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The future is local? Contextualizing municipal agendas on climate change in Chile

Rosa Lehmann [1,2,3]✉ and Alejandra Irigoyen Rios[1]✉

Social science literature on the political strategies used to mitigate and adapt to climate change has discussed the possibilities of local administrations and the multifaceted obstacles in their path. This case study looks at Chile, where debates about local climate agendas and policies have gained political relevance in recent years. It considers municipal administrations, with a focus on their agendas and the (potential) challenges they face. Building on the evaluation of literature, policy documents, and semi-structured interviews, the study concludes that local administrations have gained leeway for action due to changes in national regulation and integration into wider networks, but tight budgets for dedicated climate policies persist. The governance structures in which local climate agendas are embedded, as well as contextual constraints, reflect Chile's institutional and neoliberal politeconomic arrangements.

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LOCAL CLIMATE AGENDAS

Activities taken by administrative entities on the local scale to address environmental issues and the role they play in mitigating climate change or adapting to its consequences have increasingly gained attention, both in political debates and the social sciences[1–6]. Research vacillates between treating urban spaces as problems or solutions to environmental and climate change-related issues[7]. Most work has engaged with the local scale and urban spaces[8], discussing the role, possibilities, and constraints of local governments in environmental and climate policies and governance[5,9–14]. These studies point to the importance of context in understanding local climate agendas[15].

Although countries in Latin America and the Caribbean (LAC) account for less than 10% of global greenhouse gas (GHG) emissions, some of them have launched dedicated climate policies[16,17]. In Chile, rather recently, the notion of 'climate change' has gained significance in both public discourse and concrete experience, not least because of Chile's high incidence of water scarcity[18] and glacier melting[19]. Since the end of the Pinochet dictatorship, a growing environmental movement has mobilized against pollution caused by the pulp and paper industry[20] or by mining activities[21], as well as against water privatization[22,23] and has agitated for increased regulation, a call which was taken up markedly under the second government of Michelle Bachelet[24].

International accords, such as the Paris Agreement and the Nationally Determined Contributions, resulted in corresponding policies, including support for renewables and, in 2017, the implementation of carbon taxation on fossil fuel-based power plants with an installed capacity greater than 50 MW[25]. Chile's commitment to host the COP25 in 2019 (ultimately relocated to Madrid due to widespread social mobilizations against the neoliberal government of Sebastián Piñera) is also bound to regulations and policies addressing climate change, e.g., via the Framework Law on Climate Change (Ley Marco de Cambio Climático), the decision to decommission 18 out of the country's 28 coal fire power plants by 2025 and bet instead on Chile's huge capacity for wind and solar power generation to guarantee energy security[26], or the plan to build up an export market for green hydrogen products[25,27].

Local climate agendas are influenced by central government regulation; likewise, the Framework Law on Climate Change establishes a guideline for local governments. Although the legislative process dates back to 2018, the law was passed in June 2022 by the current government under President Gabriel Boric and Environment Minister Maria Rojas Corradi. This administration has been supported by a broad coalition of center-left groups, including environmental movements. Of particular importance for local climate agendas are governmental rhetoric about decentralization and the inclusion of actors and sectors on different institutional scales. The draft for a new Chilean constitution, although rejected in September 2022, also speaks to these political goals. The draft was supported by similar groups and contained a clear eco-centric vision and dedicated inscription of environmental and climate protection[28], as well as allowing for greater spatial and institutional distribution of power and responsibility[29].

While the Framework Law is widely considered a tool to decarbonize the country's electricity sector and make Chile climate resilient by 2050, it also prescribes local governments to address climate change. In the Chilean context, these local governments refer to the administration of the 346 municipalities or communes (comunas), although not all of them can be considered urban (that is, with a high density of population and core infrastructures). Against this background, we are interested in the possibilities and multifaceted obstacles of these local governments regarding climate change mitigation and adaptation. We ask: what are the particular agendas of local administrations? What challenges and possible strategies to address them do they perceive? And what does this mean for research on activities addressing climate change mitigation and adaptation on a local scale? We focus on subnational

[1]Heidelberg Center for Ibero-American Studies (HCIAS), Heidelberg University, Brunnengasse 1, 69117 Heidelberg, Germany. [2]Heidelberg Center for the Environment (HCE), Heidelberg University, Im Neuenheimer Feld 130.1, 69120 Heidelberg, Germany. [3]Institute of Geography, Heidelberg University, Im Neuenheimer Feld 348, 69120 Heidelberg, Germany. ✉email: rosa.lehmann@uni-heidelberg.de; alejandra.irigoyen@uni-heidelberg.de

Table 1. Quoted Interviews.

