Sustainable cities:
a conceptual and operational proposal

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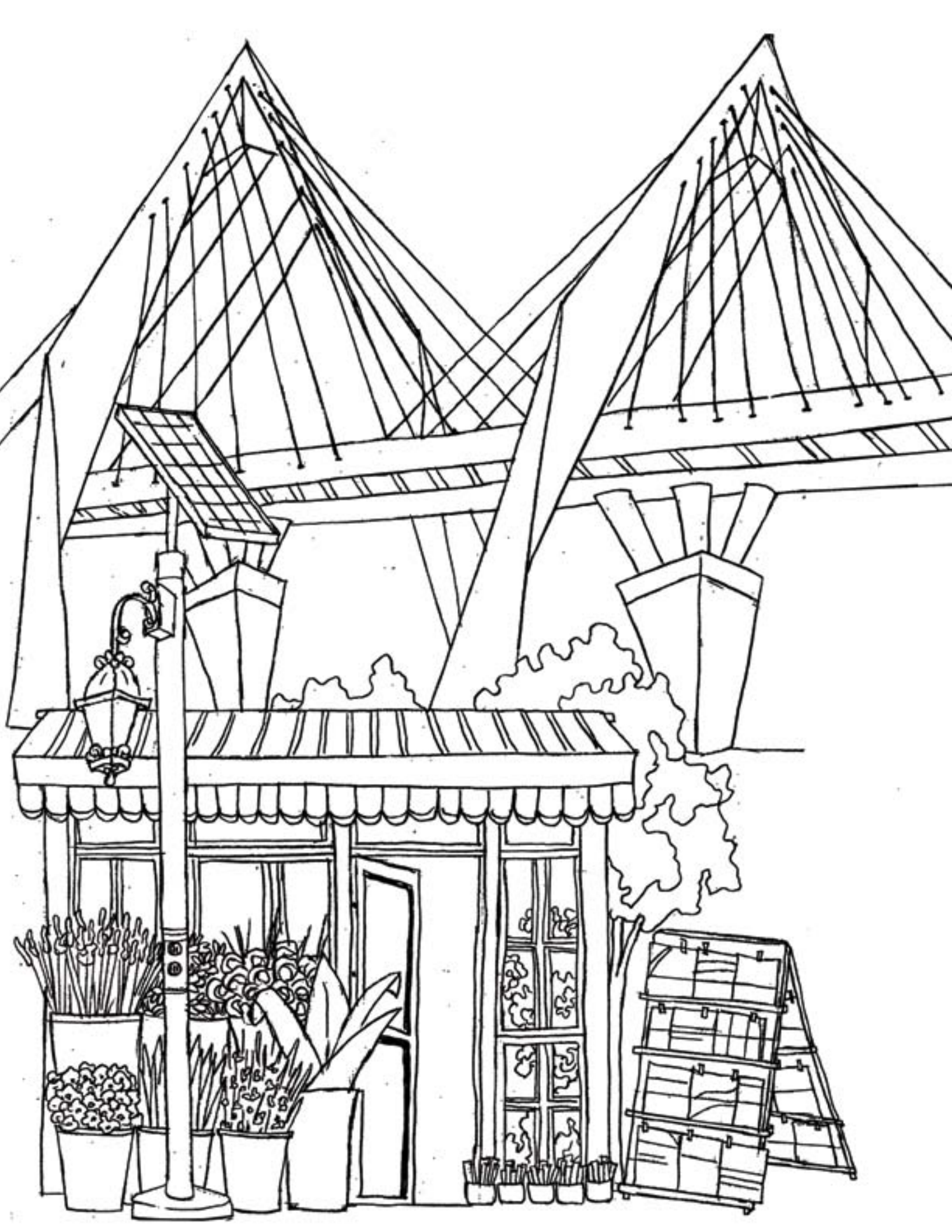

Presentation

Sustainability is an increasingly recurring term that synthesizes the growing concern to reorient economic growth and, in general, to change the way economic and human activities are carried out, so that the elements of the ecosystem are preserved, regenerated and recovered.

It has often been said that, in order to achieve this goal, cultural changes in connection with our form and levels of consumption, based on the unending creation of needs, are required. Another aspect that has been highlighted is the need to have a comprehensive approach to the process. However, in practice, we find multiple exercises or proposals where the problem is addressed in a fragmented and incomplete fashion.

Beyond that consensus or general guidelines, not enough progress has been made in terms of materializing, introducing or translating the ultimate goal of this process into public policy actions: how can we solve major environmental problems while meeting social needs?

The aim of this publication is to provide elements in order not to lose sight of the multidimensional nature inherent in the materialization of public policies, in addition to sharing several agreements and recommendations deriving from the linkage between it and the socio-environmental performance of cities in the short, mid and long-term. The most obvious relationship between cities and sustainability lies in the fact that, at present, over half of the population lives in urban settlements that are the place of production and consumption of an endless supply of goods and services, as well as the source of huge amounts of waste that, to a larger or lesser extent, transform, and have a negative impact on, the ecosystem.

Cities, and human settlements in general, are artificial milestones; their construction and functioning involve substantial transformations of the environment and have an impact not only on the area where they exist, but also on those places from which resources are extracted and to which different kinds of waste and contaminants are sent.

In addition, the urban structure generally expresses inequalities, inequity and the segregation of some population groups. In this regard, it is important to lead urban expansion in optimal directions and contribute to the elimination of inequalities within cities and between regions. This implies the need to develop interventions in different timeframes and scales under a strategic vision that includes defining the priorities of actions. Thus, the conception of sustainability in cities requires a process of dialog, through the construction of consensus and informed decisions, between authorities and local, regional, national, and even supranational, social actors, in the selection of, or the decisions regarding, urban and territorial management strategies.

The main contribution of this work is that it understands sustainability as a guiding principle in the decision-making process in all its different dimensions, taking into consideration the needs of society. To this end, the text proposes a multidimensional model aimed at the formulation of orderly, agreed, prioritized and evaluable urban development policies, based on operational instruments on different spatial and time scales.

This issue is particularly relevant in Latin America and the Caribbean, as it is precisely in this region that urban growth occurs at a faster pace. For this reason, it is necessary for the region to make progress in terms of controlling urban expansion, the consumption of resources and the wellbeing of its inhabitants. This is not a minor challenge, particularly in contexts of growing economic, political and governance uncertainty and the rhetorical use of the term by some social, economic and political agents that commonly use it to legitimate different actions. Going beyond these circumstances is an opportunity to influence the wellbeing of society, in the understanding that respect for, and the optimal management of, the environment cannot be separated.

Making reference to the different elements of the ecosystem and not to natural resources is conceptually important to differentiate and question other more anthropocentric perspectives of sustainability that assign value to nature only on the basis of its benefits or usefulness to human societies. The truth is that all the ecosystemic elements have value in themselves because they are fundamental to natural cycles, survival and the reproduction of, and in, the planet.

It is for this reason that the United Nations Fund for Population Activities and the National Population Council celebrate this type of publications, which give us an opportunity to reflect and redefine the path to follow, not only as a society, but as a human species, which goes beyond making an effort to materialize different public policy recommendations, an aspect in which, without a doubt, we will continue to work.

Sincerely yours,

Leonor Calderón Artieda
Representative in Mexico of the
United Nations Population Fund

Patricia Chemor Ruiz
Secretary General, National
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Introduction: Toward Sustainable Cities

Today, the word is facing a new phenomenon: since 2008, for the first time in the history of mankind, over half of the population lives in cities. More than 90% of urban growth is found in developing countries, which represents approximately 70 million new inhabitants in cities each year (WB, 2010). By 2030, urban settlements in the developing world will account for 80% of the world's urban population (UNFPA, 2007).

Over the course of the next 20 years, the *Homo sapiens* (the wise man) will become the H*omo sapiens urbanus* in virtually all the regions of the planet (UN-HABITAT, 2008: VIII). It has been estimated that, within 20 years, there will be almost 2 billion new urban residents, and it has been estimated that cities already contribute with approximately 70% of the world's GDP (WB, 2010). A large part of this new phenomenon is found in cities in developing countries, such as those of the Latin American region.

Cities are places of opportunity, the engines of the economy. They promote the creation of prosperity, social development and employment, the provision of fundamental goods and services, innovation, industrial and technological progress, the entrepreneurial spirit and creativity; they generate economies of scale, facilitate interaction, and promote specialization and competitiveness.[1] However, they can also be sources of problems if they are not properly led and governed, if public policies and institutions are dysfunctional, if the socio-spatial distribution of opportunities and the costs of development is unfair. And that is when inefficient and unequal cities that prey on the environment, unsustainable cities, emerge (UN-HABITAT, 2008; Maskell, 2001; O´Sullivan, 2008; Porter, 1998; Satterthwaite, 2007).

One way or another, it is clear that whatever happens in the cities of developing countries will shape the future of the planet in terms of economic growth, poverty and inequality reduction, demographic stabilization, environmental sustainability and the exercise of human rights (UNPF, 2007).

Successful cities thrive, improve their finances, generate development opportunities for all, create business opportunities and take care of their most vulnerable inhabitants. All of this is leading to a new paradigm that highlights the *benefits* of urbanization and raises red flags on its major risks. Unlike the 1980s, the question now is not how to stop urbanization, but how to take advantage of the different opportunities it offers while minimizing its contingencies (WB, 2010); how to achieve cities that are efficient, fair and responsible when it comes to environmental management. In other words, how to achieve *sustainable cities*.

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1 In addition, the opportunity costs of staying in disadvantaged, and even oppressive, rural settlements, especially for women, are too high, and that is why migration to cities does not stop (Garrocho, 2011).

In Mexico, sustainability at the level of the discourse has been present in the main planning instruments for at least two decades. However, in the case of public policy, there is not an agreement on the meaning of the term sustainability that is really operational for the design and implementation of development strategies and actions at different spatial and time scales.

The definition of sustainable development

Since the last decade of the last century, sustainable development (SD) has become a dominant theoretical and political paradigm due to the fact that the scale of environmental problems has become a central concern of the current development process.

The best-known definition of sustainable development is that of the 1987 Brundtland Report, which states that SD must meet the needs of present generations without jeopardizing the process of fulfilling the needs of future generations. The different interpretations of this definition have emphasized at least three aspects:

i. Promoting courses of development that preserve and improve the environment for present and future generations;

ii. Improving living conditions within the limits of the capacities of local ecosystems; and

iii. Avoiding, or reducing to a minimum, the transfer or environmental costs in social, territorial or temporal terms (Burgess, 2003: 196).

This discussion proposed an agenda for the solution of global environmental problems in a context that promoted economic development to address the needs of the most disadvantaged groups. In other words, the environment was integrated into the economic agenda (see Chapter 2).

In this global political process, the concept of sustainable development attempted to integrate society's most pressing needs into a single scheme, in particular:

i. Accelerate economic development to overcome poverty;

ii. Protect the environment and preserve the natural resources life depends on, and

iii. Advance social justice and tolerance (*e.g.* cultural diversity), so that local communities can express their values. In other words, sustainability was presented as a multidimensional concept that required the integration of economic, environmental and social objectives as part of the same task (Newman and Kenworthy, 1999: 4). But, above all, the conclusion was reached that sustainability should not be seen as an ideal state that must be achieved as quickly as possible, but instead be a *guiding principle* for government policy (Hall, 2003: 55-56).

In this regard, sustainability must be seen as a *process that guides public policy* in all its dimensions so that it can group the different needs of society (*e.g.* economic, social, environmental, political, population and cultural needs, among many others).

In other interpretations of the SD concept, the suggestion has been made to add two other dimensions to the three basic dimensions already described (*e.g.* economic, social, environmental): the political and demographic dimensions. The *political* dimension, because it is necessary to include the role of the State, democratization processes and participatory planning; and the *demographic* dimension due to its direct relationship with key processes such as demographic growth, the distribution of population in the territory, migratory flows and ethnic components (Drakakis-Smith, 1995: 665-666) (see Chapter 1).

Thus, sustainability is a challenge that involves *spatial and temporal scales*. Two examples:

a) The deterioration of the different dimensions of sustainability increases as the population living in a situation of poverty grows;

b) The product growth is unsustainable beyond a certain scale, which means that, over time, adopting the concept of sustainability becomes urgent. Climate change is a proof of that. One way or another, earth will survive, but it will up to human beings to select the timing and particularities of the transition at levels that are sustainable to mankind and, in general, to the natural capital (*e.g.* land, the atmosphere, forests, water, wetlands), which provides the flow of goods and services necessary to sustain the human economy, as Goodland (1995), Daly (1990) or Ehrlich & Ehrlich (1989) claimed some time ago.[2]

It became evident that, with its emphasis on different dimensions, sustainability generated significant expectations, and it was presented as an antidote for the majority of the most destructive impacts of the global development process, both in urban and rural settings. Thus, we saw the emergence of a new way of thinking about the multiple relationships established between the different dimensions of sustainability with the purpose of identifying deficiencies and formulating long-term responses to the benefit of society (Aguilar, 2013b: 25).

However, one initial problem with the SD concept has to do with the different emphases associated with it, which often distort its multidimensional perspective. It is common for the concept to be related only to the preservation of the natural capital (e.g. natural resources and ecosystems), to more specific aspects, such as the environmental footprint, or to a priority focus on the satisfaction of social needs. In other cases, it is only related to maintaining a certain level of productive activity. It is evident that this circumstance leads to partial interpretations where the perspective of the other dimensions is lost, a situation that only leads to ambiguous and vague definitions (Satterthwaite, 1999: 7-8; United Nations Centre for Human Settlements, 1996: 421).

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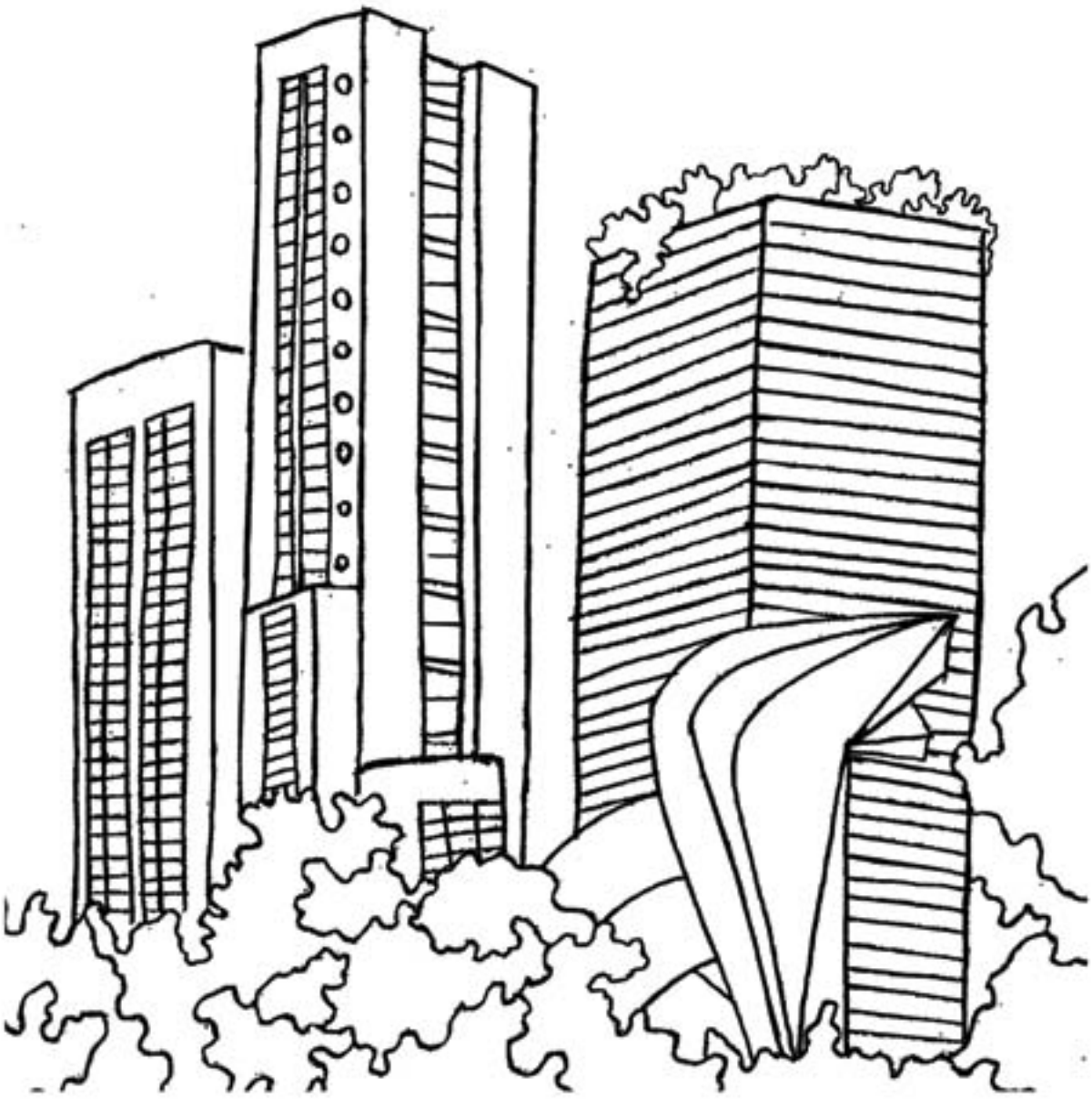
2 Daly, H. (1990), "Sustainable growth: An impossibility theorem", *Development,* 3/4; P. Ehrlich & A. Ehrlich (1989), "How the rich can save the poor and themselves", en *Pacific Asian Journal of Energy*, 3: 53-63.

One important aspect is that little attention is paid to the socio-environmental process that lies behind the most serious environmental problems (see Chapter 2). In other words, behind a certain resource consumption pattern there are social actors that exert pressure and determine the level of impact on the environment. The discourse around sustainability must not consider society as a homogenous whole; it is necessary to examine the differences between social groups, both in terms of their socio-economic condition and their access to resources, as well as their contribution to the degradation of the environment. We cannot deny social inequalities and fail to address the power relationships between the different social actors involved (Rogers, 2008: 66-67).

The interest in SD necessarily generates tensions in the process of maintaining a balance between the different dimensions it consists of. It is important to know how to resolve these tensions, for example, between economic growth, social equity, environmental preservation, and institutional forms and policies, because the different actors and institutions have the capacity to formulate and implement certain policies and not to implement others, that is, to adopt a strategic selectivity that may prioritize competitiveness and the entrepreneurial perspective over environmental sustainability and the quality of life of the poorest (Gibbs and Krueger, 2007: 102-103).



Urban sustainable development: different angles

During the 1990s, there were several compelling reasons that led to the need to address the issue of SD linked to cities. In the context of accelerated urbanization in developing countries, the adoption of sustainable urban development (SUD) policies was deemed urgent. It became evident that cities largely contributed to modifying environmental conditions and urban centers were the agents of many of the most important bio-geo-chemical changes. It became clear that the main problem of sustainability is related to the deficient functioning of cities. In fact, cities represent the predominant social habitat. Therefore, if our concern has to do with the sustainability of the planet, then we need to focus on the sustainability of cities.

Cities stand out for at least three main reasons. The first is that, at present, one half of the world's population lives in cities, and the trend is that this demographic concentration will increase in the short and mid-term, in addition to the fact that a significant proportion of this population lives in conditions of poverty. Second, urban centers concentrate a significant number of productive activities, which includes most manufacturing activities and the generation of contaminating industrial waste. Third, the demands generated by the presence of the middle and upper classes that live in urban centers create a strong pressure on natural resources, which produces a large amount of waste and generates a high proportion of greenhouse gases (McGranahan and Satterthwaite, 2003: 244).

The 1992 Rio de Janeiro Summit led to the adoption of the so-called Local Agenda 21, which outlined the basis for local-led actions for urban centers. With it, sustainability almost instantly became a universal guideline for urban development plans that suggested cooperation between different government offices to address the complex and multidisciplinary nature of a possible and sustainable urbanization. Sustainability seemed to provide a better path to protect the environment and regain a certain quality of life on the individual and community levels. The sustainable city emerged as a new paradigm in the dark landscape of the urbanism of neoliberal times (Brand and Thomas 2005: 1).

Ever since then, there has been a proliferation of interpretations of the definition of the term sustainable urbanization, and multiple efforts have been made to conceptualize and operationalize its principles in the process of planning and constructing cities. However, in practice, there has been no consensus or a clear definition. In simple terms, a sustainable city is one that is *environmentally sustainable, socially fair and economically viable*. However, the problem is that sustainability is an integrating concept that involves multiple dimensions interrelated in a very complex manner, many of them valued subjectively: the meaning of *the fair or the economically viable,* a situation that makes it difficult to agree on priorities, objectives and strategies. One way or another, this interdisciplinary quality is the distinctive trait of this approach to sustainability.

On the other hand, one of the most important arguments in connection with sustainable urbanization claims that cities will never achieve sustainability, because they depend on the import of foods and energy, both from distant and close ecosystems. Therefore, the approach to reducing the environmental impact of urban centers would require intra and extra-urban actions that reduce the transfers of environmental problems to other ecosystems, which is virtually impossible (Satterthwaite, 1999: 82).

Thus, the shift toward a *sustainable city* must be seen in the context of a sustainable society, and in relation to its contribution to sustainable global development, which demands political action on different geographical scales: from the local and urban to the regional and global (Haughton and Hunter, 1994: 26-27). A sustainable city is not a specific entity, *it is not a final state*; it must be seen as a *process that contributes to sustainable global development.*

In order to move toward sustainability, it is necessary to implement urban policies that can establish a balanced link between environmental care, social development (e.g. poverty and urban inequality) and economic development. However, politically speaking, that it something very difficult to achieve in urban contexts with low economic growth, unemployment, inequality and poverty (which is the case of Mexico and other Latin American countries). In cities in emerging countries (but also in those of many advanced countries), the most powerful economic groups make an unequal distribution of the benefits and burdens of development among society. Thus, the number of poor people grows, and situations of widespread inequality, both in the present and the future, become endemic (Haughton and Hunter, 1994: 26-27; Satterthwaite, 1999: 82).

It is essential for sustainable urbanization to be understood as the *balanced* interaction between economic growth (see Chapter 3), social development (see Chapter 2) and environmental protection (see Chapter 4). Urban policy must achieve this balance between the three dimensions, with effective regulatory frameworks (see Chapter 5), and with no priority whatsoever assigned to any of the different dimensions. For example, the neoliberal policy shows a keen interest in the *glamour* of being economically competitive, urban renewal, large infrastructure projects or attracting new businesses, without assigning the same weight to aspects such as the modification of consumption patterns, recycling of urban waste or the legitimate reduction of poverty and social inequality.

It is necessary to consider that, generally speaking, cities *are not valid environmental management units*; they are not autonomous entities that can become sustainable through endogenous change processes. It has become evident that urban centers not only relate to their immediate *hinterland* but, in the current context, are intensely linked to national and international networks and flows of trade, capital or innovations. The global dynamics of urban development tends to weaken and reduce local efforts to advance toward the sustainability of cities (Aguilar, 2013b: 33).

In other words, the city does not constitute a *closed system*, and it exerts a strong environmental pressure in broader geographical contexts. The appropriate *scale* of analysis of sustainability, but all the area of influence reached by the environmental footprint and exchanges of supplies and waste.

It is advisable not to make a rhetorical use of the concept of sustainability (especially by the public and entrepreneurial sectors), which tends to label and justify as “sustainable” a wide range of actions different in nature, forgetting about the multidimensional essence of the concept (Aguilar and Vieyra, 2009: 192-193). Local authorities must *secure* the advancement toward sustainability through policies, laws, and/or regulations that point in the right direction; this is particularly important for Latin America, where the governance factor of the urban system often fails, not only from the standpoint of handling the relationships between social actors, but especially in the application of the formal rules of the institutional and normative framework of the local government (Winchester, 2006: 8; see Chapter 5).

In order to go beyond the discourse, the concept of sustainability must be translated into a *multidimensional* model that allows for the generation of orderly, mutually agreed, hierarchical and quantifiable urban development policies, based on *operational instruments* applicable to different spatial and temporal scales. The model and key instruments proposed in this book are shown in Figure I.1 and Table I.1, and are explained in detail in the following section.

The dimensions of sustainability

In this book, sustainable urban development is understood as a *guiding principle* for public policy that is multidimensional in nature, and not as an ideal state to be achieved as quickly as possible. The dimensions we consider strategic are the social, economic, environmental, political, demographic, mobility, inclusion and institutional dimensions, as well as that on access to urban opportunities. These dimensions are equally important; they are not only closely interrelated, but also overlap, and they are presented here in a separate fashion to limit them as *analytical categories* (see Figure I.1).

