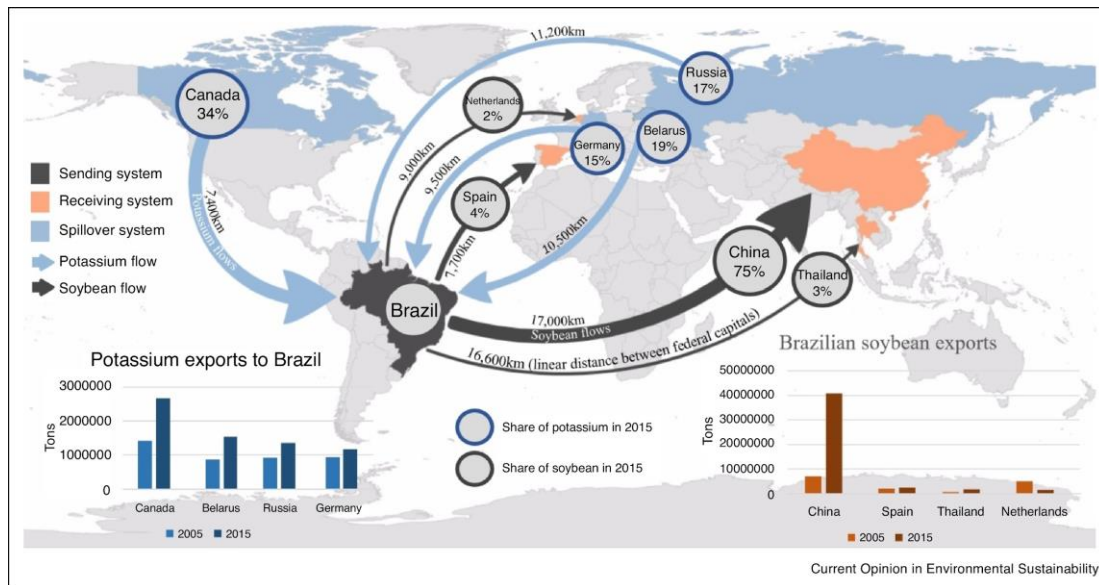
In the evolution of his theory of an emerging *World Risk Society* (BECK, 1996), German sociologist Ulrich Beck sketches the possibilities for creating a “green modernity” (BECK, 2010). Risk in its manifold dimensions, in the sociological interpretations by authors such as Anthony Giddens and Ulrich Beck, has been produced by the current technoscientific development model and is constantly being reproduced by it. Furthermore, due to globalization, the nature of risks has fundamentally changed its characteristics from locally situated to a complex transborder problem that is difficult to

contain within national jurisdictions. Nowadays, risks reach everyone across class and income intersectionalities, as is illustrated e. g. by urban air pollution (URBINATTI; FERREIRA, 2019). We assume here that the responses in countries of the Global South like Brazil and China have certain similarities that differ from the experiences of risk in the industrialized countries of the Global North (BARBI; FERREIRA, 2017). Considering some thoughts proposed by Fan Ruguo (2018), we also stress the importance of Chinese participation and leadership in engaging in global risk and sustainability debates and proposing approaches to their solutions. Using the example of virtual water contained in Sino-Brazilian agri-food chains, our focus here lies on the possibility that trade between the two nations offers in the complex global supply chains to implement concrete and innovative mechanisms to “greening” a telecoupled commodity.

Besides examples like air pollution or the effects of transgenic crops, the complex supply chains in international trade illustrate the aforementioned risk dimensions very well. The demand for Brazilian products to feed the increasing demand for animal products in China not only establishes export ties of meat, but also soy to feed pork in China. One of the most emblematic cases for the study of Brazil-China trade is the case of soy, which has become the biggest share of trade between the two nations. Since the 2000s commodities boom in Brazil, trade has reached a volume of more than USD 64 billion in exports to China in 2018, with soy representing 43% of the total exported volume (FGV, 2019). A seemingly simple crop is embedded in a complex production system that involves not only the agricultural factors that make its production possible but also fertilizers, climate change, and local socioeconomic dynamics that affect and are affected by the production of soy. Liu et al. (2018) in their extensive work on those *telecoupled* socio-ecological systems and their connections that span around the globe, have exemplified how small changes in one system e. g. the increase in demand for meat in China, will have amplified effects on other linked products in Brazil.

Figure 1 shows the relations between soy exports from Brazil to China, Thailand and Spain, and the necessary imports of potassium fertilizers from Canada, Russia, and other countries. This case is a helpful metaphor for illustrating how complex and interdependent our global economy has become and how risks in one place affect supply systems and production dynamics at the other end of the planet.

FIGURE 1 – Flows of soybean from Brazil to importing countries and the spillover systems affected by the increased Brazilian demand for potassium fertilizers

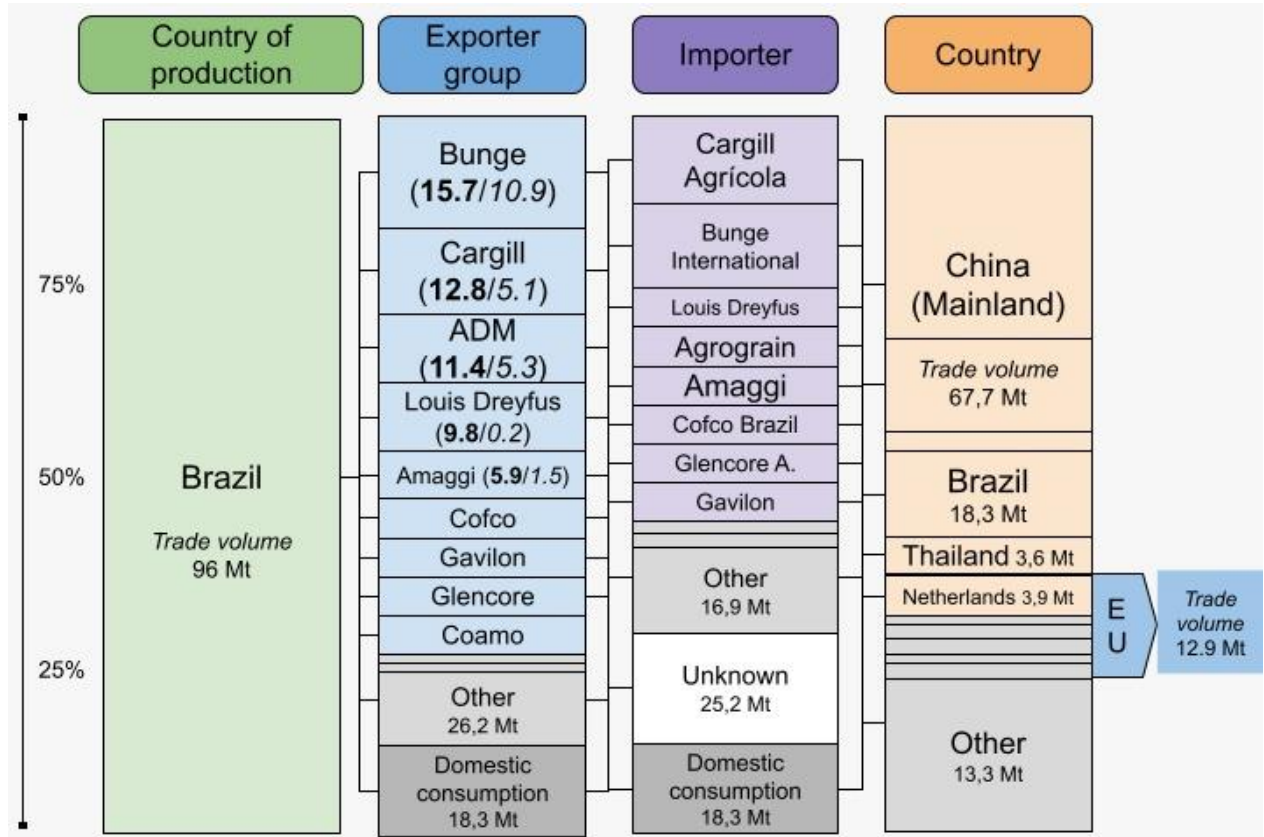


Source: Liu et al. (2018).

China is the main destination for Brazilian soy and most of it will be used to feed pork in Chinese farms. According to Trase (2020), China's soy imports from Brazil increased 170% between 2010 and 2017 making China the main (65%) destination of Brazilian soy. The impacts in terms of CO₂ emissions risks because of farming-related deforestation is concentrated 70% in the Matopiba region between the states of Maranhão, Tocantins, Piauí and Bahia. The Cerrado biome, the world's most biodiverse savannah, is one of the most threatened biomes by soja monocultures, even surpassing the Amazon. The report states that Chinese "companies and the government can play a role in supporting existing international, national and sub-national efforts in Brazil towards deforestation-free soy". This would also represent an opportunity for China to reduce its CO₂ emission risks as well as long-term food security risks and to demonstrate global leadership in driving deforestation-free agriculture policies.