List of quoted interviews			
No.	Interviewees	Date	Format
I1	Public Officer Ministry of the Environment	May 30, 2022	In person
I2	Public Officer Municipality of Independencia	June 9, 2022	In person
I3	Public Officer Municipality of Temuco	June 15, 2022	In person
I4	Officer of the Chilean Association of Municipalities	October 21, 2022	In person
I5	Public Officer Municipality of Peñalolén	October 24, 2022	In person
I6	Public Officer Municipality of Renca	November 30, 2022	Online
I7	Public Officer Municipality of Providencia	May 11, 2023	In person
I8	Public Officer Municipality of Vitacura	May 12, 2023	In person

governments in urban spaces because of their relevance in the literature on what is referred to as urban or subnational climate governance[30,31], urban politics of climate change[32], or local climate agendas[2]. Before we present that literature, we briefly describe our methods.

METHODS

Case study and qualitative interviews

This work is designed as a qualitative case study[33]. Data was gathered via qualitative research methods[34] (Flick 2009), in particular, the analysis of policy documents[35] and nineteen semi-structured interviews conducted between May and November 2022, both online and in-person in Chile and with informed consent (see Table 1). Interview partners were selected on the basis of their relation to climate and environmental policies at the local scale. In particular, we interviewed representatives from municipal administrations to garner insight into their perspectives on local climate agendas and challenges. Interviewees were selected via two processes: initially, we identified municipalities that already had a Sustainable Energy and Climate Action Plan (SECAP) (Plan de Acción para el Clima y la Energía Sostenible), which were developed with the support of various organizations: Adapt Chile, Chilean Network of Municipalities Against Climate Change (Red Chilena de Municipios ante el Cambio Climático), International Urban Cooperation Program for LAC (Programa Internacional de Cooperación Urbana para América Latina y el Caribe (IUC-LAC)) under the initiative of the Global Covenant of Mayors for Climate & Energy (GCoM). Secondly, we looked at municipalities that were visible in Transnational Municipal Networks (TMNs), sometimes called climate clubs[36], which emerged in the context of the Rio+20 summit, like the global C40 Cities network and the GCoM. We also interviewed representatives from the central government, including officials from the Ministry of the Environment and the Ministry of Energy, as well as the Chilean Association of Municipalities (Asociación Chilena de Municipalidades), and the EU (because of their support for TMNs). Furthermore, expert interviews complement data. Interview questions concerned the agendas of local administration in regard to climate and environmental issues, the challenges they perceive, and possible strategies to address them. We evaluated the interviews using thematic coding[37] and triangulated the results with the literature. It is important to note that in line with our research questions, our interview partners are public officials from subnational and national governments or supranational and transnational organizations and, therefore, exclude the business and civil society sector.

CONCEPTUAL FRAMEWORK: URBAN SPACES AND SUBNATIONAL GOVERNMENTS

Urban environmental issues gained prominence in the 1970s. Chapter 9 of the Brundtland Report is tellingly titled "The Urban Challenge"[38]. Cities turned from being framed as a 'sustainability problem' (due to urban sprawl in the Global North, the growth of informal settlements in the Global South, and the cities' high greenhouse gas emissions) to becoming a 'sustainability solution'. Urban spaces came to be perceived as exactly the right sociospatial scale for working on environmental problems. If a city launches a successful program to cut emissions (e.g., in the transport sector), then CO2 emissions can be reduced significantly in a single stroke[7].

