



Gender into Urban Climate Change Initiative

Status Quo of Pilot Cities

Mexico City and Tlaxcala



Status Quo of Pilot Cities: Mexico City and Tlaxcala

Gender Equity: Citizenship, Work and Family A.C. 2019.

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1. OVERVIEW

Equidad de Género, Ciudadanía, Trabajo y Familia, AC (Equidad) Gender Equity, Citizenship, Work and Family, A.C.) is a Mexican civil society organization dedicated to promoting equality between women and men. Its guiding principles are equality, fairness and non-discrimination. This has allowed it to become a reference in the mainstreaming of the gender perspective in public programs and budgets, and to include the perspective of gender and sexual health and reproductive rights in the analysis of sustainable development, and climate change, always within the framework of human rights and equality between women and men. Equidad works considering sustainability as an alternative paradigm that integrates intergenerational solidarity and the economic, social and environmental dimensions in a balanced way. The goal is to transform the current development model by addressing the structural causes that generate and reproduce inequalities, limit the full exercise of human rights and degrade the environment.

In the international arena, Equidad is part of various networks and groups. It stands out for its role as a member of the United Nations Economic and Social Council (ECOSOC) and its role as one of the eight Organizing Partners (OPs) of the Women's Major Group, actively participating in the 2030 Agenda. It also coordinates the Women's Working Group on Financing for Development, and as a member of the Women and Gender Constituency of the United Nations Framework Convention on Climate Change (WGC-UNFCCC), promotes coherence between the three decision-making negotiating platforms for the Agenda.

With respect to the latter, Equidad has been participating since 2013 in the Conference of Parties (COP) of the UNFCCC, accompanying the negotiation process and promoting a coherent and inclusive framework encouraging environmental sustainability while recognizing the human rights framework, gender equality and the strengthening of the State, as well as transparency and accountability.

Equidad has been part of advocacy teams in formal negotiations to propose content in the implementation of the Paris Agreement and its Decision, as well as in its secondary instruments. Thanks to this expertise, the organization was invited to join the Gender into Urban Climate Change Initiative project, as part of which it proposed its implementation in two cities in Mexico.

The Gender into Urban Climate Change Initiative project is financially supported by the International Climate Initiative (IKI, for its German acronym) and managed by GenderCC - Women for Climate



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Justice. It currently operates in 12 cities in India, Indonesia, and South Africa, with the aim of transferring and fostering skills and know-how for evaluating and monitoring urban climate change policies, as well as increasing the participation of women and socioeconomic disadvantaged population groups, implementing pilot actions and dissemination campaigns, and introducing concrete policy strategies and measures for gender-sensitive mitigation and adaptation.

This project aims to integrate the gender perspective into climate policy through methodical approaches and their practical application. It is based on the premise that it is essential to incorporate the gender perspective into urban planning in order to improve cities' resilience to the impacts of climate change; for achieving this, it applies the Gender Assessment and Monitoring of Mitigation and Adaptation (GAMMA) methodology, which consists of three stages of evaluation of climate policies and actions, and is accompanied by capacity-building workshops and a media campaign to disseminate the results.

In the Mexican case, it was chosen to work with cities that differ in their level of appropriation and formalization of the gender perspective in their programs and public policies, with the interest of showing how the methodology can be applied in different contexts coinciding in the objective of incorporating the gender perspective in climate change mitigation and adaptation measures in cities. It is important to mention that the work proposal for Mexico will be differentiated from the rest of the participating partners due to the level of political dialogue between those who operate the project and the authorities of the two proposed cities.

Given the numerous differences between the country's territories, cities with institutional frameworks of different complexity and different degrees of experience in mainstreaming the gender perspective were particularly valued, leading us to prioritize those in which Equidad has presence and work experience. As a result of this evaluation, Mexico City and Tlaxcala de Xicohténcatl were chosen as pilot cities.

Mexico City's path towards gender equality is well recognized, and it represents the national vanguard. In that sense, as an organization, Equidad has strengthened advocacy processes in public policy, and we consider it pertinent to make synergies in our expertise and seek to influence urban policies on climate change.

On the other hand, although the city of Tlaxcala does not have the same local civil society organizations' capacity for advocacy, it does make multiple efforts to incorporate the gender

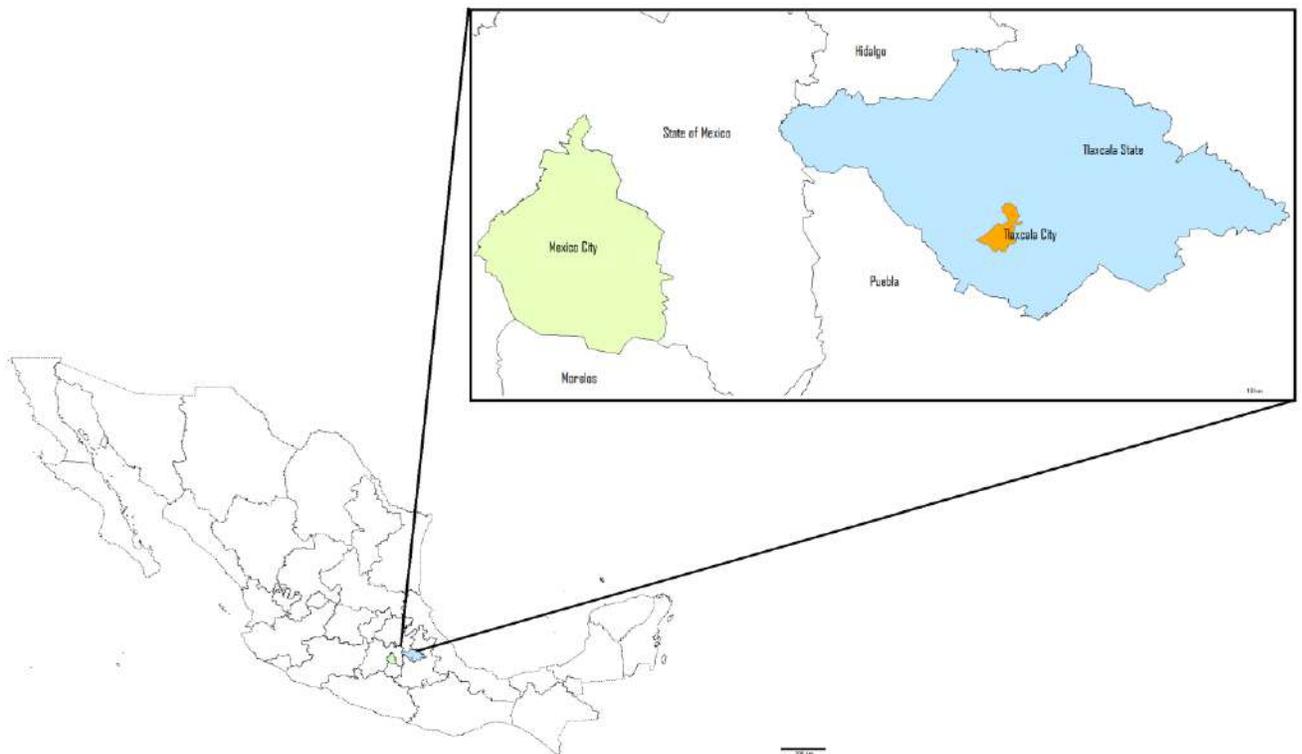


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perspective within its institutions, regulatory framework, plans and public programs, particularly in the field of climate change.

Thus, this first document presents the context of the two cities where the project will be implemented, in terms of socio-demographic data, particular effects of climate change, greenhouse gas emissions and the implementation of public policies related to climate change and gender mainstreaming.

MAP 1. PILOT CITIES



Source: Own elaboration based on INEGI, Mexico's Digital Map.

Note: Scale equal to 200 km and 10 km.



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2. NATIONAL FRAMEWORK RELATED TO CLIMATE CHANGE AND GENDER

2.1. *Climate change policy framework*

There is a concrete national framework for climate change as a result of Mexico's participation in the international conferences on climate change. Also, the country has a specific national framework for climate change, where State commitments and measures are articulated. In 2012, the General Law on Climate Change was enacted (Diario Oficial de la Federación, 2012); it is the national public policy guiding instrument for environmental protection, sustainable development, and preservation and restoration of ecological balance. In order to comply with this law, the creation of the National Climate Change System, the Inter-Ministerial Commission on Climate Change and the National Institute of Ecology and Climate Change was decreed, and national planning instruments, such as the National Climate Change Strategy and the Special Climate Change Program were established, and operate at federal, state and municipal levels (SEMARNAT, 2014) (Government of the Republic, 2013).¹

These components are briefly described below according to their classification in the Mexican institutional framework. In order to regulate and promote climate change policy and to determine the scope, content, obligations and powers of the three levels of government, in addition to institutional mechanisms, the **General Law on Climate Change (LGCC) (2012)** was enacted, aiming to: I. Guarantee the right to a healthy environment and establish the concurrence of powers of the federation, the states and municipalities in the development and implementation of public policies for the adaptation to climate change and the mitigation of emissions of greenhouse gases and compounds; II. Regulate emissions of greenhouse gases and compounds [...]. III. Regulate actions for mitigation and adaptation to climate change. IV. Reduce the vulnerability of the country's population and ecosystems against the adverse effects of climate change, as well as create and strengthen national capacities to respond to the phenomenon. V. Promote education, research, development and transfer of technology, innovation, and dissemination in terms of adaptation and mitigation to climate change. VI. Establish the bases for the agreement with society. VII. Promote the transition towards a competitive, sustainable, low carbon economy and resilient to extreme

¹ These programs include the projection of the constitutional periods corresponding to the federal and state administrations, and forecasts for ten, twenty and forty years, as determined in the National Strategy.



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hydrometeorological phenomena associated with climate change and VIII. Establish the bases for Mexico to contribute to the fulfillment of the Paris Agreement [...].

For the coordination between the different orders of government and the public, private and social sectors, the integration of the **National System of Climate Change (SINACC)** is mandated, which will serve as a permanent mechanism for concurrence, communication, collaboration, coordination and agreement on the national climate change policy and the mainstreaming of the national climate change policy in the short, medium and long term.

For the operationalization, the **Inter-secretarial Commission on Climate Change (CICC)** is established, which is composed of the heads of the Secretariats of Environment and Natural Resources, Agriculture, Health, Communications and Transport, Economy, Tourism, Social Development, Government, Navy, Energy, Education, Finance, Foreign Affairs, and Territorial and Urban Development. Among its objectives and functions are: to coordinate the actions of the various agencies and entities of the federal public administration in order to formulate and implement national policies for the mitigation of and adaptation to climate change; to develop criteria for the mainstreaming and integration of such public policies; to approve the National Climate Change Strategy, and to participate in the preparation and implementation of the Special Climate Change Program. This Commission has its counterpart representatives at state level.

The **National Institute of Ecology and Climate Change (INECC)**, a decentralized public body of the federal public administration (sectorized in the Ministry of Environment and Natural Resources), was created to I. Coordinate and carry out studies and projects of scientific or technological research on change climate change, protection of the environment and preservation and restoration of the ecological balance; II. Provide technical and scientific support to the secretariat to formulate, conduct and evaluate the national policy on ecological balance and protection of the environment; III. Promote and disseminate criteria, methodologies and technologies for the conservation and sustainable use of natural resources; IV. Assist in the preparation of qualified human resources, in order to address the national problems with regard to the environment and climate change; V. Collaborate in the preparation of strategies, plans, programs, instruments, contributions determined at the national level and actions related to sustainable development, the environment and climate change [...]; IV. Evaluate the fulfillment of the adaptation and mitigation objectives foreseen in the law, as well as the goals and actions contained in the National Strategy, the Program



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and the programs of the federative entities (states) referred to in this regulation, and VII. Issue recommendations on policies and actions to mitigate or adapt to climate change.