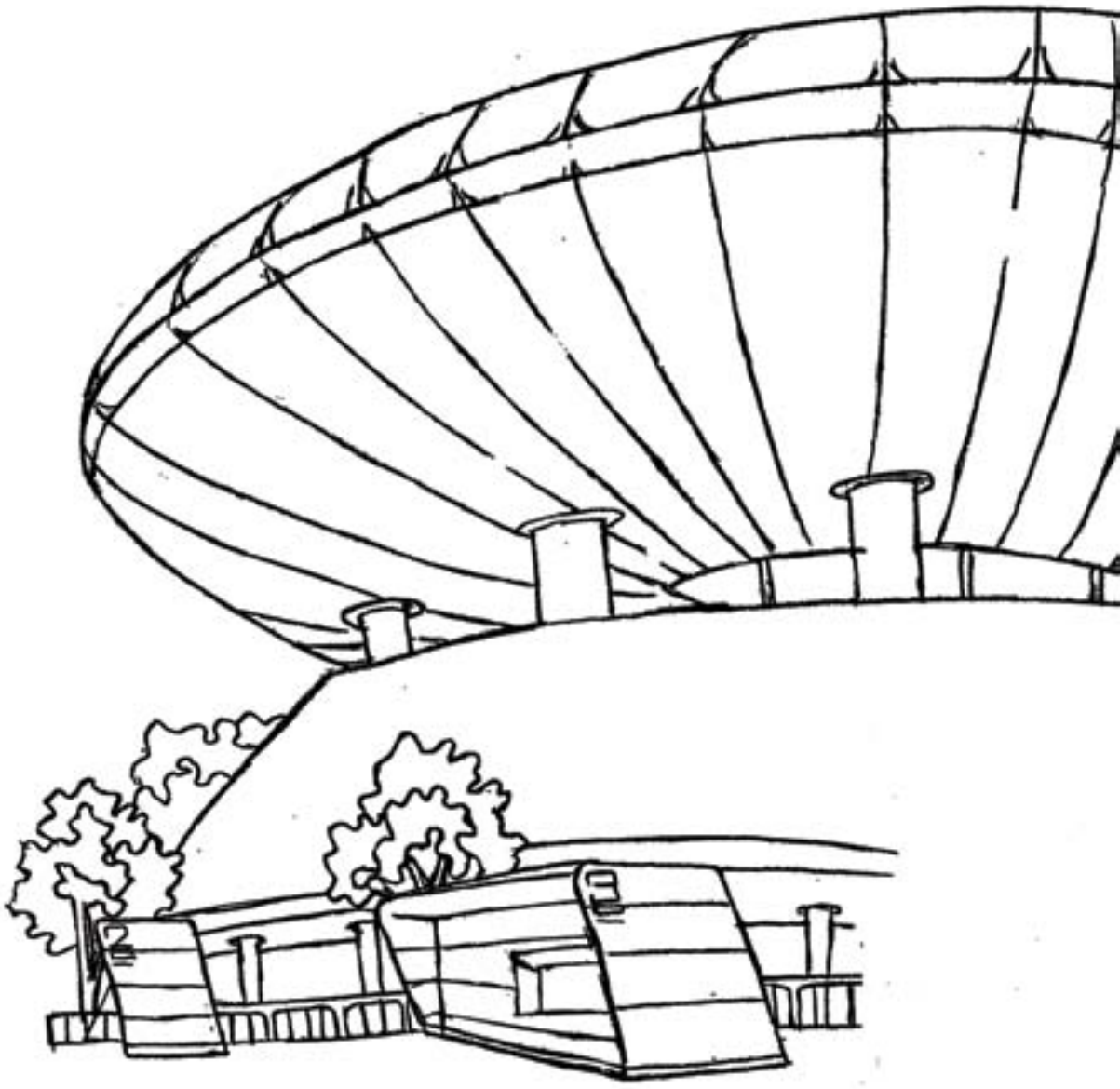


Figure I.1

STRATEGIC DIMENSIONS OF SUSTAINABLE URBAN DEVELOPMENT

ENVIRONMENTAL

- POPULATION, ACTIVITIES SCALES AND TIME
- ENERGY, TRANSPORTATION, HOUSING
- SOLID WASTE
- ENVIRONMENTAL ACCOUNTS
- COMPACT CITY
- METROPOLITAN GOVERNMENTS

MOBILITY, INCLUSION AND ACCESS TO URBAN

- MOBILITY INEQUALITY
- LABOR MOBILITY
- EVERYDAY MOBILITY
- INTRA-METROPOLITAN MIGRATION

INSTITUTIONS

- FORMAL
- NFORMAL: VALUES, ATTITUDES
- EXEMPLARY CHANGE AGENTS

POLITICAL

- INSTITUTIONAL CAPITAL
- LEGAL FRAMEWORK
- CAPACITY OF LOCAL GOVERNMENTS: FINANCE, PLANNING, TAX COLLECTION

POPULATION

- GROWTH
- AGE STRUCTURE
- AGING
- TERRITORIAL DISTRIBUTION
- SEGREGATION
- FAMILY ARRANGEMENTS
- MIGRATION

SOCIAL

- POVERTY AND INEQUALITY
- HEALTH AND EDUCATION
- WATER, SEWAGE SYSTEMS AND ELECTRICITY
- COMPUTER, INTERNET, MOBILE PHONE
- INSECURITY AND VIOLENCE
- VACANT HOMES

ECONOMIC

- DYNAMICS AND SPECIALIZATION
- EMPLOYMENT
- COMPETITIVENESS

SUSTAINABLE URBAN DEVELOPMENT

- DEFINITION OF SUSTAINABILITY
- DEFINITION OF SUSTAINABLE URBAN DEVELOPMENT

SOURCE: OWN, BASED ON DRAKAKIS, 1995.

The earliest direct reference to this conceptual approach is Drakakis (1995). However, we differ from it in two major aspects –the most important factors in each dimension fit into the Mexican context, but we have added two dimensions:

i. Mobility, inclusion and access to urban opportunities, and

ii. Institutions (*e.g.* incentive systems, norms, regulations, values, traditions, laws, beliefs, power relationships, cultural practices and interests that limit, both formally and informally, the interaction and behavior of individuals and public and private organizations).

The first dimension is key in the case of large cities in developing countries, which usually pay significant costs in terms of traffic jams, severe spatial imbalances between the workplace and housing, lack of land use planning and an accelerated aging process (*e.g.* the main cities in Mexico, notably Mexico City). The second dimension has proven key in the process of triggering any development process (Arellano and Lepore, 2009; Dellepiane, 2010).

We have translated the general conceptual model (see Figure I.1) into key elements of policies for sustainable cities (see Table I.1). These elements also correspond to the reality and the development priorities of Mexican cities, but are highly likely to coincide with those in different Latin American countries. We have identified five purposes of the highest level, four fundamental public policy instruments and five evaluation criteria to measure the advancement of sustainable urban development policies.

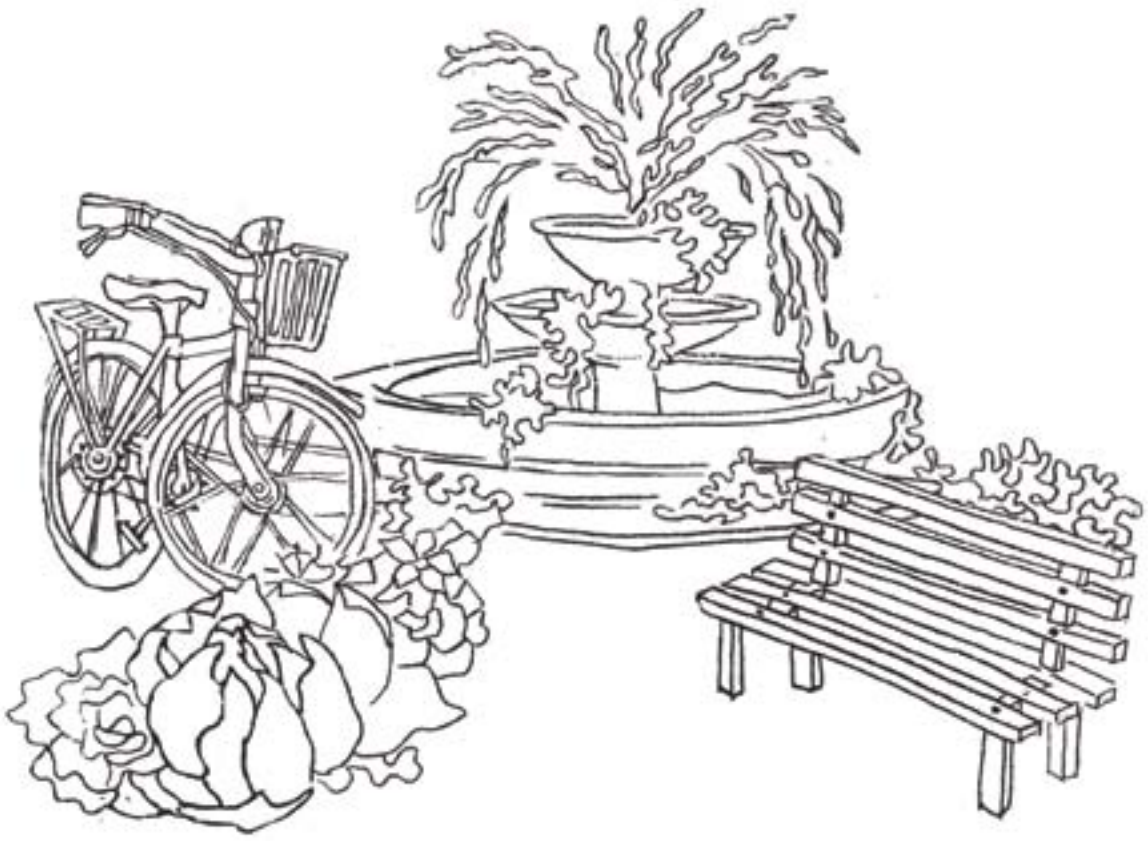


Table I.1

KEY ELEMENTS OF POLICIES FOR

SUSTAINABLE CITIES

PURPOSES

1. REDUCE (MULTIDIMENSIONAL) POVERTY
2. REDUCE INEQUALITY
3. MAKE A RATIONAL USE OF NATURAL CAPITAL AND RESOURCES
4. FOSTER LOW-CARBON ECONOMIC GROWTH
5. GENERATE AND INCREASE ACCESS TO DECENT (QUALITY) EMPLOYMENT
6. ACCESS TO OPPORTUNITIES

INSTRUMENTS

1. QUALITY AND INCLUSIVE PUBLIC SERVICES
2. LAND USE CONTROL
3. LOCAL PUBLIC FINANCE
4. URBAN-METROPOLITAN LAWS AND REGULATIONS

EVALUATION CRITERIA

1. EFFICIENCY (COST-BENEFIT)
2. EQUITY (IN TERMS OF ACCESS OR CONDITIONS)
3. EFFECTIVENESS (HOW)
4. TIMING (WHEN) 5. TERRITORIAL SCALES (WHERE)

SOURCE: OWN

The highest level Purposes are the following:

i. Reduce poverty;

ii. Reduce inequality;

iii. Make a rational use of natural capital and resources;

iv. Foster low-carbon economic growth; and

v. Increase access to urban opportunities. On the other hand, the central policy instruments we propose are:

- *i.* Quality and inclusive public services;
- *ii.* Land use control;
- *iii.* Strong and orderly local public finance; and,
- *iv.* Urban-metropolitan laws and regulations.

Finally, the criteria to evaluate achievements in connection with the guiding principle for sustainable urban development are:

i. Efficiency (cost-benefit relationship in a broad sense);

ii. Equity (*e.g.* access, use, conditions);

iii. Effectiveness (the contribution of strategies to achieving the highest level purposes: the *how*);

iv. Timing (opportunity and duration of public policies: the *when*); and

v. Territorial scales (the partial scale of application of policies: the *where*).

As is clearly evident, the definition of a sustainable urban development conceptual model and the key elements that make it operational (purpose, instruments and evaluation criteria) involve a theoretical and political stance. We take care of that. We are open to debate and also to suggestions to improve our proposal.

The Montevideo Consensus on population and development

As regards the issue of population and sustainability in Latin America, one of the most important documents is the *Montevideo Consensus*. From August 12 to 15, 2013, the first meeting of the Regional Conference on Population and Development in Latin America and the Caribbean was held in Montevideo, Uruguay. This Conference revolved around two central issues:

i. Outline a post-2014 Plan of Action, based on the achievements made over the last 20 years in the area of population and sustainable development in Latin America and the Caribbean; and

ii. Identify the fundamental measures to accelerate development in the region, with a focus on regional emerging issues in the area of population and development, human wellbeing and dignity, and their sustainability.

Among the most important conclusions of the conference, we find that, despite the significant achievements made by the region in the promotion, protection and guarantee of human rights over the last 20 years, these efforts have not trickled down to all individuals and, while economic and social inclusion policies have increased opportunities and wellbeing, many persons continue to live in extreme poverty conditions, facing huge inequalities deriving from deeply-rooted historical patterns and new forms of discrimination that limit the full exercise of their rights. At the same time, it is recognized that preserving our planet and its ecosystems is fundamental to achieve a *fair balance* between the economic, social and environmental needs of current and future generations.

On the other hand, it is recognized that population dynamics influence human development opportunities.[3] Since they are sensitive to public policy, it is key to establish a framework for their planning aimed at sustainable development in its three pillars: social, economic and environmental (ECLAC, 2013: 5)

The *Montevideo Consensus* defines ten priority measures to be integrated into the population and development agenda for Latin America and the Caribbean beginning in 2015 (ECLAC, 2013: 7-27):

a) Full integration of population dynamics into sustainable development with equality and respect for human rights.

b) Recognize the rights, needs, responsibilities and requirements of girls, boys, adolescents and youth.

c) Recognize population aging, social protection requirements and the socio-economic challenges it involves.

d) Promote universal access to sexual and reproductive health services.

e) Guarantee gender equality.

f) Recognize international migration and the protection of the human rights of all migrants.

3 For example, growth and growth decline, changes in age structures, urbanization, migration and change in households and family structures, territorial distribution.

g) Formulate strategies to fight territorial inequality, vulnerability and spatial exclusion.

h) Protect and respect indigenous peoples, promoting their rights and interculturalism.
i) Integrate afro-descendants, fight racism and racial discrimination and guarantee the enforcement of their rights.

j) Strengthen frameworks for the implementation of the future regional agenda on population and sustainable development.

k) A permanent follow-up on the advancement of the regional agenda.

In order to promote the implementation of these measures, a request was made to include them in the strategic plans of the different organizations, funds and programs of the UN agencies, as well as in agreements reached with countries in the region in the following years. All of this is helping to bring attention to the concern over population and sustainable development in Latin America and the Caribbean.

Sustainability in public policy instruments in Mexico[4]

The use and the practical application of the term sustainability in public policy instruments are closely linked to the United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992. Since the 1983-1988 period, public policy in our country has been led by the National Development Plan (NDP). In it, the term *sustained* is used with an emphasis on the country's growth and economic stability. In the 1989-1994 Plan, it is identified as the rational and sustainable use of natural resources and ecosystems. It was only in the 1995-2000 Plan that the term *sustainable development* was explicitly introduced and became a programmatic objective.

Between 2001 and 2006, this same expression appears in different strategies as an *adjective* of economic growth to refer to the preservation and rational use of natural resources. The 2007-2012 NDP distinguishes the human dimension from the environmental dimension in the process of development by introducing the term *sustainable human development,* the aim of which is to create an atmosphere for the multiplication of opportunities for all and the expansion of opportunities for future generations. Another term that appears is that of *environmental sustainability*, which is used to refer to the efficient and rational management of natural resources to improve the population's current wellbeing, without compromising the quality of life of future generations. Finally, in the 2013-2018 NDP, sustainable and comprehensive development is cited as essential for the achievement of the country's goals: different strategies recognize the importance of the natural capital, environmental goods and services for the development of countries, and the population's wellbeing.

4 The references cited in this section are: DOF, 1983; PR, 1995; PR, 2001; PR, 2007; PR, 2013; PEF, 1995; CONAPO, 2001, CONAPO, 2008, CONAPO, 2014.

In the field of demographic planning, the term *sustainable development* first appeared in the 1995-2000 National Population Program (NPP), which recognized that people's quality of life cannot be detached from the quality of the environment, and also that it is possible to have an impact on both dimensions through a territorial distribution of the population that is consistent with the availability of natural resources and the quality of the environment. The 2001-2006 NPP followed the same direction and recognized the need to influence sustainability by harmonizing growth and the population's territorial distribution in order to improve the quality of life of Mexicans.

The 2008-2012 NPP maintained the same approach of the two previous plans: it proposed the geographical distribution of the population based on the potential for sustainable development in the territory, promoting urban-regional systems and fostering the rational use of natural resources and the preservation of the environment. The 2014-2018 PNP highlights the importance of promoting the territorial distribution of the population by building local capacities and building infrastructure to generate productive chains, integrate excluded territories and lead the urbanization process in safe and sustainable directions.

In Mexico, sustainability at the level of the discourse and programs has been present in the main national development and demographic planning instruments for at least two decades, and ever since its inclusion, the terms *sustained* and *sustainable* have been used interchangeably. However, it is important to note that these concepts have different implications and, therefore, consensus must be reached on the use of one or the other.

As far as public policy instruments are concerned, it is necessary to reach an agreement on the conceptualization of the term *sustainability*, as well as its meaning in terms of specific and horizontal coordinated actions in order to avoid rigid and too fragmented policies. The relationship between demographic policy and sustainability is a typical example of a relationship that must address economic growth, the creation of employment, reducing poverty and inequality and environmental care. All of it in a fair and balanced context.

In the use of the term *sustainability*, we can observe an evolution that favors the comprehension of the complexity of the concept. This has led to the denomination or separation of the different dimensions of the process (the human and the environmental). Nevertheless, while this distinction is useful for purposes of assigning powers and competencies of the public administration, it is necessary to reflect as to whether this has fostered the design and implementation of policies by sector, as opposed to coordination and the generation of synergies (*e.g.* public and private actions) that would strengthen the capacities of the population in the management of the territory.

From the perspective of demographic planning, the most explored facet of the relationships between population and sustainability is the one that corresponds to the territorial distribution of the population (see Chapter 1). Without a doubt, that interrelationship is close and cross-cutting to government actions and requires coordination between the different sectors of the public administration and the different population sectors for the creation of sustainable employment, migration and residency options, something that, in turn, requires going beyond management by sectors.

It is necessary to reflect on the meaning of sustainability based on the singularities of developing countries. And, in particular, on the associations between economic growth and sustainable development in the context of a globalized market economy, as well as on how this translates into strategies to promote competitiveness and productivity in the region that improve the wellbeing of the population, beyond conventional income measures.

Document structure

The document is divided into five chapters and a brief final comment. The first chapter explores the relationship between *population distribution and sustainable development.* The conceptual starting point is the interaction between population and environment. It then analyzes recent trends in the distribution of the population in Mexico (which is predominantly concentrated in cities), and ends with strategic public policy recommendations. After establishing the country's population concentration context, chapter two shifts the focus to *sustainable urban development.* It begins with a review of the main ideas and concepts on this elusive concept and, after defining its profile, it outlines an agenda of recommendations in very different areas, with an emphasis on the most important ones for Mexico.

The third chapter focuses on the *economic dimension*. It establishes a conceptual link between the idea of competitiveness and sustainable urban development, to then evaluate competitive performance in the national urban system and link urban competitiveness to energy use and sustainability. This chapter, like the previous ones, ends with key public policy recommendations. The fourth chapter focuses on the *environment, poverty and natural resources* link. It begins by examining the relationship between population and the use of resources, which reveals the environmental impact of the population. It delves deeper into the meaning of resources as natural capital and highlights the complex interactions between environment, poverty and use of natural resources. Finally, it presents innovative proposals in connection with the most appropriate scales for the implementation of sustainable development policies.

After a review of the demographic, social (in its broadest sense), economic and environmental dimensions, the fifth chapter focuses on four key recommendations in the area of sustainability for local governments, which are considered here as key change agents to advance sustainable urban development. These recommendations are:

i. Establish national and regional programs for the training, supervision, evaluation and certification of municipal treasurers and urban planners;

ii. Implement a national land-use planning strategy;

iii. Integrate the demographic perspective into urban and regional planning, and

iv. Implement regional strategies to promote the creation of metropolitan authorities.

The text concludes with a final comment that summarizes our stance in connection with sustainable cities in Mexico, which could also be applicable to different countries in the Latin America and the Caribbean region. At the end, we present the bibliography consulted for the preparation of the text.

1. Population Distribution and the Paths toward Sustainable Development.[1]

1. The relationship between population and environment

Over the course of the last forty years, Mexico's total population has increased significantly and, during the same period, the pace of changes in the environment has accelerated in an unprecedented way. Considering this steady population growth and the environmental degradation associated with it, it is really important to lay emphasis on the relationship that exists between population dynamics and environmental changes, in particular from the perspective of population distribution.

Population distribution refers to the concentration or dispersion of individuals in a given territory. This location pattern establishes a type of interaction with the environment that translates into pressure on natural resources as a result of the need to meet basic food, housing, health or recreation needs. But this population-environment interaction in a given place and space is characterized by a series of *accumulated effects*, considering that past history exerts an influence, that can sometimes be decisive, on the current situation and its future course. In other words, the current territorial population distribution pattern is not the result of the current natural advantages and potentialities of each space, but a complex set of historical decisions that have endowed each territory with material, social and cultural wealth in different moments (ECLAC, 2012: 23).

In other words, a country's distribution of the population by regions –or in urban and rural locations, or according to its size- not only reflects multiple decisions made by individuals and families in response to social inequalities, economic crises and political processes (endogenous conditions), but is also a response to global processes such as economic, environmental, and even cultural changes (Sklair, 1991; García Canclini, 1999; Bauman, 2007) that have an impact on all scales, from the local to the global.[2]

There are two trends of the demographic dynamics that have an influence on environmental pressure in each region: first, the differential pace of demographic growth that occurs in the territory and causes some areas to grow above the national average, exerting more pressure on natural resources, while others grow a slower pace. And, second, national and international migratory flows, which result in a redistribution of the population and lead to a higher or lower

1 The author wishes to thank Josefina Hernández and Diana Guerrero for processing statistical data and preparing all the tables and graphic materials.

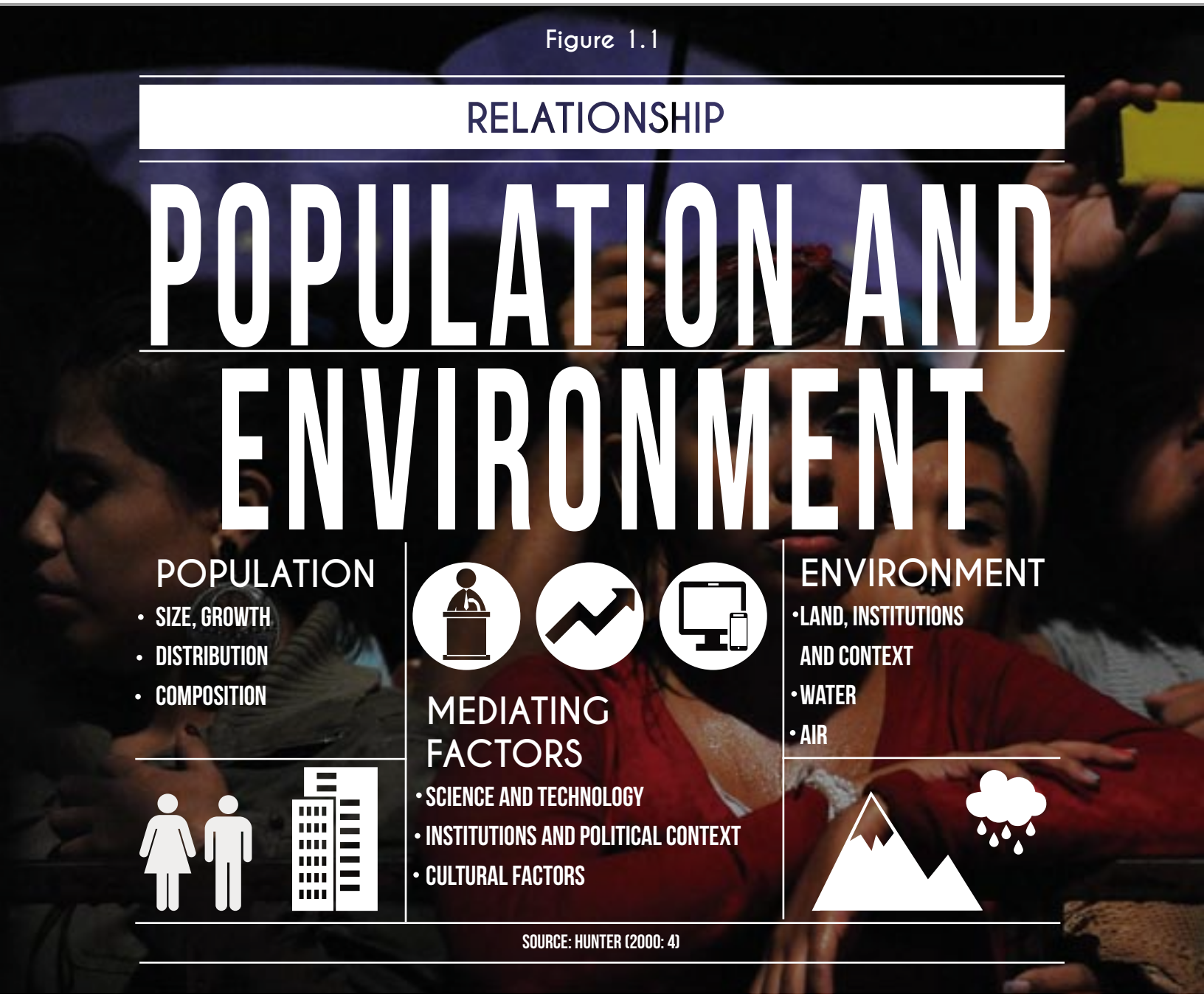
2 Cited in Aguilar and Graizbord (2014: 783).

demographic weight (depending on whether positive or negative balances are generated), increasing or reducing pressure on local environments. Both trends are reflected in a certain level of population density, which is a useful indicator of population variations by region or territorial unit. The increased pressure on natural resources due to the increase in density tends to result in a scarcity of agricultural land and water and energy sources, among other things.

However, production and consumption patterns, rather than the magnitude of the population, may be the key to achieving efficacious and efficient situations that can sustain future generations. The process to overcome gaps in a developing country like Mexico exerts a lot of pressure on the environment. Creating full employment, increasing income and fighting poverty require a higher level of sustained economic growth, but this will only increase environmental pressure, especially if the economy is dependent on extractive industries such as oil, and also if a higher demand for food increases agricultural exploitation with the consequent deterioration of the environment (UNFPA, 2012: 6-7).

Figure 1.1 shows a conceptual description of the relationship between population dynamics and environment in a deliberately simple fashion. Population size is closely linked to the environment, considering that every individual requires a certain amount of resources and contributes to environmental deterioration. Population distribution refers to the dispersion/concentration of the population and its density, which exerts different levels of pressure on the environment. The composition of the population can be related to age and income structures where young people are prone to migrating, and those with higher income levels are correlated to higher production and consumption levels. In its relationship with the environment, the population has several mediating factors that can accelerate or reduce environmental pressure, such as technology, institutions, policies and cultural factors, among others. Today's environmental deterioration can be clearly exemplified by two long-reach impacts, to wit, global climate change and land use change.