While the influence of local authorities in these processes varies (depending on how the political system distributes responsibilities) local governments are key to implementing sustainable development policies[39]. Local Agenda 21, finalized in the Earth Summit in Rio in 1992, highlights local authorities' role in implementing climate policies. The assumptions that local governments and governance are key to sustainable development are supported by the increase of local scale agendas of governments, civil society organizations, and businesses to address climate change[40] and by research that supports the idea of a subsidiary or policentric politics[41,42]. The corresponding literature highlights local authorities' administrative experience in addressing environmental impacts in the field of energy management, transport, and land-use planning, as well as their innovative measures and strategies to reduce climate impacts, for instance, via the support of small-scale projects to exemplify the costs and benefits of reducing greenhouse gas emissions[43]. Yet, the leeway of local actors and subnational governments, in particular, should not be overstated, because issues such as transportation and land-use planning require cross-scalar coordination and policies[41]. Further, areas of utmost importance in addressing climate change, such as energy, industrial policies, and corporate regulation, are simply beyond the control of subnational governments[44].

In general, the turn to the urban scale and local administrations further reflects processes of rescaling in light of globalization[45,46] and the reallocation of tasks to the subnational level in the neoliberal context[47]. In Latin America, neoliberal reforms from the 1980s onwards partly broke with the state-centered logic of the Fordist or developmental state[48], built on the involvement of more actors on different scales (local, municipal, national, inter/transnational), and different political actor groups (NGOs, unions, private business). Together with a particular neoliberal idea of the 'lean state', this inspired a diversification of responsibilities and the attribution of decision-making powers without necessarily providing the resources to fulfill them, particularly at the local, municipal scale[49–51]. Literature indicates that processes of rescaling, such as shifting responsibilities to 'the local', obscures obligations by actors on the inter/trans- and national scale, tends to overburden

municipal administrations with tasks and duties[52], and ignores power asymmetries and inequalities in urban spaces (e.g., refs. [44,51,53]). While gaining membership in a TMN, such as Local Governments for Sustainability (ICLEI) or the GCoM, can be a strategy for subnational governments to access resources for climate agendas[10,54], climate change is only one issue for local governments, co-existing with challenges related to demographic change, crime, natural disasters, risk, and waste management (e.g., refs. [51,55]). Municipal portfolios that increasingly (must) integrate climate and environmental policies might exceed local government resources and capacities for decision-making and resource management[7,51,54], in particular in regions further away from economic and political centers[10].

RESULTS: CHILEAN MUNICIPALITIES AND AGENDAS ON CLIMATE CHANGE

Municipalities are the smallest administrative subdivision in Chile. The country has 345 municipalities, also known as *comunas*, 52 of which are located in the Santiago Metropolitan Region. Municipalities operate independently from the executive government and are responsible for local administration. Although they are autonomous, they maintain a relationship of subordination and coordination with the central government. Municipalities have a double legal status: on the one hand, they form part of the State; on the other, they are autonomous, making their own decisions regarding their attributions and legal functions. They often have a difficult position in the centralized Chilean political system, since major decisions are taken on the national scale. The highest authority of the municipality is the mayor, who is directly elected by universal suffrage for a four-year term[56]. According to the Political Constitution, municipalities have their own legal identity and assets. Their objective is to satisfy the needs of the local community and to ensure their participation in the commune's economic, social, and cultural progress, as stated in Article 118[57]. Their finances come from three sources: their permanent revenues, the Fondo Común Municipal (Common Municipal Fund), and transfers from the central government[58]. The first two come mainly from land and vehicle taxes, municipal licenses, and waste taxes. The Common Municipal Fund is a scheme where each municipality must contribute a percentage of its income, and the sum of these contributions is redistributed among the municipalities in favor of those with the greatest deficit in their income[59].

Municipal administrations' budgets reflect their inhabitants' wealth. This "vicious circle of accumulation of territorial disadvantages"[60], p. 43) reproduces sociospatial inequalities. Certain municipalities of the Santiago metropolitan region have experienced a significant increase in their incomes due to commercial development and the presence of large shopping malls[51,60]. Revenue generated from commercial patents obtained by professionals, industry, and commerce also contributes to municipal prosperity. Vehicle taxes are tied to the number of cars, which tend to be more common in high-income municipalities, further boosting the revenue of the area. As a public officer of a lower-income municipality points out: "[…] there are municipalities where all families have two cars, so they have to pay for two license plates […], here generally families do not have a car." (I2). Urban development also impacts budgets. In the case of the municipality of Peñalolén, urban growth "[…] added to the arrival of supermarkets, malls, and more structured meeting points. The cost of capital gains or the value of the land has changed" (I5). Furthermore, differences in municipal income have generated inequalities in access to green spaces. The four highest-income municipalities in the Santiago Metropolitan Region have 32.2% of the total green space surface, while the four lowest-income municipalities have barely more than 4.1%[61]. It is important to highlight that the spatial distribution of lower- and higher-income municipalities in Greater Santiago is a legacy of authoritarian neoliberal or dictatorship-era policies aimed at homogenizing neighborhoods and breaking resistance through land regulation, forceful evictions, and the resettlement of poorer and potentially politically opposed households[60].