Figure 2 shows the main exporter and importer groups engaged in the Brazilian soy trade, showing China's great share in the trade volume. The soy exported by Brazil in 2018 alone was associated with a deforestation risk of almost 50,000 ha causing 8.3 Mt of CO₂ emissions only from land conversion. The five biggest companies and groups engaged in export activities accounted for more than half (56%) of the volume and 46% of the soy deforestation risk calculated by Trase (2020) for the year 2018.

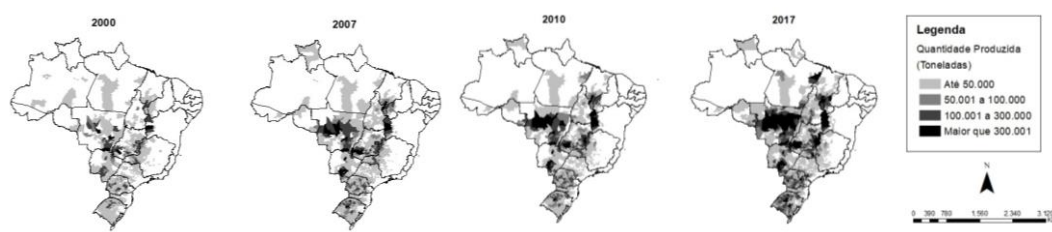
FIGURE 2 – Soy exports from Brazil, main exporter and importer groups and countries involved. The total export volume (bold, in t) and the estimated deforestation risk (italic, in ha) are indicated for the main five exporters. The size of the elements roughly represents the percentage of each company's and country's share



Data source: Trase (2020). Visualization by the authors.

As one of the world's biggest exporters of agricultural products, the domestic impacts of the dynamics of global trade have significantly shaped regional infrastructure development vectors in Brazil. The production by new and more productive farms has been migrating and expanding its “agricultural frontier” into the northern Cerrado and Amazon biomes and has moved away from traditional agricultural states in the South and Southeast like São Paulo, Paraná, and Minas Gerais. Along with the consumption of land and its respective environmental consequences, there has also been a great social influence in terms of migratory and production dynamics (CAMARGO, 2017; SILVA et al., 2017). Figure 3 shows the expansion in the Brazilian midwest, and the growth of produced tons between 2010 and 2017, which went along with a stark rise in demand that started in 2002.

FIGURE 3 – Expansion of the Brazilian “agricultural frontier”, measured in produced quantities of soy in tons



Source: Modified from Camargo (2017) with data from IBGE 1990-2017.

One important environmental aspect connected to commodity trade is the water resources contained in the products, commonly referred to as “virtual water” (ALLAN, 1998; HOEKSTRA; HUNG, 2002). As a water-rich country, and the main global soy exporter, this issue is of great importance for Brazil (CARMO et al., 2007). The areas in which the Brazilian soy production has been expanding into are, in their majority, sensitive ecosystems that have had increasing difficulties securing water resources, as the agricultural expansion is directly related to deforestation, which causes less fixation and filtration of water (ELLISON et al., 2017). However, since crop export continues to be lucrative for big commodity companies in the current trade structure, there are no financial consequences to those producers (OLIVEIRA, 2016). The possible environmental consequences and emerging risks to production are not accounted for by any of the actors in the system, their local or national governments, industries, or the consumers. For this reason, we argue, an exploration of the views on agriculture in relation to the natural environment and the potential for risk mitigation strategies in response to climate change needs to be considered in Sino-Brazilian soy trade.

2. Business and the emergence of sustainability considerations

Are environmental policies necessarily a burden for businesses or can they be an opportunity for economic sustainability as well? In this article we explore how PES, forest certificates and virtual water open up a possibility for environmental policies to contribute to the long term sustainable development of the agro-food sector and global impact.

The importance of functioning ecosystems and the benefits (ecosystem services, ES) they produce, like pollination, water filtration, and nutrient cycles have been

recognized widely by the scientific community, international and increasingly also national policymakers (IPBES, 2016). Along with diverse governance actors, the recognition of environmental variables for businesses has also been popularized and made measurable for their operations within the indicators available in a capitalist system in recent years (KUMAR, 2010). Cosgrove and Rijsberman (2014) in their report for the World Water Council call for “making water everybody’s business,” as industries, especially water-intensive ones like agriculture, will likely be the ones most affected by water shortages which become ever more likely in the future scenarios of climate change. The authors estimated that groundwater extraction worldwide would rise from 3,800 km³ in 1995 to up to 5,200 km³ in 2025 (COSGROVE; RIJSBERMAN, 2014, p. xxi).

The increasing push for a sustainable agenda in these countries is going to impact the food supply chains that connect them, reshaping the global flows and having transnational environmental impact. The complexity of this issue can be illustrated by the growing demand of meat in China, which causes the rise in demand for soy which, in turn, causes impacts in other markets like Brazil and Argentina. In 2017 the Chinese Meat Association (CMA) and 64 Chinese member companies together with the World Wide Fund for Nature (WWF) signed the Sustainable Chinese Meat Declaration that promoted sustainable meat production, trade and consumption. Among the main points of the declaration, it emphasizes: 1) Continuously move to conserve nature and resources by avoiding land degradation, deforestation and conversion of natural vegetation in the livestock production and feed value chains. 2) Continuously avoid and eliminate illegality during animal husbandry, meat production and trade. 3) Continuously increase resource efficiency including water, energy and land, increase product value and utilization, and reduce negative impacts such as GHG emissions and pollution. 4) Continuously improve traceability and transparency in supply chain management. 5) Continuously improve the assurance of rights and benefits for small & medium companies and smallholders in the supply chain of meat products. 6) Continuously improve animal welfare throughout livestock production, transportation and slaughtering. 7) Strengthen multi-stakeholder dialogue and build consensus, for continuous dissemination, sharing and extension of sustainability concepts, best practices and lessons learnt in meat production. 8) Develop

time-bound plans and establish the regular reporting, overall assessment and continuous improvement mechanism to progress the sustainable meat project in China (WWF, 2017).

Brazil also created initiatives in this direction, such as the Low Carbon Agriculture Plan, national programmes on Low Carbon Brazilian Beef and Carbon Neutral Beef, as well as regional programmes such as the state of Mato Grosso's "Produce, Conserve, Include" (PCI) strategy. This includes the Sustainable Production of Calves project, which aims to intensify cattle production and restore degraded pastures to reduce pressures on forests.

While the goals in this declaration are in huge part compatible with business interests, they also share interesting elements with the theoretical Risk Society framework adopted here. Especially, pointing to the necessity of multi-stakeholder dialogue, there continues to be huge potential for incorporating broader representation of stakeholders in the process to reach more representative and equitable solutions, which is currently a major draw-back. More qualitative social science research can contribute to this process and help to formulate concepts to approach those solutions.

For the most part, the engagement of businesses in the enhancement and insurance of ecosystem functioning until today has been rather slow. times it has been pushed forward by civil society actors and social movements that conquered their space in public policies. The political recognition of the importance of environmental sustainability did not only start with the United Nations Environmental Program's *Our Common Future* report, but important milestones for this consideration by public actors have been laid already since the 1960s (FERREIRA, 2018). In the 1980s, big conservation initiatives and NGOs started to promote ecological modernization ideas and managerial approaches to nature conservation, which would eventually attract the attention of businesses as they understood the overall long-term (financial) benefits (MACDONALD, 2011). In this process, MacDonald argues, big international organizations spearheaded the transformation of environmental and sustainability issues towards a more business-friendly perspective. Nonetheless, environmental issues still play a marginal role in the considerations of businesses in most countries today (BAUMGARTNER; RAUTER, 2017). In a changing geopolitical environment in which agricultural and food chains are ever more complex, the emergence of new "agricultural giants" like Brazil, China and India

with their diverse societies and growing social movements may bring about new visions for global food security (RESENDE; ABDENUR, 2019). Young (2016) proposes that this is a chance for more equitable practices in and from the Global South to be implemented, as the traditional players like the US and Europe have been rather slow in adopting bigger scale sustainability commitments.

The issue of water as the primary production input for agriculture is thus a prime example to think about new ways of mitigating impacts. Water is a production input in a huge variety of products around the globe. Besides its physical and ecological functions, it also possesses economic and cultural functions. As its availability varies greatly around the world, the recent increase in water-intensive crops being traded ever more globally, has had considerable impacts on local water regimes and consequently local economies and populations. Vos and Boelens (2018) affirm that in Peru and Ecuador e. g. the export of fruits, flowers and sugarcane for biofuels has increased up to ten times in the last two decades.

The concept of virtual water flow can be used to draw attention to an increasing use of water resources in regions where water is scarce. It can also be used for export agriculture as an indicator for social, political, and environmental risks and highlight the connectedness between producers and consumers of different regions in the world at different scales. Understood in the context of the expansion of the “agricultural frontier” in the Brazilian northeast and northwest, in the Amazon and Cerrado regions (see Figure 2, CAMARGO, 2017) the connection of issues of water scarcity and deforestation has to be recognized. Here, the cultivation of water-hungry soybeans drives the expansion dynamic.