Figure 1.1



In this higher density dynamics, in the last decades, population trends have been characterized by a significant level of concentration in urban areas. In the particular case of cities, the size of the population alone has caused the pressure on environmental change to become more complex and multiply in the territory, a situation that leads to a lack of infrastructure and regulatory mechanisms to reduce pollution and other environmental damages (Hunter, 2000: *xiii*). As stated by Vitousek *et al.* (1997: 494), the urbanization process, the humanization of the space, or using a more contemporary expression, the *human domination of earth's ecosystems,*

through the adoption of changes in land use to produce all types of goods and services, represent the biggest human alteration of the earth's system, creating global warming (or climate change) and causing irreversible losses in the planet's biological diversity. The repercussions of these major changes in our cities have been evident for quite some time.

Urbanization involves the construction of artificial structures that modify the environment and have an impact on the pressure on resources by unit of territory. It is generated in two different ways: first, as a result of the higher density that occurs in urban areas; and, second, as a result of the lifestyles and higher income levels of urban populations, which are linked to certain patterns of production, consumption and generation of waste harmful to ecosystems (ECLAC, 2012: 121). In fact, the impacts of urbanization on the environment are not only limited to the territory it occupies or its surrounding areas, but also extend to distant ecosystems, where the extraction of resources for urban consumption (*e.g.* water or food) is common.

The relationships between urbanization and sustainable development are established in different spheres. According to Hunter (2000: 25-26) and ECLAC (2012: 121), they materialize in four different forms:

i. Ecosystemic transformations that result from the impact on natural resources. In this case, we can point to two particular aspects: first, the generation of waste that, due to its magnitude, exceeds the environment's capacity to absorb it and translates into high concentrations of contaminants; and, second, changes in land use, where the most significant expression is the loss of vegetation or agricultural land to the benefit of urban uses;

ii. The alteration of local climate that results from the presence of artificial materials, such as concrete, that alter temperature variations and lead to heat islands, as well as climate change, due to the emission of greenhouse gases resulting from the operation of industries and motor vehicles;

iii. The rapid pace of urbanization, especially in large cities, which limits the availability of appropriate infrastructure or the creation of regulatory mechanisms to manage environmental impacts; and

iv. Disasters associated to natural phenomena, where urbanization has an effect that multiplies the damage due to the larger size of the population and the higher number of buildings or material possessions by area unit exposed to these phenomena. Disaster vulnerability in cities has grown due to the increase in the number of high density urban areas that face limitations in infrastructure and lack the means to mitigate disasters, which is the case of poor areas in conditions of irregularity..

Cities are the scenario where both *population/climate change* interactions, such as the location of human settlements, and disaster risk patterns, are predominantly defined. According to UNFPA, UNISDR and UN-HABITAT (2012: 11), this notion of *vulnerability growth* has been proposed not only as a mere reflection of the increasing number of people who live in environments prone to the impact of threats, but also the fact that disaster impact vulnerability also feeds on itself in conditions of poverty, environmental degradation and weak governance.

One of the most characteristic traits of current urban growth is peripheral urbanization or *peri-urbanization*, which represents new urban expansion patterns. These particular forms of occupation of the territory must be addressed given their implications for socio-economic development and environmental sustainability. The average density of cities experienced a rapid decline in the last ten years, at a rate of 1.7% in developing countries, and 2.2% in industrialized countries. Over the course of the next thirty years, those cities with more than 100,000 inhabitants in developing countries are expected to triple their constructed area to 600,000 km2 (United Nations Population Fund, 2007: 47).

Urban growth dispersion in the territory has become a global phenomenon. Dispersed urban expansion is closely linked to low land occupation densities; a significant separation between urban activities that leads to land use fragmentation; social segregation by income (or by age: Garrocho and Campos, 2015a; 2015b; 2015c); the consumption of important natural resources such as agricultural land and open spaces, and an increased mobility of the population, which must travel longer distances and becomes dependent on motor vehicle transportation.

In Latin America, urban policy favors this pattern of occupation of urban zones in urban peripheral areas, especially land owned by the public sector or communal land. In addition to this, poverty and social exclusion also expand city limits through informal settlements that must face significant shortages of public services and precarious living conditions. All of the above is replacing the model of more dense and compact cities with a process headed in the direction of *peripheral urban dispersion.*[3]

It is also necessary to highlight that scarce and dispersed rural settlements can have predatory effects on the environment. In their analysis of this issue, Álvarez and Herrera (2014: 289) maintain that, under certain conditions, a significantly dispersed population will deteriorate the environment and will modify land use, with serious consequences for biodiversity and the balance of ecosystems. By way of example, they point to two concrete circumstances: first, the case of rainforests in the southeast of Mexico, where large farms of hundreds of hectares were initially established but, more recently, a model of small production units was adopted through a process of colonization with *ejidos* (communal lands for agriculture) and communities mainly engaged in cattle raising and agricultural activities, and a large number of small communities of less than 50 inhabitants; and, second, the case of the Monarch Butterfly region, where a high level of population dispersion was identified in small communities, a situation associated with a higher level of environmental degradation, areas with a high level of marginalization and the presence of indigenous populations (Álvarez and Herrera, 2014: 299, 303).

3 Generating what Garrocho (2011) calls “the peripheral location trap”: in those places where the poor can live there are no jobs, and in those places where they can work there is no housing.

2. Recent population distribution trends in México

Population distribution in the country is a really important indicator of the level of attraction each space has had in the past, the current opportunities offered by different areas in the national territory, and the magnitude of environmental pressure in each individual region. In this pattern, there are spaces that stand out due to their population concentration and their appeal to the population. And these same areas will likely continue to receive a larger number of persons, unless redistribution policies are implemented to transform the economic foundations of other locations and radically change trends.

It is important to note that the economic trade openness model adopted in the country in the late 1980s had significant territorial impacts, including a redistribution of the population and productive activities in new destinations of interest to private capitals, a process supported by economic development policies. As stated by Aguilar (2014: 194-196), this can be summarized as follows:

- A reinforcement of territorial patterns that were already predominant at the time, such as the consolidation of large metropolitan areas and the emergence of others. A notorious aspect was the process of deindustrialization in the largest cities and the consolidation in them of a tertiary sector, both advanced and low-skilled, that turned them into large consumption centers;

- The promotion of industrial activities in middle-sized urban centers, such as large-scale manufacturing in the Center-North region and the maquila areas along the northern border;

- The promotion of tourism in comprehensively planned resorts along the coastal tourist corridor of the state of Quintana Roo and the Pacific coast;

- On the opposite side of the spectrum, the "losing spaces" in this territorial reconfiguration process are those linked to rain-fed rural areas, difficult-to-reach areas with large indigenous populations, and small and middle-sized urban centers not integrated into the productive systems reactivated by economic globalization.

All the above contributed to revitalizing new territories, especially those far away from the largest cities, such as middle and small-sized urban centers, and reoriented migratory flows to new destinations in the country, not only between rural and urban areas, but also between large cities and smaller urban centers, and between cities and rural areas. However, it is also important to note that, despite this recent dynamics, significant *socio-territorial inequalities* still persist between regions and between urban and rural areas.

The following is a description of four major aspects of population distribution in the country and their most important environmental impacts:

i. Population density and its relationship with water availability;

ii. The urbanization process, atmospheric pollution and municipal waste;

iii. Dispersed urbanization and land consumption; and

iv. Rural population and the loss of vegetal cover

2.1. Population Densification and Water Availability

Recent population processes have led to a concentration of the population in certain regions in the territory and, with it, to an increase in population densities by area unit. According to the 2010 Census on Population and Housing, the country had a total population of 112.3 million inhabitants, which represented an increase of 14.8 million compared to year 2000: the population grew at an annual average rate of 1.4% over a ten-year period. However, the distribution of the population is highly uneven: while some states have a scarce population relative to their area, others have a high concentration of inhabitants. The most populated states are the State of Mexico, the Federal District and the state of Veracruz (with 15.1, 8.8 and 7.6 million inhabitants, respectively), but the states that grew the most between 2000 and 2010 were the states of Mexico, with 2.0 million, Jalisco, with one million, and Chiapas, with 875,000 inhabitants. In other words, the central part of the country maintains a strong population concentration trend (Aguilar, 2013a: 186-187).

When it comes to settlements, another way of looking at regional inequalities is through density figures. In 2010, the country's average density reached 57 inhabitants by km2, compared to 25 in 1970, which represented an increase of a little more than twofold. But the central part of the country maintains the highest densities, notably the Federal District and the states of Mexico and Morelos, with values of 5,920, 679 and 364 inhabitants per km2, respectively. On the other hand, the territories with the smallest settlements are found in the north of the country and the two peninsulas (Baja California and Yucatán). For example, Baja California Sur, Chihuahua and Durango had densities of 8.6, 13.7 and 13.2 inhabitants per km2, respectively. Obviously, the highest densities are associated with urban growth in different territories in the country.

A review of the map of municipal population densities in the country as of 2010 (see Figure 1.2) clearly shows the settlements with the highest concentration levels. First, we have the central strip of the country, where densities have increased and led to a highly populated territory due to the multiplication of urban centers and the expansion of metropolitan areas. All of it linked to a dense network of ground communications that enables functional relationships and flows between human settlements. The map shows a high density area in the west-east direction that basically extends from the city of Veracruz to the city of Guadalajara.

In the northern region of the country, the highest densities have been clearly linked to specific locations, such as the outskirts of border cities, the Monterrey-Saltillo metropolitan areas, the Torreón-Gómez Palacio metropolitan area, and the Nayarit-Sinaloa and Sonora coastal strip,

In the southern region of the country, on the other hand, population increases have occurred in the states of Tabasco, Yucatán and Chiapas, as well as the outskirts of the main cities, especially those linked to oil drilling and tourism.

This population distribution clearly shows the territories subject to strong environmental pressure. One clear example worth mentioning is the strong imbalance between the distribution and natural availability of water resources. The National Water Commission (CONAGUA) has divided the country into 13 Hydrological-Administrative Regions that, despite consisting of groups of basins, respect municipal limits. Natural availability is closely related to the different types of climate, especially as a result of rainfall. In principle, the country's northern region semi-arid climates show a low level of water availability, while the southern region, which has tropical climates, has a much higher level of availability. But the different ways in which water is consumed also determine the efficiency of its use. As stated by Aguilar and Graizbord (2014: 799), in addition to its unequal distribution, water is used in different sectors in a biased and inefficient manner: water losses in the farming sector, the main water consumer, have been estimated at 40-60%, compared to 30%-50% in the case of water for public consumption. Its industrial use is the most efficient, but it is also the one that contaminates the most.

Figure 1.2

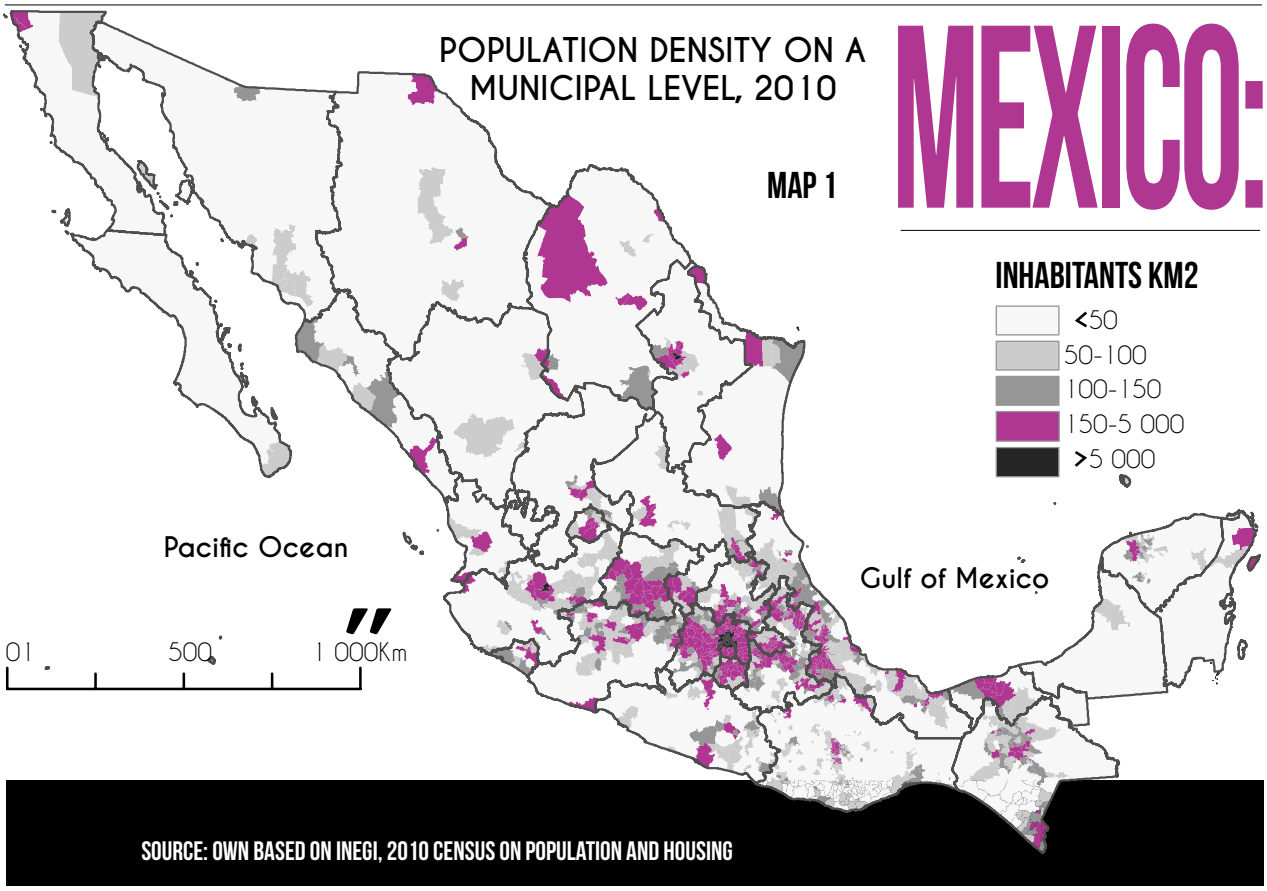


Table 1.1 shows regional differences in population concentration and water availability. One aspect that stands out, above all, is the big difference between the southern part of the country, which does not have water stress and where, in addition, there are low densities and middle-size cities are located, and the country's northern and central regions, which are characterized by strong hydrologic pressure, very high densities and larger urban centers. If we consider the economic development dimension, figures show that the production of goods and services faces a huge challenge, because approximately 60% of the national GDP is generated in regions that already have high and very high water stress levels. That is the case of the Balsas, Río Bravo, Lerma-Santiago-Pacific and Waters of the Valley of Mexico regions. Figure 1.3 shows the level of pressure on water resources and clearly illustrates the above.[4]

Table 1.3

REGIONS HYDROLOGICAL-ADMINISTRATIVE (selected variables), 2014

NO.	HAR	WATER STRESS LEVEL	RENEWABLE WATER PER CAPITA (M3 / INHABITANT / YEAR)	POPULATION (MILLIONS OF INHABITANTS)	NATIONAL POPULATION (%)	DOMESTIC GDP(%)
I	BAJA CALIFORNIA PENÍNSULA	HIGH	4 999	4.29	3.62	3.64
II	NORTHWEST	HIGH	8 324	2.76	2.33	2.86
III	NORTH PACIFIC	MEDIUM	25 939	4.42	3.73	2.72
IV	BALSAS	HIGH	22 898	11.56	9.76	6.14
V	SOUTH PACIFIC	NO STRESS	32 350	4.99	4.21	2.39
VI	RÍO BRAVO ALTO	HIGH	12 757	12	10.14	14.02
VII	NORTH CENTRAL BASINS	HIGH	8 064	4.47	3.78	4.36
VIII	LERMA-SANTIAGO-PACIFIC	HIGH	35 754	23.67	19.99	18.19
IX	NORTH GULF	MEDIUM	28 114	5.19	4.38	2.43
X	CENTRAL GULF	NO STRESS	95 124	10.4	8.78	6.07
XI	SOUTH BORDER	NO STRESS	16 3845	7.48	6.32	5.3
XII	YUCATAN PENINSULA	LOW	29856	4.43	3.74	8.01
XIII	WATERS OF THE VALLEY OF MEXICO	VERY HIGH	3468	22.82	19.27	23.86
TOTAL		LOW	471497	118.4		

SOURCE: CONAGUA, ESTADÍSTICAS DEL AGUA EN MÉXICO, EDICIÓN 2014
NOTE: HAR = HYDROLOGICAL-ADMINISTRATIVE REGIONS

4 With regard to this issue, Garrocho (2013) states that: "In spatial terms, the basins located in the north and central parts of the country have a limited natural availability of water, because their average annual rainfall is less than 500 mm. However, the economic paradox of water is that it is in these basins that a significant proportion of the population and economic activities are concentrated. This is in contrast to the situation in the Yucatan peninsula (and virtually all throughout the southeast), where the average natural availability of water is high, but less than 10% of the country's population is concentrated. However, it is in Mexico's south and southeast regions that the largest number of inhabitants with no access to drinking water services has been identified. We can call this situation the social paradox of water. In the states of Chiapas and Oaxaca, for example, only one in four inhabitants (approximately 73%) has access to drinking water, whereas in the Federal District and the states of Aguascalientes and Coahuila, more than 97% of the people have this service".

2.2. The urbanization process, atmospheric pollution and municipal waste

Mexico's population has been mostly urban for at least three decades. By 1995, most of the national population (60%) lived in cities of 15,000 or more inhabitants (Aguilar and Graizbord, 2001: 583). The country's urban population has grown systematically in the last few decades, from 47.9 million inhabitants in 1990, to 81.2 million in 2010, with a multiplication of urban centers. With it, the urban population currently accounts for 72% of the country's total population. It is worth noting that this growth has been more moderate in recent decades, and the number of cities of different sizes has diversified, a situation that reinforced Mexico's urban profile, although at a pace slower than that of the second half of the 20th century, and even slower compared to that of the 1950-1970 period (Anzaldo and Barrón, 2009: 53, 61).

Figure I.3

The urban dynamics is reflected in the structure of the different cities in the country, in the role played by some large cities, especially those that have reached more than one million inhabitants and, in general, those that due to their population growth and expansion have become metropolitan areas.

Table 1.2 shows this trend toward urbanization during the 1990-2010 period, with several aspects worth highlighting. The first important aspect is the population concentration in the so-called "millionaire" (more than one million) cities, where the number of inhabitants has virtually doubled, from 22.1 million to 41.3 million, in only 20 years, and the number of cities increased from 4 to 11. This shows the population's strong tendency to agglomerate in the largest cities that already concentrate virtually one half of the total urban population.

The second important aspect is the role of intermediate cities that have multiplied in the different regions of the country as *decentralization hubs* of the urban process. During the above-mentioned period, their number rose from 55 to 84, and their population almost doubled, from 17.6 to 30.3 million inhabitants. One last point we can mention is the case of small cities (between 15,000 and less than 100,000 inhabitants), which increased by a total of 36 over the same period. This shows a significant growth in the number of urban centers in the middle and bottom parts of the urban hierarchy, with an urban system characterized by a more balanced set of components compared to previous decades.

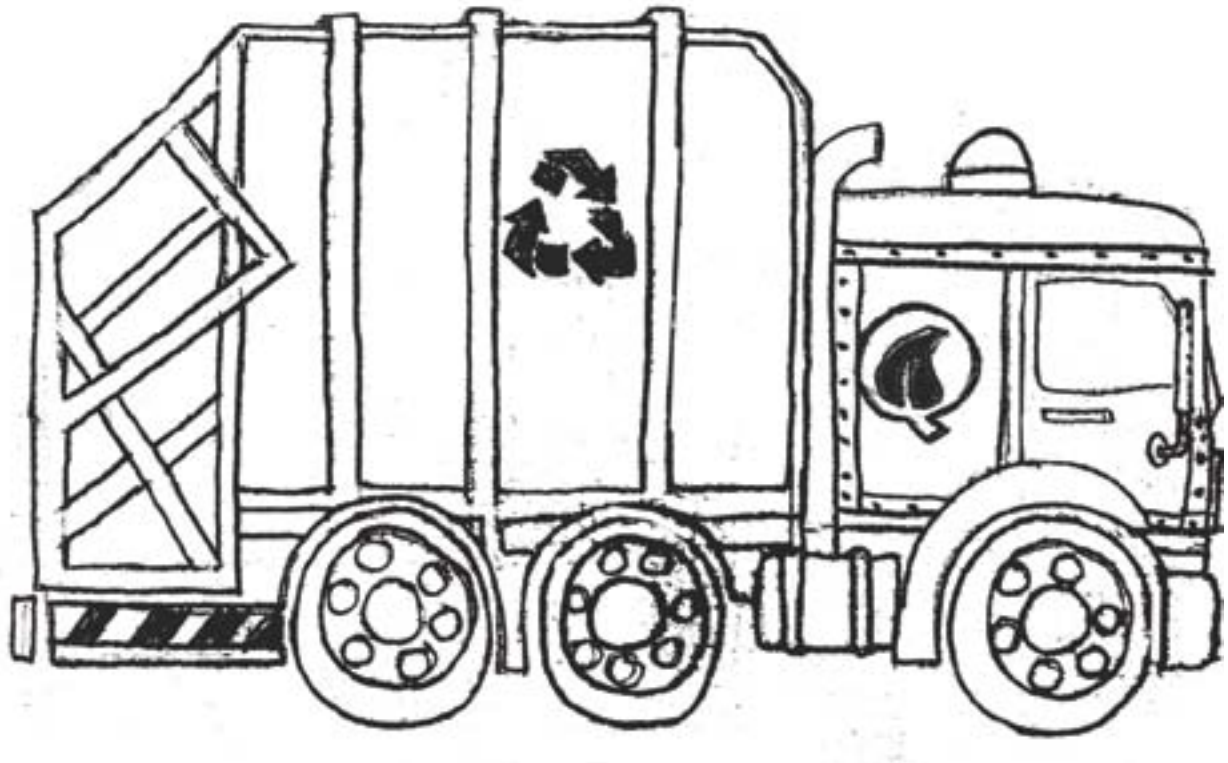


Table 1.2

TOTAL POPULATION AND GROWTH RATE

by population range in metropolitan areas, 1990-2010

RANGE	METROPOLITAN AREAS	POPULATION			AVERAGE ANNUAL GROWTH RATE (%)	
		1990	2000	2010	1990-2000	2000-2010
NATIONAL TOTAL		81 249 645	97 483 412	112 336 538	1.9	1.4
TOTAL NO. OF METROPOLITAN AREAS	59	43 340 530	54 284 700	63 836 779	2.3	1.6
5,000,000 OR MORE INHABITANTS	1	15 563 795	18 396 677	20 116 842	1.7	0.9
1,000,000 TO 4,999,999 INHABITANTS	10	13 260 044	17 405 219	21 252 198	2.8	2.0
500,000 TO 999,000 INHABITANTS	19	9 094 952	11 808 534	14 553 379	2.7	2.0
LESS THAN 500,000 INHABITANTS	29	5 421 739	6 674 270	7 914 360	2.1	1.7
REST OF THE COUNTRY	-	37 909 115	43 198 712	48 499 759	1.3	1.1

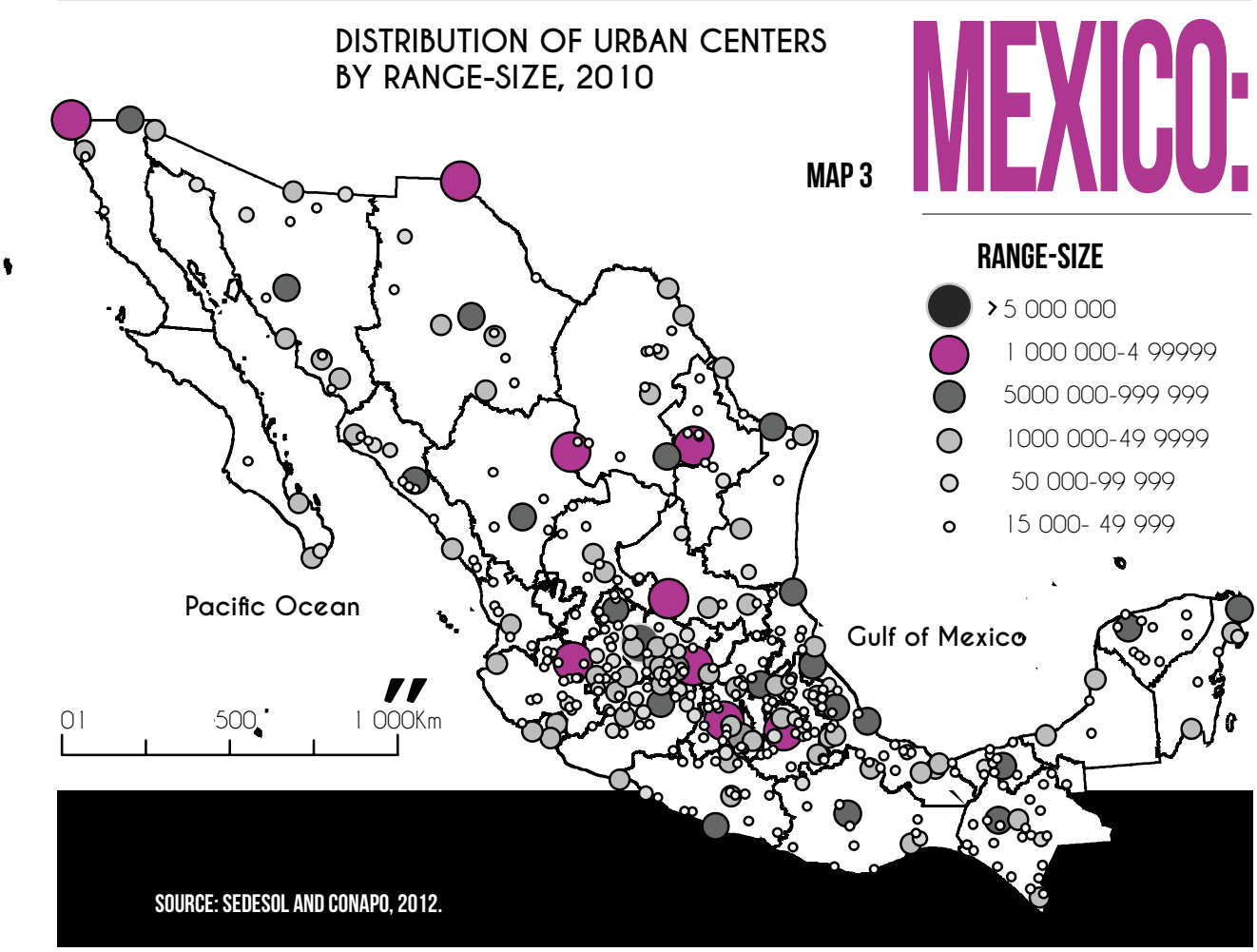
NOTE: THE POPULATION FOR 1990 AND 2000 WAS CALCULATED BASED ON THE UNIVERSE OF METROPOLITAN AREAS FOR 2010
SOURCE: PREPARED BY THE INTERINSTITUTIONAL GROUP BASED ON THE 1990 AND 2000 GENERAL CENSUSES ON POPULATION AND HOUSING

Figure 1.4 shows the distribution of urban centers by *range-size* in the national territory. In it, we can see that this distribution is highly similar to that of the high and very high density areas shown in Figure 1.2 This shows that the urbanization process is the cause of the highest population concentration levels in the country and the highest levels of environmental pressure.