Local climate agendas

Chilean municipalities are increasingly affected by climate change and environmental pollution. The infamously high level of air pollution in Southern Chilean municipalities, such as Angol, Padre de las Casas, and Coyhaique, is a case in point[62]. The announcement of a water rationing plan in Santiago in 2022 and the expected 40% drop in water availability by 2070 is another[63]. Recently, municipalities started to openly promote sustainability. This is visible, for example, in the campaign programs of some mayoral candidates in the 2021 municipal elections. One interview partner highlights:

> "It was super fulfilling […] to see that the candidates managed to include climate actions in their campaign program. […] Many of them were elected to authorities, either at the councilor level or at the mayoral level. […] we realize that we have a group of local authorities who do understand that climate change is a reality and that they are called to lead processes at the local level" (I4).

However, as interview partners underscore, municipalities also address environmental issues without explicitly adopting a discourse on environmental or climate protection, for instance, when organizing garbage collection, waste management, and the maintenance of green areas. Further, agendas of subnational governments tend to be framed in relation to climate change, but include new strategies that also address 'environmental' issues.

Programs and networks

Local climate agendas differ in scope and scale and are closely linked to national regulation and institutions. For instance, 10 years ago, the Ministry of the Environment created the voluntary Municipal Environmental Certification System (Sistema de Certificación Ambiental) that allows municipalities to integrate the environmental factor into the infrastructure, personnel, internal procedures, and services provided by the municipality to the community, according to international standards such as ISO 14.001[64]. Currently, 94% of municipalities in the Metropolitan Region are part of this system, either already certified or in the process of attaining certification[65]. The system was exported to Paraguay, because "it is a program that works with few resources. So, these programs help a lot, especially for countries that do not have, or in their GDP dedicate 0.0001% to environmental issues." (I1)

Local climate agendas are related to national and transnational networks, such as the Chilean Network of Municipalities Against Climate Change (Red Chilena de Municipios ante el Cambio Climático). Its 'Agenda for Municipalities against Climate Change' advocates the integration of climate change adaptation and mitigation strategies into the management and planning of municipal territories in nine thematic areas: water, energy, ecosystems, health, transport and mobility, waste management, critical infrastructure, disaster risk management, culture, and identity, in contrast to the above mentioned[2]. Further networks are the Alliance for Climate Action (Alianza para la Acción Climática) and the Chilean Association of Municipalities (Asociación Chilena de Municipalidades). In addition to its representative tasks, the association chairs the National Consultative Committee of the GCoM and is a member of Mercociudades, ICLEI, and the C40 (all of which are TMNs with a focus on climate change mitigation and sustainability). The GCoM occasionally acts as an

external agent to support municipalities' climate plans, or, as a public officer states: the network is "like an external organization that comes to tell you or validate that your plan makes sense" (I5). Several municipalities that have developed climate plans and are part of a TMN, such as Vitacura, Penalolén, Independencia, in the Sanitago Metropolitan Region, and San Pedro de La Paz and Temuco in the South are among those most often mentioned in debates about local climate agendas. Peñalolén and Independencia have mayors who have been prominent guests in the C40 World Mayors Summit. As Renca's mayor Claudio Castro, the only Chilean mayor to attend the COP26 in Glasgow in 2021, states: "It is not impossible for municipalities classified as poor, to generate environmental alliances"[66]. Renca has a free electric transportation system for the elderly, as well as a network of parks with native plants with low water consumption and a project to install photovoltaic panels to supply three schools in the commune[67]. Renca attributes its success to the willingness of the municipality to take on

> "challenges that municipalities generally do not take on. Municipalities are often immersed in contingency and emergency. Picking up trash is urgent and it is a priority that it be done every day. The maintenance of green areas is a priority and must be done every day. Waste management must be done every day; the collection of valuable waste must be done" (I6).