To guide all these actions, a roadmap of federal, state and local actions against the effects of climate change is established and supported, based on the following instruments:

The **National Climate Change Strategy (2013)** is the governing instrument of national policy in the medium and long term to face the effects of climate change and move towards a competitive, sustainable and low carbon economy. It is prepared by the Ministry of Environment and Natural Resources, approved by the CICC and reviewed every ten years in the matter of mitigation and every six years in the matter of adaptation.

The **Climate Change Program (PECC, by its Spanish acronym) 2014-2018** is the most important instrument of climate change policies; it establishes the objectives, strategies, actions and goals to address climate change by defining priorities in terms of adaptation, mitigation, research, as well as the assignment of responsibilities, times of execution, coordination of actions and results and estimation of costs, in accordance with the National Climate Change Strategy. Through this program, Mexico seeks to demonstrate that it is possible to mitigate GHG emissions, without compromising development. In a long-term vision, the PECC sets as a goal to reduce 50% of its GHG emissions by the year 2050 in relation to the year 2000 and a flexible convergence towards a global average of emissions per capita of 2.8 tons of CO₂ eq in 2050 (SEMARNAT, 2014).

According to the PECC 2014-2018, among the instruments that serve to operationalize national, state and municipal planning on climate change are “[...] the National Risk Atlas, which integrates gender indicators, the National Vulnerability Atlas, the National Emissions Inventory, the National Emissions Registry, the Mexican Official Standards, the Information System on Climate Change and the financial, market and economic instruments, such as the carbon tax, the voluntary emissions trading system and the Climate Change Fund. ”

The **National Risk Atlas** is the comprehensive information system on disruptive agents and expected damage, resulting from a spatial and temporal analysis of the interaction between hazards, vulnerability and the degree of exposure of the affected agents. This Atlas is also presented for the different states and by municipalities in areas of vulnerability.



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The **National Vulnerability Atlas** is an instrument that shows territorial vulnerability to climate change through geo-referenced tools, allows the implementation of strategies for the adaptation process, and serve as an input for decision-making in development planning in Mexico, at national, state and municipal levels.

National Inventory of Emissions of Greenhouse Gases and Compounds contains the estimation of anthropogenic emissions of greenhouse gases and compounds and absorption by sinks in Mexico. It must be prepared by the INECC, according to the guidelines and methodologies established by the Paris Agreement, the Convention, the Conference of the Parties and the Intergovernmental Group on Climate Change. Each state and even municipality also develop its own local inventory.

The **National Emissions Registry** is used to identify emissions generated by fixed and mobile sources of emissions that are identified as being subject to reporting.² The LGCC establishes the sources that must report by sector, subsector and activity, as well as the following elements for their registry: greenhouse gases or compounds, the thresholds above which the establishments subject to federal jurisdiction reporting must present the report of their direct and indirect emissions; the methodologies for calculating the direct and indirect emissions that must be reported; the monitoring, reporting and verification system to ensure completeness, consistency, transparency and accuracy of reporting, and linkage with other federal or state emissions registries.

Official Mexican Standards are issued to protect human health in relation to air quality; they establish acceptable concentrations in terms of the risks that contaminants represent for human health and define the acceptable concentrations for different periods of exposure, since in some cases a lower concentration during a longer exposure time also represents a risk for the population. NOM-025-SSA1-2014 refers to particles smaller than 10 and 2.5 microns (PM10 and PM2.5), NOM-020-SSA1-2014 for ozone (O₃) emissions, NOM-022-SSA1-2010 for sulfur dioxide (SO₂), NOM-023-

² Fixed sources are classified into those that generate electrical energy and some industrial activities such as chemical, textile, food, wood, metallurgical, metal, manufacturing and processing of vegetable and animal products (point sources); the generation of emissions inherent to activities and processes such as solvent consumption, surface and equipment cleaning, architectural surface coating, industrial, dry cleaning, graphic arts, bakeries, LP gas distribution and storage, wastewater treatment, composting plants and landfills (area sources); finally, everything emitted by vegetation and microbial activity in soils and oceans, which are called biogenic emissions (natural sources). Mobile sources are practically all motor vehicles and non-fixed equipment and machinery with combustion engines and the like (National Institute of Ecology and Climate Change, 2007).



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SSA1-1993 for nitrogen dioxide (NO₂), NOM-021-SSA1-1993 for carbon monoxide (CO) and NOM-026-SSA1-1993 for lead (Pb) (National Institute of Ecology and Climate Change, 2019).

The **Information System on Climate Change** integrates, updates and makes available the statistical, geographic and indicators information that is generated and available in Mexico on the following topics: climate change, soil, ecosystems, water, emissions of gases and greenhouse compounds, mitigation, vulnerability, population and biodiversity projects, among others. Is conducted by the National Statistics and Geography Institute (INEGI), in accordance with the provisions of the Law of the National System of Information, Statistics and Geography.

With the aim of capturing and channeling public, private, national and international financial resources to support the implementation of actions to face climate change the **Fund for Climate Change** was created at national level. Actions related to adaptation are a priority in the application of the fund's resources.

2.2. Gender policy framework

In Mexico there is a robust normative and institutional framework to promote equality between women and men and non-discrimination. The main approach is gender mainstreaming, which has earmarked funds as well as gender budgeting instruments. This framework has a high degree of development, which includes laws, programs and plans, as well as institutions and cross-sectional committees, in addition to the assigned resources, as already mentioned.

In terms of legislation at national level gender equality policies are framed in the **1st Article** of the Political Constitution of the United Mexican States, the **Law of Equality between Women and Men**, the **General Law on Women's Access to a Life Free of Violence** and the **Law of Planning** and the **Federal Budget and Fiscal Responsibility Law** (Diario Oficial de la Federación, 2006) (Diario Oficial de la Federación, 2007).

Part of the strategy to promote equality between women and men is to replicate the federal rights and demands at the state and local levels. In this context, each state has the responsibility to adequate gender equality laws and programs to their conditions and guarantee their enforcement. For these (and other) reasons, the attainment of gender equality varies deeply in Mexico, between one region and other.



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In compliance of the **Platform for Action of the Fourth World Conference on Women in Beijing (1995)**, Mexico set in place institutional mechanisms for the advancement of women. Following its administrative tradition, there is a federal institution for the advancement of women and 32 similar institutions, one per state. These state mechanisms for the advancement of women try to set an office in each of their municipalities. However, when reaching this level, the gender mainstreaming strategy fades off because of imperative necessities, forcing most of the local mechanisms to focus on the protection of victims of gender violence and their children.

With the aim of promoting the integration of gender equality into public policies, the National Women's Institute (INMUJERES) and the Federal Regulatory Improvement Commission (COFEMER by its Spanish acronym) established an agreement to issue the **Guidelines for Incorporating the Gender Perspective in the Operating Rules of Federal Budgetary Programs**; in other words, this regulation indicates that all programs with operating rules must comply with the criteria established therein in order to guarantee respect for and protection of women's human rights, the achievement of substantive equality between women and men, and the elimination of all forms of discrimination against women (Diario Oficial de la Federación, 2016).

2.3. Gender and climate change framework

The **General Law on Climate Change (LGCC)** establishes in its Article 26° that the climate national policy relevant must observe, among other principles, the "gender equality, the empowerment of women and intergenerational equity". Also, the Article 71° establish that the programs of the 32 states must seek gender equity.

The **National Climate Change Strategy (2013)** is organized into "Pillars of national climate change policy", actions of "Adaptation to the effects of climate change", and actions of "Low carbon development / Mitigation". Includes lines of action such as: "Consider in the design of all policies of climate change the aspects of gender, ethnicity, disability, inequality, health status and inequity in access to public services and involve in its instrumentation to the different sectors of society"; "Design and implement an effective communication strategy in all sectors of society, taking into account the diversity of contexts (cultural, economic, political, ethnic, gender and others)" and "Design and include the gender approach in the strategies of reducing social vulnerability".



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The **Special Climate Change Program (PECC) 2014-2018** included strategies and lines of action of the National Program for Equal Opportunities and Non-Discrimination against Women (PROIGUALDAD)³ and integrated gender elements into the specific following lines of action:

- Consolidate the National Risk Atlas integrating gender indicators.
- Promote with a gender perspective projects of sustainable community tourism in natural protected areas and / or vulnerable areas.
- Operate the Climate Change Fund and other financial resources with priority criteria: gender equity, transparency and efficiency.
- Identify social factors of gender vulnerability in the prevention and attention to risks of natural and anthropogenic disasters.
- Incorporate cultural and gender aspects linked to the use and exploitation of territorial resources in communities affected by disasters.
- Incorporate the needs and risks of women and girls in the design of evacuation plans.
- Incorporate the gender perspective in Civil Protection programs.
- Promote the integration of civil protection committees in disaster risk areas with the participation of women of all ages.
- Ensure the integrity and human rights of women and girls in shelters of people affected by disasters.
- Respect women's right to privacy during evacuation and emergency.
- Encourage the construction, conservation and remodeling of public space with adequate and safe conditions for women, girls and children.
- Promote compact urban designs with a gender perspective to promote conciliation, family coexistence, co-responsibility and recreation.
- Strengthen the coordination and cooperation between the three levels of government and society in favor of safe mobility.
- Incorporate a gender perspective in the National Climate Change Strategy.
- Align and coordinate federal programs and induce inclusive green growth with an intercultural and gender approach.
- Incorporate civil organizations in the ecological ordering, development and sustainable use of natural resources with a gender perspective.

³ This program is related to the one designed and operated by the last federal administration.



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- Promote programs aimed at reducing gender gaps in the access, use and exploitation of natural resources.
- Promote gender equality in the use and sustainability of natural resources including water, fishing, agriculture, livestock and renewable energies.
- Promote sustainable fishing and aquaculture activities for women in coastal and river areas.
- Promote sanitation and supply of water for human consumption and domestic use in rural areas where women supply their households.
- Ensure that financial instruments for mitigation, adaptation and reduction of vulnerability benefit women and girls equally.
- Promote an information system on climate change that generates data and indicators disaggregated by sex.

Also, there is the transversal objective 6: Incorporate gender equality policies in the three levels of government and strengthen their institutionalization in the organizational culture. Through Strategy 6.5 Orient and promote institutional capacities to comply with the National Policy on Equality between Women and Men. And its lines of action:

- Promote technical cooperation in the international area to exchange knowledge and good gender practices.
- Strengthen the international presence of Mexico in forums, organizations and mechanisms linked to gender.

Training Strategy of the Environmental Sector on Gender and Sustainability and Towards Equality.

In addition, the Ministry of the Environment and Natural Resources (SEMARNAT), in coordination with the National Women's Institute, set up a multidisciplinary technical team for the construction of the Environmental Sector Training Strategy on Gender and Sustainability, as part of the program for the integration of gender and climate change policies, and established the Environmental Sustainability Program, which promotes sustainable development projects with a gender perspective for the benefit of indigenous communities and peoples along these lines: Agroecology; Agroindustry, Handicrafts, Ecotourism, Urban Solid Waste and Climate Change; in addition to projects related to the "Promotion of Culture and Handicraft Production (CONEVAL, SEMARNAT, 2015) (SEMARNAT, 2014).



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3. MEXICO CITY

Mexico City (CDMX)⁴ is the national capital and, as such, its territory is home to both national and local government institutions. Considered an island of rights and social programs, it is also the geographical space in the national sphere where 20 years of leftist governments have converged, so that local programs, policies and budgets show an important development in terms of gender mainstreaming and adaptation and mitigation to the impacts of climate change; this is the case, for example, of urban mobility policies.

For this reason, the local mechanism for the advancement of women, the Mexico City Ministry for Women (SeMujeres), in addition to addressing violence against women of all ages, also participates in the promotion of sexual and reproductive rights, intervenes in gender equality policies and carries out public budgeting exercises with a gender perspective. These conditions represent opportunities to deepen the proposed gender assessment.