Another factor that can explain population redistribution and the relocation of economic activity is the environmental factor. On one hand, the presence of resources and access to those resources are advantages that will cause a city to grow, compared to other cities affected by shortages (for example, of water). On the other hand, a population that experiences pollution, traffic jams and insecurity will look for better living conditions in other, typically smaller, locations. Migrants (i.e., the population and businesses) are selective; they choose their destinations based on the tacit knowledge and information they have about the advantages offered by some cities and regions compared to others.

Together with this population an economic activity redistribution process, the number and proportion of poor urban people would seem to increase, especially if economic growth is insufficient to generate the quality jobs required and accommodate immigrant labor. At the same time, one of the consequences of demographic growth and urban expansion is an increase in the demand for public and private goods and services and, therefore, an increase in pressures on the ecosystems and their immediate surroundings. From there that urban policy is, in a mostly urban world, a strategic perspective of public policy in general, and social policy in particular (Berry, 2007:3).

Figure 1.4



We will now refer to two aspects that, in addition to being clear expressions of urban environmental impact, have become central to the issue of environmental deterioration: atmospheric pollution and municipal waste in the form of solid waste and wastewater.

Atmospheric pollution

The problem of air quality is particularly related to large cities, where emissions of different volumes and compositions are generated. According to Mexico's National Inventory of Emissions, in 2005 approximately 71.2 million tons of contaminants were emitted, 22% of which were generated by natural sources, and 78% by anthropogenic sources. In the case of the latter, the largest volume emitted (61%) came from automotive vehicles. If we only consider anthropogenic sources, the largest proportions of contaminants emitted were: carbon monoxide (CO; 41.9 million tons), with 76% of the total; volatile organic compounds (VOC; 5.2 million tons), with 9%, and sulfur dioxide (SO2; 3.1 million tons), with 6% (SEMARNAT, 2013: 193-194).

If we consider the emissions generated by natural and anthropogenic sources, the five Mexican states that emitted the largest amount of contaminants were the states of Jalisco, Mexico, Michoacán, Nuevo León and Baja California (see Figure 1.5). It is worth noting that, in these states, anthropogenic sources are predominant and, therefore, carbon monoxide emissions are also predominant, while in those states that are less populated, natural sources represent the majority.

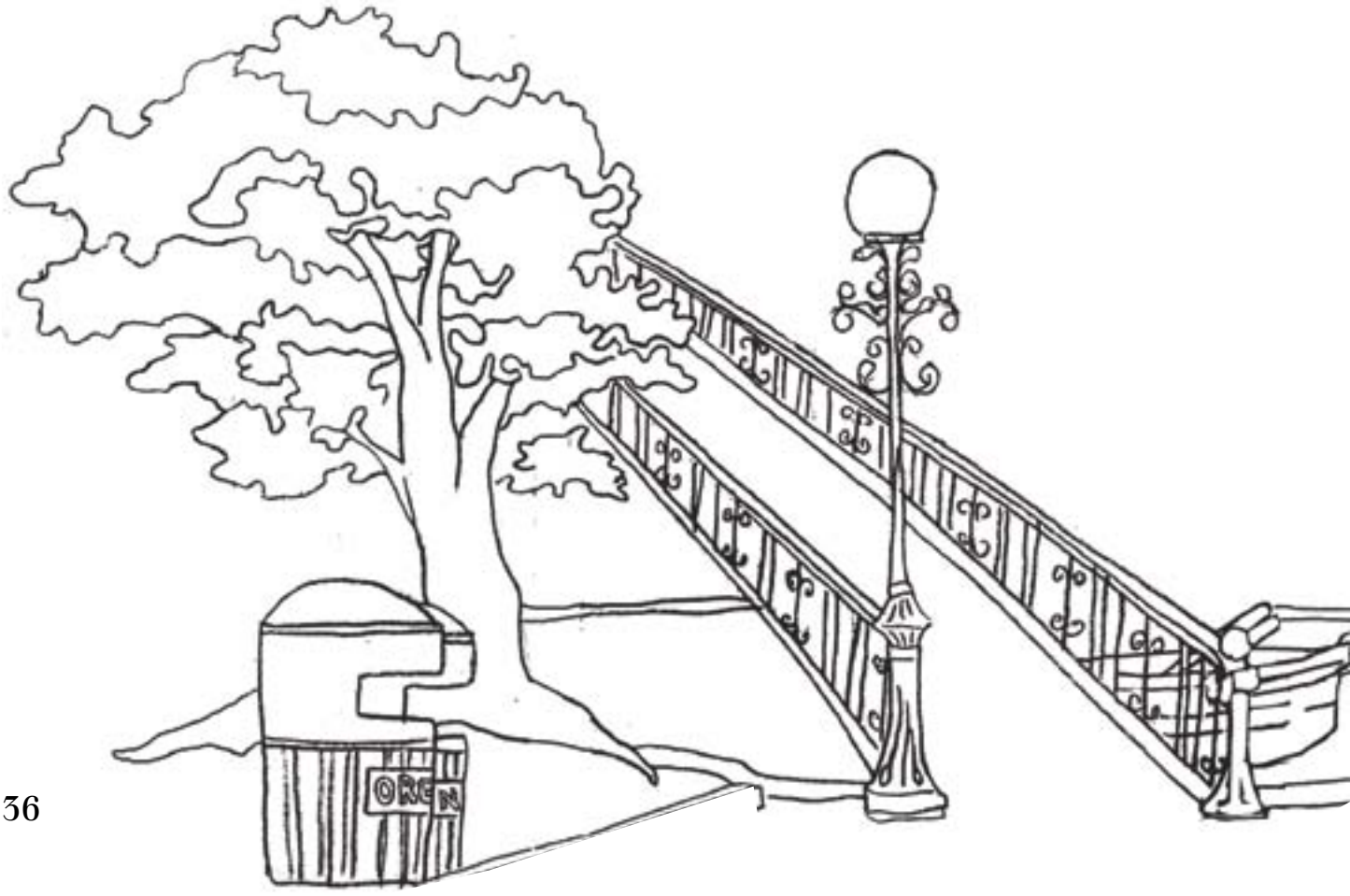
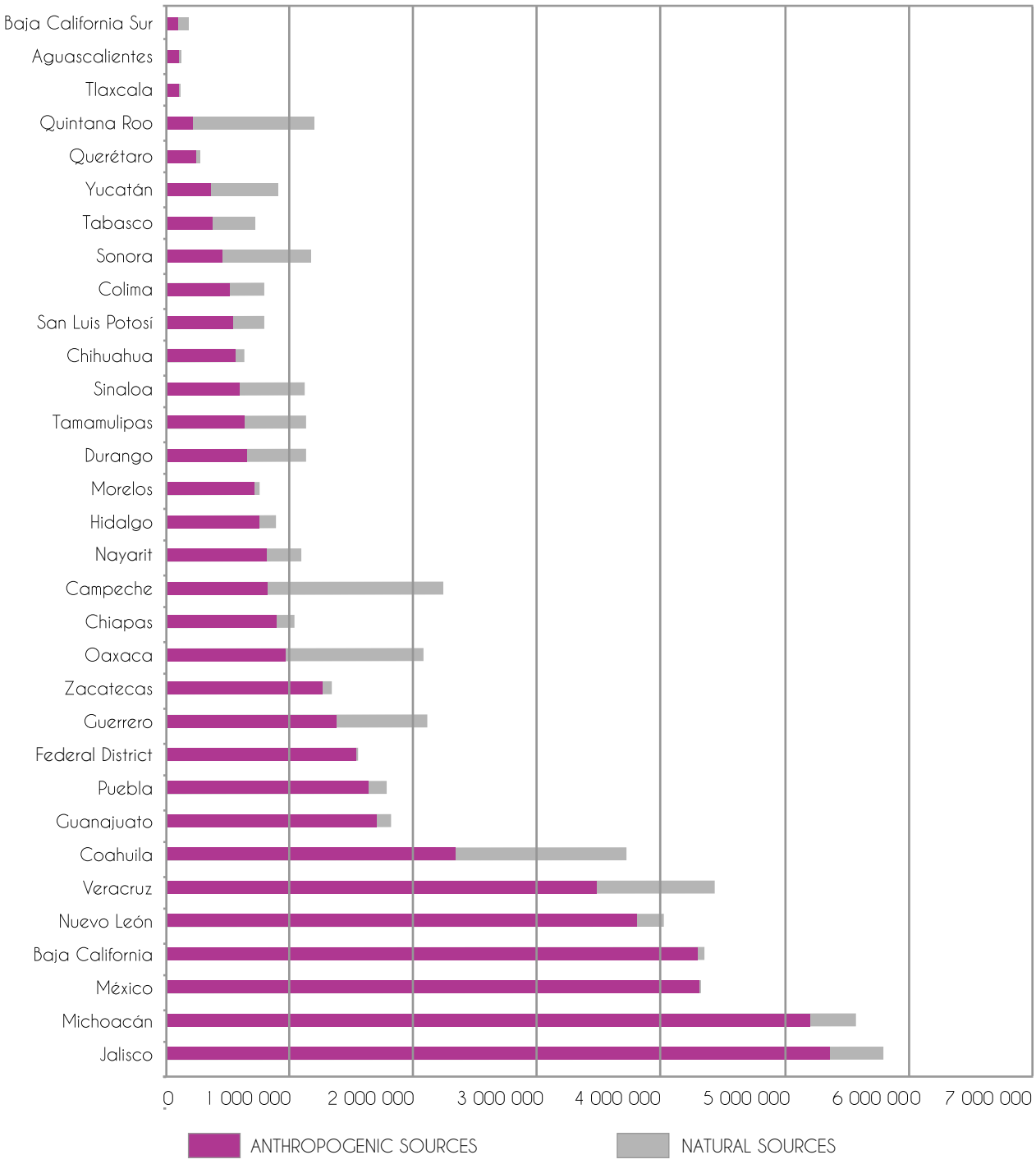


Figure I.5

MEXICO:

EMISSION OF CONTAMINANTS BY STATE, 2008



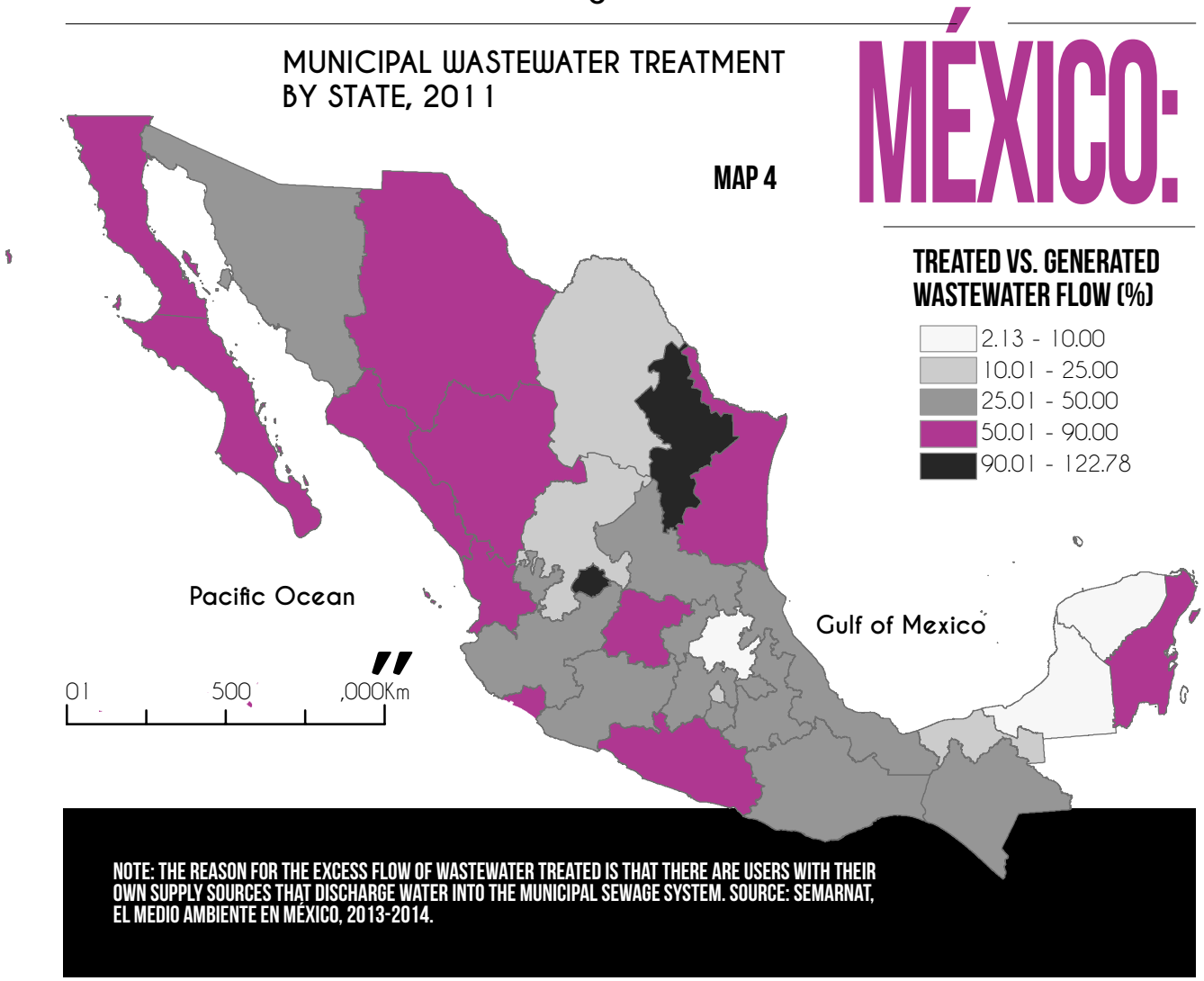
SOURCE: SEMARNAT, EL MEDIO AMBIENTE EN MÉXICO, 2013-2014.

Municipal Waste: wastewater and solid waste

A very common problem is that municipal waste is not treated before being discharged to shallow bodies of water, in the case of wastewater, or deposited in landfills or garbage dumps, in the case of solid waste. In the case of wastewater, if we consider the municipal flow of wastewater generated in 2011, only 41.3% of the total was treated. This figure clearly shows that there is still a significant number of shallow bodies of water that receive a continuous flow of untreated wastewater that contaminates them and affects the health of the population and the different species that exist in those ecosystems (SEMARNAT, 2013: 299).

As can be seen in Figure 1.6, the percentage of wastewater treated by state is highly variable. Most Mexican states have significant treatment deficits, with states in the central part of the country standing out due to their low treatment percentages (10-25%), despite the fact that a significant proportion of the population is concentrated in them.

Figure 1.6

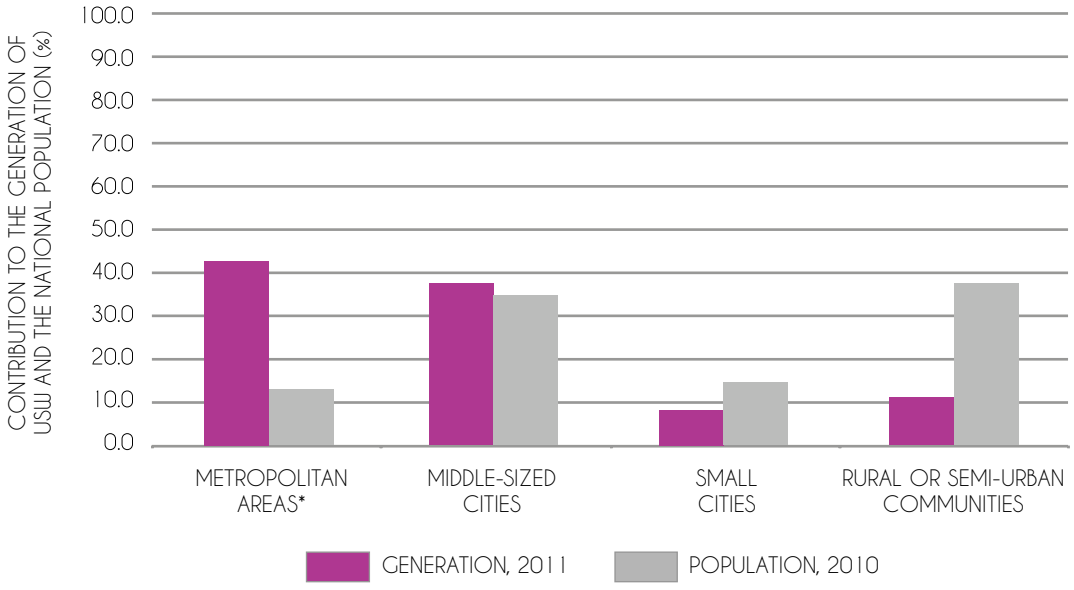


As far as solid waste is concerned, its volume and composition have grown as a result of the population's sustained consumption levels, a situation encouraged by the predominant economic model. Inadequate waste disposal has negative consequences for the health of the population and natural ecosystems: it generates contaminants and greenhouse gases, contaminates soils and bodies of water, leads to the proliferation of pests and causes disease.

There is a direct relationship between the size of a city or community and the generation of solid waste: the larger the size of the city or community , the larger the amount of waste. Thus, Figure 1.7 shows how, in 2011, metropolitan areas and middle-sized cities, as a whole, produced approximately between 75 and 80% of the total solid waste. It has been estimated that only 10% of the total volume of solid waste is treated, and 23% of such waste is dumped in illegal or non-controlled sites (SEMARNAT 2013: 319, 327, 329).

Figure 1.7

GENERATION OF URBAN SOLID WASTE BY TYPE OF CITY OR COMMUNITY, 2011



SOURCE: SEMARNAT, EL MEDIO AMBIENTE EN MÉXICO, 2013-2014

*THIS POPULATION REFERS TO METROPOLITAN AREAS WITH MORE THAN ONE MILLION INHABITANTS.

2.3. Dispersed urbanization and land consumption

Peri-urbanization is particularly significant in the largest cities in the country, whose demographic component is expressed in large population numbers and a large number of intra-metropolitan center-periphery flows, and where functional relationships go beyond the political-administrative limits of the territory where they expand, thus leading to the creation of metropolitan areas.

In Mexico, since the late last century, the evolution of the metropolitan phenomenon has been a really important process that intensified over the course of the following decades, thus leading to a multiplicity of metropolitan complexes with broad diffuse strips characterized by urban-rural traits. While in 1980 Mexico had 26 metropolitan areas that consisted of 131 municipalities or *delegaciones* (boroughs), by 2010 the number of metropolitan areas had increased to 59, which included 367 political-administrative units. In other words, the number of municipalities or boroughs almost tripled. By 2010, the demographic concentration in these metropolitan areas had reached 63.8 million inhabitants, which accounts for 56.8% of the national population (SEDESOL, CONAPO, INEGI, 2012: 15). These data confirm, in territorial terms, a predominance of the process of expansion of metropolitan peripheries in the urban landscape.

Urban sprawl has a deep impact on the population's mobility. Diffuse expansion not only increases commute times; it also increases the use of private motor vehicles, which leads to a series of environmental problems linked to the dependence on cars. Urban dispersion is closely linked to the predominance of market forces, a largely unplanned occupation of land, a high level of dependence on automobiles, a larger consumption of fossil fuels and environmental degradation, all of which exacerbates social problems.

Urban sprawl, or peri-urbanization, is highly predominant in developing countries. It represents a form of reducing the concentration of urban growth; however, it is characterized by forms of land occupation that do not follow urban regulations or make a rational use of land, a situation that leads to urban development patterns that have become unsustainable from an environmental, social and economic standpoint. This statement is confirmed by several data, for example, the fact that in Mexico, from 1970 to 2000, the physical expansion experienced in its urban areas was almost four times higher than their demographic growth (UN-HABITAT, 2013: 77). More specifically, it has been estimated that the largest cities in the group of cities with more than one million inhabitants, that is, Mexico City, Guadalajara and Monterrey, experienced a population growth of less than 2% during the 1980-2010 period, while their urban area expanded by 4% on average. On the other hand, during the same period, smaller cities such as Puebla, Tlaxcala, Toluca and Querétaro experienced a population growth of 3%, on average, while their urban area grew by 12.5%, 26.9% and 16.1%, respectively (SEDESOL, 2012: 12-33).

This expansion process integrates additional land into the urban perimeter, a situation that will have important implications in the future, considering that ecosystems are being transformed and the lifestyle of the local population is changing (see Table 1.3).

Table 1.3

MEXICO: URBAN EXPANSION OF CITIES WITH MORE THAN 500,000 INHABITANTS, 1980-2010

CITIES	1980	2010	1980-2010 DIFFERENCE
	AREA (HECTARES)		
TOTAL	141 038	1102 027	960 989
MA – VALLEY OF MEXICO	51 908	185 291	133 383
MA – GUADALAJARA	12 726	48 585	35 859
MA – MONTERREY	12 855	63 018	50 163
MA – PUEBLA-TLAXCALA	4 871	61 301	56 430
MA – TOLUCA	1 309	352 083	350 774
MA – TIJUANA	6 101	26 679	20 578
MA – LEÓN	2 502	17 031	14 529
MA – JUÁREZ	4 125	25 828	21 703
MA – LA LAGUNA	2 364	18 993	16 629
MA – QUERÉTARO	782	12 612	11 830
MA – SAN LUIS POTOSÍ-SOLEDAD DE GRACIANO SÁNCHEZ	2 000	14 863	12 863
MA – MÉRIDA	4 775	22 598	17 823
MA – MEXICALI	4 763	17 782	13 019
MA – AGUASCALIENTES	1 587	9 750	8 163
MA – CUERNAVACA	2 552	17 450	14 898
MA – ACAPULCO	1 389	13 036	11 647
MA – TAMPICO	2 906	15 471	12 565
MA – CHIHUAHUA	2 589	19 441	16 852
MA – MORELIA	1 633	10 120	8 487
MA – SALTILLO	1 497	19 177	17 680
MA – VERACRUZ	1 838	7 765	5 927
MA – VILLAHERMOSA	319	9 610	9 291
MA – REYNOSA-RÍO BRAVO	2 291	14 001	11 710
HERMOSILLO	2 118	11 161	9 043
MA – TUXTLA GUTIÉRREZ	927	14 145	13 218
MA – CANCÚN	478	12 340	11 862
CULIACÁN ROSALES	1 833	8 312	6 479
MA – XALAPA	917	7 927	7 010
MA – OAXACA	873	13 441	12 568
MA – CELAYA	967	7 484	6 517
VICTORIA DE DURANGO	984	6 049	5 065
MA – POZA RICA	1 664	6 101	4 437
MA – PACHUCA	595	12 582	11 987

NOTE: MA = METROPOLITAN AREA
SOURCE: SEDESOL, "LA EXPANSIÓN URBANA DE LAS CIUDADES, 1980-2010"

The territorial fragmentation of productive processes and the absence of more strict land occupation regulations lead to a *diffuse* urban model, the main implication of which is the *expansion* of the urban peripheral space. Thus, the city experiences a significant expansion of its territorial influence and, by including a larger number of political-administrative jurisdictions, makes the metropolitan government's coordination and territorial planning efforts more complicated. This peri-urbanization tends to fragment the urban and rural space in unpredictable ways, which unavoidable raises the question: What will be the form of future urban growth in our cities? (Aguilar and Escamilla, 2009: 6).

Due to this urban *sprawl* , which occurs in the city's periphery, a *rural-urban strip*, with increasingly indefinite limits between these two realities, tends to form. Since it is really difficult to find a universal definition of this territory, the best position may be that of adopting a *continuum* approach, considering the difficulty in defining its precise limits which, in addition, change constantly. It is advisable to examine the two ends of the continuum, the urban and the rural, and understand the dynamics of the change that affects the different cities and communities in the peri-urban area and how their condition is gradually transformed (MacGregor and Thompson, 2006: 10-11).