In 2022, Renca was one of three municipalities of Chile competing for the position of the most sustainable municipality in the We Love Cities contest of the World Wildlife Fund (WWF). Its competitors were the municipalities of Peñalolen, with its Quebrada de Macul Park as a Municipal Natural Reserve, the installation of bike lanes and access to electric bus corridors to help reduce the emissions from the transportation sector, and Providence, with its Energy Strategy, which includes the installation of various solar energy production plants, the first urban microgrid of local energy, as well as their water resource strategy, which consists of switching grass for low-water flowers, among others.

Regulation

Several formal institutions are relevant for local climate policies: The Ministry of Environment, the Environmental Assessment Service (SEA), and the Superintendence of the Environment (SMA) in 2010[68]. The enactment of Law 19.300 on General Bases of the Environment (Ley Sobre Bases Generales Del Medio Ambiente) in 1994 created a framework to facilitate decontamination plans and secure the process of assessing the environmental effects of business and services. Under this law, municipalities are required to address community complaints and engage with public opinion regarding the studies and projects that impact their region[69].

The new Framework Law establishes responsibilities and obligations. It advocates decentralized governance and participation at different institutional scales. On the national scale, the law proposes sharing this responsibility among 17 ministries, and regional and local governments. At the national scale, the law establishes the Ministry of the Environment as the entity responsible for environmental policy and its regulation, and also acknowledges the Autoridades Sectoriales (Sectoral Authorities), the Consejo de Ministros para la Sustentabilidad y el Cambio Climático (Ministerial Council for Sustainability and Climate Change), the Comité Científico Asesor para el Cambio Climático (Scientific Advisory Comitee), and the Consejo Nacional para la Sustentabilidad y el Cambio Climático (National Council for Sustainability and Climate Change). Concerning regional agencies, the law recognizes the Secretarias Regionales Ministeriales (Regional Ministerial Secretariates), which are decentralized agencies of the ministries.

Decentralizing responsibilities are expressed under Article 22, which suggests the implementation of different collaborating institutions that, in some cases, predate the law's enactment. First, the Equipo Técnico Interministerial para el Cambio Climático (ETIC, Interministerial Technical Team for Climate Change), an entity formed by various ministries, followed by the Comites Regionales de Cambio Climatico (CORECC, Regional Climate Change Commitees), which aim at implementing climate change policies and actions at the regional and municipal level. The CORECC is made up of delegates from organizations on multiple institutional scales, among them, two representatives of regional municipalities and civil society representatives. Further, the law recognizes municipalities as responsible entities at a local level. Municipalities are allowed to act independently or within municipal associations, as well as in collaboration with the CORECCs. Lastly, Mesas Territoriales de Accion por el Clima (Territorial Climate Action Boards), organized by municipalities in coordination with the CORECCs, will be made up of representatives of civil society and, especially, members of vulnerable groups. The Mesas Territoriales aims to propose and prioritize urgent issues to be implemented in their territories.

The law contains three management instruments. The Estrategia Climática de Largo Plazo (Long-term Climate Strategy) is designed for 30 years' perspective to fulfill the laws' objective and integrates the National Determined Contributions (NDCs), Planes Sectoriales de Mitigación (Sectoral Mitigation Plans), and Planes Sectoriales de Adaptación (Sectoral Adaptation Plans). On a smaller scale, there are Planes de Acción Regional de Cambio Climático (Regional Climate Change Action Plans), which determine the objectives and instruments for climate change management at a regional and local level. Finally, the law defines the Planes de Acción Comunal de Cambio Climático (Comunal Climate Change Action Plans), which should be elaborated by the municipalities.

The law determines that municipalities must address climate change in their plans, programs, and ordinances. Moreover, Article 12 states that Planes de Acción Comunal de Cambio Climático should consider: their vulnerability to potential impacts of climate change; mitigation and adaptation measures, including the identification of funding sources; and a detailed description of said measures, with implementation deadlines and a allocation of responsibilities. Lastly, the action plan should specify monitoring, assessment, and reporting indicators of the measures. The action plan must be developed within three years of the law's publication. It is important to note the law includes a sanction for non-compliance with Article 12. The fine corresponds to the monthly salary of the recalcitrant municipality's mayor.