3.1. General information

Geographically, CDMX is in the southern part of the Valley of Mexico, in the central region of the country, adjacent to the states of Morelos and Estado de México. Regarding the physical characteristics of the territory, it is estimated that 68.3% of its soil is an area without vegetation or bodies of water; the average annual temperature is 16°C⁵ and the average annual rainfall is 600 millimeters (INEGI, 2017). It is located at an average altitude of 2,500 meters above sea level, which, together with the orographic relief and the intense solar radiation in the area, makes it difficult to disperse the pollutants and promotes the formation of others, such as ozone (O₃) (SEDEMA, 2018). This has had serious implications for public health at the local and conurbation levels, because it causes environmental contingencies in which air quality falls to the worst levels, preventing the realization of outdoor activities generating respiratory problems, particularly among children and the elderly.

⁴ In 2016, the General Agreement of the Board of Government and Administration of the Federal Court of Fiscal and Administrative Justice was published in the Official Journal of the Federation, in which the Federal District was renamed Mexico City and raised to the status of a federal entity. This allows it to enjoy autonomy in all matters relating to its internal regime and political and administrative organization. This agreement establishes that all references to the Federal District in the Constitution and other legal systems must be understood as referring to Mexico City. (Diario Oficial de la Federación, 2016)

⁵ Celsius degrees.



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Mexico City occupies a territorial extension of 1,494.6 km² equivalent to 0.1% of the national territory. In spatial terms, this means that it is a small city in comparison with others in the country; however, due to the growing urban expansion, evidenced by the number of urban localities with respect to rural ones (95%) (INEGI, 2017), it is impossible to talk about the city without considering that its territory is integrated into a larger urban area, the Metropolitan Area of the Valley of Mexico (ZMVM by its Spanish acronym).⁶

CDMX is characterized by its diversity of urban landscapes, where cosmopolitan spaces and extreme poverty neighborhoods can converge. This city is home to around 8.9 million people, most of whom live in areas considered urban, with a density of 5,967.3 inhabitants per square kilometer. The ratio of men to women is 90.2 men for every 100 women, which means that 52.6% of the inhabitants of the CDMX are women (INEGI, 2015). However, as mentioned above, it is important to emphasize that this population converges in the dynamics of the entire Metropolitan Zone, which in total houses 21.4 million inhabitants.

3.2. Socioeconomic factors

As for the characteristics of the economic dynamics, due to the character of capital of the country, economic activities with important spills converge in its territory; in fact, it is the national financial center and it is here where the producer services firms that characterize global cities are located. CDMX contributes 16.8% of the national gross domestic product (INEGI, 2017).

In the CDMX, the most important sectors according to their contribution to the State's GDP are the tertiary (90%) and the secondary (almost 10%) sectors. As secondary sector activities, the manufacturing industry stands out, with a percentage contribution of 5.4% (the food industry, which alone contributes 2%), and construction, with a contribution of 4.4%. In the tertiary sector, the contribution of financial services and insurance is 10.6% and wholesale trade, 10.4%, so we can say that these are the most important economic activities in this city (INEGI, 2019). The economic units

⁶ According to the Ministry of Social Development, National Population Council, National Institute of Statistics and Geography (2012) a metropolitan area is the set of two or more municipalities where a city of 50 thousand or more inhabitants is located, whose urban area, functions and activities exceed the limit of the municipality that originally contained it, incorporating as part of itself neighboring municipalities, predominantly urban, with which it maintains a high degree of socio-economic integration. The MCMA is made up of 16 mayoralties of Mexico City, 59 municipalities of the State of Mexico and 1 municipality of the State of Hidalgo.



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engaged in these activities total 426,330, and of these, 93 of every 100 are micro enterprises (INEGI, 2017; INEGI, 2019).

To carry out these activities, labor is required, so CDMX is also one of the spaces places with the highest percentage of economically active and occupied population; that is, with a job. The population carrying out economic activities⁷ represents 56% of working age population; 43.7% are women and 70% men. In contrast, the population that does not carry out economic activities⁸ represents 43.7%; of this group, 56% are women and 28% men.

The most important sectors in CDMX for their contribution to employment are services and trade. The first sector employs 61% of the people in the city; by sex, it employs 67% of the women and 57% of the men. Commerce employs 20% of people: 21% of women and 20% of men. The economic activities with the greatest participation of women are health and social assistance services (68.1%) and educational services (60.7%).

It is important to highlight a particularity of the occupation in the city, since there is a large proportion of the population in critical conditions of occupation, that is, in informality (29.34%), or in unemployment (5.3%), underemployment (7%) or without access to legal benefits (30%) (INEGI, 2019).

According to available information, less than 30% of women are employed in the informal sector, with a significant presence in commerce and in restaurant and accommodation services (INEGI, 2015). In particular, the proportion of women aged 15 and over who are salaried is 47.4% of the total number of women employed in the informal sector (1.77 USD).

In this respect, another important data to recover is the CDMX income level. According to the latest official figures, the average monthly income is 10,144 pesos (514 USD), but when broken down by sex, the average monthly income of women is 3,451 pesos (175 USD) lower than that of men.⁹

As for time use, 87.23% of women in the CDMX do unpaid work in the home, compared to 65.49% of men. On average, women spend 41.56 hours per week doing this work, while men spend only 18.32 hours. Activities related to household work occupy an average of 23.47 hours per week for

⁷ Economically Active Population, according to the National Institute of Statistics and Geography.

⁸ Non-Economically Active Population, according to the National Institute of Statistics and Geography.

⁹ The average monthly income for women is 8,343 pesos (423 USD), and for men 11,794 pesos (598 USD) (INEGI, 2018).



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women and 10.56 hours for men, and those related to the care of children under 14 years of age average occupy 46.99 hours for women and 23.98 hours for men¹⁰ (INEGI, 2015).

In Mexico, the official measurement of poverty is based on a multidimensional methodology that takes into account the level of income in households and the deficiencies they experience, such as: educational gap, access to health services, social security, food and housing (quality, spaces and services).

Thus, according to the latest data reported, 30.6% of the inhabitants of Mexico City live in poverty, and of these, 1.7% in extreme poverty and 28.8% in moderate poverty, variants determined by social deprivation and income level. That is, these people live in poverty because they have an income below the welfare line (38.3%), because they have at least one social deficiency (59%) or because of the conjunction of both factors (CONEVAL, 2018).¹¹

The demographic transition has generated changes in the dynamics of relationships within households. It is important to note that of the 2.6 million households registered in the CDMX, 36% are female headed (INEGI, 2017). In addition, although there is no sex-disaggregated data at state or municipal level, it is estimated that in the country nearly 30% of female-headed households live in poverty (CONEVAL, 2016).

The local authorities in Mexico City adopted a different methodology, considering that the data provided at the federal level do not correspond to what happens in the city. For this reason, they adjusted the measurements of income and social deprivation, so that the data showed that the population in moderate poverty was 33.2% and those living in extreme poverty was 17.9%. In other words, in Mexico City half of the population (51.1%) lives with a daily income of less than 8 dollars and has unsatisfied basic needs in the dimensions of housing, health, social security, education, availability of durable goods, health adequacy, type of energy used in the home and access to telephony. In addition, consideration was given to the fact that some households are overworked in order to obtain more income, which is called time poverty, and which affects 47.6% of the

¹⁰ Data based on National Institute of Statistics and Geography, 2017

¹¹ According to the National Council for the Evaluation of Social Development Policy (Coneval), a person is in a situation of moderate poverty when he or she has at least one social deficiency (in the indicators of educational gap, access to health services, access to social security, housing quality and spaces, basic services in housing and access to food) and if his or her income is insufficient to acquire the goods and services required to satisfy his or her food and non-food needs. If it has three or more social deficiencies and its total income is less than the cost of the food basket, it is in a situation of extreme poverty (National Council for the Evaluation of Social Policy, 2015).



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population (Social Development Evaluation Council of Mexico City, 2019). This measurement shows that half of the women living in Mexico City live in poverty (50.3%). Besides, in Mexico City, also in this condition we find 7 out of 10 children under the age of 15, 80 per cent of those who speak an indigenous language and 47 per cent of those who have a disability (Mexico City Social Development Evaluation Council, 2019).

As noted in the previous section, CDMX is a very large city in terms of how many people live and transit through its territory. This has led to a heterogeneous landscape in which inequality coexists in the daily life of the different territorial demarcations. According to the Social Development Index, when comparing the conditions of social development of the city's inhabitants, it stands out that only two of the 16 municipalities have a high degree of social development. This means that in a large part of the CDMX, the population does not meet its basic needs in relation to (i) the quality and space available in housing, (ii) access to electricity, (iii) durable goods, (iv) health adequacy, (v) access to social security and medical service, and (vi) educational level (Gaceta Oficial de la Ciudad de México, 2016) (see Table 1).

In relation to urban housing, in the political districts of Mexico City the average number of inhabitants per house is 3.4. It can be seen that due to the exponential urbanization of the city and the metropolitan area, irregular settlements have increased in risk areas and conservation land; a situation that was aggravated by the earthquake that occurred on September 19, 2017. The latest data from the local administration indicate that by 2016 irregular human settlements in the CDMX grew at a rate of 37%, which at that time represented a total of 2,739.12 hectares (PAOT, 2016).



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TABLA 1. MEXICO CITY: SOCIAL DEVELOPMENT INDEX

Mayors	IDS	Degree
Álvaro Obregón	0.82	Medium
Azcapotzalco	0.88	Medium
Benito Juárez	0.96	High
Coyoacán	0.88	Medium
Cuajimalpa de Morelos	0.80	Medium
Cuauhtémoc	0.89	Medium
Gustavo A. Madero	0.82	Medium
Iztacalco	0.86	Medium
Iztapalapa	0.77	Low
Magdalena Contreras	0.79	Low
Miguel Hidalgo	0.93	High
Milpa Alta	0.64	Very Low
Tláhuac	0.74	Low
Tlalpan	0.78	Low
Venustiano Carranza	0.86	Medium
Xochimilco	0.70	Low

Source: Own elaboration based on the Official Gazette of Mexico City, 2016

The availability of services in the housing in the CDMX is related to the degree of urbanization; for example, according to statistical data, 89.4% of the houses have piped water, 98.8% have drainage, 99.4% have sanitary service, 99.8% have electricity and 58% have internet.¹² Although these figures are significantly higher than those of other cities in the country, they also imply a greater use of resources and higher energy consumption. In fact, the demographic density is beginning to generate

¹² These data account for access but not for the affordability and quality of services, for example, the Internet in the city is still poor, since it does not have full coverage and compared to other parts of the world, the downloading average speed is very low, at just 5.7 Mbps (megabits per second) (Cable.co.uk, 2019).



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stress on certain resources, which represents a challenge for the city's inhabitants. Water scarcity is a recurring problem, but so is insufficient infrastructure for wastewater treatment in the rainy season.

To counteract the lack of services and infrastructure, infrastructure programs and sustainable practices have been initiated, so that 0.5% of homes in the CDMX already have solar panels, 2.2% with solar heaters, 65.5% with energy saving lights and 90.3% separate waste. Regarding this last point, it is important to note that there are special regulations¹³ that establish the obligation for municipalities and citizens to separate waste into organic, inorganic with recycling potential, non-recyclable inorganic and special handling and bulky waste (SEDEMA, 2017).

The gaps of inequality between women and men in terms of access to living conditions that respect economic, social, cultural and environmental rights, and the right to a life free of violence, highlight the different ways of living, moving around and occupying urban space, which are fundamental factors in the analysis of how the effects of climate change in the cities are manifested in a differentiated way according to the sexual allocation of urban inhabitants bodies. Therefore, the following provides information on some sociodemographic factors.