The following are the main characteristics of peri-urban areas that must be taken into account:

i. In this *urbanization* process, which is regional in nature, the city's influence expands to a large regional territory, a process facilitated by technological advances and a new territorial production logic;

ii. There is a mix of *activities and land uses* that leads to a much more dispersed and fragmented urban space where traditional peri-urban agriculture takes place next to new urban housing projects, industrial parks, corporate urban developments, recreation sites or environmental reserves. Usually, due to the severe lack of infrastructure and the poor conditions of transportation systems, the wealthiest groups do not move to the periphery in massive numbers; instead, the periphery is a place of poor and informal settlements, which leads to new forms of *polarization and socio-territorial segregation;*

iii. Severe environmental impacts occur and, together with the intense dynamics of change in land use, negative impacts are generated on the local environment. Some common elements are the lack of support for agricultural and animal husbandry activities, the disposal of solid and hazardous waste in bodies of water and the ground, the extraction of construction materials, the pressure resulting from the occupation of environmental reserves, the overexploitation of aquifers, and the disruption of natural conditions that increase vulnerability to floods and landslides (Douglas, 2006);

iv. The *overflowing of the city* is favored, because the periphery offers cheaper labor and land, as well as larger spaces with a certain "natural" environment. These conditions are highly suitable for the construction of housing affordable to poor people and migrants in scattered locations with significant deficits of services, often times in illegal conditions, which leads to a peripheralization of poverty with a concentration of population that lives in precarious conditions (Aguilar, 2009: 26);

v. These spaces *lack good "governance"*, because they integrate an increasing number of political-administrative units that are far away from the central city and sometimes belong to other states or jurisdictions. Due to their peripheral condition and the fact of belonging to other jurisdictions, land use regulations and the enforcement of urban laws and regulations become more difficult. Also, the new political-administrative units recently integrated into the city lack a good institutional structure and the technical and political capacity to manage urban growth.

It is important to highlight the fact that the territorial expansion of cities must treat the periphery as an integral part of the city, rather than a fragment thereof. In other words, it is necessary to adopt a comprehensive view of the city. It is also important to remember that the center-periphery link includes several factors: the supply of agricultural and animal husbandry products, water supply, environmental preservation and environmental services areas, labor displacement, the extraction of construction materials and recreational areas, among many others (Aguilar, 2009: 27).

2.4. Rural Settlements and the Loss of Vegetal Cover

The settlement pattern of the rural population is characterized by a huge dispersion in the territory in a multitude of small towns or communities. However, these areas also experience population losses, and their populations faces persistent situations of poverty and food insecurity and, with it, a generalized deterioration of their quality of life (Aguilar and Graizbord, 2014: 816-819; Ávila, 2014: 270-272).

The above translates into an out-migration process that shows how rural areas lose part of their population due to the search for urban destinations, as well as international migratory flows. The reason for this is the lack of job opportunities in regional markets, in addition to a lack of basic infrastructure such as health and education centers, and deficient communications, which prevent them from improving their access to middle-sized urban centers. Of course, the effects of all these factors vary by region, but in those areas where all of them are combined, the conditions of poverty and social backwardness worsen, to the extent that in some areas the demographic structure has changed with a predominance of children, women and elder people due to the out-migration of the male component (Aguilar and Graizbord, 2014: 816).

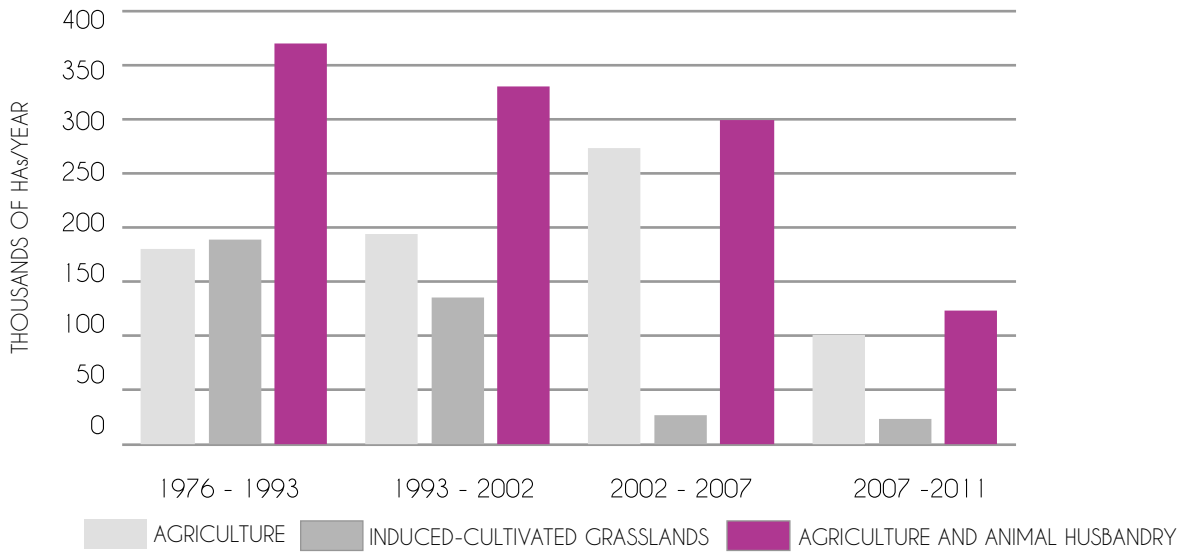
In 2010, the country had 188,593 rural communities (that is, with less than 2,500 inhabitants), which accounted for 98% of the total number of cities or communities in the country. 74% of them had less than 100 inhabitants (Ávila, 2014; Tables 1.1 and 1.2), which reflects the huge dispersion of the rural population. Most rural communities are usually far from middle or large-sized urban centers, and they are part of a scarce socio-economic development environment, which means their conditions are not appealing to productive investment. The most isolated communities are far more vulnerable, because they have a higher level of poverty, lower levels of access and a higher dispersion. According to CONAPO (2012: 50; Table 1.3), 92% of the most isolated rural communities have a high or very high level of marginalization.

Álvarez and Herrera (2014: 298-303) affirm that there is a direct relationship between the loss of vegetal cover and the distribution pattern of rural settlements, and that disorganized dispersed communities, with a weak social fabric, are more prone to mismanaging natural resources in fragile ecosystems. In fact, the ecological regions with the largest number of small and isolated communities are temperate rainforests, humid rainforests and dry forests.[5]

The conversion of land for agricultural and animal husbandry uses is one of the main causes of deforestation. Land use change figures in the country show that the area of land for agricultural use has continued to grow, and that growth has accelerated in recent years. A little more than 179,000 hectares were converted annually (on average) between 1976 and 1993. This figure rose to 272,000 hectares between 2002 and 2007, and then dropped to 100,000 hectares between 2007 and 2011. In these last two periods, most of the natural vegetation transformed into agricultural land corresponded to sub-humid rainforests (31%), xerophilous bushes (23%) and temperate rainforests (15%) (SEMARNAT, 2013: 80). In contrast, the areas dedicated to cattle-raising and cultivated or induced grasslands have been steadily declining (see Figure 1.8). Thus, demographic dispersion resulting from the existence of a large number of very small communities becomes an environmental imbalance factor.

Figure 1.8

LAND USE CONVERSION FOR AGRICULTURAL AND ANIMAL HUSBANDRY USES



SOURCE: SEMARNAT, EL MEDIO AMBIENTE EN MÉXICO, 2013-2014.

5 In their analysis, Álvarez and Herrera (2014: 310) state that "a single family under the slash-and-burn system can dismantle up to 20 hectares in a single three-year cycle".

3. Public Policy Responses to the Territorial Demographic Dynamics and Sustainable Development

3.1. General Policy Considerations

The 1992 Rio Declaration on Environment and Development stated that "human beings are at the center of concerns for sustainable development". This principle has remained valid throughout the years, and, in 2011, it was reaffirmed in the Laxenburg Declaration, which stated that "Any analysis of sustainable development must recognize the differences among people in terms of their impacts on the environment and their vulnerabilities to risk, which depend on their age, gender, location, and other socioeconomic characteristics. New evidence indicates that human capital, enhanced through education and health, can make a substantial difference in people's contributions to sustainable development and their capacity to adapt to environmental change". (UNFPA, 2012: Annex A; Chapter 2). In other words, promoting wellbeing and an increase in the standard of living are not only objectives of the development policy, but also important means to address the population dynamics and promote sustainable development.

It is important to establish that the path toward sustainability does not rely on policies that focus on the population *in itself,* but rather on policies that focus on a *series of elements* that contribute to the population's wellbeing. In the case of the latter, we refer to those that focus on aspects related to land use, consumption or productive processes that have the potential to induce environmental changes in the different places where the population lives (influencing migration patterns), in production or in the application of new technologies, among many other things. For example, environmental deterioration due to the distribution and redistribution of the population can be mitigated through restrictions on local land use with zoning regulations, the designation of preservation areas, or technological regulations and laws in urban-industrial areas.

One essential element is that all sectoral policies must integrate the population dynamics into their actions. This type of active planning must include a systematic use of information on the demographic dynamics and its projections in the mid and long-term on the national, state and micro-regional levels. The current dynamics and potential demographic change scenarios must be taken into account in rural, urban and national development strategies, as well as in sectoral plans for the development of infrastructure and services (UNFPA, 2012: 12).

Policies in the areas of environment and population dynamics require a comprehensive approach that recognizes the important interactions *between population, environment and mediating factors.* In the case of climate change, for example, a reduction in population size can create positive cost-benefit effects in the long run. However, the demographic dynamics should not be the only important consideration; the same applies to changes in consumption patterns, alternative energy sources and the economic development models that play a crucial role in greenhouse gas emissions (Hunter, 2000: 69).

It is important to reflect on the most appropriate territorial model for the development we aspire to achieve. The large cities model does not seem to be the most appropriate (although

the debate is intense: Glaeser, 2012; Moretti, 2012; Storper, 2013).[6] Instead, we need a more balanced and cohesive model that consists of a dispersed and decentralized, but highly interconnected, system of settlements that favors *cooperative competition* (Garrocho, 2013). It isnecessary to promote socio-territorial processes complementary and alternative to urban concentration, and evolve into territorial convergence (Aguilar, 2013a: 197). We must also prevent the territorial exclusion process from continuing and accelerating the weakening of many local territories, in addition to overcoming the challenge of integrating local territories into the internationalization and/or competitiveness circuits.

3.2. Specific Policies

The implications of environmental pressure that derive from the population size suggest how important it is for sustainability to slow down the pace of demographic growth. Careful land use planning must be coupled with a series of reorientations in the distribution of the population, in particular taking action in connection with *migratory flows* headed in the direction of environmentally fragile areas, as well as in connection with the increase in densities in the most populated areas. It is also important to have strategies in place to reduce the expulsion factors that affect migrants in their places of origin, which are linked to the lack of employment opportunities, infrastructure and efficient equipment.

Rural areas require a revitalization process that motivates the local population to settle down. We must have policies in place to encourage a sustainable use of natural resources, especially in areas with scarce agricultural land. The application of technological innovations, or the intensive use of technologies currently used, is an essential requirement in a stage of higher demographic pressure. The quest for increased productivity with a better management of natural resources will be of great support to ensure food production in the mid and long-term.

It is imperative to design policies that tend to mitigate *situations of poverty* and build human capacities. One of the priorities must be a shift toward inclusive economic development that generates productive employment, increases household income, reduces poverty and strengthens social cohesion (UNFPA, 2012: 10). It is necessary to make sure that growth-oriented policies guarantee social transfers to the most vulnerable groups, both in rural and urban areas, and increase access to healthcare services, including reproductive health, as well as access to education levels above primary and secondary education.

Actions are required to strengthen human capital in those areas with higher levels of backwardness, with policies that promote investments in reproductive health (for example, to reduce adolescent fertility), in addition to providing training for young people with the aim of increasing their permanence in the education system and delaying marriage and the age of onset for reproduction (UNFPA, UNISDR and UN-HABITAT, 2012: 35). These measures will lay the foundations to materialize the potential benefits of the *demographic dividend* that contribute to higher economic growth.

It is necessary to recognize the *structural and, to a large extent, irreversible nature* of the urbanization process, which requires a different attitude in order to recognize the advantages

6 Still, a large city will always fare better than a small city. However, the central issue is not the dimension of the city (the pace of growth would also be important), but the quality of its management. In Mexico, unfortunately, quality in the management of cities has not been the rule.

it can offer and implement policies that can maximize its economic advantages, the application of new technologies and the environmental benefits of concentration. In this regard, we must address the *urbanization of poverty* and lead future growth by taking care of the poor settlements that require access to decent housing, lack income and basic infrastructure, and are highly vulnerable to disasters.

The *rapid expansion of the area occupied by cities* demands creative responses on the part of those actors that deal with urban planning and real-estate development. These solutions must consider metropolitan areas as a whole, as well as the city-region phenomenon. It is necessary to promote negotiation and cooperation between adjacent state and municipal governments in order to meet basic needs, especially those of the most disadvantaged populations. All of this must be done from the perspective of a sustainable use of the territory, so that the growth expected can fit, to the extent possible, into the space in an efficient and fair manner.

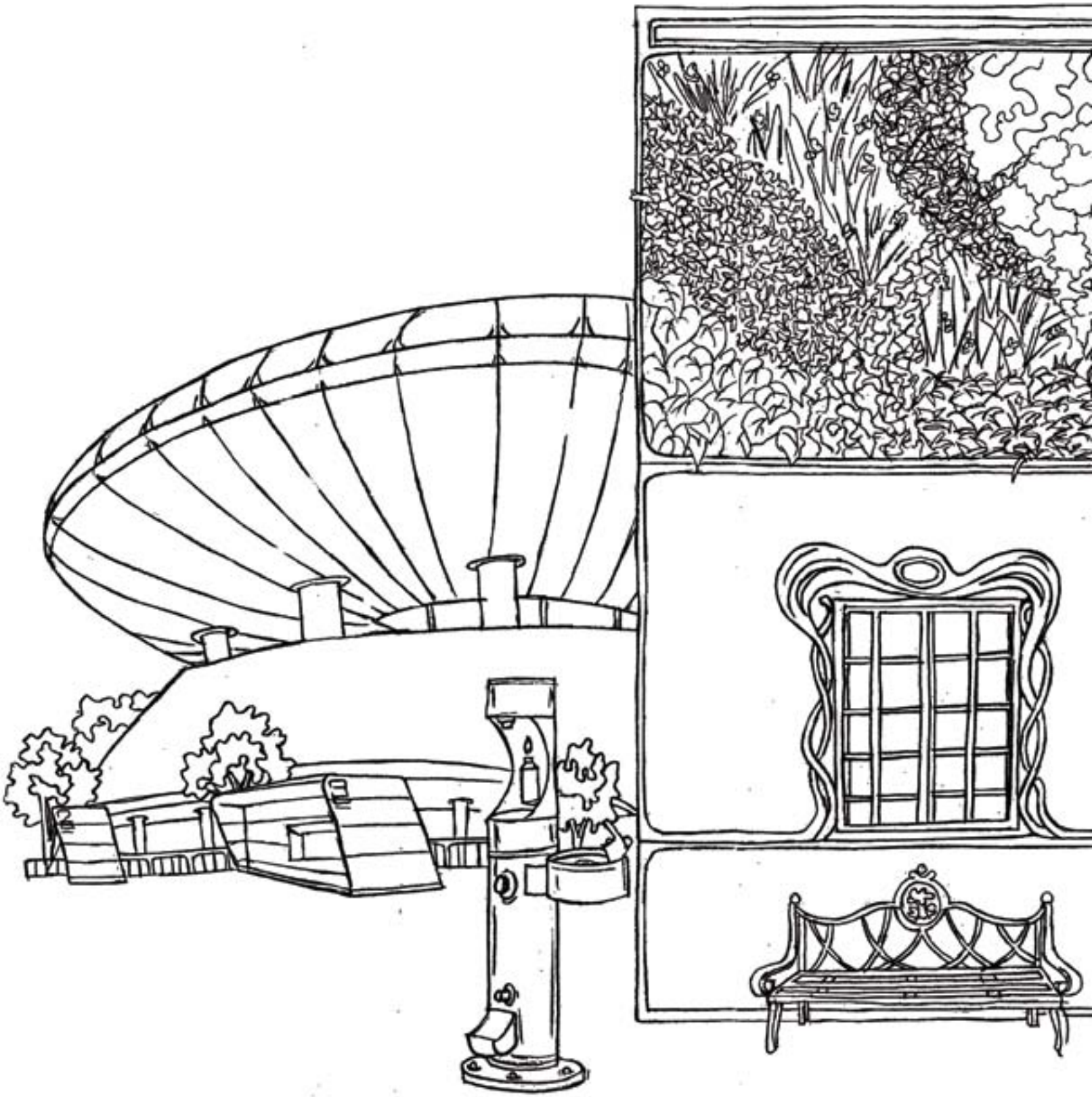
As far as the urbanization process is concerned, the priority has not been the care and preservation of the environment. A very obvious example is that of *urban infrastructure related to municipal waste* (for example, solid waste and wastewater), which has serious deficiencies in the different communities that exist in municipalities, regardless of their size. It is urgent to overcome those deficits in order to find a balance between urban development and environmental protection, and take action based on the principles of sustainable development.

As regards the perspective of cities or towns with different ranges or sizes, it is important to identify those *urban-rural subsystems* that favor the linkage between settlements of different sizes and can also define those cities with the best capacities for development, in particular from the standpoint of the presence of natural resources such as water and land for urban development, so that they can become alternative destinations outside of the most populated areas. This strategy will trigger regional and micro-regional development.

Strategies to mitigate the population's vulnerability to disasters associated with natural phenomena must contribute to encourage the preservation of the environment and the sustainable use of natural resources in all population centers to reduce their vulnerability to disaster and risk situations (Aguilar, 2014: 217). There are several areas in the country that are exposed to a series of natural phenomena that cause disasters and significant losses, both in terms of human and economic lives: highly seismic areas and areas exposed to cyclones and prone to floods, where the relationship between population and environment is clearly expressed.

The current physical expansion of cities is excessive compared to the pace of growth of their populations, and it does not contribute to sustainable urban development. It is urgent to adopt a stance in connection with the future form of urban growth in our cities, and consider the application of the principles for the design of compact cities in new urban developments (guaranteeing vertical transportation for a rapidly aging population).

Peri-urban belts must be part of a comprehensive policy that considers the periphery as an essential part of the city, and not as a separate unit. Providing these belts with services and sufficient jobs will contribute to reducing *intra-metropolitan inequalities*. Current peripheral developments require a truly regional land-use planning policy that guarantees the strict application of urban laws and regulations on land use and controls the land market so land use can be more efficient.



2. Sustainable Urban Social Development

Introduction

The international discourse around sustainability has mainly relied on the so-called three-*pillar model*. This model for sustainable development suggests three equally important dimensions for the achievement of strategic objectives: the environmental, economic and social dimensions. The model is based on two key arguments:

i. Human needs cannot be met just by providing a stable and healthy environment. Basic economic and social needs ought to be taken care of as well. Therefore, it is imperative, from the standpoint of sustainability, to transfer to future generations economic and social conditions that favor their development; and

ii. The environmental, the economic and the social are three individual interconnected systems that must be sustainable in the long term in order to maintain the progress of civilization. Advances toward sustainability can only lead to improvements in the three dimensions. This implies that the different policy objectives in each dimension of sustainable development must have equal priority and contribute to the sustainability of the other dimensions, and not be achieved at their expense (Littig and Grießler, 2005).

However, the fact of giving *equal priority* to the three dimensions of the three-pillar model is a theoretical, rather than practical, issue, as it is rare for it to occur in the real world. Often times, the *'win-win'* schemes of sustainable development only consider the economic dimension and, to a lesser extent, the environmental one, leaving the social dimension lagging behind even further (Omann and Spangenberg, 2002). In addition to this, there is a series of conceptual problems that, in practice, are yet to be resolved: What does "equal" priority mean? How can "equal priority" be given to the three dimensions? What happens with the trade-offs (positive and negative indirect effects) between them? So far, there are no generally agreed answers to these questions, and the debate is still open (Littig and Grießler, 2005).

While the idea of the "three pillars" is generally accepted, the most intense discussion has to do with the definition of their *key objectives*, the *strategies* to achieve them and the design of the *indicators* to measure achievements or gaps. As far as these objectives are concerned, the environmental ones appear to be the clearest, followed by the economic objectives. The strategies to achieve those objectives, however, are still vague and subject to intense debate (even if one accepts that sustainable development is not a *situation to achieve*, but a *continuous transition process:* Garrocho *et al.*, 2014; see the Introduction of this book). In the case of the social

objectives of sustainable urban development, the situation is much more complex, because there is not even a consensus as to what those objectives are (Omann and Spangenberg, 2002).

This chapter is divided into two sections. The first is aimed at better understanding the meaning of sustainable urban social development (SUSD) and, therefore, explores the following key topics:

i. The *relationship* between sustainability, equity, cohesion and social inclusion;

ii. The main *dimensions* of SUSD; and

iii. The *gears* that articulate the SUSD dimensions. This is the conceptual platform that serves as a basis for the second section of the chapter, the purpose of which is to *translate* the concepts outlined in section one into a series of priorities for Mexican cities and SUSD policy recommendations. The topics addressed in this second section are: the importance of public services, the metropolitan challenge, the need to have quality institutions, fighting poverty and inequality, improving health and education, expanding the offer and quality of modern and traditional basic services, addressing the problem of unoccupied dwellings and reducing insecurity and violence.

1. Basic concepts and ideas on sustainable urban social development

A large part of the problem of defining the objectives of the social dimension lies in the fact that *there is no clarity* as to the meaning of this dimension in the context of sustainable urban development (Littig, 2002). Also, there is no consensus around its *connection* to economic and environmental sustainability (Dempsey *et al*., 2011). This indefinition of social sustainability makes its implementation really difficult (an issue that Becker *et al*., 1999: 4, had already pointed out more than 15 years ago).[1]

Several attempts have been made to define social sustainability. On one hand, some maintain that long-term sustainable development only calls for a minimum of social requirements and, therefore, propose a *very specific definition*. Seen from this perspective, the objective of sustainable social development is to determine the *minimum of social requirements* and identify

1 Still, social sustainability is key to sustainable urban development and, therefore, it is essential for this book to explore its meaning. In general terms, the idea of sustainability is the persistence of certain necessary and desirable characteristics of individuals, their communities, institutions, organizations and the surrounding environment in the long term (v.g. for an indefinite period of time), as well as those of the relationships between society and environment. These relationships must be functional, inasmuch as they must ensure that future generations can meet their needs (Littig and Grießler, 2005). However, defining those needs and differentiating them from desires (in specific societies, places and times) involves a complex debate, even if their definition is linked to the idea of a dignified life (which can also have diverse and dynamic meanings depending on the social, spatial and temporal context it refers to). For this reason, it is important to understand that advancing toward sustainability involves maintaining and, better yet, improving, human wellbeing and the ecosystem, without one making progress at the expense of the other. In other words, understanding that people and the surrounding world are interdependent (Hodge and Hardi, 1997: 7).

the *critical challenges* for the appropriate functioning of society, in order to guarantee progress in the long run (Biart, 2002: 6). On the other hand, there is a current of thinking that links the idea of *social sustainability* to environmental protection, social justice and political participation, which involves a full theoretical and operational challenge (Littig and Grießler, 2005), especially if a global vision is adopted and the significant differences that exist between developed countries and the rest of the countries are taken into account (Becker *et al.*, 1999: 1).

The challenges in the conceptualization of social sustainability also result from the vague differentiation between their *analytical, normative and political aspects.* One of the reasons for this is the *broad and multifaceted connotation* of the term "social" (*v.g.*, that would even include the economic or the political). The point to highlight is that, when it comes to sustainability, development cannot be understood without its *previous requirements*, and these constitute an issue for social sciences, and not only natural sciences. In other words, social processes *shape* the society-nature interaction, in different temporal and spatial (*v.g.* global, regional, urban, local) scales. This issue has been raised by social sciences through a brief and challenging question: how can societies regulate and change their processes and structures so as to ensure the chances for development of future generations? (Littig and Grießler, 2005).

In this chapter, and all throughout the book, we do not maintain that social sustainability means the satisfaction of a minimum level of social rights (as in the *specific* definition by Biart, 2002), to then defend them against the primacy of economic policies and/or the predominance of the environmental dimension. Instead, our idea was to suggest *socio-spatial* structures and processes that influence the metabolic exchange between society and nature (more in the terms of Fischer-Kowalski and Haberl, 1993). We add that environmental sustainability is closely linked to diverse *structural attributes of societies* (*e.g.* social, intra- and inter-generational justice, values, ideologies, institutions, culture and history, among others). Thus, sustainability is a research topic with a huge *social content* that addresses the processes through which societies *manage* the material conditions of their reproduction, including the social, economic, political and cultural values and principles that guide the distribution and redistribution of resources (including environmental ones: Becker *et al.*, 1999: 4).

1.1 Factors and indicators of sustainable urban social development

Even in this uncertain landscape that revolves around the meaning of SUSD, the literature points to different dimensions and indicators of urban social sustainability. Littig and Grießler (2005), for example, suggest three dimensions of basic indicators to evaluate the social dimension of sustainability.

i. Satisfaction of basic needs and quality of life (*e.g.* income, poverty, income distribution, unemployment, education, housing conditions (*v.g.* decent housing), health, security, job satisfaction and environment, among others);

ii. Social justice (*e.g.* social equity, including gender equity, distributive justice of economic and non-economic goods, intra- and inter-generational justice, equal opportunities, social participation: Dempsey *et al*., 2011; Nussbaum and Sen, 2002); and

iii. Social coherence (*v.g.* integration of individuals into significant social networks, participation in collective activities, solidary and tolerant attitudes toward minorities: migrants, the unemployed, homosexuals and indigenous people, among many others).

Dempsey et al. (2011), on the other hand, did a broad review of the literature and identified a series of key factors of urban social sustainability in the British context (see Table 2.1).[2]

2 Their sources include: Chan and Lee, 2008; Meegan and Mitchell, 2001; Turkington and Sangster, 2006; Jacobs, 1999; Bramley *et al*., 2009; Yiftachel and Hedgcock, 1993; Urban Task Force, 1999; Hopwood *et al*., 2005; Littig and Griessler, 2005; Burton, 2000a.