The national and regional agencies stated in the law already existed and were previously recognized in the Plan Nacional de Adaptation al Cambio Climatico (National Climate Change Adaptation Plan) approved on December 1, 2014. This is the case for the collaborating organizations as well. Yet, the new climate law institutionalizes rules that existed but were not mandatory. This is also reflected in the Comunal Climate Change Action Plans (Planes de Acción Comunal de Cambio Climático) that municipalities must developed, including adaptation and mitigation strategies. Some municipalities have elaborated this plan previously and need to update it. "Today Chile has the Climate Change Framework Law that obliges subnational governments to develop the Adaptation and Resilience Plan. What we now have as a challenge […] ultimately it will be an update of our Local Climate Change Plan" (I6). Importantly, there is no methodological guideline to develop the plans yet.

Yet, other municipalities need to develop plans from scratch, and some initiatives like the Chilean Association of Municipalities cannot finance them but, as its official states, "we know the people

who have the know-how in this" (I4). Some municipalities with advanced climate agendas seek to achieve a balance with the new plans of the law. "What we have been doing is always in pursuit of the conservation of our ecosystems and the local services that we are promoting in the community, which is also exactly what we are talking about, when we make a Climate Change Law" (I8). Some municipalities with high levels of pollution as Temuco used these emergency situations as motivation to develop strategic plans. It is important to mention that Communal Climate Change Action Plans have a binding character under the new Law. It will be feasible for high-income municipalities to comply with their action plans, which, as discussed, they have already elaborated in many cases, but the real challenge will be for vulnerable and low-income municipalities. These challenges were not addressed in the law.

Perspectives of local climate agendas

Scholarly literature agrees that perspectives on local climate agendas are highly contextual[2,15], depending on factors such as the availability of information and resources[13]. Based on our interviews, we highlight 6 aspects. First, for the Chilean case, the role of mayors seems crucial. "The municipalities that advance the most in Chile are because they have had political will. Mayor Leitao, Mayor Duran, Mayor Castro who is from Renca […] we always find the same mayors. And why? Because they are the most interested" (I4). In the case of Peñalolén, this resulted in an increase of staff in the environmental department.

Second, lack of data hinders municipalities' ability to formulate targeted policies. One public officer pointedly states:

> "[.] I think we all know that it would be tremendously beneficial to replace all grass areas with low-water-consumption species. This is, for example, a measure that is almost obvious. But the question that any investor is going to ask you is, how much water are you going to save? And how long will it take for me to see the economic benefit of the investment […]" (I7).

Third, resources condition local climate agendas. Integrating climate issues still seems to be a privilege reserved for municipalities with sufficient resources and budgets earmarked for a specific purpose, as one interview partner explains: "In addition to the budget for the professionals, of the nine professionals, we also have a budget to finance activities, but they are mainly dissemination activities. For example, campaign, advertising, these types of things. But for important projects, we don't have a budget" (I3). Few municipalities have up-to-date tools for land-use planning and land management, including tools that acknowledge an ecological dimension to improving green areas. Daily issues such as waste and pollution further often seem more pressing. "The day to day is so hard in the municipalities that it prevents them from getting involved in these issues that can often be seen as elite or as a more sophisticated challenge or that we address the problem of climate change not today, but tomorrow" (I4). Programs that target recycling and corresponding education often present challenges "[…] the challenge is to integrate climate issues in more complex territories, because normally an elite is generated […] municipalities that have money are going to be there" (I1). However, some interview partners state that low resources in municipalities can also be used as an excuse not to address climate issues since there are several alliances and networks that provide support with financing, personnel, and guides. "There is always a way to finance it. […] economic resources are not; today, they are not an excuse for not doing something. So, there is an opportunity, a challenge, that is somehow not being performed" (I4). The municipal budget for environment and climate issues – while information is difficult to access – can be very low to non-existent. In some cases, the budget for environmental and climate concerns is part of other municipal units or areas[68].

Fourth, climate agendas focus on adaptation strategies for various reasons. "[…] we seek to adapt. Without leaving mitigation aside, but let's think about a percentage, it would be 80%, even up to 90% adaptation and 10% mitigation. Without prejudice to the fact that both elements feed each other" (I1). Especially vulnerable municipalities with low or no budgets do not include mitigation agendas. In addition, mitigation strategies often require the approval of national authorities; therefore, municipalities give preference to policies under their direct control. The elaboration of mitigation plans requires a qualified technical team, particularly for the quantification of emissions. These limitations may raise concerns about the three-year time frame the law gives to elaborate the action plans and their implementations.