The average age of the people living in CDMX is 33 years, reflecting indeed that it is a city with a majority of young people of productive and reproductive age; in fact, there are 42 people of dependent age for every 100 of productive age (INEGI, 2015).

In terms of educational level, most of the population has the last grade of basic education (38.9%); women and men from 3 to 14 years old mostly attend school (94.4% and 94.9% respectively); women who cannot read or write reach 2% and men 0.87% (INEGI, 2018).

A fundamental issue in the life of the country, and in particular of Mexico City, is the situation of women with regard to gender-based violence: the prevalence of partner violence is 52.6% among women aged 15 and over; 49.4% corresponds to emotional violence, 19.1% to physical violence, 7.8% to sexual violence and 23.5% to economic or property-related violence. Regarding discrimination, it is important to mention that of employed women aged 15 and over, 10.4% were discriminated against in their workplace because of pregnancy (INEGI 2018).

¹³ Environmental Standard NADF-024-AMBT 2013 on Separation, Classification, Selective Collection and Storage of Federal District Waste.



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Finally, it is estimated that of the total population aged 6 years and over in the MCMA, a little over 80% make at least one trip during the week to move around the city; of this population, 50.6% are women and 49.4% men. Of the total number of trips, 66% are made on foot, 51% by public transport, 22.3% by private transport and 2.2% by bicycle. Although the most recurrent destination is the home, the differentiated patterns of mobility between women and men stand out: while the former declare that they make more trips to school (21.7%) and to businesses such as markets, shops or malls (13.7%), men declare that they mainly travel to school (15.6%) and the office (10.2%), and also state that their main reason for making trips other than walking is to go to work.

3.3. Climate hazards

Compared to other cities, CDMX is not located in an area particularly affected by natural disasters such as cyclones, monsoons or tsunamis. According to the report Mexico City in the 21st Century: realities and challenges (Aguilar, 2016), the most important risks in relation to climate change can be grouped into those related to the availability of water resources, air quality and floods and landslides.

As for the water resources, CDMX has an availability of 74 cubic meters of water per inhabitant/year, which makes it the region with the lowest water availability per capita and the highest population density in the country. According to the above-mentioned study, this phenomenon has been caused by the modification of land use and its consequent environmental and social risks, such as climate alterations, loss of biological diversity, loss of forest area for carbon capture and aquifer recharge, the impact on neighbouring basins, pollution from the connection between forest areas, urbanization where waste water discharges converge.

As for the second risk, since the beginning of the 1990s the severe air quality problem of Mexico City and its urban area became visible and had important repercussions on the health and quality of life of its inhabitants. Given the economic dynamics of the metropolis and its physical characteristics, this situation has not been able to be completely counteracted, since, despite the incipient energy transition, a large quantity of pollutants is emitted into the atmosphere every day by combustion processes. Furthermore, the city's location favours the stagnation of pollutants, which even causes phenomena such as thermal inversion to occur throughout the year.

Another important risk is that of flooding, which is attributed to insufficient drainage capacity combined with torrential rains and runoff on hills and mountains. The problem of sewage disposal



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is attributed to the deforestation of the watersheds and the accumulation of garbage and construction materials in the streets and sewers.

The environmental stress to which the city's resources and its surroundings are subjected, has meant that floods and other phenomena are having increasing consequences or reaching areas where they did not occur before. The effects of torrential flooding are due to the reduced infiltration capacity of the soil that channels the flow of water into the streets, and can exacerbate mass removal processes, especially in areas adjacent to hills, basins and ravines. These phenomena affect the inhabitants of hillsides and ravines that have been modified for the construction of irregular housing.

3.4. Greenhouse gas emissions

The air quality in the CDMX began to be monitored with four stations in 1966. In 1972, the Undersecretariat for Environmental Improvement was created, which was in charge of monitoring and reporting air pollution in the Valley of Mexico based on the methodologies used by the Environmental Protection Agency in the United States. A periodical emissions inventory proposed until 1986, and it carried out every two years. Since then, the methodology used has incorporated new elements for a more accurate analysis of air quality (SEMARNAT, 2018).

To understand the calculation methodology, it is convenient to retrieve the information from the *Inventario de emisiones de la Ciudad de México. Memorias de cálculo. Contaminantes criterio, tóxicos y compuestos de efecto invernadero* (Ministry of Environment of Mexico City, 2013), which explains that calculation includes the reporting of greenhouse emissions and compounds from 93 categories: 25 point sources,¹⁴ 55 area sources,¹⁵ 11 vehicle types, and 2 natural sources. It adds the estimation of new categories and pollutants, such as waste and brickyards burning of, carbon dioxide emissions from cigarette consumption, as well as particles from pet feces and criteria pollutants from organic waste treatment (compost).

¹⁴ Refers to fixed location facilities, which are intended to carry out industrial, commercial or service operations or processes that generate polluting emissions into the atmosphere. They include regulated industries, businesses and services.

¹⁵ Pollutant-emitting facilities, which are small, numerous and dispersed, but which can generate considerable emissions. This source includes domestic, fuel, solvent, waste, agricultural and livestock emissions, as well as non-regulated businesses and services, among the main ones.

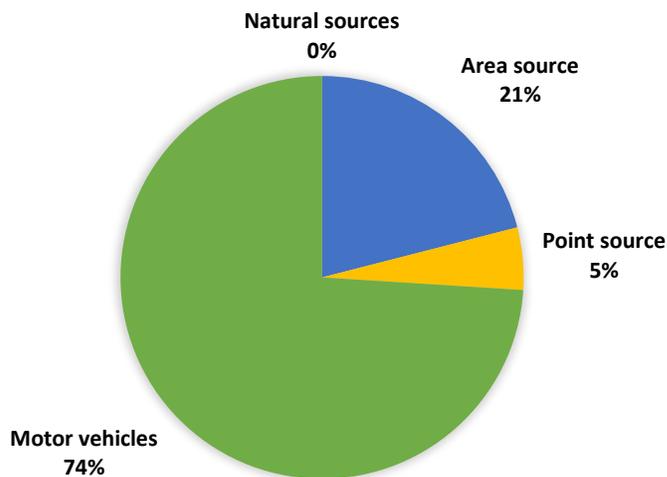


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Biogenic emissions are updated with the MEGAN model (Model of Emissions of Gases and Aerosols from Nature) and transport emissions with the MOVES-Mexico model (Motor Vehicle Emission Simulator).

In CDMX, emissions of greenhouse compounds are mostly of anthropogenic origin and are concentrated in the urban area. Transportation and residential combustion are the sectors with the highest energy consumption, and therefore, with the highest carbon dioxide (CO₂) emissions. According to the latest estimate, in 2015, nationwide, Mexico emitted 683 million tons of carbon dioxide equivalent (CO₂ eq),¹⁶ of which CDMX greenhouse gas (GHG) emissions represented 3.2%. Regarding methane emissions (CH₄), these mostly come from solid waste and wastewater.

GRAPH 1. GREENHOUSE GAS EMISSIONS OF MEXICO CITY



Source: Based on figures from Mexico City's Ministry of Environment, 2018.

According to the emissions records of recent years, CDMX has started to stabilize the emissions of these compounds, so it is estimated that a significant reduction will be observed from the year 2020. This is due to the strengthening of strategies for transport decarbonization, the introduction of new and better vehicle technologies, as well as the use of renewable energies and urban waste

¹⁶ It is the measurement unit for Greenhouse Gases where, in addition to carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and fluorocarbons (CFC) are accounted for.



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management (Ministry of Environment of Mexico City, 2018). It is important to clarify that these are measures only to reduce greenhouse emissions and not to democratize urban space.

Biogenic CO₂ is not reported as emission because it is part of the carbon cycle, however, for CDMX the following emissions were estimated: Firewood combustion: 19,766 t / year; sanitary landfills: 10,129 t / year; change in land use: 63,033 t / year. Additionally, 6.4 million tons of CO₂eq were quantified for the generation of electrical energy and 12.9 million for CDMX population activities, which occurred outside the territorial limits; this represents a challenge that requires the attention and inter-institutional coordination of all the ZMVM authorities.

GHG emissions concentrate in areas with high population density and intense vehicular traffic, such as downtown, where main working and trading centers are located, and the industrial zones that still exist in the municipalities of Azcapotzalco, Gustavo A. Madero. Also, in Venustiano Carranza, where emissions come from the activities of the Mexico City International Airport (under federal jurisdiction) (Mexico City Environment Ministry, 2018).

It is worth mentioning that in spatial-administrative terms, methane emissions, which originate mainly from the degradation of organic matter present in solid and liquid waste, come mainly from the sanitary landfill Prados de la Montaña, currently inactive, in the municipality of Álvaro Obregón, and from the municipality wastewater of Iztapalapa, where is the residual water treatment plant “Cerro de la Estrella”.

The rest of the emissions, although not considerable, are generated by transport, which is why it follows a pattern like the road network (Secretaría del Medio Ambiente de la Ciudad de México, 2018)

3.5. The city's response to climate change

The factors mentioned above show that the CDMX is particularly exposed to the impacts of climate change; given city heterogeneity and immensity, to face those impacts it is necessary that urban planning considers the implementation of differentiated, cross-cutting and comprehensive policies in each of the government sectors.

Actions to address the effects of Climate Change in Mexico City start from the national framework. However, it is important to recognize that in the year 2000, the Ministry of the Environment of the Government of Mexico City (SEDEMA) included within its structure the Sub-directorate of



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Environmental Management and Climate Change, which was responsible for preparing the first inventory of greenhouse gas emissions and the first climate change strategy.

That is, before national legislation, there were already local frameworks for action in this matter, since, as it was pointed out at the beginning of the document, the CDMX is considered a reference for the rest of the country and even a sort of social laboratory in which programs and policies are tested.

Thus, at the local level, instruments, planning documents, institutional arrangements and a legal framework were developed to guide the commitments and actions to be implemented in the city to address climate change.

FIGURE 1. MEXICO'S CITY CLIMATE CHANGE POLICIES TIMELINE



Source: Own elaboration based on Secretaría del Medio Ambiente de la Ciudad de México, 2019.



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3.5.1. Local governance and services

The coordination and implementation of these public policies is the responsibility of the city administration, headed by Claudia Sheinbaum Pardo, Head of CDMX Government, whose mandate ends in 2024. The Government Cabinet is composed by different Secretariats and agencies: Ministry of Government, Legal Department, Attorney General's Office, Ministry of Administration and Finance, Economic Development Ministry, Urban Development and Housing Ministry, Integral Risk Management and Civil Protection Ministry, Mobility Ministry, Works and Services Ministry, Original Peoples and Neighborhoods and Resident Indigenous Communities Ministry, Health Ministry, Culture Ministry, Tourism Ministry, Labor and Promotion of Employment Ministry, Women Ministry, Inclusion and Social Welfare Ministry, and Ministry of the General Comptroller's Office; Undersecretary of Government, Undersecretary Programs of Mayors and Reorganization of Public Roads, Undersecretary of Metropolitan Coordination and Government Liaison, and Undersecretary of the Penitentiary System; Digital Agency for Public Innovation; Directorate General of Electric Transportation Services, Directorate General of the Water System of Mexico City; General Coordination of the C5, General Coordinator of the Historic Center Authority, General Coordination of Advisers and International Affairs, General Coordination of the Transport Regulatory Body; Metrobús, Housing Institute, Institute of Sport, and the Mechanisms for the Comprehensive Protection of Human Rights Defenders and Journalists.

All these entities have different attributions in accordance with their respective organic laws indicating their participation in relation to social, economic and environmental integrity policies. The agency in charge of protecting environment and promoting city's sustainable growth is the Environment Ministry (SEDEMA). As the head for conducting city public policies relevant to climate change, all its work is focused on five priority axes (o areas): i) air quality and climate change, ii) conservation soil and biodiversity, iii) green urban infrastructure, iv) water supply and quality; and v) environmental education and communication (SEDEMA, 2019).