As one of the two most traded commodities between Brazil and China, its significance for the trade relationship is huge. China has been the country purchasing the majority (over 50%) of Brazil’s soybean exports since 2009 (SILVA et al., 2017). Also, soy is an indispensable strategic crop to China, which plays an important role in the country’s food security (LIU et al., 2019). We propose to discuss here, how virtual water along with other environmental variables have a high effect on agricultural business in the country and present considerable risks to production and would like to sketch some suggestions to approach their mitigation here.

3. Ideas on consumption impact mitigation

The proposed case of Sino-Brazilian soybean trade outlines some theoretical considerations about the importance of widening the consideration of environmental variables for agribusiness. The example of virtual water between China and Brazil and the dynamics of the expansion have been briefly explored. While there have been theoretical discussions, and calculations on the “water remittances” there have practically been few concrete applications (TIAN et al., 2018). One possible revindication would be requiring water footprint labels for products. Some of the first ones mentioned above include NGO initiatives like the Alliance for Water Stewardship initiative by the WWF and the Rainforest Alliance as well as industry initiatives like the Round Table on Responsible Soy, the Roundtable on Sustainable Biofuels, the Better Cotton Initiative, and the Better Sugarcane Initiative (VOS; BOELENS, 2018).

Farnia; De Marcellis-Warin, N.; Warin (2018) suggest though, that their enforcement “may be seen as a trade barrier and unfair trade practice, putting additional costs on products to and from countries.” However, in view of the current global environmental crisis and the sustainability debate, it would be a necessary step to start implementing price measures in order for those theoretically known factors to become more visible. The local impacts of global trade and division of labor in agriculture will have to take a more central role in the debate about how to reform capitalism towards a more sustainable model.

Within the emerging global food and agroindustrial order, there are increasingly spaces to discuss more just and sustainable solutions (HECHT; MANN, 2008; WILKINSON 2009; HASE UETA et al., 2018). Oliveira (2016) suggests that these are increasingly reflected in the sub-imperialist role of Brazilian soybean agribusiness in South America, its influence through ‘South-South cooperation’ for the expansion of commercial agriculture in Africa, and its relations with China and other countries of the global South through bilateral agreements and multilateral forums of international governance such as the WTO.

There are already proposals of more “spatially explicit assessments of virtual water flows linking local water use and scarcity to the global demand of Brazilian farming commodities” (FLACH et al., 2016). Together with the implementation of cross-border

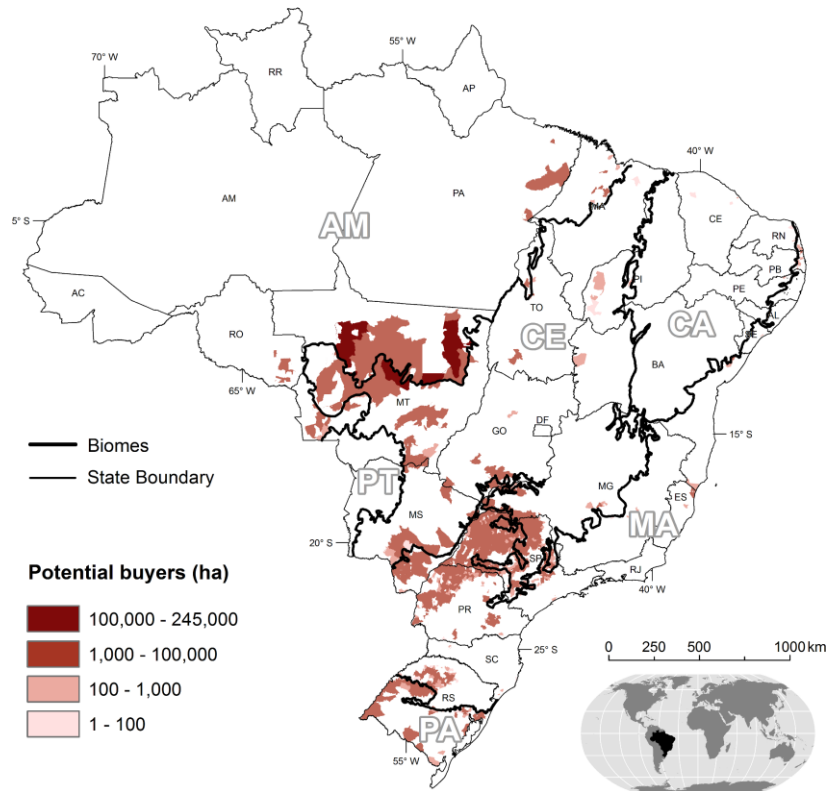
sustainability policies, solutions could be found in new conservation approaches that make use of payments for the conservation and maintenance of important ecosystems, of which forests, as well as agro-pastoral systems, are an integral part. Such payments could furthermore be understood as a kind of risk mitigation strategy, thinking along the lines of Ulrich Beck's (2010) ideas on a Green Modernity in which global risks are negotiated and defined in a global context and arena by actors on far away ends of e. g. product chains. Quaas and Baumgärtner (2008) suggest that payments for ecosystem services (PES) can be understood as natural and financial insurance in the management of public-good ecosystems, like those benefits produced e.g. by Brazilian soils, discussed here. The insurance values from the managed ecosystems could then be taken into account in national and eventually in global food production chains (PAAVOLA; PRIMER, 2019).

And while China is "greening" its domestic economy with its policy integration to "construct an Ecological Civilization", in a globalized world its economic activities are having an increasingly direct and indirect impact on other countries' economies, not least through its growing international engagement in the Belt and Road Initiative (BRI) (ASCENÇÃO et al., 2018; TEO et al., 2019). To rethink global food chains, compensations of any kind could be a first step in bringing about more environmental justice (HASE UETA et al., 2018). Liu and Yang suggest that enhancing international cooperation on the issue of incorporation of virtual water is an important step in the direction of achieving water sustainability.

In essence, this idea is a "user pays (for externalities)" motto (WANG, 2010) that has been discussed as "polluter pays principle" for environmental externalities for decades and is already in practice in national or regional contexts around the world, for example in the form of certifications (WEINS; HASE UETA, 2022; HASE UETA et al., 2018; SILVA et al., 2019). In China, cross-provincial eco-compensation schemes have already been put into practice and could eventually become a model for expanding the scope of PES beyond national borders and in(to) other parts of the world (SONG et al., 2018; WEINS; FERREIRA, 2019).

Another practical implication which can already be found in existing legal frameworks in Brazil is forest certification. Even though reforestation is not explicitly linked to virtual water, the ES from well functioning forest ecosystems include water and carbon

storage as important variables in many projects (BÄCKSTRAND; LÖVBRAND, 2006). The Brazilian Forest Code, which was (controversially) reformed in 2012 foresees compensation obligations including PES to reward reduced emissions from deforestation. The new version of the law not only reduced reforestation requirements by 60% but also forgives illegal deforestation from the past, and leaves aside several important aspects of biodiversity conservation (AB'SÁBER, 2010). However, it also establishes possibilities to use market mechanisms for conservation. In their model, Soares-Filho et al. (2016) calculated the potential of PES linked to the legal obligations established by the law, simulating land use trends to 2030 for calculating the possible effects of the market mechanisms. They estimate investment opportunities of US\$ more than 8 billion to purchase low-cost certificates for Environmental Reserve Quotas which, according to the authors, could cut deforestation that is legal under the current legislation in half (19 Mha) and reduce CO₂ emissions by up to 4 billion tons. Given the estimated potential of the southern parts of the Cerrado, Atlantic Forest and Amazon biomes (see Figure 4) they suggest that Brazil could become the largest market for trading forest certificates in the world.

FIGURE 4 – Effective demand for certificates per units of municipality/biome

Source: Soares-Filho et al. (2016).

One aspect we want to emphasize here is the important role of leading international actors to facilitate those cross-border discussions. If emerging economies like Brazil and China could lead the incorporation of environmental variables, such as those from international food chains, as relevant factors for business, this idea could be pushed forward much more quickly (WEINS et al., 2023). Furthermore, it could help thoroughly change the agendas of businesses in the Global South, which are currently still driven by short term profit considerations that do not take local environmental conditions, let alone ES, into account. In this way, it could lead to disastrous consequences in the long term business planning.

4. Discussion: risk mitigation through PES

A vivid academic debate about virtual water in those Sino-Brazilian trade relations is still ongoing, but practically no concrete applications of mechanisms to change how the system works have been applied internationally yet (TIAN et al., 2018). Given

China's Ecological Civilization framework and the widening and innovative application of eco-compensation mechanisms in the country (WEINS; HASE UETA, 2022; WEINS; FERREIRA, 2019), the country's interest in making its economy more sustainable offers an opportunity to finally put into practice what has been found by academia: PES and the incorporation of virtual water can help recognize, compensate and mitigate environmental externalities in practice.

Implementing environmental policies today will make sure that resources will continue to be available, which is going to be crucial for the development of business in the future, especially for commodity-oriented economies like Brazil. While this compensation is increasingly being implemented by local governments and with the involvement of the business community within the two countries, the growing global environmental impacts of consumption should make us reflect about the whole product cycle and recognize that compensations are necessary not only in the place of consumption but also in the place of production, as the risks brought about by their production, in the end, could affect everyone in a complex Global Risk Society. Changes in the consumption patterns, as pointed out in the analysis by Hase Ueta et al. (2018) may be a key factor to consider in the discussion on solutions to global issues and cross-border PES linked to those consumption patterns could be a viable solution.