Fifth, several municipalities lack an institution or department to manage environmental issues independently. Often, these matters are managed by other departments such as those responsible for Community Development[68].

> "The department where we are, is called the Department of Environment, Cleaning and Landscaping, and it receives resources annually. We have a budget, but usually almost all of it goes to paying for the cleaning service. […] The Department of the Environment, basically what it has as permanent, is the payment of salaries of the officials who work here, but we don't have anything more than that" (I2).

Sixth, the situation that municipalities are autonomous but, on the other hand, depend on the central state leads to some sort of blockades. For instance, The Ministry of Energy promoted the creation of Estrategias Energéticas Locales (Local Energy Strategies), which seek to involve citizens and generate decentralized energy, allowing municipalities to make use of their own energy resources[70]. The program Comuna Energética (Energy Comune) was created in this context, to support municipalities in the transition towards sustainable energy development in their territories, however, municipalities in this arrangement lack direct legal power to carry out energy efficiency efforts in the communes[68] and must therefore coordinate with the central government.

DISCUSSION AND OUTLOOK

The results presented here clearly indicate the relevance of local climate agendas in Chile. Our data show that local administrations have gained leeway for action due to changes in national regulation and their integration into transnational and national networks. However, the persistence of tight budgets and the sociospatial inequalities, which the funding mechanism seems unable to remedy, present a crucial challenge to the implementation of local climate agendas. Our results further indicate that the priorities chosen for policies and programs appear not to cover the full necessities and ideas for effective climate change mitigation and adaptation local administrations identify. Yet, there are some 'lighthouse' municipalities whose broad climate agendas are the result of the political will to apply for and access resources the government offers. Thus, financial resources and respective political room for maneuver seem to depend on the local administration's ability to apply for and manage financial resources offered via government programs. This is ambivalent since this does indeed support municipalities supporting environmental and climate-related activities; on the other hand, it might hinder or disadvantage municipalities with fewer 'initial' resources and fewer capacities to attract personnel and funding, albeit this applies to every aspect of municipal administration and tasks. With the regulation in the new Framework, which obligates

municipalities to develop climate plans, the challenges will be present for all municipalities in Chile.

As such, the shape, design, and challenges of local climate agendas reflect and are embedded in Chile's institutional and politeconomic arrangements. Individual commitment to the creation of resources is valued more highly than the provision of a sufficient budget, and the differences between poorer and richer municipalities are left unaddressed, even if compensation payments are not negligible. Although this concern was not discussed in the interviews, it is problematic from a climate perspective that it is precisely the richer neighborhoods, often with multiple cars per household, that produce more emissions, whose administrations have more funds for the subsequent mitigation of emissions. In this sense, our findings reflect scholarly debates that a focus on local climate agendas might shift the focus away from global and national distribution issues[44,52].

Further, our findings need to be contextualized in current debates in Chile around the decentralization of governance. The instantiation of certain mechanisms in the new Framework Law speaks to this, and it is too early to judge if the regional and local scales are strengthened and if this strength also concerns sovereignty over budget or even energy issues. In general, no regulation setting out rules and ordinances for the execution of the law is yet in place.

Research needs to follow local climate agendas with a critical study of how responsibilities and resources can be allocated. Possible further lines of inquiry could address the role that transnational fora and actors on the inter/transnational scale play in supporting or impeding this process, how participation processes work across different scales; and the perception of climate policies by different actors, including not only governmental authorities, but also business and civil society actors such as neighborhood committees. These are actor groups we did not include in our research design since we were interested in the perspectives of local agendas from the perspective of public officials, but identifying their perspective on climate plans and the corresponding challenges would surely enrich our understanding of how to address climate change in local contexts.

DATA AVAILABILITY

We confirm that all relevant data are available from the authors with the restriction that we must guarantee the anonymity of the interviewees.

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R.L. and A.I.R. contributed to substantial contributions to the conception or design of the work or the acquisition, analysis or interpretation of the data, drafting the work or revising it critically for important intellectual content, final approval of the completed version, accountability for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Correspondence and requests for materials should be addressed to Rosa Lehmann or Alejandra Irigoyen Rios.

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