It is important to note that the mechanism for the advancement of women in Mexico City is the Women Secretarial, whose objectives include, among others, ensuring the full enjoyment, promotion and dissemination of the human rights of women and girls, as well as substantive equality between women and men, mainstreaming the gender perspective in the city's public administration, eradicating discrimination and all types of violence against women, and promoting the public care system. (Semujeres, 2019).



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Regarding the provision of water, energy and transport, there are specific dependencies and regulations for each of these services.

In the first case, the Mexico City Water System (SACMEX) is the sectorized body of the Environment Ministry whose function is to provide public services for drinking water supply, drainage, sewerage, wastewater treatment, and its reuse. It is a state service for which differentiated fees are paid depending on whether the water is used for domestic or non-domestic purposes, as well as by the correlation between cadastral value of the user space and the income and degree of marginalization of the holder. That is, according to these indicators, the water and drainage service can be granted by tandem (at specific times during the day) or waivers or reductions may be applied to the payment (Mexico City Water System, SACMEX, 2019).

In the case of electrical energy, the responsible entity is the Federal Electricity Commission (CFE), a productive company owned exclusively by the Federal Government, whose attribution is to provide the public service of transmission and distribution of electrical energy (Federal Electricity Commission, 2019).

The Federal District's Transportation and Roads Law (Ley de Transporte y Vialidad del Distrito Federal) establishes that passenger transport is provided by decentralized public agencies (that is, part of the local government) and by concessionaires (individuals or corporations). Regarding the first, there is the "Metro" Collective Transport System, the Federal District Electric Transport Service, the Federal District Passenger Transport Network and the Federal District Public Passenger Transport Corridor System, Metrobús. The concessionaires are different public transport systems operated by individuals and companies that provide service on the different routes of minibuses and buses. The Ministry of Transportation and Roads of the Federal District determine the rates. (Gaceta Oficial del Distrito Federal, 2002).¹⁷

There are 2.3 million vehicles in the CDMX as a result of a constant increase in the vehicle fleet; in fact, from 2010 to 2015 the motorization index went from 309 to 588¹⁸ (INEGI, 2017). For this reason, it is crucial to refer to private transportation, which is one of the most polluting sources of

¹⁷ There are some extensions for agricultural tractors, machinery dedicated to the construction and mining industries, motorcycles, vehicles with gross vehicle weight less than or equal to 400 kilograms, electric vehicles, hybrid vehicles with gasoline and electric propulsion engines, vehicles with old and/or classic car registration, vehicles with demonstration and/or transfer registration and those whose technology is considered clean (Official Gazette of Mexico City, 2019).

¹⁸ It measures the number of vehicles per thousand inhabitants.



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VOC and NOx emissions. In order to limit these emissions, the Compulsory Vehicle Verification Program was promoted, which establishes the guidelines and the schedule for circulation of internal combustion motor vehicles registered and / or circulating in Mexico City territory, and those carrying metropolitan license plates.

In addition, it is important to emphasize the operation in the provision of liquefied petroleum gas (LPG) and natural gas for domestic use, runned by private companies. For its regulation, the Energy Regulatory Commission (state entity) issued the Official Mexican Standard NOM-003-SECRE-2002, which establishes the security minimum requirements in the distribution process (Energy Ministry, 2002).

Finally, according to the Solid Waste Law of the Federal District, the sweeping of streets, roads, parks and gardens, as well as the collection and transportation of solid waste are public services that are responsibility and attribution of the public administration of the municipalities of Mexico City (Environment Ministry, 2016).

3.5.2. Climate policies and action plans

The coordination of climate change policies in the CDMX is the responsibility of SEDEMA, which has the Climate Change Directorate, from which the development of the CDMX Climate Action Plan and the programs and actions deriving from it are operated. The regulative support for these actions is based on the following instruments in the local sphere:

Law on Mitigation and Adaptation to Climate Change and Sustainable Development for the Federal District.¹⁹ It establishes the actions that will be implemented to address the effects of climate change in Mexico City. In other words, it provides the establishment of a series of operating instruments and a financing fund to assist in local adaptation and mitigation policies.

Climate Action Program, Mexico City (PACCM). Is the driving axis that transcends by two years the six-year governmental period (Mario Molina Center for Strategic Studies on Energy and Environment, A.C, 2014) The Climate Action Program of Mexico City 2014-2020 is currently in force, and SEDEMA, in collaboration with other local government agencies, civil society, academia and citizens, is conducting consultation workshops that design the CDMX Action Plan to the coming years (2021-2027).

¹⁹ Promulgated on June 16, 2011 by the then Head of Government Marcelo Ebrard Casaubon.



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Despite the difficulty of transitioning from the previous government's planning to the current one, SEDEMA (2019) indicates that the objective of the PACCM is to increase the quality of life and sustainable low carbon development in the city by i) reducing emissions of greenhouse compounds, ii) decreasing vulnerability conditions and increasing the citizens adaptive capacities to climate change, iii) fostering an educated, informed and sensitive citizenry, iv) increasing competitiveness and governance in the implementation process and v) establishing the co-responsibility of the government and society to achieve a low carbon economy and risk prevention.

To achieve this, eight priority criteria were identified, among which are gender equity, equity and social inclusion and sustainable development framework. The actions of this Program seek, by the year 2020, to i) directly reduce 8 million tons of carbon dioxide equivalent and ii) increase the resilience to the effects of climate change of 5.6 million people vulnerable to such change.

Local Strategy for Climate Action of Mexico City (ELAC) 2014-2020. Guides medium- and long-term policy relevant to addressing the effects of the climate change at the local level, in accordance with the ENCC. In other words, it functions as a reference for the PACCM by establishing the scientific, technical and institutional framework for mitigation and adaptation actions in the city.

Together, PACCM and ELAC have 7 strategic axes, which include 101 mitigation, adaptation, education and communication actions. The document *Mexico City Vision on climate change by 2025*, presented five years ago, shows the progress of actions in mitigation, adaptation, cross-cutting policy and the Resilience Strategy by 2015 (SEDEMA, 2015).

CDMX Resilience Strategy. It was developed to promote public policies that contribute to strengthening the capacity to face various risks. Among its main lines of action are adaptation in water issues, urban and territorial planning, mobility and innovation. With the new administration, this strategy now has become the Mexico City Resilience Agency, a decentralized body of SEDEMA that aims to coordinate the collaboration between the agencies, for the design and execution of policies, programmes and actions that contribute to building resilience.

Finally, the **Environmental Fund for Climate Change (FACC)** serves to finance actions and projects related to the conservation and protection of natural resources; emission mitigation; education, awareness and dissemination programs on climate change information; studies and research on this phenomenon; development of the risk atlas, emission inventories, information systems and the implementation of the PACCM 2014-2020.



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In addition to the, other dependencies have developed plans whose actions contribute to adaptation and mitigation against climate change. This is the case of the **Mexico City Economic Plan 2018-2024**, led by the Economic Development Ministry, in which one of its pillars is the energy transition that mitigates greenhouse gas emissions, and of the **Strategic Mobility Plan for Mexico City 2019**, which seeks to improve the quality of life of city's inhabitants and floating population, through i) integrating the means of transport, promoting walking, cycling and public transport; ii) improving transport infrastructure and services to reduce travel times, improve travel conditions and make freight transport more efficient; and iii) protecting the users with inclusive, decent and safe services.

3.5.2.1. Climate change mitigation policies

Building settlements and urban planning

Subsidies for Sustainability is a program of the Urban Development and Housing Ministry (SEDUVI), which consists of providing monetary benefits for the reduction of CO₂ emissions and energy savings in homes through the installation of solar heaters and electricity saving bulbs.

In collaboration, SEDUVI and SEDEMA work on the definition of zones prone to the implementation of a photovoltaic panel program

Biological Diversity

Green Challenge is a program to replant and reforest the city to have more green spaces, increase environmental humidity and mitigate the effects of climate change. And with it, recover the city's biodiversity in the Natural Protected Areas and Areas of Environmental Value, most located in Conservation Land. Creating gardens for pollinators is part of this program.

Economic and business activities

Solar Energy Nixtamalization is a program of the Economic Development Ministry that calls on nixtamaleros for the installation of solar heaters in exchange for tax benefits, in order to reduce greenhouse gases by 50-70% and have greater security.

The manufacturing industry in local jurisdiction can apply for a one-year exemption from the Mexico City Atmospheric Contingency Program (PCAA), depending on the degree of emissions of ozone and other polluting particles.



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Energy supply and demand

SEDEMA is leading a program for the installation of solar water heating systems in public hospitals. In addition, there is the energy reconversion program for public buildings, which is expected to mitigate GHGs in specific buildings and facilities, such as the CDMX Metro. It also has pilot projects that operate under the Energy Services Companies (ESCO) scheme for the replacement of street lighting and air conditioning systems and luminaires inside buildings and the installation of photovoltaic panels in buildings.-The Environmental Standard for the Federal District (NADF-008-AMBT-2017) establishes the technical specifications for the use of solar energy to heat water in buildings, facilities and establishments.

Mobility, transport and transport infrastructure

The Compulsory Vehicle Verification Program was developed in order to evaluate the limits of pollutant emissions from the exhaust and the operating condition of the environmental control components of motor vehicles in circulation that use gasoline, gas, diesel or other alternative fuel, that are registered and / or circulating in the city.

The Hoy No Circula Program controls the mobile sources that circulate in the city, regardless of whether the registration is local or out of state. This, to prevent, minimize and control the emission of pollutants.

The ECOBICI is a public bicycle program operated by the CDMX government in order to reduce travel time and GHG emissions by substituting the means of transport. The program allows registered users to take a bicycle from any cycle station and return it to the closest one to its destination in 45-minute journeys. To access the ECOBICI System, users must register with an official identification and a bank credit or debit card to pay the cost: annual subscription, \$462.00 pesos; weekly, \$ 346.00; for three days, \$208.00 and for one day, 104.00).

3.5.2.2. Climate change adaptation policies

Building settlements and urban planning

The Sustainability Subsidies Program abovementioned can be considered an adaptation measure, since supports are also granted for water saving and waste management in homes, through the installation of toilets with a duo system, water saving faucets and showers, cans garbage separators and use of composters.



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Urban agriculture, fishery and food security

The "Altepetl" Program is a government strategy that seeks the integral recovery of the conservation soils of Mexico City; one of its components, "Centli", aims to promote sustainable rural development with gender equity by maintaining, integrating and strengthening rural activities in CDMX so that agro-ecological processes and practices are incorporated to reduce dependence on agrochemical inputs without compromising production levels.

Until 2018, the Food Culture, Artisan, Commercial Linkage and Promotion of Interculturality and Rurality Social Program provided economic transfers, in-kind and / or services, to help CDMX producers to disseminate and market their harvested and/or processed agro-food products. One of the aims of this was to guarantee food security in the city by promoting local consumption and traditional cuisine.

"Conservation, use and biosafety of native corn in conservation soil in Mexico City" is a project from which was derived the programs to detect, prevent, avoid and remedy the introduction of crops with transgenic corn that contaminate the genetic material of corn. (There are dozens of varieties of corn in Mexico, which together are the basis of food. Genetically modified crops threaten this diversity and are insufficient to guarantee local food security and sovereignty.)

Biological Diversity

The Altépetl Program includes other components whose purpose are the rescue and preservation of the forest area ("Cuauhtlan"), the maintenance, protection and conditioning of tangible cultural heritage and the promotion of intangible cultural heritage ("Nelhuayotl") of the World, Natural and Cultural Heritage of Humanity Zones in the municipalities of Milpa Alta, Tláhuac and Xochimilco.

Until 2018, the Program of Funds to Support the Conservation and Restoration of Ecosystems through Social Participation (PROFACE) promoted the protection, conservation and restoration of ecosystems, biodiversity and environmental services generated in the CDMX Conservation Area.