The special importance of water as a strategic resource in Brazil-China trade interactions demands further investigation from different disciplines. Within forums like the BRICS, dialogue on environmental issues including water is already expanding (ANDREONI, 2019). China, as the world's biggest CO₂ emitter and Brazil as the world's biggest market for compensation certificates, makes the cooperation on sustainability issues ever more important. Furthermore, the two countries as big *hydro-powers* in terms of hydroelectric energy generation and the similar spatialities of their growing *hydromegalopoles* already constitute a significant potential for dialogue on issues related to water and environmental impacts on different spatial scales (VIEIRA, 2017; SCHMIDT; CARMO, 2019).

When it comes to doing business, we believe that it is crucial for the leading sources of policy and business information to consider such environmental aspects in production and consumption in order to make the necessity for action clear to political

decision-makers and consumers alike. It is important to go further, gather more data and to build more representative considerations about the agribusiness in Brazil considering the environmental issues that will be central for the future business developments in the region. Eventually, once the consequences become more visible, awareness and demand may become driving forces for change, as can be seen in the European context.

However, in the unequal societies of the Global South, such actions function in fundamentally different ways, making more active engagement from national governments and international organizations a necessary condition for fairness. The suggested idea of compensations, in the form of PES, could help mitigate risks e. g. as a kind of insurance value (PAAVOLA; PRIMER, 2019). However, it has to be clear that they are only a proxy to the resolution of the problem, as they do not eliminate risks that continue to be produced by those complex systems. What is necessary now at a more systemic level are structural changes in (agro)industrial production and global consumption patterns, especially in the Global North, as the majority of demands for cheap food and purchasing power are still concentrated in those countries.

We are hopeful that considerations of social and environmental sustainability and responsibility will take a more central stage in the coming years and that countries of the Global South will bring about long awaited changes, as new ways of looking at the world are incorporated into global environmental governance. While there are very diverse approaches to global challenges in different parts of the world, the promising role of China as a leader in many emerging fields could and should translate into the environmental sphere as well. The "Construction of an Ecological Civilization" within China's development model raises hopes that active engagement and promotion of sustainable policies will follow from this leadership role (WEINS; FERREIRA; FEODRIPPE, 2020). It is not only in China's international actions where the country continues to promote international cooperation and multilateralism, but also in its domestic context that important reform is happening. Changes for foreign companies in China's national business environment appeared on the horizon with the new 2020 Foreign Business Law which opens the possibilities of foreign countries to invest in securities and insurance in China (ZHOU, 2019). This may open an interesting opportunity which could stimulate investments the other way round from countries with capital surplus, expanding the

securities and insurance markets to agricultural and ES as risk mitigation strategies in regions that are of interest to Chinese consumers. Nonetheless, such insurance mechanisms for ES are still in the idea stage and few empirical studies exist to put such strategies into practice. The PES debate on the other hand is already much more advanced.

In our understanding, while the responsibility for the environmental externalities of consumer goods lies in the hands of consumers and industries, it is ultimately up to governments to create the necessary regulatory environments. The scientific community has had fruitful theoretical debates about topics like virtual water, and, more recently, compensation and certification mechanisms. Now, streamlined global coordination is needed to bring about the changes in business practices needed for global food chains to change towards a more sustainable model that manages to account for the complexities pointed out here. In light of the global environmental crisis, we hope that well-coordinated multi-stakeholder approaches with a clear vision of sustainability as a guiding idea will be able to put those ideas into practice because action is urgently needed to avoid or at least mitigate consequences of the current unsustainable model.

5. Conclusions

Considering the growing importance of sustainability considerations in food chains around the world, the case of virtual water in Sino-Brazilian soy trade is just one of many examples that expose the unsustainability of the current organization of global production chains. The associated environmental impacts and risks that are situated further and further away (even alienated) from the places of consumption, make the perception of those impacts difficult for consumers to perceive. However, as scientific evidence on phenomena like virtual water and telecoupled impacts becomes more widely available to policymakers, solutions to those pressing problems must be thought of in a way that considers this global interconnectedness and the responsibility they bring along.

While Payments for Ecosystem Services may not be an ideal way of fully compensating those impacts, they are a viable possibility of setting a monetary value that could induce more sustainable choices both on the production end (avoiding deforestation) as well as the consumption end (recognizing ES value by paying higher

prices). Virtual water is just one of many environmental variables that illustrate a small part of the socio-environmental complexities that international trade tampers with and measuring and compensating it is by no means the solution to the problem. It can however be a viable intermediary step to mitigate existing environmental imbalances and make use of already existing legal frameworks. In the future however, a more broad-scale arrangement for global environmental governance will be needed to find solutions to the wide array of environmental issues among countries of the Global South.

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Source: Available in: <https://www.shanghaimuseum.net/mu/frontend/pg/m/article/id/C100004992>.

Metamorphosis is not evolution,
not reform, not revolution,
not transformation, not crisis.
It signifies a different mode of change
and a different mode of existence.
Beck (2014, p. 90).

7. DISCUSSION: THE METAMORPHOSIS OF CHINESE ENVIRONMENTALISM

This thesis set out to investigate how a Chinese system of market-based conservation instruments is impacting the country's outlook on its ambitions to become an Ecological Civilization by mid-century. The theoretical bases to conduct this research lie in Beck's (1986) risk society theory and his building blocks for a sociological theory of metamorphosis (2016) set in motion in the face of global climate change. The original aim of this PhD research was to empirically test Beck's assumptions about the reconfiguration of actors and consider multi-scale and multi-actor dimensions as proposed by Ferreira and Barbi (FERREIRA; BARBI, 2016). In the course of the research (and much due to the pandemic restrictions) this scope was widened to include how these domestic changes may impact other countries in the future, especially those in the Global South. Hereby, some of the transborder elements in Beck's theory provided a red thread throughout the chapters on topics which traditionally hinge much more strongly on global environmental governance.

Building on the explorations of the Chinese development model through political economy, international relations theory and political sciences (WEINS; FERREIRA; FEODRIPPE, 2020), and sociological research conducted on climate governance in China (BARBI; FERREIRA; GUO, 2016), I fully agree with Zinda; Li and Liu's (2018, p. 867) assertion that China "summons" for environmental sociology. These approaches to China's "environmental entanglements" have led my way to looking at environmental governance issues in the emerging Asian superpower through risk sociology. The central role of the state in the orchestration of all types of (environmental) policies and politics, just like questions about the meanings of our experiences and aspirations as a world society in modernity have come up as recurring themes that need further exploration. The recent emergence of NbS and the global politics involved in both practice and discourse (QI; DAUVERGNE, 2022b) have further consolidated my conviction of approaching these problems through interdisciplinary perspectives but with the theoretical roots in environmental sociology.

A theoretical starting point of this research lies in a discussion of the adequacy of current sociological theories being able to explain China's "environmental turn" under Eco-Civilization. Certainly, in the development of environmental sociology as a discipline

it has expanded its field of vision to a wide array of ever more serious environmental issues since the 1970s. However, some elementary questions like those in the contributions of Illich (1973); Ophuls (1977) and Dunlap and Catton (1979) remain relevant until today. For instance, when raising a critical reflection about growth-dependency in Western capitalist civilization (OPHULS, 2011), questions about this dependency continues to be worth asking about China's Eco-Civilization, too, as they invite us to think not only analytically about specific issues in time but about philosophical and sociological imaginaries. Such imaginaries can be seen e.g. in the growing genre of sinofuturism where visions about ecological collapse, the responses to our disconnect with the natural environment as well as the increasing urbanization and dependence on built infrastructure are projected (GARE, 2016; LEK, 2022; SCHMITT, 2016; TIAN, 2023; WALSH et al., 2020). The role Eco-Civilization plays as a guiding framework for those visions is still under-researched while it already has real impacts on more than a billion people's lives and their environment.

The acceleration of modernity and the emergence of unprecedented risks and uncertainties associated with environmental problems marked the beginning of a denser discussion about socioenvironmental problems following the Earth Summit in Rio de Janeiro in 1992 (FERREIRA; VIOLA, 1996). The creation of the new frameworks like the three Rio conventions gave important impulses for sociologists, particularly in North America and Europe, to enter discussions that had previously largely been reserved for the environmental sciences. In the 1990s and early 2000s and in dialogue with the work of Anthony Giddens (2003) and Ulrich Beck (2003), now self-identified environmental sociologists like Yearley (1996); Mol and Spaargaaren (1993); Foster (2000), and Hannigan (2006) among others, brought the environmental discussion into the International Sociological Association (ISA). They made instrumental contributions about the science that informs responses to these risks, about local perceptions and global dimensions of the social construction of the environment. Theories like Ecological Modernization were widely received, tested and discussed (LIANG; MOL, 2013; MOL, 2006; MOL; SONNENFELD; SPAARGAREN, 2020). However, with these mostly male authors from the Global North often came a universal, normative, liberal character which made an increasing number of authors from the South call their validity into question. After

all, the predicted “end of history” after the fall of the Berlin Wall (FUKUYAMA, 1989) proved not to turn out to apply in the context of post-socialist (ERMOLAEVA, 2019; TANG, 1993; TOOKEY, 2007), African (BERGIUS; BENJAMINSEN; WIDGREN, 2018) and Latin American countries (FERREIRA, 2002; FERREIRA et al., 2006; ROMERO LANKAO, 2007). Saito (2023, p. 3) suggests that, similar to the change in the thought about the “end of history,” the environmental crises of the early 21st century around climate change, accompanied by drastic images of wildfires, heatwaves and extreme precipitation patterns seem to show how “the ‘end of nature’ dialectically turns into the ‘return of nature’.”