Table 2.1

KEY FACTORS

OF URBAN SOCIAL SUSTAINABILITY IN THE BRITISH CONTEXT

NON-PHYSICAL FACTORS

- EDUCATION AND TRAINING
- SOCIAL JUSTICE: INTER- AND INTRA-GENERATIONAL
- SOCIAL PARTICIPATION AND LOCAL DEMOCRACY
- HEALTH, QUALITY OF LIFE AND WELL-BEING
- SOCIAL INCLUSION (ERADICATION OF SOCIAL EXCLUSION)
- SOCIAL CAPITAL
- SAFETY
- FAIR DISTRIBUTION OF INCOME
- SOCIAL ORDER
- SOCIAL COHESION
- COMMUNITY COHESION (WITHIN AND BETWEEN DIFFERENT GROUPS)
- SOCIAL NETWORKS AND SUPPORT: SIGNIFICANT INTERACTIONS
- SOCIAL INTERACTION
- SENSE OF COMMUNITY AND BELONGING
- DECENT EMPLOYMENT
- RESIDENTIAL STABILITY AND SECURITY
- ACTIVE COMMUNITY ORGANIZATIONS
- CULTURAL TRADITIONS

PREDOMINANTLY PHYSICAL

- SUSTAINABLE URBAN DESIGN
- ATTRACTIVE PUBLIC REALM
- DECENT HOUSING
- LOCAL ENVIRONMENTAL QUALITY AND AMENITY
- ACCESSIBILITY TO LOCAL SERVICES AND FACILITIES / EMPLOYMENT / GREEN SPACE
- SPATIAL STRUCTURE OF CITIES AND THEIR NEIGHBORHOODS
- WALKABLE CITIES AND NEIGHBORHOODS: PEDESTRIAN FRIENDLY

SOURCE: DEMPSEY ET AL., 2011

Beyond the indicators identified by Dempsey *et al.* (2011), it is important to highlight the *overlaps* that exist between *the social* and *the physical*; in other words, those overlaps that geographers call the *socio-spatial*, understanding the social in its broadest analytical and operational sense (which includes the economic, the political and the cultural, among many other areas); and, on the *spatial* sphere, *spatial* structures and processes, vicinity/distance effects, accessibility and scale, among other aspects. The *scale* deserves a particular comment in this chapter. The factors of urban social sustainability can be related to multiple scales at the same time (*v.g.* multiscale) or specific scales. Social cohesion, for example, is more often analyzed on a national, regional, urban and neighborhood scale; employment on a regional and urban scale; environmental quality on the scale of large areas in the city; and significant social interactions on a neighborhood scale (Penninx *et al.*, 2004).[3]

1.2. Sustainability, equity, cohesion and social inclusion

In the academic world, there are different social sustainability indicators in contexts of coherence and balance with the rest of the systems that make up sustainable development (Holden and Linnerud, 2007). However, in practical terms, the key lies in their legitimate and efficient integration into public policies. While the study by Dempsey *et al.*, 2011 focuses on the United Kingdom, it is worth reviewing because the key urban social sustainability factors they identify are linked to three major concepts that are also highly relevant to Mexican (and Latin American) cities: *equity, cohesion and social inclusion* (*v.g.* fair and non-segregated cities).[4]

The basis of the social equity concept is that of the theories of social justice, distributive justice and equal conditions (Burton, 2000a: 1970), a concept directly associated with the most accepted definitions of sustainable development and clearly linked to socio-environmental integration (Hopwood *et al.*, 2005; Holden and Linnerud, 2007). Thus, a city is only *fair* to the extent there are no *exclusion* or discriminatory practices that prevent all from partaking of the benefits of living in a society (Pierson, 2002; Ratcliffe, 2000). In other words, it is a city with a fair distribution of the *benefits and costs* of living in society. Therefore, having a fair city is essential to achieving cohesion and social inclusion.

In a spatial sense, social exclusion and inequity can express themselves as *areas of deprivation* that can lead to poorer living conditions and less access to the opportunities for development the city offers. This translates into a distribution of *sub-benefits and added costs* for the weakest groups of society (Brook Lyndhurst, 2004; Macintyre *et al.*, 1993). Geographers (and other scholars specializing in cities) translate the concept of equitable city into *territorial justice* when access to opportunities and the distribution of costs tends to be equal in socio-spatial terms. Sociologists often refer to territorial justice as *horizontal equity* (Kay, 2005).

In this context, *accessibility* is a key indicator of social equity (Barton, 2000; Burton, 2000b) directly linked to the *constructed urban environment* (*v.g.* regulation of land use and densities, location of essential public and private services and facilities, design of public transportation routes, provision of diverse infrastructure). These issues have been studied in the context of Mexican cities for a long time (Garrocho, 1997; Garrocho and Campos, 2006).

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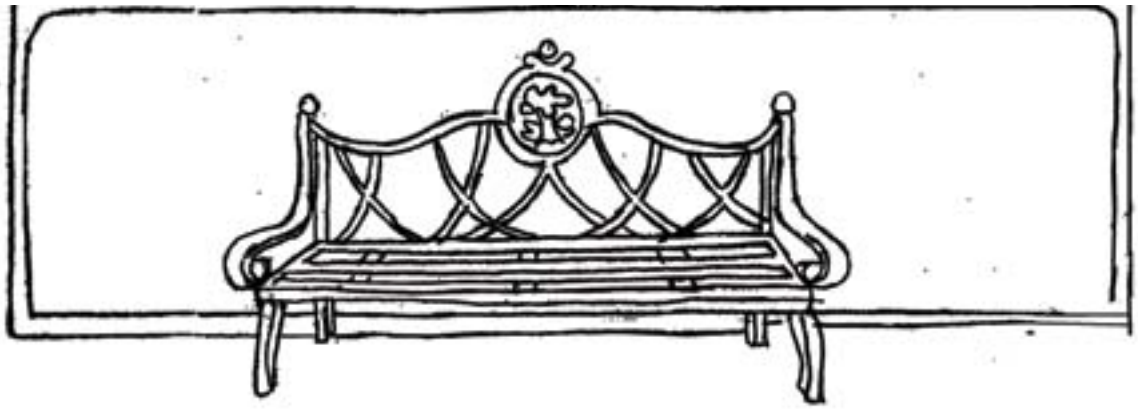
3 In temporal terms, the scale is also key: certain aspects of sustainable development can be analyzed in the short-term but others can only be analyzed in the mid or long-term.

4 An explanation of these concepts in the context of sustainable urban social development and the urban form can be found in Bramley and Power, 2009.

In this book we assume that, in order to advance toward urban sustainability, a vision that goes beyond the city, regions and countries is required (Haughton, 1999; see the Introduction and Chapter 1). Still, we also agree with Dempsey *et al.* (2011) that the local scale (*v.g.* the neighborhood) is fundamental for social sustainability in *everyday life*, particularly due to its influence on cohesion and social inclusion. In this regard, *accessibility* to the opportunities the city offers in terms of key everyday services (and their distance from risk areas: *e.g.* garbage dumps, areas vulnerable to disasters caused by natural phenomena) is also a priority (see Table 2.2).

In this regard, cohesion and social inclusion are key elements of the theory and design of policies that contribute to stronger (*v.g.* competitive, efficient) and fair (*v.g.* equitable, non-segregated) societies for present and future generations (Lister, 2000).[5] In essence, cohesion and social inclusion refer to a *social environment* and an *everyday space* that trigger *significant interactions* between individuals (*v.g. non-segregated cities*); to values, norms, and solidary and reciprocity institutions that guide social behavior (Coleman, 1988; Dempsey, 2008a); and also to the creation of *support networks* for the most vulnerable residents (among other relevant issues: Garrocho and Campos, 2015a). Thus, the community's sustainability depends on the social capacity, on different spatial scales (*v.g.* neighborhood, city), to sustain and reproduce themselves and function in a fair, efficient and efficacious way.[6]



5 Even Pope Francis has made reference to these issues in his famous Encyclical of 2015: "Many cities are huge, inefficient structures, excessively wasteful of energy and water. Neighborhoods, even those recently built, are congested, chaotic and lacking in sufficient green space. "We were not meant to be inundated by cement, asphalt, glass and metal, and deprived of physical contact with nature". (Pope Francis, 2015: 35).

6 Exactly the opposite of what some find, for example, in Mexico City: "…it is like, out there, the city did things to destroy people". (de Mauleón, 2015: 367).

Table 2.2

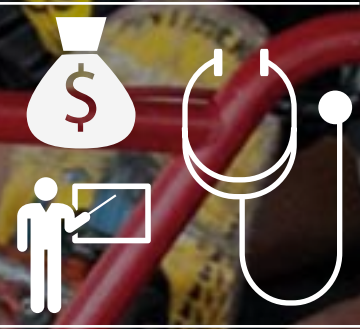
LOCAL SERVICES

KEY EVERYDAY

- COMMUNITY CENTER
- SPORTS/RECREATION (FOR EXAMPLE, BARS)
- PARKS FOR CHILDREN
- PUBLIC OPEN/GREEN SPACE

- DOCTOR / GP SURGERY
- SCHOOLS
- EMPLOYMENT
- SUPERMARKET
- GROCERY STORE

- MARKET
- PHARMACY
- SCHOOLS
- BANKS
- PUBLIC OFFICES
- CHURCHES



SOURCE: DEMPSEY ET AL., 2011

The community's sustainability involves, among other aspects, the social interactions between its members (such as the establishment of *significant interactions:* sustainable, solidary, reciprocal, based on trust: Reardon and O'Sullivan, 2004); a certain level of stability in the community, both from a demographic (*v.g.* net migratory balance) and economic (*e.g.* quality and number of businesses, workers) standpoint; participatory and plural local collective institutions (both formal and informal: García and Madrigal, 1999); trust between the members of the community, including compliance with the law by citizens and governments, and enforcement of the law by the State (*e.g.* security of citizens and their assets, complying with contracts and protection from governments, among other aspects); a sense of belonging, identification and pride of being part the community (Dempsey *et al.*, 2011). In summary, an active, productive, inclusive, healthy and safe society (Burton and Mitchell, 2006) where residents wish to stay (Forrest and Kearns, 2001).

1.3. Main dimensions of sustainable urban social development

The community's sustainability refers to the different *socio-spatial processes of collective life* that can be grouped into five dimensions (Dempsey *et al.*, 2011):

i. Social interaction/Social networks in the community. These processes are a fundamental part of social capital (Forrest and Kearns, 2001; Putnam, 2000), and include trust and the density and intensity of interactions, as well as the collective acceptance of obligations and expectations (individual and social behavior models: Pennington and Rydin, 2000). These factors facilitate reciprocal actions, cooperation and social cohesion between diverse groups and generations (Putnam, 1993).[7] The issues of social interaction/social networks in the community emerge, in part, as a response to certain evidence of disintegration and segregation in the intra-urban space (Forrest and Kearns, 2001), not only by race or economic level (from the classic study of North American cities by Burgess, 1928) or health condition (a classic reference is Gabriel, 1925), but also evidence of segregation between age groups, which includes Mexican cities (segregation of the aged population: Garrocho and Campos, 2015b).

There is evidence that the *urban form* influences the generation/inhibition of social interactions through population density, a mix of land uses or the provision of common spaces that are not *places of transit*, but *places of gathering* (especially green space and infrastructure for children and youth, or churches and community centers, which are preferred by the elderly). It is accepted, for example, that streets with high density and mixed housing-commercial use facilitate social interaction more than fully residential streets, because they generate pedestrian flows that coincide in time and space, a situation that facilitates *face-to-face* contacts (Jacobs, 1961; Talen, 1999). However, while spatial proximity is an essential requirement to establish face-to-face contacts and generate significant interactions, it is not enough. Other public policies that take advantage of the *spatial proximity* and reduce *social distances* are required: this includes collective community projects (*v.g.* educational, in order to promote decent or quality employment, improve neighborhoods, and support traditions and artistic and cultural activities, among others) (Garrocho and Campos, 2015b).

ii. Participation in social activities. Participating in local and community activities is a strategic component of social sustainability and social capital, due to its relationship with community cohesion and the integration of networks (Forrest and Kearns, 2001; Littig and Griessler, 2005). Participating in groups that engage in specific activities (*e.g.* negotiating services, supporting a political candidate, organizing social or religious events) implies close relationships between the different individuals that reside in a territory (*v.g.* neighborhood). It also creates a *sense of community* and reinforces the

7 Without social interaction, the persons who live in a territory are simply a group of segregated individuals, with no sense of community, pride or place attachment (Dempsey, 2006).

idea of *civil society* (Putnam, 1993). If there is no participation in the community's organized activities, the situation of the neighborhood or the city tends to be unsustainable (Dempsey *et al.*, 2011).

Apparently, participation in diverse groups and networks can be triggered by population density and an appropriate mix of land uses, because this generates a larger variety of activities where it is possible to participate (Talen, 2001). But the level of that offer and accessibility to public and private facilities in the community is also essential: the higher the level of the offer and accessibility, the larger the participation in activities (and vice versa). Evidence from different cities in the United States shows that commute times are inversely proportional to community participation, and also that those individuals who have longer daily commutes are less likely to participating in community affairs (Putnam, 2000). Transportation costs (both tangible and intangible,

iii. Demographic and economic stability. This dimension refers, above all, to the capacity of the neighborhood and the city to *retain* their populations, economic units and employment. It has been suggested that a sustainable community requires residents and economic units that are well established in the long-term (Silburn *et al.*, 1999). High residential mobility (*v.g.* the entry and exit of population and businesses) can be a symptom of a *lack of cohesion and a sense of attachment* to a city or neighborhood (Bramley and Morgan, 2003; Wilson and Taub, 2006). The extreme case of negative net migration rates (the net loss of population and jobs) is, without a doubt, a clear indicator of the failure of a region, city or neighborhood.

Still, some argue that the population *turnover* (provided there is not a loss of population and opportunities) can reinvigorate the community and increase its social capital (Kearns and Forrest, 2000). In fact, there are highly dynamic neighborhoods or cities where the population turnover is inevitable and, still, the results are positive. The most iconic examples include university communities and cities, as well as cities and communities that are net attractors of talent (*e.g.* San Francisco, including Silicon Valley).

The link between the community's stability and the form (or design) of the city or neighborhood is neither clear nor direct (Dempsey *et al.*, 2011). The residents' decisions to stay in a neighborhood or leave it depend on different factors: the perceived quality of the environment (including how safe it is), the offer and quality of services in the area, the level of accessibility to key services and facilities (such as schools in the case of young parents, or hospitals in the case of the elderly), or the type and size of dwellings in relation to the person's stage in life (Wilson and Taub, 2006). For example, in Mexico there are more than five million unoccupied dwellings, mainly due to the poor location of real-estate developments (*v.g.* low levels of access to schools, jobs, stores, banks, public offices: a problem directly linked to the urban structure and *sustainable urban design*), a situation that led to the bankruptcy of large real-estate

consortiums in the country (BBVA, 2014).[8] The next big real-estate crash could have its origin not in the location of housing developments (assuming the lesson was learned), but in the design of dwellings, if developers fail to take into account that, in the following decades, their potential clients will be a new group of key users in Mexico –*the aged population* (Garrocho and Campos, 2015b).

iv. *Pride/Sense of belonging to the place.* The positive sense of "place attachment" is a dimension of urban social sustainability, because it is an integral component of the *enjoyment* of the city/neighborhood where people live (Nash and Christie, 2003). The residents' place attachment is related to the physical (*v.g.* tangible) environment where they live, but also derives from a *socio-spatial interpretation* that includes the social (*v.g.* intangible) environment. Thus, the place attachment and sense of community constructs are related to the attributes of the rest of the residents in the area, social order, common norms and the predominant civic culture (*v.g.* values, behavior norms) (Fukuyama, 2000: 15; Kearns and Forrest, 2000). It may be for that reason that Talen (1999) defines the *sense of community* as an amalgam of shared emotional contact that is established through significant interaction with others, place attachment and a sense of belonging (*v.g.* pride and the right to belong).

The pride and sense of belonging to a place can be affected by the perceived quality of the neighborhood or city (Talen, 1999). If neglect, filth or vandalism are perceived, the sense of attachment weakens (Nash and Christie, 2003) and there is a negative effect on the sense of security. And this could reduce the frequency and intensity of social interactions and community participation. For this reason, it is important to have land use and construction *codes and regulations* that are respected, as they will ultimately have an impact on common behavior patterns (Kearns and Forrest, 2000). The constructed environment and place attachment are shared by the residents of the city/neighborhood who, together, will create an image of their own (either positive or negative) that distinguishes them from other places and communities (Relph, 1976). In this context, a careful design of spaces and the preservation of symbolic points of reference and identity are highly important (Duany, 2003).

v. *Protection and safety.*[9] The perception of safety is fundamental to social sustainability (Barton, 2000), because it is a basic need of human beings (Maslow, 1954). Cities and

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8 Two very practical references of the predominant currents of thinking in the area of sustainable urban design are NYC (2008) and EC (2004). The former presents the New York City design manuals and the latter identifies best practices in the area of urban design to support the sustainability of cities in the European Union, as well as recommended actions on different socio-temporal scales.

9 In this context, protection has a sense broader than that of safety. Here, protection refers to the prevention of physical, social, spiritual, economic, political, emotional, work-related, psychological and educational damages, among others. It also refers to controlling risks, both natural (*e.g.* floods and earthquakes: caused by natural forces) and artificial, which result from the action, or lack of action, of strategic groups or agents (mainly governments or large corporations), in connection with collective issues on different scales: global (such as climate change), national (an economic development model based on the depletion of natural resources), urban (urbanization model) or neighborhood (segregation and lack of social cohesion). Safety, on the other hand, mainly refers to effective crime prevention.

neighborhoods free from crime and chaos give their residents a sense of safety, which is essential to establish significant social interactions and participate in collective activities (Shaftoe, 2000). The sensation of safety reinforces trust and reciprocity among residents, promotes a *sense of community*, and has a positive effect on the consolidation of *place attachment* (Dempsey *et al.*, 2011).

The constructed environment and the *city form* also play an important role in the fundamental subject of safety. Land use zoning; maintaining the environment, facilities and infrastructure in good conditions; the construction of attractive gathering spaces; the possibility of walking around the city; collective activities in open spaces and the social ownership of the street have positive effects on safety and the perception of safety (Worpole, 2003). In this perspective, the broken windows syndrome, where even cosmetic damages can trigger more serious damages, antisocial behavior or even criminal behavior, is crucially important (Johansen *et al.*, 2014; Wilson and Kelling, 1982).

1.4. The gears of the dimensions of sustainable urban social development

The dimensions of urban social sustainability are articulated through two key concepts: social equity (understood as intra and inter-generational distributive justice) and *community sustainability* (Dempsey *et al.*, 2011). The former is a concept that has already been broadly addressed in the international literature (recently by Allingham, 2014), and has even been applied in Mexican cities in the specific case of the *spatial distribution of opportunities* (Garrocho, 1995; 1997).

The concept of community sustainability has been less studied. We must bring attention, however, to the work of Dempsey *et al.*, 2011 and, in general, to that of the research network they are part of (known as *CityForm*), which operates in different cities of the world.[10] According to the *CityForm* network, community sustainability refers, in particular, to the long-term *viability* of communities and the appropriate functioning of society as a *collective entity* (on different socio-spatial scales). In broader terms, this research network defines urban sustainability as the *coherence and balance of social life, economics, ecology, energy and transport* (Dempsey *et al.*, 2011: pp. 10-11).

While we generally agree with the above, this definition proposed for the United Kingdom must be adapted to the socio-spatial reality of Mexican states. This is done in the following section.

10 http://www.city-form.org/index.html

2. Key policies for sustainable urban social development in Mexico

The theoretical approach adopted in this book, which was already mentioned in the Introduction, implies the interrelationship between different dimensions of sustainable urban development that are fundamental for Mexican (and possibly Latin American) cities. This section, on the other hand, focuses on the SUSD priorities for Mexican cities, highlighting the links between the social (defined as a broad analytical category, see the previous section) and the other dimensions of our approach: the economic, political, environmental, institutional and population dimensions, as well as those related to mobility and access to urban opportunities. Attention is also paid to the city's *nonphysical and predominantly physical factors* (see examples in Table 2.1). Each subsection on the SUSD priorities for Mexican cities begins with a brief argument that justifies it in conceptual and operational terms, and then outlines the key recommended actions.

2.1. Accessible and affordable quality public services

One of the main responsibilities of Mexican governments is that of offering quality public services (*v.g.* that respond to prevailing technical specifications and users' expectations) that are accessible (*v.g.* that all population groups, especially the most vulnerable ones, can easily access services) and affordable (*v.g.* that can be used/paid by the poorest). Public services are funded with resources obtained from society in the form of taxes and then assigned to the three levels of governments. That means that the use of these resources should be efficient (*v.g.* so that the biggest benefits can be obtained), orderly (*v.g.* using resources in an efficient, clean and transparent fashion) and fair (*v.g.* both in social and territorial terms) (Garrocho, 2013). Therefore, public services must be carefully planned.

Governments typically rely on different instruments to plan the distribution of the benefits and burdens generated by public services:

i. The formulation of zoning regulations and urban development plans;

ii. Participation in the formulation of regional development plans;

iii. Authorization, control and oversight of land use;

iv. Granting of construction licenses and permits, and formulation of building regulations;

v. Participation in the formulation and application of public transportation programs (which changes accessibility landscapes), among others (Cabrero, 2005). In other words, they have sufficient instruments for the efficacious, efficient and fair distribution of public services. There are no excuses.

However, the quality of government actions has not been the best. The following are the key recommendations regarding accessible and affordable quality public services:

- Identify the *mix of allocation* of resources that benefits society in an acceptable manner (*v.g.* if not the best combination of investments, at least one that is considered *good*), based on *priority* general needs (*v.g.* education, health, communications, transportation, green space, and drinking water, to mention just a few examples). In other words, to define *how much* and *where resources will be invested* based on the city's *vision* and *needs*.

- *Allocate* investments, taking into consideration three fundamental coordinates: *social* (*v.g.* target population: *who*),[11] *territorial* (*v.g.* location in the space: *where*) and temporal (*v.g.* their sequence in time: *when*). These three coordinates are interrelated and influence each other. Therefore, an error in any of these coordinates will cause the investment to fail and will lead to potential social bankruptcy. Public services planning must consider these three coordinates at the same time. The spatial location of services involves a socio-spatial redistribution of resources. This redistribution can be *regressive* (if it favors the most disadvantaged groups) or *progressive* (if it benefits the most vulnerable and tends to socio-spatial convergence).

- Ensure the fair distribution of resources transformed into public services, in a context of functional and operational efficiency. Differences in accessibility define *who benefits more and who benefits less* (or *not at all*) from a public service. Accessibility is especially important for certain population groups with mobility problems (*v.g.* the elderly, mothers with small children and populations with disabilities, among others) and the poorest.

- Ensure that the *socio-spatial* distribution of the *externalities* (both positive and negative) of public services is fair and efficient, considering they have a significant effect on the wellbeing of people and the value of their assets.[12] Private services and facilities also generate externalities (*e.g.* positive: proximity to industrial employment *vs.* negative: environmental pollution), this being the reason why land use policies are, at the end of the day, policies of redistribution of benefits and costs (*v.g.* externalities) among the population.

- Promote partnerships between local governments, as well as with the state and federal levels, in order to finance certain public services that require investments that exceed the financial capacity

11 It is essential to take into account the characteristics of the target population that will have access to services. For example, it is important to take into account accessibility for the elderly and persons with disabilities.

12 Public services generate positive (e.g. schools) and/or negative (e.g. waste-disposal sites, bus terminals) effects. These indirect effects are called externalities. Positive and negative externalities can also derive from private investments. For example, from a pharmacy, where positive externalities predominate, or a discoteca (the word for nightclub in Chile), boliche (the equivalent word in Argentina) or antro (the equivalent word used in Mexico), where negative externalities predominate. Both the pharmacy and the antro may be private businesses, but their location is the result of a land use license granted by the municipal government.

capacity of a single municipality (*v.g.* a water treatment plant) (Rodríguez-Oreggia and Tuirán, 2006). This involves negotiating the terms of projects and their *location*.

• Plan public services with a *metropolitan vision* (*v.g.* considering the city as a whole), which necessarily requires partnerships between municipalities and partnerships with state governments and, sometimes, the federal government.[13] Mexico does not have *really successful* metropolitan coordination experiences (the only cities that have attempted to do something in this regard are the metropolitan areas of Guadalajara and the Valley of Mexico: Mexico City).

• Develop a database to gather information on the *demand* (*v.g.* the population: how many and who they are, where they are, what their needs are), the *supply* (existing public services: where they are located, as well as their coverage, quality and availability), and *key indicators* on the progress/deficit in the provision of public services. This database must be periodically updated and should also include information on the availability of modern public services: computers, Internet and cell (or mobile) phones, given their importance for socioeconomic development.[14]

• Design a *program of investments* in public services with a short, mid and long-term vision and, if applicable, with a *metropolitan perspective*. This program must include expenditure budgeting and programming, and must be periodically updated.

• Classify population groups and areas based on their level of *need or deficit* of public services, with the idea of reducing inequalities in the provision of services and consolidating existing services.[15]

• Negotiate with population groups the priorities in the area of public services (*v.g. where* resources will be invested: drinking water, parks, lighting, for example) and their location: social (*who*), spatial (*where*) and temporal (*when*). Negotiations should focus on the issues of accessibility and positive and negative externalities.

• *Be fully accountable* to society for those investments and the rationality of public actions. All of this in a context of transparency.

• *Promote mechanisms for citizens' participation* in an organized and permanent fashion (*v.g.* Citizens' Participation Boards, Residents' Associations, Block Representative Committees).

• *Provide training* to (*e.g.* municipal) urban development planning teams and promote *career civil service*.

• Explore the possibilities offered by *Information and Communications Technologies* (ITCs: especially mobile phones and the Internet) in order to offer/support certain public (*e.g.* assitan-

13 In other federal countries in Latin America, the term state government can refer to provincial, federal or departmental governments.

14 In Mexico, a significant part of this information is available from censuses on population and housing.

15 In order to have appropriate public policy decision-making processes, it is important to have assessments based on timely and quality socio-demographic information sources, with the disaggregated data necessary to monitor access to the rights of the target population. Mexico has these instruments.

ce and appointments to complete procedures) and private (e.g. operation of taxis, business location maps) services.

• *Build the municipality's tax-collection capacity* (*v.g.* land registry, potable water fees) in order to offer more and better public services.

• Analyze the convenience of granting concessions for the provision of certain public services.