The establishment of Natural Protected Areas for the Conservation and Protection of Biodiversity in the Territory of the CDMX aims to reduce their possible vulnerability by guiding conservation, restoration, supervision, protection, surveillance and maintenance

The Green Areas Inventory is a canyon management program, a planning instrument to achieve the conservation and preservation of ecosystems and their biodiversity in situ.



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Disaster risk reduction

As already mentioned, the CDMX Resilience Strategy (promoted by the Rockefeller Foundation) was developed to promote public policies that contribute to strengthening the capacity to face diverse risks. Among its main lines of action are adaptation in water issues, urban and territorial planning, mobility and innovation. With the new administration, this strategy has been transformed into the Mexico City Resilience Agency, a decentralized body of SEDEMA that aims to coordinate collaboration between the agencies, for the design and implementation of policies, programs and actions that contribute to building resilience. Among its pilot programs are Ruta Resiliente and Barrio Resiliente. The latter is designed to strengthen organization and reaction to various disaster risks.

The Ministry for Comprehensive Risk Management and Civil Protection of Mexico City coordinates and supervises the operation of the CDMX Civil Protection System; incorporates the active and committed participation of society, both individually and collectively; integrates the Risk Atlas as a tool to guide planning, risk reduction and emergency response; promotes the Culture of Civil Protection; integrates the CDMX Early Warning System; and promotes the actions necessary to foster and increase resilience in the inhabitants of Mexico City.

Health

The campaign "Know your IRPS number" (Risk Index for Susceptible People) aims to enable the population to identify their degree of vulnerability to climate conditions through a website that indicates who should limit their outdoor activities.

The mobile application "Air" shows the levels of CO, NO₂, O₃, PM and that recommends people to limit their sun exposure and outdoor activities according to their state of health.

Tourism

The Alternative and Heritage Tourism Program of the CDMX Alternative and Heritage Tourism Program of the CDMX, aims, among other lines of work, to ensure sustainable management of natural resources of indigenous peoples, to integrate the tourism supply of the rural area of the city.



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Water and water regime

The “Rainwater Harvesting Systems” Program (SCALL) seeks to improve in the short term the conditions of access to water for the population in houses with high levels of water scarcity and to increase resilience to specific supply crises in the City of Mexico.

Coastal erosion and flooding

Coastal erosion does not apply. However, soils play an important role in preventing flooding in the CSD. In this context, the already mentioned "Altépetl" Program offers aid to Agricultural Nuclei and small landowners for the conservation, protection and restoration of forest conservation soil areas, community ecological conservation areas, community ecological reserves and community conservation areas, as well as their surveillance and monitoring.

Climate Friendly consumption and waste management

At CDMX, the integrated management of solid waste has a national and local legal basis; this in particular is aimed at preventing and minimizing solid waste, through actions, operations and processes that allow for the reduction of its quantity in each of its stages: generation, storage, collection, treatment and adequate disposal.

Several programs have been derived from this. "Zero Waste" is the program that invites city dwellers to reduce product consumption, prioritize the use of renewable energy and increase their durability through the circular economy. "Barter Market" seeks to contribute to the city's environmental education by exchanging inorganic waste for local agricultural products. "Reciclatrón" and "Ponte Pilas con tu Ciudad" promote the correct handling, separation and recycling of electronic and electrical waste and the handling and recycling of used batteries. There are also campaigns promoted by SEDEMA to discourage the use of plastic packaging, such as the program "No bow and no bag, please".

It is important to note that, based on the Environmental Standard NADF-024, SEDEMA orders the separation of solid waste from urban households, including differentiated waste collection, as well as composting.



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3.6. Gender dimensions of climate change policies

The PACCM 2014-2020 establishes gender equity as a guiding principle, it mentions:

"In the Federal District, a new democratic path has been opened for social and cultural appreciation through the Second General Program of Equal Opportunities and Non-Discrimination against Women, where the GDF plans to modify the idea that policies are neutral and therefore, they benefit all social sectors equally. It is expected that gender inequalities will be considered and it will not be assumed that the differences between men and women will not be taken from granted in the development of each action of this Program, so that women's work and social life, as well as the exercise of their rights will not be excluded. For this reason, it is methodologically advisable to use the gender perspective during the implementation of actions to rule out discriminatory behavior or attitudes based on sexual differences, so that those actions in which must be emphasized that it is necessary to incorporate the gender perspective in the search for social development will be signalled by the global sign of equity" (SEDEMA, 2013: 102).

A total of 31 actions are listed, but it is not explained why these and not others, nor how this perspective will be incorporated; nor is it observed that they follow guiding criteria to diminish the gaps between women and men that are deepening due to the effects of climate change. And there are other actions, such as the Ecobici, microbus scrap metal, credit and financing (and similar) that are not marked as having to include the gender perspective. It should be noted that, according to authorities' plan, the fundamental actions between 2014 and 2020 to mitigate and adapt to the impacts of climate change in the CDMX that "will integrate the gender perspective" are the following:

- Create a territorial planning program for the Federal District that integrates environmental and urban policies.
- Increase and rehabilitate intraurban green areas.
- Develop the Leak Suppression and Pipe Rehabilitation Program.
- Implement new Metrobús corridors.
- Carry out soil and water conservation work on conservation land.
- Update the Atlas of Dangers and Risks of the Federal District.
- Draw up a catalogue of environmental education.



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Some results derived from these actions should be observable today; however, the programs and actions implemented do not fully correspond to the actions taken by the city administration (see section 3.5.2), so at this point in the research it is not possible to identify the relationship between gender and climate change applied to public policies in CDMX beyond its enunciation in the PACCM 2014-2020.

For example, the SEDEMA published as a gender relevant action the collaboration with C40 for the campaign “Women 4 Climate”, launched by the Mexico City Mentory Program. This program was about developing research focused on at least one of the seven axes of PACCM. Among the results, there are projects on construction industries, carbon footprint, energy efficiency and sustainable and resilient cities. This shows that although CDMX administration is making an effort to link climate change policies with gender policies, the assumption that gender is equal to women has not yet been transcended and, therefore, programs that identify women as a target population are catalogued as if they include gender.

3.7. Implementation status

The aforementioned actions have already been implemented as part of the progress made in meeting the goals of the PACCM 2014-2020. To monitor them, the Law on Mitigation and Adaptation to Climate Change and Sustainability for the Federal District establishes that the program must be carried out under measurable, reportable and verifiable parameters. In this regard, Climate Change Directorate of SEDEMA coordinates and evaluates progress, in addition to conducting third-party verification. The system works in coordination with two other monitoring schemes, the Environmental Administration System and PROAIRE (a program to Improve air quality in the Metropolitan Area of the Valley of Mexico (ZMVM) 2011-2020).

The results are published on the website of the program, which reports the degree of progress of the actions (given that compliance with the PACCM depends on 14 agencies, each reporting its own progress according to the actions that are its responsibility); in addition to a calculation of the reduction of emissions that by January 2019 reported 7, 174, 248 tons of CO₂ eq, representing 72% of the goal by 2020. On the other hand, the progress report to 2016 was also issued, it presents the percentage of progress on the program’s indicators.

At present, due to the transition in the public administration of the CDMX, some actions and programs linked to the previous PACCM are being worked on. In particular, progress has been made in the design of PACCM 2020-2026 through workshops involving authorities from the three levels of



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government, academia, international organizations and civil society; this participatory exercise has indicated an interest in ensuring that the program incorporates the gender perspective.

4. TLAXCALA

4.1. General information

This diagnosis offers a synthesis of the general context of the City of Tlaxcala²⁰, whose most updated statistical information is found mainly in two documents: the 2015 Intercensal Survey of the National Institute of Statistics and Geography (INEGI) and the Atlas of hazards and/or risks of the municipality of Tlaxcala, Tlaxcala (2018) of the Ministry of Agrarian, Territorial and Urban Development (SEDATU). These show a geographical, demographic, social and economic overview of the city. It is important to mention that in Mexico, the information that gives data from the municipal level is of lesser extension than the one that gives data from the national or state level; thus, for Tlaxcala City there are not all the instruments of statistical analysis available for the CDMX, which, due to its importance as the capital of the country, generates a greater amount of data by various local institutions. Another relevant factor is that, even though the City of Tlaxcala is the state's political-administrative center, its population is smaller. The municipality's data regarding climate change could only be in the Risk Atlas, the State Inventory of Greenhouse Gas Emissions for the State of Tlaxcala (IEEGEI) 2005-2009 and in documents prepared by the Autonomous University of Tlaxcala.

The state of Tlaxcala²¹ is in the central region of Mexico, its territorial extension is 3,991 km² and its population is 1.1 million inhabitants, distributed in 60 municipalities. Tlaxcala de Xicohténcatl is both the state and municipal capital (Tlaxcala, State Government, 2020).

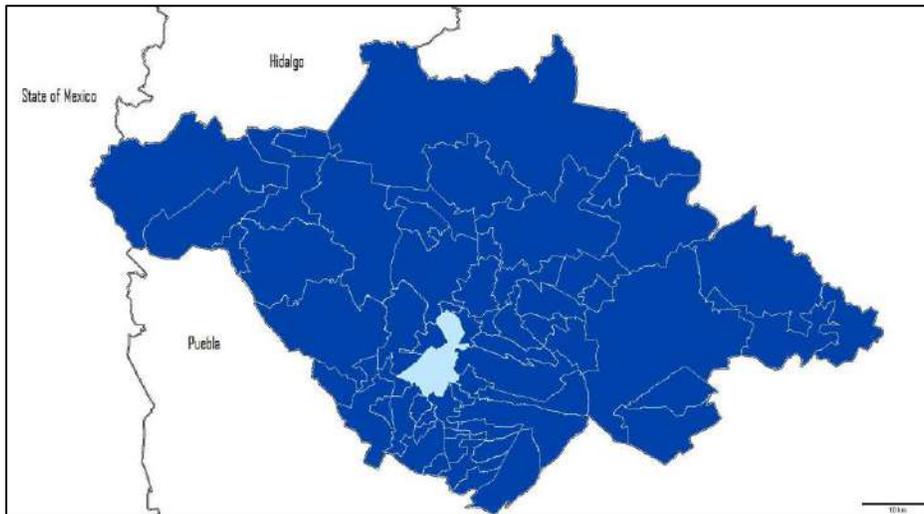
²⁰ It borders to the north with the municipalities of Totolac, Xaltocan, Amaxac de Guerrero and Apetatitlán de Antonio Carvajal; to the east with the municipalities of Apetatitlán de Antonio Carvajal, Chiautempan, La Magdalena Tlaltelulco and Santa Isabel Xiloxotla; to the south with the municipalities of Santa Isabel Xiloxotla, Tepeyanco, San Jerónimo Zacualpan, Tetlatlahuca and San Damián Texoloc; to the west with the municipalities of San Damián Texoloc, Panotla and Totolac (SEDATU, 2018: 7).

²¹ Total population: 1,169,936 inhabitants, of whom 604,161 are women and 565,775 men. The population distribution: 80 per cent urban and 20 per cent rural, and the economic activity that contributes most to the State's GDP are communal, social and personal services. 99.2% of the surface of the state presents sub-humid temperate climate, 0.6% presents dry and semi-dry climate, located towards the east region, the remaining 0.2% presents cold climate, located in the summit of La Malinche. The annual average temperature is 14°C, the average maximum temperature is around 25°C and it is



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MAP 2. STATE OF TLAXCALA



Source: Own elaboration based on INEGI, Mexico's Digital Map.

Notes: Dark blue symbolizes the State of Tlaxcala and the lighter blue the Tlaxcala City. Scale equal to 10 km.

MAP 3. TLAXCALA CITY



Source: Own elaboration based on INEGI, Mexico's Digital Map.