This return of nature has powerful implications for the social sciences that have long upheld human exceptionalism (FOSTER, 2012). Environmental sociology and other disciplines discussing socioenvironmental issues in and from the Global South have consistently criticized such exceptionalism e.g. in its dialogues with ecological economics, to point to the historical power relations that shape our relations with the environment and socially organize the benefits produced in this interaction (BERBÉS-BLÁZQUEZ; GONZÁLEZ; PASCUAL, 2016). In line with this, our discipline has also consistently articulated critiques of the above described normative state-market relations. As development models have been influenced in many diverse ways that go beyond technical fixes, neoliberal “modernization” and innovation through markets, we need to free ourselves from such paradigms and decolonize human-nature relations, especially around the topic of land (SANTOS, 2022).

In the ever more clearly evolving multipolar world order we are living in, environmental issues have become a centerpiece not only of national policy making but are finally agglutinating actors from all sectors on a global scale and urging them to cooperate in new ways around issues pertaining to the environment in ways in line with Beck’s ideas about a metamorphosis (2014, 2015, 2016; VARA, 2015). The High Seas Treaty, agreed upon by UN members in March 2023 (UN NEWS, 2023) can be seen as a piece of evidence for such global arrangements which have become more agreeable beyond national interests due to climate change.

Making use of existing sociological theories, I set out to test the building blocks for a theory of Metamorphosis proposed by Ulrich Beck. This framework is based on his theory of a global risk society that redefined the sociology of environmental issues in the

West. The important theoretical critiques the German sociologist brought forth since the end of 1980s have helped to reassess some of the foundations of social theory building in times of geological-scale human impacts on the planet that helps us navigate the triple planetary crisis of unprecedented climate change, biodiversity loss and pollution that will far outlast humanity. Therefore, central issues relevant to sociological research about climate policies lie in “the transformation of basic concepts and institutions established during the development of contemporary society” and the ways these changes are occurring (FERREIRA, 2020, p. 289). In the process of overcoming the currently still ideology of neoliberalism and its practical implications, new forms of transnational responsibility have emerged and are emerging around the world (FERREIRA; BARBI, 2023). We need to understand these from many different disciplines, vantage points but also cultural and historical perspectives. Environmental policies have become a prime example of the limitations of currently still dominant nation-state-centered theories in the social sciences. With an underlying understanding of risks in the Beckian sense, as being the result of multiscalar processes that arise from the organization and structure of societies that reflect their options of how to develop, the theoretical framework for this thesis makes an effort to work with multi-level theories from the South adapted to its circumstances. This makes the application of more multi-level and multi-actor governance approaches imperative (BELLINSON, 2018; BETSILL; BULKELEY, 2004; JÄNICKE, 2017). defining appropriate rules, institutions and modes of governance to meet these changes at different levels and scales and in enforcing the defined rules and regulations (BARBI; FERREIRA; GUO, 2016).

Another argument brought forth here is the centrality of cities in this process while recognized in the literature (GORDON; JOHNSON, 2018). When looking at the ways in which the responses to climate change are organized on the different levels of governance, an emerging empirical example are the networks forming around climate change issues that are de facto shaping the future of an urbanizing planet as a space of global governance beyond the nation state (BARBI; FERREIRA, 2013; BARBI; MACEDO, 2019; TORRES et al., 2021; WEINS, 2023). The techniques and policy ideas that circulate through those spaces can unveil power relations (OLIVEIRA, 2021; STONE; PORTO DE OLIVEIRA; PAL, 2020; VELLOZO; SANTOS; WEINS, 2022).

I argue here that the example of eco-compensation mechanisms in China's Construction of an Eco-Civilization is another central example that will, in the mid to long term, be indicative of how human-nature relations can be redefined much more drastically than previous experiments that have failed to meaningfully cause such a paradigm shift. Looking at environmental interventions outside of the traditionally normative liberal democratic contexts of the West, however, demands some fundamental rethinking and reconceptualizations. The underlying understanding of human agency on nature in Chinese environmentalism as opposed to dominant preservationist conceptions bears radical implications for our understanding of environmentalism globally (ZHU, 2022). Eco-Civilization as a concept that has emerged in a process of reinterpreting the country's historical relations with the environment (HANSEN; LI; SVARVERUD, 2018) and in "global dialogues across Marxism, earth systems science, and ecological economics produced ecodevelopmental logics central to" CPC environmental policies (LEMCHE; MILLER, 2019; RODENBIKER, 2021, p. 1942).

How this environmental modernity is constructed in China reflects some elements (albeit limited) of EMT but also builds its theoretical references for the legitimacy of CPC rule on (interpretations of) Western Marxist thought. For research about the politics of climate change in the national context (GIDDENS, 2009), it is fundamental to understand the history of domestic actor configurations (FERREIRA, 2020) but also understand the country's position in the global system as its identity is shaped by its international relations. When it comes to applying conventional or hegemonic, i.e. European theories to international dimensions of environmental issues, the explanatory power of e.g. EMT is often weak. When it advocates incremental changes to the existing systems through technological innovation and the decoupling of economic growth and industrial development from environmental damage, this presents nothing more than a cleaner industrial revolution (FOSTER, 2012; HOWES, 2009, p. 9). But researchers and politicians in China affirm repeatedly that Eco-Civilization is exactly not equal to green industrial civilization and even that it "has become the only choice to achieve sustainable development" (ZHANG, 2021, p. 509). Despite valid critiques of the Chinese approach to green development, e.g. for its focus on continued green growth and technology (GORON, 2018; HANSEN; LI; SVARVERUD, 2018), there are some important differences

in its approach through the overarching imaginary of Eco-Civilization that could provide environmental sociology (and any discipline concerned with the environment for that matter) with a fruitful South-South dialogue on the way to a more global and less eurocentric process of theory-building (HONG, 2007; HUA; FLINT, 2009; LIDSKOG; MOL; OOSTERVEER, 2015; WEINS; FERREIRA, 2020).

The study of the local context in Chongqing as an example of the tensions between conservation and development in China's development frontier region also illustrates the challenges in multi-level implementation of Eco-Civilization as a central guiding policy framework. Large-scale compensation policies all over the country are contributing to meeting national commitments and goals: in the North, the Great Green Wall "provides" forests for CO₂ emissions in China's biggest green lifestyle app, Ant Forest; in the Southwest the reservoir of the Three Gorges Dam demands large areas of slopeland to be forested to minimize sedimentation. Tree planting has become a politicized practice under Xi Jinping's motto "Green mountains and rivers are mountains of silver and gold" (lvshui qingshan jiushi jinshan yinshan 绿水青山就是金山银山) that expresses political loyalty of companies, local and city governments in China (HANSEN; LI; SVARVERUD, 2018; HANSON, 2019; ZHU; LO, 2022). Chongqing, as a hub for automotive and computer production and end-point of the BRI, evidence of urban paradiplomacy around tree planting is emerging (HU; TAN, 2022), weaving sub-national engagement into the global perspectives for the Eco-Civilization concept. As a domestic and international policy framework it will enable the country to match the self-confident global role it aspires to hold as a leader in the fight against climate change.

In the North Atlantic, discussions about China's rise often focus on strategic issues and the potential threat the East Asian giant poses to the hegemony of the US and the EU in the current world system. In the Global South, especially in countries of Latin America and Africa however, the perceptions of China's rise are (and should) more often be focused on the potentials for achieving their own modes of development and interpretations of modernity. In the "continuous restructuring of centre-periphery relations" (EISENSTADT, 2016, p. 325) in modern societies, there is a tendency to politicize the "demands of various sectors of society and the conflict between them" and the "continual struggle about the definition of the realm of the political" (EISENSTADT, 2016, p. 324).

There are complex changes happening in the country and Eco-Civilization is still a blindspot in the literature on environmental governance (CHEN; ZHAO, 2022). China's domestic forestry policies and the wider implications of its rise as a green superpower and proponent of an Ecological Civilization should be understood as a political possibility to redefine ideas about development. The metamorphosis taking place due to Eco-Civilization, even if they may not resemble Beck's eurocentric observations, offers new horizons of possibility for cooperation, dialogue and exchange of practices and (environmental) sociology is uniquely positioned to help mediate this process.