• Periodically and reasonably estimate and adjust fees and costs in order to sustain and maintain the availability of public services.

• *Carefully evaluate* the advantages of access to complementary financial resources from credit institutions, with advice from experts from the state government and the development banking sector, in a context of transparency and accountability.

2.2. The metropolitan challenge

By 2010, Mexico already had eleven "millionaire" cities. All of them had a *metropolitan* structure.[16] These eleven cities had a total of 41.3 million inhabitants, that is, less than 40% of the country's total population. However, if we consider Mexico's 59 metropolitan areas identified by SEDESOL, CONAPO and INEGI (2012), we can see that, in 2010, they accounted for 56.8% of the national population.[17]

These cities generate 73% of the total value of production in the country and account for 6 out of 10 economic units; 71.7% of the total number of workers employed and 81% of their income (INEGI, 2009). But, in addition to that, they centralize a disproportionate percentage of the different cultural, scientific and recreational activities in the country. How can we feed, provide decent housing and employment and facilitate the mobility of this population of workers and consumers? How to collect, treat and dispose of solid waste? How to supply drinking water to the inhabitants of each and all of these cities? And, finally: How to plan these cities with a *metropolitan vision*? In other words, how to *manage* a city with several governments (*v.g.* several pilots) *in a coordinated fashion* so as to maximize its *potential* and reduce its risks?

16 The following ten cities with the largest population in Mexico are also metropolitan areas.

17 A metropolitan area is defined as the combination of two or more municipalities occupied by a city of 50,000 or more inhabitants whose urban areas, functions and activities exceed the limit of the municipality that originally contained it; integrating –either as a part of it or its direct area of influence– other neighboring and predominantly urban municipalities with which it maintains a high level of socioeconomic [functional] integration (SEDESOL, CONAPO and INEGI: 2012:25). This definition differs from that of "metropolitan area". The latter only includes those municipalities that contain part of the city's continuous urbanized area.

We suggest, among other things, the following recommendations:

- Raise awareness, among the different *social actors* (*v.g.* governments, businesses, social organizations and society in general), of the fact that the city faces *intense competition* from other cities in the planet and it will only become competitive if a *metropolitan vision* is adopted.

- Promote a vision where *coordination* between governments, businesspeople, organizations, and society is key in the process of facing challenges, reducing risks and maximizing advantages and opportunities.

- Create *metropolitan decision-making* bodies that rely on the broad participation of society.[18]

- Take advantage of *economies of scale* (*v.g.* the higher the level of production, the lower the cost per product unit) and *scope* (*v.g.* the possibility of producing several goods or services simultaneously), in order to finance the provision of public services (*efficiency with socio-spatial justice*).

- Control the negative *externalities* of local activities (*e.g.* the negative effects of vicinity: pollution or incompatible land uses).

- *Reduce social and spatial-temporal differences* through the fair allocation of development costs and benefits (*e.g.* intra- and inter-generational distributive justice).

- Promote urban and regional *convergence* in the area of sustainable development (*v.g.* social-spatial convergence).

- Eliminate any type of *unnecessary* barriers (*e.g.* physical, social, economic and cultural) to accessing *quality* public goods and services (*accessibility and affordability*).[19]

- Ensure the *transparency* of public actions and the legal responsibility deriving from the impact of those actions (accountability).

18 Mexico not only has no metropolitan governments; it does not even have examples of formal inter-municipal governance relationships. Instead, there are a few cases of circumstantial inter-municipal relationships based on the proximity and supranational nature of certain problems. There are some metropolitan commissions that are usually ineffective. One exception was the Metropolitan Environmental Commission (CAM), although its focus was on air quality in the Mexico City metropolitan area. This commission recently became the Megalopolis Environmental Commission (CAME).

19 There are unnecessary barriers to the use of public services, such as the fact that courts in indigenous areas do not provide services in local languages. There are also necessary barriers, such as the cost involved in the provision of a public service (e.g. electricity, drinking water) to make it viable and sustainable in the long term.

2.3. Quality institutions

Development (*v.g.* economic growth, poverty and inequality reduction, innovations, scientific advances) is not generated everywhere, but is concentrated in the territory, that is, in certain cities and regions. This concentration of development unavoidably leads to *winning* cities and regions (*v.g.* those that develop in a rapid and sustained fashion) and *losing* cities and regions (*v.g.* those that do not develop or do it at an insufficient pace).

What are the drivers of development? Why is development only concentrated in certain parts of the territory? Why different places develop at different paces? There are different explanations to this, and while no definitive explanation has emerged yet (it would be the Holy Grail of urban and regional economics: Storper, 2013), we have some partial responses. One of them has to do with the *institutional context*, and there is a growing consensus in the sense that a key element to promote development is the quality of institutions. Institutions can be understood as the rules of functioning of a society, and their influence is key in multiple dimensions of the city's life.[20]

• Create institutions *aimed at sustainable development*, that is, institutions that allow for the resolution of conflicts, the peaceful transition of power, the reduction of uncertainty in connection with the economic and social behaviors of individuals and organizations, establishing formal and informal commitments (*v.g.* legal contracts or verbal agreements), promoting investments, cooperation for development and economic growth, the resolution of collective action problems, reducing corruption, the prevention of opportunistic behaviors (*v.g.* the pursuit of individual interests at any cost in order to obtain unlawful advantages), the facilitation of flows of information and interactions between individuals and or and organizations, implementing mechanisms for the distribution of benefits and burdens, and the reduction of transaction costs, among other things.[21]

• Ensure that those institutions aimed at sustainable development are quality institutions. This will make it easier for all type of transactions to generate the biggest benefits for society as a whole. Therefore, the quality of the city's institutions (*"the rules of the game"* in the city) is key to the process of leading individual and collective actions, and it exerts a significant influence on the economic and social development of individuals and businesses. There is a *direct*, although complex, *relationship* between the quality

20 Incentive systems, norms, regulations, values, traditions, laws, beliefs, power relationships, interests and cultural practices are also considered institutions that limit, both formally and informally, the interactions and behaviors of public and private organizations and individuals (Arellano and Lepore, 2009).

21 Transaction costs can be economic or otherwise (*v.g.* annoyances, time invested, uncertainty, energy, obstacles). While they usually apply to economic exchanges, here they can be associated with different procedures, from the costs involved in getting a license from a municipal government to withdrawing money from a bank. In these cases, transaction costs may include the annoyance of arriving in a government office really early to stand in line, waiting in line at a bank and anticipating uncomfortable service spaces, being mistreated, or having to return at a later date because you must produce documents you were not informed of, among many other examples.

of institutions and the *pace* of development (Dellepiane, 2010).[22]

• Assign to city *managers*, especially the city's government(s), the role they must play in order to improve and create institutions that promote sustainable development. This role must be based on *trust* (to coordinate efforts and revitalize the economy), *efficiency* (to generate wealth and wellbeing), *equity* (so that the benefits and burdens are fairly distributed in the society and efficiency is sustainable) and *innovation* (the driving force of development in the 21st century). Those societies with higher quality institutions are *more innovative* in the long term and can better adapt to changes in the high-level *urban competition* that exists in today's world (Farole *et al.*, 2011).

• Strengthen the city's human capital (*v.g.* with highly qualified individuals with the capacity to generate new ideas), which is the most important element of sustainable development aimed at innovations (a *sine qua non* of competitiveness). This can be achieved in three key ways: *training, retention and attraction* of talent (Glaeser, 2012; Moretti, 2012; Storper, 2013).

• Develop institutional contexts that enable the training, retention and attraction of talent. This includes, first and foremost, the creation of enabling *agglomerations* (*v.g. innovative ecosystems*: Storper, 2013).[23] Some good examples of innovative cities are London (a center of financial innovation) or San Francisco (and Silicon Valley) in California (the United States' most important digital technological innovation center), but there are also multiple examples in Latin America.[24]

• Explore *diverse areas of innovation*. Not all innovations have a hi-tech orientation. Lima (Peru), for example, is a *world-class gastronomic innovation* center,[25] Buenos Aires (in particular the Palermo neighborhood) is a place of in-

22 The underlying question is: What triggers the behaviors that cause rules to become shared and accepted (or imposed) mechanisms relatively stable over time? (Arellano and Lepore, 2009).

23 In this context, ecosystems are concentrations of innovative human capital and businesses in the territory.

24 São Carlos (Brazil) produces sensory analytical and GPS software to monitor crop irrigation and farming; Montevideo has developed a new risk investment model to provide ICT support to Uruguayan companies; Mendoza (Argentina) not only produces great table wines as a result of different innovations, but is also home to companies that develop biometric software programs to improve online transaction security; the Radomiro Tomic mine (close to Calama, 1,700 kilometers to the north of Santiago de Chile) pioneered the development of robotic systems for the global mining industry. In Mexico, Monterrey is an innovation center in the areas of industry and organization, and Guadalajara is a pioneer in the development of ICTs. And it was in Mexico City that solid rain was invented. Solid rain is powder spread in crops that can retain water for up to 40 days. There are multiple examples. See: http://www.fastcompany.com/most-innovative-companies/2013/industry/south-america and http://www.corfo.cl/archivos/70_Casos_de_Innovacion.pdf

25 Lima is the city with the largest number of foreign tourists with a minimum one-night stay in the Americas, only behind New York (Hedrick-Wong and Choong, 2014): http://newsroom.mastercard.com/wp-content/uploads/2014/07/Mastercard_GDCI_2014_Letter_Final_70814.pdf

novation in the fashion industry. Curitiba (Brazil) is an innovative city in the area of *urban planning*, Panama City designed aninnovative model to *attract international institutions and corporations*, Bahía Ballena and Puerto Jiménez (Costa Rica) are leaders in the field of ecotourism innovations, and Santiago de Chile is generating *important innovations* in the field of *low-cost construction*. In Mexico, Querétaro has developed an innovative model to attract research centers and hi-tech companies. However, in Latin America, only Chile, Panamá and Costa Rica are listed among the Top 60 countries of the 2014 *Global Innovation Index*, with numbers 46, 52 and 57, respectively, in the ranking (Dutta *et al.*, 2014). These three countries have an element in common: their main strength is the *quality of their institutions*, an area where they ranked high.

- Develop, through consensus, a strong, clear and fair *institutional framework* with the capacity to create an environment that is enabling (or at least not unfavorable) for development: high-quality, flexible, change-adaptive and self-reinforcing *institutions*. Growth and development cannot thrive in an institutional vacuum.

- The city's government(s) must ensure equal compliance with, and the enforcement of, the legal framework: traffic and transportation rules and regulations, land use, building regulations and revenue collection (*v.g.* collection of taxes and fees), among many other things. The *rules of the game* must be the same for all.[26]

- Implement *active policies* to reconcile social interests, promote values that enable development among *key actors* (*e.g.* groups of interest, businesspeople, students on all education levels) and improve the behavior of citizens (including key actors);

- *Eliminating corruption* is one of the main challenges and conditions of development. The initial requirement to succeed in this regard is the *firm belief* that it can be done. The city's management cannot be an *accomplice* to impunity. One example in Mexico is the Federal District's Center for Administrative Sanctions and Social Integration, better known as *"El Torito"*.

- Make viable and credible government commitments *with and within* organized society, and *fulfil those commitments*. The city's inhabitants clearly recognize which commitments are fulfilled and which are not.

- Manage the city in an *exemplary* manner. The city's management must be at the forefront of efficacy, efficiency, honesty and accountability. Otherwise, it will lack *political legitimacy* and will lose the citizens' trust; it will lack leadership and the capacity to negotiate with the most influential groups of interest, and it will be unable to fulfill its duties appropriately (*v.g.* achieve a fair and competitive city). Rather than relying on words and authority, *a city must be led by example*.

26 Esto es posible incluso en México: una institución ejemplar en la manera igualitaria de aplicar la ley es el Centro de Sanciones Administrativas y de Integración Social, mejor conocido como "El Torito", que tiene diversos objetivos, pero es famoso por la aplicación estricta y justa del "Programa de Control y Prevención de Ingestión de Alcohol en Conductores de Vehículos en el Distrito Federal".

- Governing requires *coordinating efforts and facilitating development*. The government must never be a burden that hinders that process. Good urban management is not a luxury; it is a *vital need* of sustainable development.

- Promote, on a permanent basis, *participatory democracy* and the collective resolution of problems with the support of social organizations, and strengthen them with an inclusive perspective that integrates the neediest and most vulnerable groups. *Cities cannot be managed in isolation*.

- *Educate society* in order have a more efficient participation in sustainable urban development.

- Develop long-term development plans with *legitimate consensus* reached together with society. Only society can support and oversee the continuity of plans and programs, and give *certainty* to the city's mid and long-term direction.

- Use public resources *based on the priorities* negotiated with society, in a context of balance between justice (*v.g.* the socio-spatial distribution of externalities), efficiency and efficacy

- *Provide ongoing training* to the city's employees on all levels, beginning with the *top* levels. City governments should lead by example.

- *Creating institutions* that can truly promote development involves a process: they cannot be created overnight. This process requires experimentation, an innovative spirit, a fair knowledge of local history and conditions, and leading the city by the hand. Today, the context to do that is more favorable and demanding than it was in the past: democracy, respect for human right, real-time information flows (*v.g.* "everybody knows"), and economic openness, among other things, are making headway.

2.4. Poverty

Mexico's urban population distribution in the territory also involves the distribution of poverty (see Chapter 1). While poverty can have more *intensity* in rural areas, its magnitude is bigger in urban areas (Damián, 2010; UN-HABITAT, 2008). Fighting poverty requires a *substantial change* in the way society is organized. However, this can take a really long time, and waiting for it to happen is the most conservative position one can adopt (Titmuss, 1987). In the meantime, several *palliative actions* can be carried out:

- Design *specific* policies to fight poverty in socio-spatial terms. This requires responding, at least in one initial stage, to the following questions about the population living in poverty: *how many, who and where they are*.

- Implement *policies targeted* specifically at fighting poverty. Extreme poverty in Mexico experiences *decline, stabilization and growth* cycles (both in absolute and relative terms). However, it always shows a *high level of inequality by age*, but *not by gender*, and is even more pressing among the *indigenous population* (CONEVAL, 2013).

- Identify those *cities* where the *design of custom policies* is critical. It is also necessary to adopt a regional vision that takes into consideration where poverty is being generated in cities, so that the policies designed to fight it consider cities not as *isolated points* in the territory, but as networks that articulate regions with problems varying in nature and intensity.

- Distinguish the problems *in* cities from the problems *of* cities. The former are problems *located* in cities, because that is where the population and activities are concentrated, but they have their origin in the *established social order*. The latter are problems generated or exacerbated by the *poor management and operation of* cities. The city does not create poverty; it does exactly the opposite: the *city attenuates* and offers opportunities for the poorest in society (including those in the countryside: it offers the so-called *urban advantage*, which is linked to the *right to the city*: Glaeser, 2012; UN-HABITAT, 2008). However, that is not enough; the city must do a *fair distribution and redistribution* of opportunities and the burdens of development (Rawls, 1971; Sen, 2009).

- Understand that *the city and the countryside are the two sides of the same coin*. Poverty in Mexico has slightly declined in relative terms, but continues to grow in absolute terms. One of the main and most immediate factors that explain this situation is the increase in food prices, which mainly affects lower-income households (SEDESOL, 2013; RF, 2014).

- Eliminate the traditional *regional north-south division* of poverty on a national scale. Rather than a regional convergence, *disparities* are increasing in Mexico. It is urgent to implement efficient regional convergence policies that foster social cohesion (*v.g.* between groups, between generations and between cities), *efficiency and equity* (Dávila *et al.*, 2002).

- Reduce *inequality*. In Mexico, 60% of poverty reduction can be linked to the slight decline in *inequality* experienced in the country since 1994 (Lustig, *et al.*, 2012; Pánuco-Laguette and Szekely, 1996).

2.5. Inequality

Mexico has always been a *highly unequal country*. The country's income inequality is much higher than the average for Latin America, which is probably *the world's most unequal region* (Corbacho and Schwartz, 2002). Inequality has been considered a crucial factor that has a negative effect on *social stability, competitiveness and sustainable development* (Saraví, 2008).

While our country experienced a significant decline in inequality in the 1960s and 1970s, a period of rapid economic growth (approximately half a century ago) (Esquivel and Cruces, 2011; Székely, 2005), inequality grew significantly between 1984 and 1994 (when major economic crises occurred, Bouillón et al., 2003; Legovini *et al*., 2005). Ever since then, inequality has been declining, although slowly, in *decline, stabilization and growth* cycles.

Inequality *between rural areas* and between cities is more important than the gap that exists *between the city and the countryside*. The decline in inequality can be explained differently in cities and in the countryside. In urban areas, a decline occurred in the income of the most advantaged groups. In rural areas, income grew in general terms (Esquivel and Cruces, 2011).

The following are the main recommendations to reduce inequality:

- Allocate more resources from social programs (*e.g.* Oportunidades), and allocate them *more efficiently*, through the use of more targeted instruments. While the contribution of government transfers for poverty reduction has steadily increased, it is still *insufficient* (Lustig *et al*., 2012). Increasing the *quality of expenditure* is urgent.

- Reinforce social programs targeted at the poorest households.[27]

- Achieve higher levels of education to reduce salary inequalities. The generation of quality jobs is key to the reduction of poverty and inequality (Esquivel, 2008).

- Create a more educated and productive labor force (*v.g.* human capital) in order to have less unequal and more competitive cities.

- Promote *salary convergence* policies in all the different sectors and cities in Mexico.

- Place education *at the center of* policies to reduce inequality. Education coverage tends to be more egalitarian, but the same cannot be said about the quality of education (which, in general terms, is deficient, see the next subsection). Quality of education may be the biggest challenge for Mexico in the 21st century.

27 Large conditional cash transfer programs such as *Jefes y Jefas* (Argentina), *Bolsa Familia* (Brazil) and *Oportunidades* (Mexico) have significant redistributive effects, and while they only account for a small proportion of social public expenditure, they have a huge impact from the standpoint of inequality and poverty (Lustig et al., 2012; Esquivel and Cruces, 2011).

- Promote an entrepreneurial spirit and values among young people, especially in education institutions on all levels, in an environment of *formalization of decent employment*.

- Increase women's participation in the formal labor market through the implementation of support policies. For example, increase the availability of quality, affordable, accessible and inclusive child daycare services for mothers with small children from low-income households.

- Design a *realistic* pension system with a long-term vision and taking into consideration the population's aging. This will allow the working population and their families to take timely and preventive measures in preparation for their aging.

- Promote a migratory policy with the United States so that Mexico can receive increasing flows of international remittances and give families advice on the use of their resources.

2.6. Fundamental services: Health and Education

Investing in the development of human capital is a basic condition for sustainable development and achieving a more equitable distribution of the advantages and burdens that the city generates (UN-HABITAT, 2008). Education is an inalienable human right and a necessary requirement to sustain any conception of development. It is directly linked to the full development of the potential of individuals, and it significantly affects the opportunities and the quality of life of society as a whole, as well as the capacity of individuals to fulfill their life plans. Education has a significant influence on comprehensive development, economic participation and the levels of income of individuals, the demographic structure (by influencing fertility and mortality, mainly) an the transmission of key values such as justice, equality, and inclusive and solidary social life with tolerance and respect for human rights, among many other aspects that favor civilized coexistence in a context of prosperity (Ordaz, 2009).

Mexico's development possibilities depend on the existence of a high-quality and large coverage education system (*v.g.* accessible, inclusive), especially in a world that leverages on the *economy of knowledge* and whose *only constant factor* is change.

Health, on the other hand, is an indispensable condition for the wellbeing of individuals and a key component of human capital. However, epidemiologic and demographic changes in the country, its regions, cities and settlements, pose new and highly complex challenges (e.g. population aging).

The education and health systems are made up of thousands of units of different types. Many of these elements (*v.g.* schools or health units) are public and provide services that are completely *free at the point of offer* (*v.g.* the school or health unit). However, if we think about the *real price* of the service (that is, the cost of the service plus the cost of transportation to get to the point of offer), the concept of free education/healthcare could be called into question, because users and their families must pay the cost of the transportation to the point of service.

If the service is free at the point of offer (*v.g.* the school or the health unit), then the real total cost of the service is the cost of transportation, which is variable in socio-spatial terms.[28]

The following are some recommendations for an appropriate *socio-spatial offer* of these fundamental services:

• Look after the *accessibility* of services. This is crucial so that the population, especially the poorest, can use them appropriately.

• Improve *locational planning* on the national, regional, urban and intra-urban levels, because it has a significant impact on the most disadvantaged groups, intensifying or reducing their situation of poverty and inequality. Locational planning also helps the environment by reducing travel time (especially if we also consider the travel time required to get to the point of offer of private products and services).

• The existence of basic services and their accessibility is not enough. They must also have good quality (both in technical and perception terms) and be affordable, inclusive and fair. The territory (*e.g.* regions, cities, neighborhoods) must be a *node* for the convergence of health and education policies.

In the area of education:

• Design the city's education system based on its long-term vision (provided it exists and also that it was designed through consensus: its economic specialization, for example). The big challenge for the city lies in creating a quality education offer that is internationally competitive and having a labor market that can accommodate its human capital (Loyo, 2010).

• Expand coverage with equal access and quality. The challenges of coverage and equity are bigger in the case of secondary and middle-higher education. The problem of quality is common to all education levels.[29] The low level of quality in education condemns millions of Mexicans to poverty and inequality.

• Increase quality in a context of *socio-spatial convergence* in school performance. Disparities in this regard lead to poverty and inequality in cities, regions and sociodemographic groups.

• Bridge school performance gender gaps, which have not changed since 2003 (OECD, 2013).

• Provide support, through scholarships and incentives, to the poorest students in order to eliminate exclusion and unequal access to education, and achieve the convergence of school performance in a context of high quality education.

• Eliminate the huge inequalities in the quantity and quality of education resources allocated to schools (*e.g.* expenditure by student). In Mexico, this type of inequality is the highest of all the OECD countries, and the third highest

28 We should also consider intangible costs –stress, risk and effort–, which increase as the distance traveled increases.

29 Mexico ranks among the lowest of all OECD countries for the different PISA tests (OECD, 2013).

among all the PISA participants (behind Peru and Costa Rica) (OECD, 2013).[30]

• Strengthen the *culture of evaluation* of students, graduates, teachers and researchers, as well as the *external evaluation and accreditation* of institutions and academic undergraduate and postgraduate programs.

• Establish a clear path toward the *society of knowledge*, based on the quality of education, leading-edge research and a strong link between education and the market.

In the area of health:

• Population aging (*v.g.* the growth of the population age 65 and above) is the most important demographic issue faced by Mexico in the 21st century (CONAPO, 2011; Ham, 2003; 2012; Ordorica, 2012).

• Improve the population's health, reduce health inequalities, provide *effective access* with quality and increase efficiency in the use of resources. In all the key indicators, Mexico is far below the OECD averages (OECD, 2013).

• Eliminate the significant *socio-spatial inequalities* that exist in the area of health. In the poorest regions, cities and neighborhoods, malnutrition, infectious diseases, non-transmissible chronic diseases and injuries coexist as the main causes of death. Disease is more common among the poorest and the most vulnerable (*e.g.* children, the elderly and pregnant women in a situation of poverty and a peripheral location).

• Establish a better coordination between health policies and other social and economic policies. *Health inequality* is directly related to levels of poverty, education, and availability of public and household infrastructure, among other social factors (Marmot and Wilkinson, 2005; CONEVAL, 2012). The level of schooling, age, place of residence (*e.g.* urban or rural) and the condition of belonging to an indigenous group are the main factors of sexual and reproductive health inequality.

• Reduce maternal mortality, which is one of the most important indicators of the health of a society, considering it reflects, in a synthetic fashion, the negative effects of a large number of socioeconomic and cultural factors.

• Allocate more resources to the health sector and use them more effectively (*v.g.* by increasing the productivity of health units and resources). While public expenditure in the area of health has grown compared to the GDP, it is still one of the lowest among the OECD countries. This insufficiency of resources is *exclusive and unequal* in socio-spatial terms. There are different areas for improvement: for example, the administrative expenditure of the National Health System represents approximately 17% of the total expenditure, a little more than four times the average for the OECD countries, which is of 4% (OECD, 2013).

• The geographical distribution of infrastructure shows an *inefficient concentration* in the territory, which leaves numerous population groups with no access. Infrastructure is also inefficiently *concentrated in time* (*v.g.* schedules and service days: the vast majority of health units close on weekends, for example) (CONEVAL, 2013).

30 However, in Mexico the "expenditure by student" indicator should not be interpreted as real and effective "expenditure in the student", as shown, to mention just one example, by the budgets of the National Coordination of Education Workers (Coordinadora Nacional de Trabajadores de la Educación - CNTE).

2.7. Traditional basic services: water, sewerage systems, electricity

Traditional basic services are also fundamental human rights. There is a general agreement in the sense that *traditional* basic infrastructure social services (*v.g.* electricity, drinking water and appropriate sanitary installations) represent *essential components of development.*[31] The State has the responsibility to ensure the provision of those traditional basic services. It can be said that, by denying citizens access to traditional basic infrastructure services, governments violate their human rights (WHO, 2006).

In Mexico, inequality in the provision of traditional services tends to decline. With a few notable exceptions (*e.g.* the cities of Veracruz or Guerrero), the differences between cities in the country in terms of availability of traditional basic services in dwellings are small and we can find convergence (CONEVAL, 2007). Neither the population size nor the pace of demographic growth, or density, are statistically related to the coverage of traditional basic services in dwellings. The problem is one of *efficiency* and *efficacy* of local governments (Garrocho, 2013).

As far as the provision of basic services for dwellings is concerned, the recommendations are the following:

- Increase the quality of performance of municipal governments.
- Promote agreements between metropolitan municipalities, and also between municipalities and the highest levels of government (*v.g.* state and federal).
- Integrate society as a user and *monitoring agent* of public construction projects. It is urgent to increase the quality of expenditure significantly.
- A significant increase in the volume of water treated in cities.
- An efficient use of traditional basic services.