Notes: Scale equal to 2 km.

presented in the months of April and May, the average minimum temperature is 1.5°C in the month of January. Rainfall occurs in summer from June to September (Tlaxcala, State Government, 2020).



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According to the Atlas of dangers and / or risks of the municipality of Tlaxcala (2018), the city²² has a territorial extension of 51.94 km², is located within the Transverse Volcanic Axis with an altitude of between 2,300 and 2,500 meters above sea level. The predominant climate is usually temperate and / or sub-humid and the annual average temperature between 12°C and 18°C, with a minimum temperature of 3°C and a maximum of 22°C. The largest area, 57.41%, is for agricultural uses, while the coverage of the urban area is 27.39%. The municipality also has a protected natural area of 680 hectares that represent 7.1% of its territory, the Xicohtécatl National Park.

The municipality is divided into 16 conurbated locations: Tlaxcala de Xicohtécatl, Ocotlán, San Buenaventura Atempan, San Diego Metepec, San Esteban Tizatlán, San Gabriel Cuauhtla, San Hipólito Chimalpa, San Lucas Cuauhtelulpan, San Sebastián Atlahapa, Santa María Acuitlapilco, Santa María Ixtulco, La Trinidad Tepehitec, La Era, Cruz Blanca, Potrero Grande, Rancho Cruz Blanca (San Isidro); in recent years, it has become a highly urbanized region generating changes in agricultural, forestry and urban land use. Particularly in the foothills of the La Malinche volcano, settlements are subject to risks derived from the urban sprawl on the slopes and the deforestation of the higher areas, which cause landslides and rockfalls that could impact on populated areas of the valley; to this is added the irregular occupation of flooding areas, mainly gullies, streams or intermittent bodies of water, which in the rainy season or when there is extraordinary rainfall, can affect the population and the buildings (SEDATU, 2018). The municipality is divided into 16 conurbated locations: Tlaxcala de Xicohtécatl, Ocotlán, San Buenaventura Atempan, San Diego Metepec, San Esteban Tizatlán, San Gabriel Cuauhtla, San Hipólito Chimalpa, San Lucas Cuauhtelulpan, San Sebastián Atlahapa, Santa María Acuitlapilco, Santa María Ixtulco, La Trinidad Tepehitec, La Era, Cruz Blanca, Potrero Grande, Rancho Cruz Blanca (San Isidro); in recent years it has become a highly urbanized region thus generating changes in agricultural, forestry and urban land use. Particularly in the foothills of La Malinche Volcano, the population settlement is subject to risks derived from the urban sprawl on the slopes and the deforestation of the higher areas, that result in soil and rocks detachment falling over the populated areas of the valley; this is added to the irregular occupation of flood areas, mainly gullies, streams or intermittent bodies of water, so

²² It borders to the north with the municipalities of Totolac, Xaltocan, Amaxac de Guerrero and Apetatitlán de Antonio Carvajal; to the east with the municipalities of Apetatitlán de Antonio Carvajal, Chiautempan, La Magdalena Tlaltelulco and Santa Isabel Xiloxotla; to the south with the municipalities of Santa Isabel Xiloxotla, Tepeyanco, San Jerónimo Zacualpan, Tetlatlahuca and San Damián Texoloc; to the west with the municipalities of San Damián Texoloc, Panotla and Totolac (SEDATU, 2018: 7).



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that in the rainy season or when extraordinary rains occur, the population and constructions can be affected (SEDATU, 2018).

Regarding the demographic dynamics, the municipality follows a growth rate higher than the state average, although by national standards it has a low density with an average of 54.4 inhabitants per hectare. In 2015 it had a total of 95,051 inhabitants, which represented 7.5% of the state population and the projection for 2020 was 103,837 inhabitants (SEDATU, 2018).

According to data from the Sociodemographic Panorama of Tlaxcala 2015 (2016) describing the general characteristics of the population - based on the Intercensal Survey 2015 - there are 89.4 men for every 100 women, that is, of the total population 52.8% are women and 47.2% are men; half of the population is 30 years old or younger and of every 100 people of productive age there are 44 in a condition of dependency. Fourteen per cent of the total population considers itself to be indigenous.

4.2. Socioeconomic factors

In the city of Tlaxcala, the Economically Active Population (EAP) or working-age population (over 15 years old) represents 55.4% of the total population, of which 44% are women and 56% are men; the Non-Economically Active Population (NEA) represents 44.5% of the total population, of which 41.4% are students, 11% are pensioners and 36.2% are people dedicated to housework and caring of household members.

As for the city's productive activities, the tertiary sector is the most relevant in terms of the number of jobs, as it generates 82% of them. Commerce and services are the most important sectors, with 28.7% and 53% of the population employed, respectively, which in terms of the number of people employed represents a total of 10,332 women and 11,467 men. One outstanding activity carried out by the municipality, where a significant concentration of establishments prevails, is related to government public services, which allows it to maintain its character as a political-administrative center not only in the metropolitan area, but also at the state level.

In relation to its contribution to the Gross Domestic Product, the most important economic activity is the manufacturing industry, which represents 57.6% of the total production of the municipality, while the tertiary sector contributes 29%; on the other hand, the generation of employment in industry, which is integrated mainly by establishments of light industry of final consumption products, with predominance of the food and beverage industry, is significantly lower: it contributes



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13.8% of the total employment of the municipality. The activities in which women predominantly participate are commerce, services and manufacturing, with 56.2%, 45.8% and 43.1% respectively (SEDATU, 2018).

According to the National Household Income and Expenditure Survey (ENIGH)²³ (2018), the average quarterly income of households in urban areas of Tlaxcala in 2017 was 42, 052 pesos, ranking the entity in 28th place in the country. The quarterly monetary current expenditure per household in the urban areas of Tlaxcala was 28,811 pesos (INEGI, 2018)²⁴.

According to Coneval, the National Council for the Evaluation of Social Development Policy, there are several indicators that show social deprivation, such as educational gap, access to health services, social security, food, housing and basic services.

Regarding schooling, 1.7% of the population aged 15 years and over has no schooling at all, 34.5% have basic education, 24.4% have secondary education and 39.1% have higher education. The literacy rate in the state is 91.2% among women and 95.3% among men; the enrolment rate, from primary school to bachelor's degree, is 66.3% for women and 66.6% for men. (INEGI, 2015).

As to housing, in the city of Tlaxcala 70.8% of the population has their own home, 17.5% rents it and 10.5% lives in a borrowed home or with their relatives; 84.7% of homes have piped water, 99% have drainage, 99.3% have sanitary service and 99.6% have electricity. In total, the municipality has 26,572 private homes (representing 8.6% of the state total), where an average of 3.6 people lives.

With respect to access to health services, 80% of the population has access through the Popular Insurance, which covers almost two thirds of the population, 70.3% of the total, followed by the IMSS, with 21.7% and the ISSSTE, with 6.9%. (INEGI, 2016: 114).

²³ The objective of the ENIGH is to provide a statistical overview of the behaviour of household income and expenditure in terms of its amount, origin and distribution, as well as to offer information on the occupational and socio-demographic characteristics of the members of the household and to present data on the characteristics of the housing infrastructure and household equipment.

²⁴ An increase in quarterly household income was registered for 2019, at the state level, which amounted to 40, 301 pesos, below the national average income, of 49, 610 pesos. However, in terms of quarterly income the state is the ninth lowest in the country, ranking only above the income recorded by Chiapas, Guerrero, Veracruz, Zacatecas, Hidalgo, Puebla and Tabasco which had incomes between 26, 510 and 39, 450 pesos (ENIGH, 2019).



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At the state level, the population in condition of poverty represented 48.4% of the total population, of which 28.6% are vulnerable due to social deprivation; only 15.4% are considered not poor or vulnerable (CONEVAL, 2018).

4.3. Climate hazards

The Atlas of Dangers and Risks of the Municipality of Tlaxcala (2018) presents the risks posed by geological and hydrometeorological causes, whose dangerous effects could be intensified by climate change. Among the most important are floods and electrical storms, while hailstorms and low temperatures come in second place. Recently, cold waves have become more frequent and intense, and have had a greater impact on the population. The phenomena that present lesser dangers are droughts, hot waves, snowfalls and tropical cyclones. In addition, according to the Atlas, floods have a predominantly anthropogenic origin resulting from a faulty (or sometimes non-existent) storm drainage system.

TABLE 2. MOST IMPORTANT EFFECTS OF CLIMATE CHANGE IN TLAXCALA

Type	Natural hazard	Damage level
Hydrometeorological	Warm waves	Very low
	Low temperatures	Medium
	Drought	Low
	Hailstorms	Medium
	Snowfall	Low
	Tropical Cyclones	Very low
	Electric storms	High
	Floods	High

Source: Ministry of Government-CENAPRED, 2019, Nacional Risk Atlas.

4.4. Greenhouse gas emissions

By law, each state in the country has a State Climate Change Action Program. The Tlaxcala Program was prepared by the Universidad Autónoma de Tlaxcala and was published in 2014. It contains the 2005-2009 State Inventory of Greenhouse Gas Emissions (IEEGEI), whose base year is 2005 and was prepared based on the methodologies of the 1996 Intergovernmental Panel on Climate Change (IPCC) and its Good Practice Guidelines for the six greenhouse gases listed in Annex A of the Kyoto Protocol.

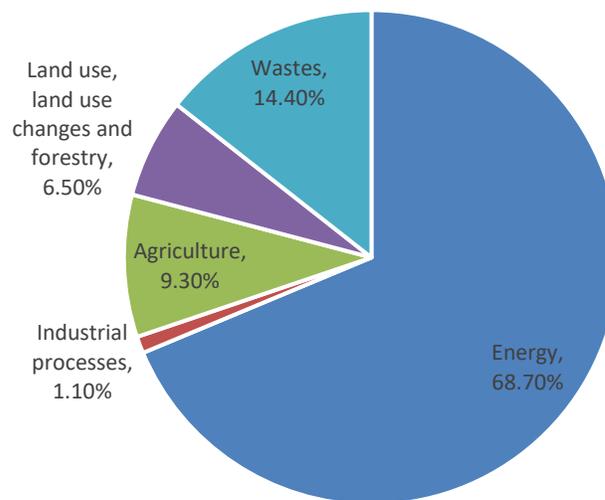


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The information presented below refers to the state of Tlaxcala because there is no specific information for the City. During the 2005-2009 period, the inventory shows an increase in GHG emissions of approximately 20.9%, reaching 3,593.2 Gg of CO₂ in 2009, which means an average annual growth rate of 4.9%. In terms of CO₂ eq, GHG emissions per capita increased by 13.8% in the same period (annual growth rate of 3.3%: 2.8 tons of CO₂ in 2005 and 3.2 tons of CO₂ in 2009). The main sources of emissions, categories and subcategories are detailed in the following table.

The following graph shows that the category that contributes most to GHG emissions is Energy; it includes transport and the burning of fossil fuels, among others, and its behavior pattern is similar to the pattern of emissions that are causing climate change worldwide. The Waste category is the second largest source of emissions. This is a great opportunity for action within the city.

GRAPH 2. GREENHOUSE EMISSIONS OF TLAXCALA, 2009



Source: Tlaxcala State Action Programme on Climate Change, 2014.