For this reason, a better understanding of Chinese thought on the environment and of current issues is necessary. Sociology as a largely Western discipline has been taken up and "indigenized" in several contexts of the Global South to fit local characteristics. In China, this went hand in hand with the resuscitation of historical elements as scientifically valid variables which had been banned from China during the Cultural Revolution (CHEN, 2018). When it comes to human impacts on the environment, there are central elements of human-nature relations that are too anthropocentric, deterritorialized and based on the assumption that there is a clear and complete separation of humanity from nature. Non-Western sociologists who have entered into dialogue with Chinese sociology (HUA; FLINT, 2009; ZINDA; LI; LIU, 2018), have observed the inadequacy of such assumptions for the explanation of a millennial culture like the Chinese. Fei Xiaotong (费孝通), for instance, affirmed that the bases of Chinese society come "from the soil" and this connection to the home village and hukou affect social phenomena even in times of rapid urbanization (FEI, 1992; 2015). Thus, current national policy initiatives like the "rural construction" movement (WEN et al., 2012) or the resurgence of Daoism as a "green religion" in modern China (LEMCHE; MILLER, 2019) need to be understood taking into account historical context. On the other hand, assumptions about what modernity is in China needs to also clearly recognize the role socialist institutions and the strong role of the central government play (HE, 2007). Some, such as Merle (2004), even go as far as suggesting China needs a Chinese Sociology of Communism to study the vastly different "communist civilisation" (gongchan zhuyi wenming 共产主义文明). Based on the understanding that the distinct historical

trajectories, one marked by capitalism, the other by communism, cannot be studied with the same precepts (MERLE, 2004).

These ideas may apply in large parts to the domestic implications of the umbrella topic of this thesis, Eco-Civilization, but there are also factors outside the national scope that play into how China's activities unfold globally and that may redefine human-nature relations, at least in the Global South (QI; DAUVERGNE, 2022a). In the context of an emergence of a more global and pluralized environmentalism in the 21st century, China's rise in the environmental policy sphere offers a wide field for reassessing our relationship with the environment (ZINDA; LI; LIU, 2018; ZHU, 2022). One such example lies in the country's embrace of Nature based Solutions (NbS). Nascent research into China's NbS policies reveal vastly different motivations and circumstances in its domestic strategy of large-scale tree planting and an "Eco-restructuring" (ZHU; LO, 2022) on the one hand and support for NbS in multilateral fora on the other (QI; DAUVERGNE, 2022b). While such "Chinese-style" NbS have been elaborated in close observation of and dialogue with the IUCN's global standard, which emphasizes certain governance norms, Qi and Dauvergne (2022b, p. 5) affirm that "distributional and procedural justice has largely been ignored in Chinese environmental projects" lacking "equitable compensation policies, a just process for transitioning workers, and meaningful public participation and consultation." Furthermore, the scale of application of NbS, in many cases limited to e.g. urban parks, is still small-scale (GOODWIN et al., 2023). With the Green BRI, the large-scale ecosystem modification and even landscape engineering Chinese scientific and political actors have been experimenting with at home for more than two decades are likely to be exported to countries that maintain good ties with the East Asian country (RODENBIKER, 2022; WEINS et al., 2023; ZHU, 2022).

Beck (1987, p. 67) suggests that the fundamental transformation of societies in second modernity, lies in the scientific sphere, in what he termed "political theory of knowledge". Oftentimes it is through policy consultancy and international development organizations that ideas are taken from one place and implemented in another. Ideas of how to reconcile the need for economic development with the ever more urgent need for the conservation of basic ecosystem functions and services, calls for a closer exploration of the way planning practices like eco-compensations and NbS travel around the world

and are adapted through “cosmopolitan communities of risk” (BECK, 2016, p. 169). Healey suggested that the narratives of what she calls “travelling planning ideas” need to be given attention not only in their micro-dynamics, but within the “wider structuring forces which create moments of opportunity and limits on inventive possibilities” (HEALEY, 2012, p. 196). The forms in which China-based and global institutions engage to shape and diffuse a new norm of NbS or eco-compensation in the Global South on different levels are only starting to take shape (ZHU et al., 2020). While UN institutions already have programs that would be compatible with global dialogues about Eco-Civilization, such as the “Harmony with Nature” initiated by Bolivia in 2009, distinctly Chinese policy frames are starting to appear in global environmental governance spaces and may function as a vehicle to promote such new, different or competing norms as “Chinese style NbS” in the near future. However, as the recent CBD COP15 under the motto “Ecological Civilization – Building a Shared Future for All Life on Earth” has shown, these spaces and the language of Eco-Civilization are not the only rhetorical umbrella for the country to pragmatically promote its interests (ZHU; WEINS; CHEN, 2022).

Despite great progress in terms of the restoration of degraded ecosystems and the provision of ES critical to rural livelihoods, many of China's sustainability and protected area programs have had limited contributions to the conservation of biodiversity (WU; KONG; JIN, 2019). This is also reflected in eco-compensation policies. While “biodiversity PES was the most concerned type of PES from 1999 to 2003, [...] it has obtained less and less academic attention since then” (YU et al., 2020, p. 4). In times of what the United Nations are calling a “triple crisis” of climate change, air pollution and biodiversity loss (UNFCCC, 2022), it is not enough to focus only on the carbon politics of climate change. The use of compensatory politics like PES has to support a wider understanding of the catastrophic implications of the sixth mass extinction and has to therefore make biodiversity conservation an integral part of conservation policies. The availability of carbon credits through market-based conservation tools cannot justify unsustainable production and consumption patterns, even if they are part of a broader green restructuring. Furthermore, the process of recovery of native forests needs to be emphasized more as the creation of large scale carbon sinks of non-native species with low complexity ecological interactions does not contribute to the globally agreed upon

biodiversity goals (HUA; XU; WILCOVE, 2018). Environmental sociology should focus e.g. on the “ontological politics of conservation” as they bring “new worlds, or new futures, to reality” (LOCKIE, 2023, p. 4) and move beyond Western dominated theories about human-nature relations (ZINDA; LI; LIU, 2018).

New theories for the South from the South need to be fortified in dialogue and applied (ROULLEAU-BERGER, 2011; 2021; ROULLEAU-BERGER et al., 2008). The endeavor of the “Construction of an Ecological Civilization” needs its own contextualized sociological understanding of historical and cultural dimensions. To understand the Chinese “Quest for a Sustainable Future” holds philosophical and religious dimensions (MILLER, 2017) and e.g. aspects of food consumption (HASE UETA, 2021; MARTINDALE, 2019; ZHANG, 2018). This is especially interesting in the current phase of the “indigenization” of ecological ideas in public discourse, making parallels of Daoist, Buddhist and Confucian texts to construct ecological cultural aspects as a historical continuation (HANSEN; LI; SVARVERUD, 2018; SCHMITT, 2016; WEN et al., 2012) and not only an adoption of (supposedly) neutral and apolitical foreign norms of sustainability.

Beck’s theoretical building blocks for a theory of Metamorphosis may not apply in their entirety to cases in the Global South but they open the door for the exploration of societal powers that can be unleashed as a result of the reconfiguration of centers of power (VARA, 2015). In a political moment of new beginnings in several countries of the region, Eco-Civilization may provide a green thread for the redefinition of China Latin America relations around environmental issues (CHEN Y., 2015; VILLA, 2022) and for reimagining this relationship in respectful ways to overcome colonial extractivist modes of cooperation and development.

This thesis has opened up a wide array of issues and questions that leave many possibilities for further research that I would encourage curious readers and researchers to follow up on:

First and foremost, more attention needs to be directed to non-Western theories about human-nature relations as suggested by Zinda and colleagues (2018). Environmental sociology as a discipline in China has developed “on the express lane” in recent years (HONG; GONG, 2015), especially in quantitative approaches to solve public policy issues.

More studies are needed to understand the connections between different levels of governance arrangements involving state and non-state actors to better comprehend the ways in which international norms and agreements are shaped to fit local needs. Dialogues across the Global South could contribute to theory building and a better understanding of national models in reference to others (FERREIRA; BARBI; BARBIERI, 2021).

Qualitative approaches that document, structure and situate changes in societal aspirations and imaginaries about “living in harmony with nature” in different political systems (and not only in liberal societies) are needed to widen the possibilities of understanding and cooperation.

One such entry for both quantitative and qualitative approaches to the issue could be through South-South studies of youth, environmental issues and/or the climate crisis. Surveys like the first Sino-Brazilian youth study on values, lifestyles and horizons provided important insights into (among others) the perceptions of environmental problems and willingness to act (DWYER, 2015; 2017). In combination with findings on sustainable nutrition (HASE UETA, 2021) or environmental movements (BARBIERI, 2020) provide extensive data and material for further discussion.

In terms of our understanding of Eco-Civilization as an environmental paradigm for China in the 21st century, more in-depth research into ecosocialism and ecological Marxism are necessary to understand e.g. the different role and configuration of interest groups, the socio-political organization of environmental exploration and production but also rhetoric inside the country as well as abroad. Several of the results of the analyses in this thesis are a starting point in research on ecosocialism (ZHU; LO, 2022). These approaches have been left unexplored in this thesis but may provide more answers to theory-building in CPC that are essential in discussions on Eco-Civilization (WANG, 2012).

Despite the growing difficulties in conducting such research on the ground, environmental justice aspects in China’s modernization and urbanization process have to be further discussed (MAH; WANG, 2017). While I explicitly oppose simply applying Western theories of rights and justice to the Chinese context, the inequalities between rural and urban should be further explored (ROAST, 2019; RODENBIKER, 2019). Hopes

and fears about the future direction of e.g. infrastructure development are being dealt with in Chinese literature and cinematographic productions (TIAN, 2023) but also need engagement with the social sciences.

Finally, the discussions proposed in this thesis have the objective to contribute to a more respectful dialogue and mutual understanding in Sino-Latin American relations. Global climate change has made clear that urgent action is needed but also that this action has to be collaborative. Between Latin America and China there is immense potential for dialogue about human-nature relations (CHEN Y., 2015; LING; PINHEIRO, 2014). The Eco-Civilization framework but also the theoretical ideas about the potential to unleash new forms of interactions in times of climate change provide useful structures for these discussions.

... [the] caterpillar of mankind is in the process of emerging from its cocoon, but it laments [its] disappearance because as yet it does not suspect the existence of the butterfly it is becoming. On the other hand, it could also happen that we trust too much in hope, as expressed by the German poet Hölderlin, that what saves us grows with the dangers we face.

(BECK, 2010, p. 264).

8. FINAL CONSIDERATIONS

Emerging from three years of pandemic restrictions in which life was transferred to the online sphere, the moment of concluding this thesis coincides with a moment of immense hope in Brazilian environmental circles²⁷. Hope for a better, less catastrophic future. Of course, generations of young and old before me have wished and longed for positive change. But following the reiterations in the literature I have been exposed to over the past four years, this moment in human history seems to be qualitatively different. We are living at the beginning of the sixth mass extinction, an event with implications that, I believe, we are not grasping just yet. The whole world is getting more and more used to extreme weather, radical disasters and a rise in temperature which still seems small, almost insignificant to those most responsible and in positions to significantly change these trends. Humanity is merging with digital communication technologies (the implications of which we also do not seem to comprehend) while moving into what looks like a third world war.

Environmentalists are known for alarmism or pessimism and this outlook really focuses on all the risks and dangers we are moving towards. As environmentalists, we know that such desperate wakeup calls will not cause the desired effect though. That is why we need to make an effort to look at things in a different light. I believe there is hope if we think of the potentials of the human species. These are evoked most often when we are faced with immediate dangers. A look at the development of China's forest cover over the past 20 years under the initially risk affirming discourse of Eco-Civilization affirms this. Having been taken up in the political sphere just 15 years ago, the idea of the Construction of an Ecological Civilization provides a much needed framework and positive civilizational outlook for rethinking the relationship between humans and nature. Eco-Civilization as an umbrella vision for a sustainable future has already brought lots of new topics and non-Western perspectives on environmentalism into the global discussion and with this thesis I would like to defend that it will do so even more in the coming years.

What drew me back to research on China only two years after concluding my undergraduate degree in East Asia studies, were its massive investments in the afforestation of watersheds, a topic I was introduced to in Brazil when looking for case

²⁷ See e.g. Rodrigues (2023).

studies applying payments for ecosystem services. Seeing the impressive numbers must have given me the hope that, if one country scales up its fight against climate change and biodiversity loss, others will soon follow suit. Indeed, carbon peak and carbon neutrality pledges by nations, organizations and companies trickled in at the end of the 2010s – if they are (fast) enough is a different discussion. For the sake of the discussions in this thesis, what is interesting is the direction of change and reorganizations of priorities we are witnessing. When China announced its carbon peak before 2030 and carbon neutrality by 2060, ten years after many major countries, valid criticism arose about the world's biggest CO₂ emitter's contributions being too little and too late.

Conducting research on China, especially when it is from outside, there are many contradictions in thought and in actions that can be difficult to comprehend at times. These contradictions, in a Marxist interpretation, can be seen “as the engine of progress” (CAMPOS, 2021, p. 1) or as a lack of contextual understanding. Sometimes the explanation of a contradiction lies in the future – in longer term planning than we are used to in short-cycle democracies –, sometimes it lies in the past - in reference and careful observation of historical events like epidemics, floods or a different understanding of what makes up the Chinese nation and its people. Most certainly, however, there is an inspiration and fascination when entering in dialogue with or reflecting about any issue related to China, especially when it comes to environmental issues.

Due to the still ongoing Covid pandemic, my plans for conducting extensive fieldwork in Chongqing were crossed and, much more than anticipated, this thesis ended up depending on “desk research”. The focus of my research had to shift from its planned domestic focus to the international level. Thanks to the untiring motivation of my co-supervisor in the Netherlands, the research and activist networks I have become part of and the generous and flexible support of FAPESP, I could participate in COP15. Even though the conference could not be held in Kunming²⁸, as originally planned, China maintained the CBD presidency and carefully weaved a final text for the post-2020 biodiversity framework (ZHU, 2023b; ZHU; WEINS; CHEN, 2022). Eco-Civilization featured in the conference title, the Chinese pavilion and associated events like the Nature-Culture Summit, but was much less present than expected by researchers (LU;

²⁸ The CBD COP15 was divided into two parts, see IISD (2021) for more.

MYXTER-IINO, 2023). In the midst of many other crises and the fear of the consequences of getting infected with Covid, it seems that Chinese diplomats and scientists were careful in using the opportunity of orchestrating the gathering of the convention but did not seem to seize the moment for using its soft power as an emerging environmental leader under the circumstances of hosting the COP in Montréal. These recent events have important implications for the global community as we negotiate the way out of the triple planetary crisis.

They also lead me to respond the question in the title of this thesis in the following way: while Eco-Civilization has become an important part of China's domestic policy ambitions and provides a positive vision which at times overlaps with global agendas like the sustainable development goals, associated norms like the wide implementation of eco-compensation mechanisms is not yet part of a global endeavor. Despite the relatively low-profile presence of Eco-Civilization on the global stage at this point, the possibility of changes in its language does not make it any less significant. Rather, the contrary is the case. The reliance on technological fixes and economic growth, i.e. not distancing this eco-utopian vision from economic growth may be one of the biggest drawbacks of Eco-Civilization, as pointed out by Hansen; Li and Svarverud (2018). Despite the growth rates in forest cover or the share of renewable energies, the aspirations for achieving a capitalist consumer lifestyle as a measure for development is problematic. The country's fossil-fuel-dominated energy mix has to be understood. It can certainly be attributed to the CPC's pragmatic style of governance that often considers stability against progress. As energy has once again shown to be a security issue with the 2022 invasion of Ukraine, sustainability concerns have also suffered all around the world. However, critiques in this direction voiced in the literature on ecosocialism in China (see Chapter 7), seem to remain a relatively local phenomenon and represent almost a niche perspective. Further research into this topic and unforeseeable future changes may prove this statement wrong.

Observing the main topic of discussion proposed in this thesis, eco-compensations are indicative of these contradictions. While China has seriously advanced the debates on multiple ecosystem values, the centrality of ECMs as part of wider development policies and the prioritization of economic values of nature in the execution

of compensation became clear for the case of Chongqing in the data analysis conducted in Chapter 4 of this thesis and also dominate my conclusions about the topic. Eco-compensations play a key role in the current and future ways China's development model evolves. Nonetheless, allowing for environmentally harmful policies and actions by relying too much on the compensability of damage rather than actual reduction of harmful impacts should call into question which kind of Eco-Civilization China's aspirations are based on. Albeit its rapid transformations, and in line with Beck's theoretical predictions about the potential of climate change for unleashing new ways of being in the world, eco-compensations in China's Eco-Civilization are at this moment still rather a cure of symptoms rather than the structural solution of the central problem we face in 21st century capitalism: reliance on growth and the still not internalized limits to growth.

When regarded in light of Beck's more optimistic ideas however, eco-compensations could also be appreciated as *positive side effects of bads* – as opposed to *negative side effects of goods* – generated by the institutions of modernity. The extensive application of ECMs throughout the country and the funds for reforestation or afforestation generated through them, have changed Chinese landscapes, potentially beyond the existence of the human species. Mountain tops that have been reforested twenty years ago offer any person a different, a greener sense of their environment they are living in. The regulating ecosystem services generated by such landscapes which include temperature and humidity, the provisioning services such as timber, fiber and fruit, but also the cultural services like recreation, connection and the psychological benefits such as a sense of calmness, generated by forested landscapes may, in the long run, outweigh the currently still dominant and externalizing logic of a carbon market that made its existence possible. These arguments become even more evident when looking at China's Great Green Wall which has transformed desert landscapes into rolling green hills. Notwithstanding the critiques on the use of monocultures and the loss of unique desert ecosystems through this landscape conversion, the implications for human-nature relations and the materialization of a human-made ecosystem at such a large scale are idiosyncratic of the Anthropocene. Furthermore, they may be adding a positive example to the long list of negative impacts we as humans have had on our planet in this new era of geological-scale consequences of our actions.