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TABLE 3. STATE OF TLAXCALA: GREENHOUSE EMISSIONS, 2009

Emissions class	CO ₂	CH ₄	N ₂ O	Total CO ₂ eq.	%
Total emissions of the state of Tlaxcala	2,707.3	643.4	242.5	3,593.2	
<i>Energy</i>	2,435.1	24.7	9.0	2,468.8	68.7%
Fossil fuels	2435.1	24.7	9.0	2,468.8	
Manufacturing	888.5	1.1	1.6	891.2	
Transportation	1,193.0	5.7	3.1	1,201.8	
Other sectors	353.5	17.8	4.3	375.7	
Homes				(326.6)	
Business				(48.1)	
Agriculture				(1.1)	
<i>Industrial process</i>	40.0			40.0	1.1%
Mineral products	11.0			11.0	
Metal production	28.9			28.9	
<i>Agriculture</i>		131.1	203.9	335.1	9.3%
Enteric fermentation		121.8		121.8	
Manure management		4.4	0.0	4.4	
Farmland			200.5	200.5	
Burning of agricultural waste		4.9	3.4	8.4	
<i>Land use, land use change and forestry</i>	232.2	0.7	0.1	233.0	6.5%
Changes in forests and other wood biomass reservoirs	132.8			132.8	
Forest and grassland conversions	108.4	0.7	0.1	109.2	

Continues



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Emissions class	CO2	CH4	N2O	Total CO2 eq.	%
Abandonment of farmland	-9.0			-9.0	
Waste		487.0	29.5	516.5	14.4%
Disposal of solid waste		434.2		434.2	
Sewage treatment		52.8	29.5	82.3	
CO2 emissions from burning biomass	142.0			142.0	

Source: Tlaxcala State Action Programme on Climate Change, 2014.

4.5. The city's response to climate change

4.5.1. Local governance and services

The municipality of Tlaxcala is governed by a City Council²⁵, composed of the Municipal President, a councilor (*síndico*), 7 aldermen (*regidores*), as well as the who, meeting in municipal council (*cabildo*), make agreements, approve public policy, the police and good government sides, the laws, the annual budget; it is their responsibility to decide on territorial aspects, authorize public works, oversee that public officials carry out their duties and promote public policies that promote gender equality among other powers indicated in Article 33 of the Municipal Law. The City Council also organizes itself into commissions to follow up on the different areas and problems. In the case of the municipality of Tlaxcala, its seven aldermen are organized into nine commissions, which include a president, secretary and two members.

For this project, it has been considered relevant to take into account the commissions on Urban Development, Public Works and Ecology, Agricultural Development and Human Rights and Gender Equality, firstly because these commissions are the ones who have the information regarding the situation of the public administration on climate change and gender issues, and secondly because they are the ones who have the function of proposing public policies, approving them and generating the related regulations before the City Council.

²⁵ The City Council (Cabildo) is a deliberative assembly composed of the members of the City Council to propose, agree and deal with municipal affairs, as outlined in the Municipal Law of the State of Tlaxcala in Article 4.



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The physical expansion of the city was accompanied by the expansion of the coverage of basic services of drinking water, drainage and electrical energy, which in most of the municipality have lack of maintenance and cause deficiencies in the provision of the service.

The public company Federal Electricity Commission is in charge of the provision of electric energy service; the Drinking Water and Sewerage Commission of the Municipality of Tlaxcala supplies drinking water to approximately half of the municipality's territory (CAPAM); the rest is supplied through a public well system.

The municipality receives 26% of the total state drinking water supply, a percentage equivalent to 12,268 thousand cubic meters; two forms of supply coexist. The first is the service by pipe, with greater stability in the supply. The second modality is through 149 deep extraction wells in different places and 23 springs that supply a wider region, with 47,225 thousand cubic meters of drinking water.

In any case, the supply of drinking water is variable: sometimes the supply is daily but dosed, for three or four hours on average, while in others it is distributed every three days, so it is important to implement comprehensive programs to improve and maintain the supply of the service.

At the meeting to launch this project, it was commented that there is significant hotel development in the city, which consumes and contaminates large amounts of water. However, the most serious issue is the presumption of its link to the trafficking of women for sexual exploitation.

Drainage coverage is 91.1% to 99% of households. However, the lack of maintenance caused the collapse of a group of homes near the Acuitlapilco lagoon, which was contaminated. The Risk Atlas also mentions that there is a public wastewater treatment plant in the municipality and that it is out of service.

The electricity generation infrastructure is mixed, based mainly on the burning of fossil fuels. It has an important part of hydroelectric generation and lower percentages of generation through geothermal, wind and electric energy and a minimum generation through nuclear energy. There is a process underway to privatize the electricity generation service, which prioritizes wind energy. However, this process, which is part of the energy sector reform, is plagued by irregularities. With respect to the end user, the company CFE is responsible for supplying electricity to households (either from energy produced by the company or purchased from private generators) and is characterized by a stable supply and strong subsidies.



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4.5.2 *Climate policies and action plans*

In the present administration, there is no overt commitment to climate change at the municipal level. However, in Axis Five, of Environmental and Territorial Development for the future of Tlaxcala, some indicators related to mitigation and adaptation are mentioned, such as care for the quality of air, water and natural resources, responsibility for garbage and an effective system of territorial reordering. For the above purposes, the departments of Ecology, Public Works and Public Services and the Water and Sewerage Commission of the Municipality of Tlaxcala are involved.

As a federal entity, Tlaxcala has a State Program of Action on Climate Change. This document states the existence of an Intersectoral Climate Change Commission, composed of different representatives of federal and state government agencies, as well as the most important local institution of higher education: The Autonomous University of Tlaxcala. Despite the above, the installation of this commission has not been formalized; according to information from the General Coordination of Ecology of the State Government,²⁶ the installation of such a collegiate body is still being planned, which prevents the promotion of initiatives on the subject and coordinated actions and hinders progress in the approval of a specific state law on climate change.

The city of Tlaxcala has no climate change law, no state climate change strategy and no fund to address it. It only has the State Program of Action on Climate Change (2014) and the State Inventory of Greenhouse Gas Emissions 2005-2009, so it will be necessary to resort to national frameworks with which it is possible to contribute to adequate municipal planning.

The current level of development of strategies and commitments in the city and municipality of Tlaxcala is incipient and is in a phase of definition of objectives. It is still necessary to develop the capacities and instruments to implement the regulations and programmes. To date, we can say that most of the city's resources are concentrated on addressing the disasters listed below (based on the Municipal Risk Atlas):

- Communication channels for alerts in danger situations.
- Evacuation and access routes
- Temporary shelters
- Civil Protection Committee

²⁶ Oficio Num./CGE/TUT/035/2019 dated February 5, 2019, sent to the Institute of Access to Public Information and Protection of Personal Data (IFAI) of the State of Tlaxcala.



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- Conducting simulations and disseminating information
- Emergency plan

4.6 Gender dimensions of climate change policies

The City Council's Development Plan (2017-2021) presents a strategic objective called "Inclusive Social Development for the good of the people of Tlaxcala: Transmit the importance of the culture of respect and equality between men and women as part of social development and the promotion of the construction of a strong society that addresses the main problems and antisocial behaviors" (Gobierno de Tlaxcala, 2017: 92).

To achieve this objective, the following strategies are proposed:

- Local policy for women's access to a life free of violence
- Strengthening of the body responsible for comprehensive care and development of women
- Policies for comprehensive care and development of women
- Channelling women to support institutions for their care
- Establishment of an individual or collective support program for women
- Diagnosis of the nursery system within the municipality in order to improve its conditions
- Establishment of a local policy on gender equality
- Training for the Promotion of Gender Equality
- Management of training in women's human rights and gender perspective for public servants
- Policy to raise awareness in institutions and companies to achieve equality in the recruitment of men and women
- Awareness Program for men and women to promote healthy life for the couple

Currently, the gender issues presented are related to climate change adaptation measures, especially in water supply, both for personal hygiene and for unpaid domestic work. Secondly, women's health was often discussed as a gender dimension in climate change, this because in Tlaxcala the abrupt changes in temperature cause health problems that are related to the sexual division of labor. For example, tortillas are prepared outdoors and require very high temperatures; the contrast between the heat of cooking and the cold climate is uncomfortable and related to joint pain.



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The Tlaxcala State Program of Action on Climate Change includes a section on gender and climate change, which states that "in order to integrate the gender perspective into the analysis of climate change, specifically in the adoption of adaptation and mitigation measures, it is proposed that our entity should encourage women's leadership in promoting the adoption of sustainable practices".

The sectors where women have the greatest influence are the category of waste where their participation in the integral management of solid waste from consumption habits, separation, reuse, recycling and composting is essential. Another key category is energy, in the subcategory of biomass emissions, where one of the fundamental purposes is to promote the adoption of wood-saving stoves, which is also considered an adaptation measure since it prevents respiratory diseases. Another sphere of action is that related to GHG emissions from energy use and residential use, where savings in electrical energy consumption are fundamental, and therefore the impact on modifying consumption patterns and technological change (household appliances, light bulbs) is key.

In the category USCUS (Land Use, Land Use Change and Silviculture), women can become promoters of the integral use of the forest by making forest use residues more efficient, preventing fires and reducing fuel in the forest area, which in the long run would minimize land use change.

Another point of this document is the need to integrate the Agenda on Gender and Climate Change of Tlaxcala, in addition to promoting research on the relationship between gender and climate (differentiated access to natural resources, knowledge, local skills and participation of women in decision-making in communities or cities, among other aspects).

4.7 Implementation status

Due to the incipient degree of development of climate change strategies in Tlaxcala mentioned above, it is difficult to follow the progress of implementation. The Municipal Development Plan for Tlaxcala presents titles for indicators on environmental protection issues that have yet to be developed.

5. CHALLENGES AND KNOWLEDGE GAPS

In the case of Mexico City, although there is a policy of transparency and accountability, extensive information on characteristics of the population, different organizations and institutions that support public policies related to climate change and gender, a robust regulatory framework from which medium-term action programs can be derived, and political conditions to promote



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progressive agendas in relation to human rights, equality, non-discrimination and sustainable development, there are still major challenges in terms of implementation and monitoring.

We see the following challenges: i) obtaining statistical data with a gender perspective, that is, beyond the disaggregation by sex, data that account for the power relationship between women and men in the city; ii) the slow adaptation to the city's administrative political reform, which transformed the hierarchy and attributions of local authorities, both in the municipalities and in some institutions; iii) the transition from the previous to the current administration has a negative connotation, so that a large part of the programs and actions designed and implemented in the past are currently not recovered, without clarity regarding their evaluation; iv) due to this transition a large number of female and male public servants were relieved, so that many people, as well as work processes are waiting to be reinstalled; v) willingness of local authorities to make a reassessment of the actions that were identified as those that would "incorporate the gender perspective"; v) the reluctance of certain counterparts in government institutions to link climate change with structural inequalities between women and men; and vi) a fickle planning process for the next Climate Action Program for Mexico City.

In the case of the City of Tlaxcala, one of the main challenges was to identify recent information at the local level, due to the traditional process of data collection by federal institutions. Within this strategy, the collection of municipal information is extremely costly for national institutions; therefore, there is very little disaggregated data at the municipal level, most of it collected during the 2010 National Census and not related to climate change. Positively, due to political and cultural issues, the Autonomous University of Tlaxcala maintains strong links with local authorities. In this relationship we identified a potential ally in the rector, Dr. Luis Armando González Placencia.

6. PRELIMINARY CONCLUSIONS

Mexico City tends to unite its programs for climate change mitigation and adaptation with programs for pollution control, especially air quality. In turn, it links both issues with the guarantee of rights such as the right to health, food, housing, security, respect for dignity and to have an income. On the other hand, the most recent programs include the achievement of gender equality among their objectives, recovering the Agenda 2030 and linking it with the Sustainable Development Goals. It is noted that mitigation actions are less numerous than those of adaptation, and that in both cases social criteria that account for power relations are absent. This means that the policies that seek to "incorporate the gender perspective" are not responding to structural problems and are rather



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essentialist for women; for example, in adaptation, generating actions for women because they believe they have a natural link with the environment. But they reproduce stereotypes and generate extra burdens of domestic work and unpaid care at the very least. This has led to a situation in which the participation of women in mitigation policies is disengaged from the heads of sector.

Finally, in the city of Tlaxcala one of the difficulties that have been identified is the disarticulation that exists with respect to the federal and international normative frameworks on gender equality; this hinders the generation of specific lines of work on gender and climate change.

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