Beyond these specific discussions though, the main contribution this thesis aims to defend, lies in the theoretical approach to China's rise, its approach to the environment and therefore to global environmental governance. While environmental sociology provides important underpinnings for research into human-nature relations and the social construction of environmental problems and their solutions, the fact that most of the theory building still takes place in North America and Europe limits global debates and advances in the field. As pointed out by Zinda; Li and Liu (2018) in their article "China's summons for environmental sociology" and the editorial of *Environmental Sociology* (LOCKIE, 2023) so many of the domestic and international environmental issues surrounding China should be on more sociologists' research agendas. While some important foundations have been laid, the greater endeavor of understanding the global society (or societies) we live in through non-Western sociologies, will demand significantly more dialogues between countries of the Global South. For this, we need respectful dialogues as equals and a peaceful environment to be able to have these conversations.

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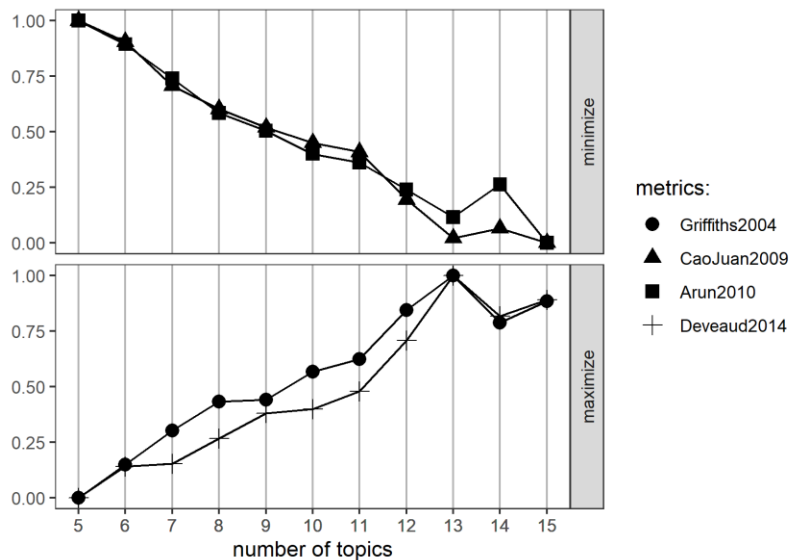
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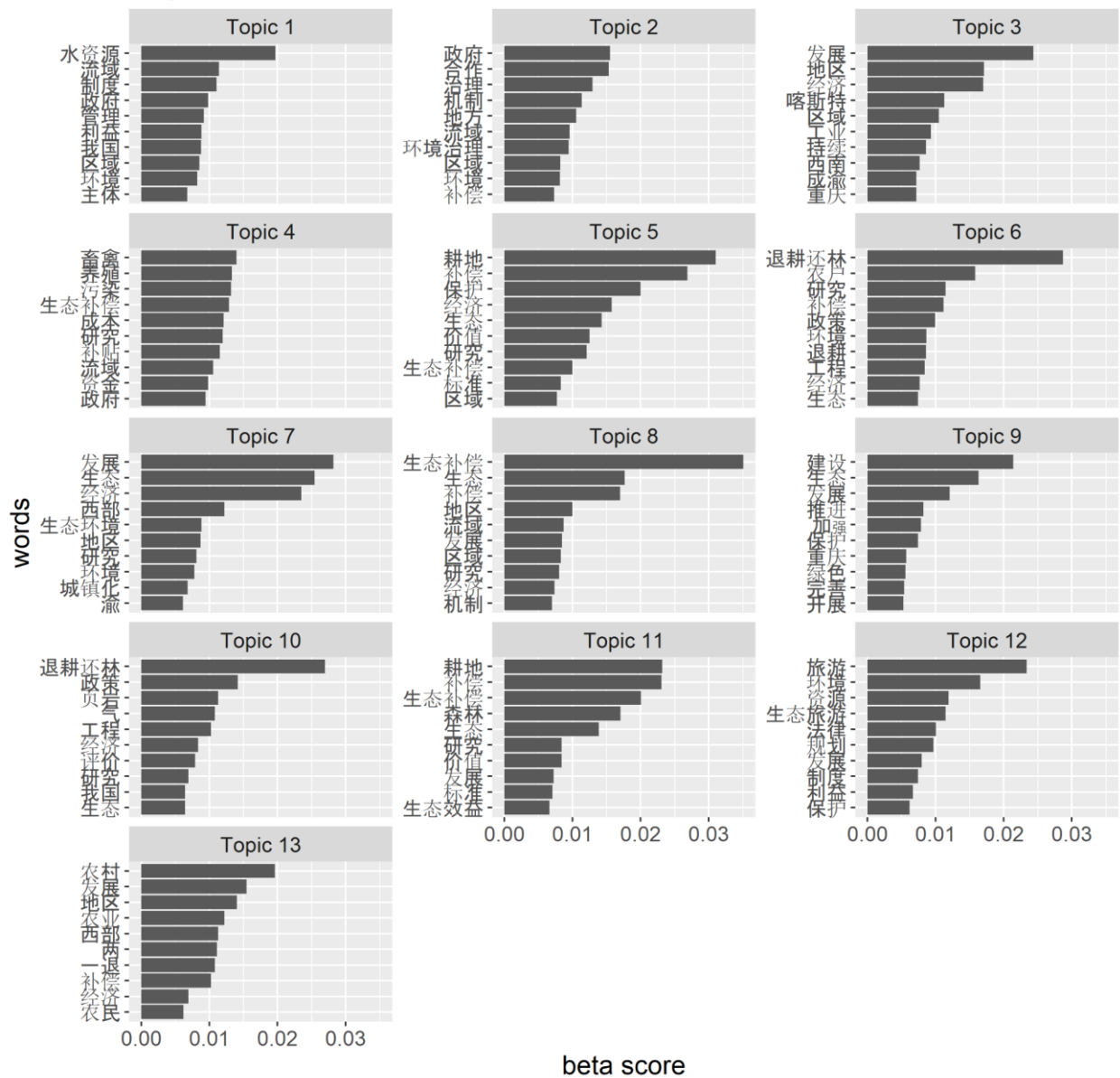
APPENDIX

APPENDIX 1 – Latent Dirichlet Analysis (LDA) Tuning Plot



APPENDIX 2 – Key terms in each topic in Chinese

Key words in each topic



APPENDIX 3 – Table with translation of the 13 topics

1. Water resource management	2. Governmental leadership in environmental governance
1. Water resources 2. Watershed 3. System 4. Government 5. Manage 6. Benefit 7. China 8. Area 9. Environment 10. Main part	1. Government 2. Cooperation 3. Govern 4. System 5. Place 6. Watershed 7. Environmental governance 8. Area 9. Environment 10. Compensation
3. Economic development in the Southwest	4. Agricultural practices and problems
1. Development 2. Local/region(al) 3. Economy 4. Karst rock 5. Area 6. Industry 7. Sustainable 8. Southwestern 9. Cheng-Yu cluster 10. Chongqing	1. Domestic animals 2. Breed 3. Pollution 4. Eco-compensation 5. Production cost 6. Research 7. Subsidize 8. Watershed 9. Funds/capital 10. Government
5. Compensation for conservation of arable land	6. Farmland in Grain for Green
1. Arable land 2. Compensation 3. Conservation 4. Economy 5. Ecological 6. Value 7. Research 8. Eco-compensation 9. Standard 10. Area	1. Grain for Green 2. Rural household 3. Research 4. Compensation 5. Government 6. Environment 7. Retire farmland 8. Construction project 9. Economy 10. Ecology
7. Economic and eco-development in Chongqing	8. Ecological compensation
1. Development 2. Ecological 3. Economy 4. Western area 5. Eco-environment 6. Area 7. Research 8. Environment 9. Urbanization 10. Yu/Chongqing	1. Eco-compensation 2. Ecology 3. Compensation 4. Area 5. Watershed 6. Development 7. District 8. Research 9. Economy 10. System
9. Ecological construction & Development	10. Natural resources and Grain for Green
1. Construction 2. Ecological 3. Development 4. Advance 5. Strengthen 6. Protect 7. Chongqing 8. Green 9. Refine 10. Launch/development	1. Grain for Green 2. Government 3. Shale 4. Gas 5. Construction project 6. Economy 7. Evaluate 8. Research 9. China 10. Ecology
11. Values of Forests & Arable land	12. Ecotourism
1. Arable land 2. Compensation 3. Eco-compensation 6. Research 7. Value 8. Development 9. Standard	1. Tourism 2. Environment 3. Resources 6. Plan 7. Development 8. System 9. Benefit

4. Forest 5. Ecology	10. Ecolog. benefit	4. Ecological tourism 5. Law	10. Conservation
13. Villages & the “Retire-1-receive-2” policy			
1. Village 2. Development 3. Area 4. Agriculture 5. Western area	6. [Receive] Two 7. Retire one 8. Compensation 9. Economic 10. Farmer		

ANNEX

Annex 1 – Publishing Authorization Taylor & Francis (Chapter 2)

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