2.8. Modern basic services: computer, Internet and cell phone services

The population of the 21st century not only requires access to *traditional* basic services, but *modern* basic services, which are essential to participate in the new society of knowledge and information: computer, Internet and cell phone services. In the economic and social context of the 21st century, the population's development opportunities are directly linked to these new information and communications technologies (ICTs: here, we only refer to computers, Internet and cell phone services). Today, having access to ICTs in dwellings is a key factor of social inclusion or exclusion for individuals and families (Hilbert and Katz, 2002; UN-ICT, 2002; Khalil *et al.*, 2009). In Mexico, human development and poverty levels are the main factors that explain the availability of ICTs (Garrocho, 2013).

31 Here, we establish a difference between *traditional* basic services –electricity, drinking water and sewerage systems– and *modern* basic services –computer, Internet and cell phone services (Garrocho, 2013).

As far as ICT availability is concerned, the recommendations are the following:

• Consider ICTs as *fundamental public services of the 21st century*. This means they must be of quality, affordable and accessible for all. The availability of intra-urban public spaces with *open Internet* access is essential.

• Reduce socio-spatial inequalities in the availability of ICTs. This inequality hinders the convergence of sustainable development between regions and cities;

• Bridge the *digital divide* and reduce *unequal access* to ICTs (*e.g.*: broad-band Internet, laptop computers, tablets), considering their importance in terms of interaction, social development and economic growth. Access to ICTs increases income and reduces poverty and inequality.[32] We must not forget that the digital divide is a by*product* of socio-economic gaps.[33] In order to bridge the digital divide, it is necessary to:

i. Increase the population's *income levels*;

ii. Reduce the *number of users* by computer;

iii. Reduce the cost of access to ICTs (*e.g.* Internet subscriptions);

iv. Increase the population's level of education; and

v. Increase Internet speed (v.g. Mbps: Megabits per second) (ALADI, 2003: 40).[34]

• Increasing the availability of cell phones among the population is key for communications and development. At present, cell phones are the *world's broadest distribution platform*, and they are particularly important in developing countries and also for the poorest inhabitants in cities and rural areas. In addition to bringing economic benefits, cell phone (or mobile phone) services can also be used to achieve several social development goals (*e.g.* they contribute to increase education levels and learning, improve health services, reduce the prevalence of disease and premature deaths, and reduce poverty and inequality: ECLAC, 2003; Khalil et al., 2009).

• Encourage *competition and accelerate the penetration of* cell phone services in Mexico.[35] Ciudad Victoria (Tamaulipas) is a *paradigmatic success story* in this regard. With a population of less than 350,000 inhabitants, it was

32 Econometric evidence from the World Bank for 120 countries concludes that each 10 percent point increase in the broadband services penetration corresponds to an increase in economic growth of 1.3 percent points (Qiang, 2009).

33 The digital divide can be understood as "the technological distance between individuals, families, businesses, groups of interest and geographical areas, in terms of their opportunities of access to information and communications technologies in a broad range of activities" (ALADI, 2003: 5).

34 In 2014, according to the AKAMAI Internet Performance Index, Mexico ranked 38 among 51 countries considered. The world's estimated average speed is 3.9 Mbps, with South Korea at the top of the list with 25.3 Mbps, while Mexico only had an average speed of 4.1 Mbps. We have one of the world's worst Internet services. Available at: https://content.akamai.com/English-Consumer.html?loc=/us/en/multimedia/documents/secure/akamai-state-of-the-internet-report-q1-2014.pdf&cid=F-MC-27380&ls=website&lsd=resources&hst=www.akamai.com&tid=2F36A519595FA828BA75652D4238EEB3

35 At present, a single company concentrates approximately 70% of cell phone services, 68% of land line telephone services, and 67% of the broadband available (SCT, 2013).

the city with the fastest Internet performance in Mexico in 2013 (Ookla, 2013).[36]

• Fight *digital illiteracy*, the high price of services and the lack of hardware (*e.g.* computers, tablets).

• Implement a series of policies that link education and funding to provide access to ICTs and subscription to services.

• Promote the combination of the *new key production factors* to reduce transaction costs and information asymmetries, facilitate access to new markets and support the creation of *flexible supply chains*, in addition to advancing the *digitalization of information*. All of this has a significant and positive impact on the economy and productivity (OECD, 2004).

2.9. Unoccupied dwellings

Dwellings without people and people without dwellings: this is the paradox of housing in Mexico. Approximately 14% of the country's total number of dwellings (approximately 5 million dwellings) are unoccupied. The percentage of unoccupied dwellings is as high as 18% in states along the north border, such as Chihuahua, Tamaulipas and Baja California. The main factor of this lack of occupation is the *wrong location* of real-estate developments, which involves transportation costs that are simply too high to get to the workplace, schools, stores, banks or public offices (although insecurity situations also play a role) (BBVA, 2011; Isunza-Vizuet and Méndez, 2010). In other words, the *real-estate tsunami* is the result of a lack of coherence between housing developments, the city's *functional structure* (*e.g.* depending on whether it is monocentric, polycentric, dispersed or compact) and a sustainable *urban design approach.*

36 Ookla Net Index: http://www.netindex

The expansion of urban areas as a result of new urbanizations, predominantly in the peripheral areas of those cities where land has a lower cost (see Chapter 1), implies public policy challenges in at least five dimensions linked to each other, the solution of which is complex and slow. These dimensions are: *transportation*, *land*, *housing*, *environment and urban planning* (which includes sustainable urban design). In the case of these dimensions, we have the following recommendations:

• *Transportation*. Favor the *complementarity and inter-modality* of transportation and its functional articulation with *urban land zoning* (*v.g.* land uses), in a context aimed at the *reduction of carbon emissions*. In 2008, transportation consumed 50% of the energy used in Mexico. In Mexico City, only 16% of trips were made in environment-friendly forms of transportation (subway, trolley bus, light train and bicycle) (see Chapter 3).

• *Land*. Design differentiated fiscal measures to *increase the land offer* and favor the *reduction of land prices*. For example, raising property taxes on unoccupied plots of land in the city or use resources obtained from construction licenses for the acquisition of public land reserves, with the aim of reducing real estate speculation.

• *Housing*. Ensure that new housing developments take into consideration *accessibility and connectivity* to employment and basic services (*e.g.* education, health, stores, green space, entertainment facilities, churches, that is, *urban structure* aspects), that their location does not affect the environment and, in the coming years, that housing designs include arrangements for elderly persons with mobility problems (*e.g.* dwellings without stairs; in the case of high density developments, it is important to ensure the availability of vertical transportation 24/7, with elevators where a stretcher can fit at the very minimum. This may require subsidies such as those for horizontal transportation: (*e.g.* the Mexico City subway system).

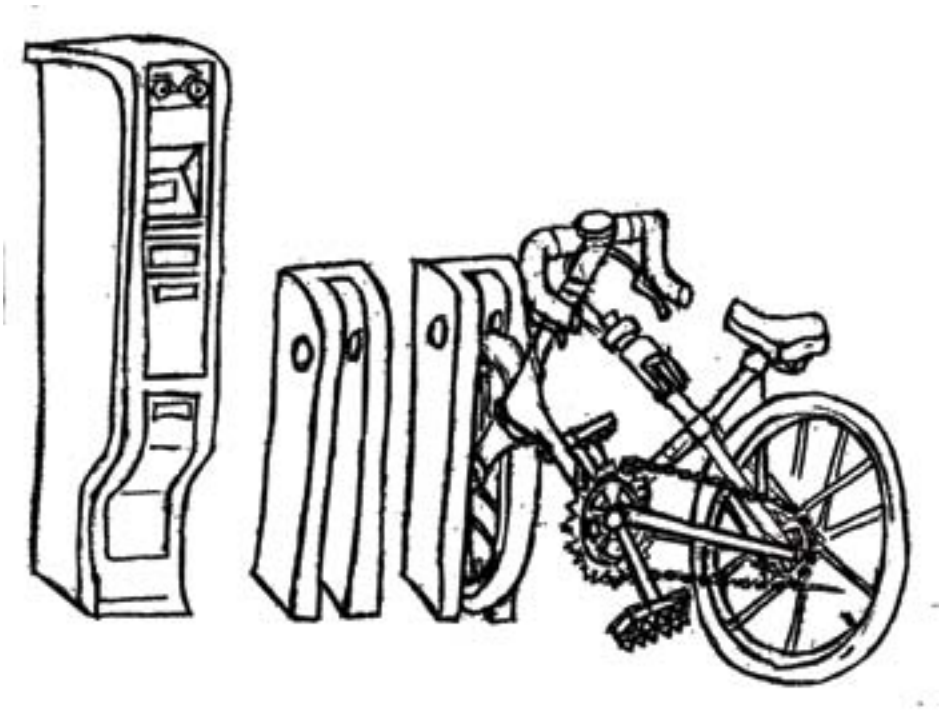
• *Environment*. Reduce the emissions of contaminants related to *flows of (public and private) automotive vehicles*. This requires taking into consideration that the most important daily flows are those to go to work or school. It is necessary to adopt regulatory measures that *everybody complies with* (including measures applicable to bus transportation concession owners, such as the so-called *pulpo camionero*, (the "bus octopus" or bus transportation monopoly)), non-polluting technological solutions to speed up transportation flows, and improving public transportation systems and transportation infrastructure.

• *Planning*. It is important to have a transparent and participatory planning scheme that allows for the design of *long-term* plans for the city's development (with a *metropolitan vision*, if applicable) that include, at the very minimum, land use zoning, a priority occupation of unoccupied interior plots of land, increasing population density, and the definition of zones suitable or not suitable for urban occupation and strategic aspects of the transportation system.

2.10. Insecurity and violence

The causes of insecurity in Mexico are related, to a large extent, to *structural variables* (*e.g.* unemployment, inequality, lack of education, poverty) and also to high levels of *corruption* (Benítez, 2009; Buscaglia, 2013). However, there is evidence that countries with more disadvantaged structural conditions compared to Mexico have achieved better crime-related indicators thanks to the performance of their justice administration institutions and their lower levels of corruption (*v.g.* the quality of their institutions: Acemoglu and Robinson, 2013; Diamond, 2013). When cities lack the capacity to deploy institutions and procedures that respond to everyone's needs, *impunity*, *exclusion* and *social inequality* become barriers to fundamental rights and freedoms, threatening social cohesion, economic efficiency and political stability (UN-HABITAT, 2008).

Therefore, it would be wrong to assume that, in order to achieve advances in the area of security, structural variables must be corrected first. Making immediate changes in *institutional variables* is not only urgent, but a faster route. Also, it is not true that insecurity is exclusively a high intensity social problem; it also has a significant impact on competitiveness, economic development, poverty and inequality (ISD, 2014). Insecurity and violence linked to organized crime have very high costs for Mexico.[37] Total economic losses from violence have been estimated at between 12% and 15% of the domestic GDP (IMCO, 2013).



37 However, not much is said about its economic benefits that, one way or another, trickle down (although in a clearly unequal fashion) to society as a whole. As reported by the well-known Colombian economist José Antonio Bejarano: "In Colombia the economy is doing well, but the country is falling into pieces" (Bejarano *et al.*, 1997).

The main recommendations are the following:

- Assign the highest *priority* and guarantee the security of citizens and their assets (including their companies and businesses) in the city. This is the first responsibility and the *fundamental purpose* of governments (Barry, 1995; Stoker, 1998).

- Eliminate the failures of the *judicial system* and the *high levels of public and private corruption* that affect business activity, investments, collective life and sustainable development in general.

- Apply (in all the country) the provisions of the *Palermo Convention* (UN, 2004) and the best protocols against *human trafficking* (UN, 2000), including the trafficking of elderly persons.

- Eliminate *intra-urban inequalities* in the area of insecurity, especially in the case of high impact crimes: homicides, kidnappings, extortion and human trafficking.

- Create a *stable and predictable local legislative environment*. If this does not exist, the risk of doing business increases (a situation that leads to the need for mechanisms so that legal problems can be solved in a fair, expedite and transparent manner), transaction costs rise, market inefficiencies and distortions are created and the competitiveness of cities falls.

- Carry out actions to *improve urban design* so that *the city is more walkable* (*e.g.* wider sidewalks in good condition, belter quality urban infrastructure, functional public lighting), by creating a more attractive environment, improving the quality of the local environment, creating neighborhoods walkable for pedestrians of all ages and creating *gathering*, and not only *transit*, spaces.

- Implement programs to promote culture, sports and *collective activities* that allow society to reclaim public spaces and the right to the city.

- Promote *women's empowerment*, (*e.g.* more and better education for access to quality employment) and ensure their financial independence, favor their life plans and protect them from violence. This requires, among other actions, promoting financing for women, reinforcing society's education in the area of gender equality, promoting communication and interpersonal relations, changing cultural norms related to gender, and enacting laws and implementing policies to protect women, fight discrimination against them, promote gender equality and encourage the adoption of more peaceful cultural norms (UN, 2013; Cerezo, 2012)).

The failure to implement *truly efficacious* SUSD policies in a country like Mexico is so serious that it is simply the equivalent of *doing nothing*. This reminds us of a statement made by the famous writer Keigo Higashino (2013: 310) in one of his recent novels: "…[he] limited himself to doing nothing …the crime was precisely doing nothing".


PRIMARIA

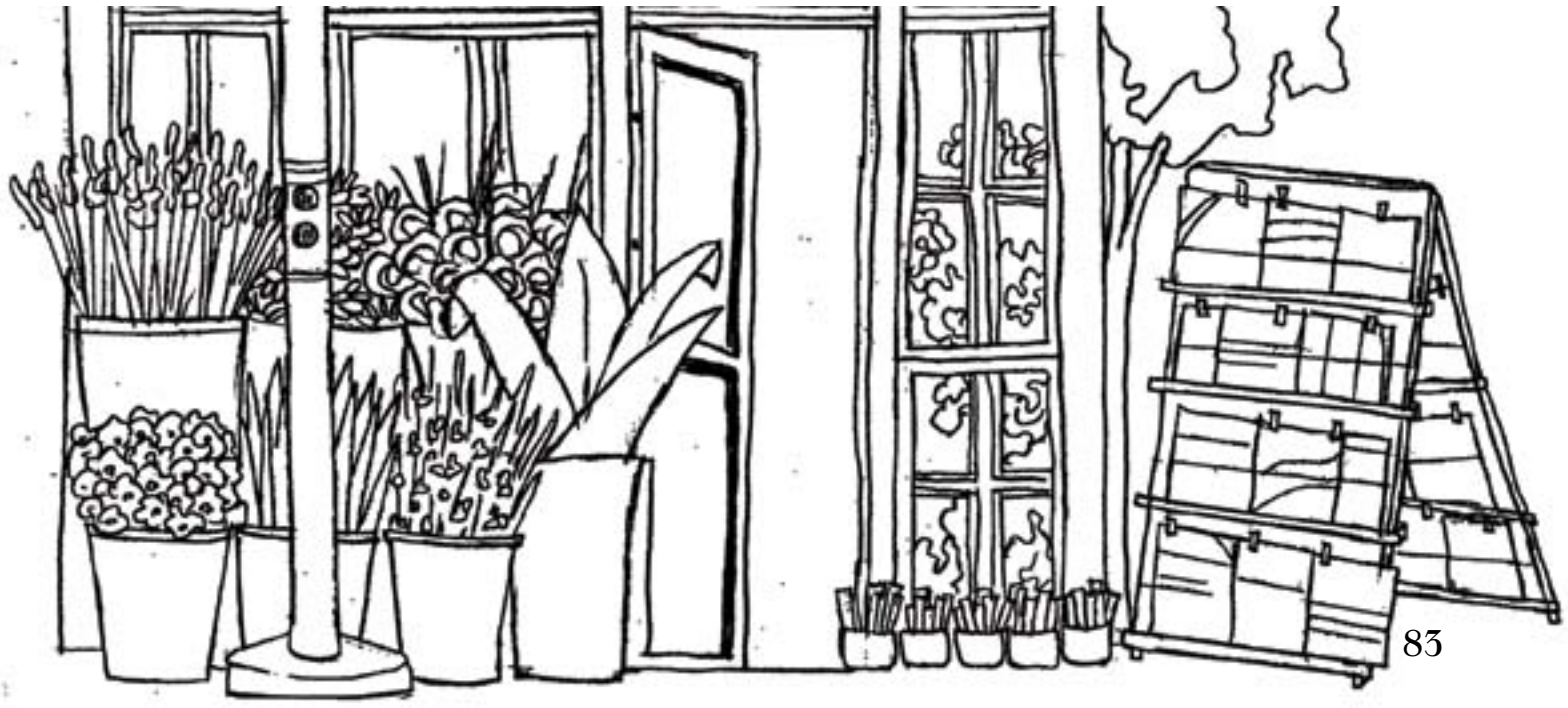
3. The economy and competitiveness of cities

Introduction

This chapter explores the relationship between competitiveness and sustainability in the case of Mexico's main cities. In one first section, we have included a bibliographic review about *urban competitiveness* and its relationship with *sustainable urban development*. In the second section, we review the results of an empirical exercise to measure the competitive position of the main cities in Mexico during the 1998-2008 period. In the third section, we relate the competitive performance of cities to their energy use to illustrate the relationship between competitiveness and sustainability. Finally, we suggest a series of policy guidelines to promote competitiveness in cities in a context of sustainability.

1. Competitiveness and sustainable urban development

Cities are concentrated spaces of population and economic activities. In 2010, Mexico had a total of 384 cities, of which Mexico City, with 20 million inhabitants, was the most important. These urban areas concentrated 72% of the country's total population and generated 85% of the gross domestic product. Cities require energy resources for their habitat and functioning. In the case of Mexico, hydrocarbons constitute the main source of energy, contributing with almost 90% of the total offer.



There are five factors that can help understand the structure and dynamics of the economic growth of cities (Bluestone *et al*., 2008):

i. Costs of trade and transportation;

ii. Internal economies of scale;

iii. Agglomeration economies;

iv. Size of consumption markets; and

v. Technological development.

The origins of the city date back to the development of its *commercial function*. The specialization and division of labor are the economic foundations of trade and explain the role of the city as a market place, that is, the place where the population gathers to exchange goods and services. In order to purchase these goods and attract the population, the city must reduce its transportation costs. It is for this reason that those cities that specialize in trade are the ones with a sufficient size and appropriate accessibility for the exchange of goods.

As is known, industrial production consists of the processing and transformation of raw materials for the production of tangible goods that meet the needs of the population. The cities that specialize in industrial activities take advantage of internal economies of scale (*v.g*. reduction of the average cost per product unit as the volume of production increases), as well as transportation costs for the purchase of supplies and the distribution of products. However, the spatial concentration of the industry and the specialization of cities in this sector mainly occur as a result of agglomeration or external production economies, either in the form of urbanization economies (*v.g*. reduction of the average cost per unit produced as the population size increases) or localization economies (*v.g*. reduction of the average cost per unit produced as the size of the economic activity in question increases).

Technological development and globalization have promoted a decentralization of manufacturing production and a centralization of the coordination and provision of services of a *higher order*. Cities that specialize in services for producers utilize agglomeration economies generated by the market size and the availability of infrastructure for the generation and transmission of ideas and knowledge. Other cities that specialize in services evolve thanks to the growth of specific activities and functions, such as tourism (*e.g*. Cancun, Los Cabos), government (e.g. Ciudad Victoria, Chilpancingo) or a higher education offer (*e.g*. San Luis Potosí or Xalapa).

Oil-based energy provision faces two important challenges from a sustainable development point of view. The first is of an environmental nature and is related to global warming: the production and use of energy is characterized by the burning of charcoal and oil, where greenhouse gases are emitted in the atmosphere, one of the main causes of global warming, a topic of global debate and the reason for international meetings where, to date, the only advances have come from individual efforts in each nation, given the impossibility to reach international binding agreements.

The second is of an economic nature and is related to the finite nature of hydrocarbons as a social good for a particular use with an unlimited use. This *tragedy of the commons* is expressed both in the increasing tendency of international prices of oil and the increasing vulnerability of those nations highly dependent on this hydrocarbon, which adds to the insufficiency in the domestic production of this type of energy. In these circumstances, private markets cannot achieve socially efficient production levels, which justifies the formulation and implementation of public policies that help redirect the course of the economy under a sustainability approach.

Sustainable development is a concept of common used in the social consciousness and political discourse, but its theoretical development has not been really consistent (see Chapters 1 and 2). By sustainable development we understand the possibility of indefinitely maintaining a process, both in terms of its factors and resources used, and the quantity and quality of tangible and intangible goods produced (Forsse, 2006). The concept of sustainability involves the economic, social, environmental, political, demographic, institutional and mobility dimensions, and assigns a distinctive trait to the concepts of growth and development. Sustainability, sustainable development and sustainable urban development are concepts still subject to debate, both in the academic world and within the government and the private sector. There is consensus in the sense that a sustainable society is one whose economic and social development is linked to the utilization of natural resources and the environment in such a manner that the present use of these resources does not compromise their availability for future generations.

In Mexico, the public management of the environment has been characterized by the creation of an administrative structure divided into sectors, with a hierarchical organization that is disaggregated when it comes to dealing with problems. This structure has neither favored the *integration of society* into decision-making processes, nor had the sufficient force, within the spheres of power, to implement consistent and long-term programs to achieve sustainable development.

The management of sustainable urban development must contain at least five major elements:

i. Identify the intervening agents;

ii. Recognize the controversies generated between the agents in its actions;

iii. Determine the spheres of power and government spatial structures to deal with environmental matters;

iv. Establish general and specific guidelines for the search of sustainable development, as well as the role to be played by each social agent; and

v. Promote and encourage the attraction and localization of economic activities that contribute to environmental achievements.

Policies regarding territorial development have recently introduced the *relationship* between society and nature, in a way that the organization of the territory is no longer about the definition and regulation of land use, but also about the land attributed to carry out diverse human activities. In the case of cities, territorial planning has adopted a *strategic approach* where the organization of land use is combined with the promotion of economic activities and the search of other key objectives such as social cohesion, governance and environmental protection (see Chapters 2 and 4).

In the *economic* sphere, strategic planning of urban centers has general recourse to the concept of *competitiveness* for local economic promotion. Urban competitiveness is the degree to which a city, in comparison to other competing cities, is able to attract productive investments that translate into the generation of jobs and an increase in income, while increasing and consolidating the quality of life and social cohesion of its residents, institutional governance and an appropriate environment (Global Urban Competitiveness Project, 2005). Cities compete for the attraction of public or private investments, as well as national or international capital (*first moment of competitiveness*). These investments contribute to the accumulation of the fixed capital of the city and can be oriented to build infrastructure and equipment (social fixed capital), or the production of goods and services (private fixed capital).

The success in the attraction of investments is based on a series of factors, or competitive advantages (*second moment of competitiveness*), which can be divided into:

i. Size-related, and

ii. Quality-based (Sobrino, 2006; Turok, 2005).

The size-related competitive advantages (territorial and distributive) operate under the concept of agglomeration economies generated by the scale, the scope and the complexity of the urban area. Cities do not require a particular organization to offer these advantages, nor the cooperation among economic units or social agents. On the other hand, *quality-based* competitive advantages (entrepreneurial and institutional) have to do with the *collaboration* among firms, the participation of local governments in the economic promotion of the city, and the coalitions among social agents. These advantages are not defined by the population size or economic importance of the city, but the exercise of planning strategies, formal arrangements and informal proposals. Their creation, maintenance and improvement depend on the necessary cooperation between persons, levels of government and territories (see Chapter 2), the so-called *competitive cooperation* (Leydesdorff and Eztkowitz, 2003).

The effects of competence among cities (*third moment of competitiveness*) are expressed through three main variables:

i. Increase in local productivity;

ii. Change in the labor urban market; and

iii. Improvement in the life conditions of the resident population.

A fundamental element that determines productivity growth is technological progress, which generates an increased efficiency in the use of productive factors. On the other hand, the urban labor market is the most important of all the urban markets because it will determine if people have employment or not and at which salary. The improvement in the life conditions is expressed in:

i. A larger quantity and quality of satisfactors of collective needs;

ii. An increase in physical accessibility and integral mobility;

iii. Increased participation in decision-making processes, and

iv. Increased conscience of environmental affairs and the protection of the environment.

The production and use of energy are present in the two determinants or factors of competitiveness among countries and cities, as follows:

i. A sufficient energy supply is a scale-related territorial competitive advantage;

ii. The use of that energy is an indicator of the grade of efficiency of the productive process and, therefore, operates as a quality-related advantage; and

iii. The search of alternative energy sources and their use is one of the objectives that have encouraged the creation of public-private coalitions.

Energy flows through different dimensions of human activity. The economic, social and environmental implications of the production and use of energy lead to the establishment of a link between energy and sustainability, as well as an analytical perspective between energy and competitiveness. It is necessary to understand the particular context of each country, region and city in the *energy-competitiveness-sustainability triangle*, which reflects the absence of a single sustainability criterion, as well as the lack of a concept of competitiveness that only relates to elements of economic growth.

2. Competitive performance in Mexico's urban system

As already mentioned, in 2010, the Mexican urban system consisted of 384 cities, 11 of which had a population of less than one million inhabitants, 84 were middle-sized cities, with a population volume between 100 and 999,000 inhabitants, and the remaining 289 were small, with between 15 and 99,000 inhabitants. 81.2 million people lived in these 384 cities, which indicates a level or urbanization of 72% (SEDESOL and CONAPO, 2012: 21-22). Mexico City concentrated 18% of the population in the country, the 10 millionaire cities 19%, the 84 middle sized cities 27%, and the 289 small cities 8%.

In 59 cities, urban expansion had surpassed the municipal limits of the central city, thus creating metropolitan fabrics. These 59 metropolitan areas consisted of 367 municipalities, where 63.8 million people, that is, 57% of the total population, lived (SEDESOL, CONAPO and INEGI, 2012: 15). With this level of concentration, Mexico had reaffirmed its position as a *predominantly metropolitan* nation. The last two decades of the 20th century were characterized by a significant decline in the pace of demographic expansion. In 1980, the annual average population growth rate was 3.2%, which then dropped to 2% in 1990, 1.9% in 2000 and 1.4% in 2010. This decline in the growth rate is attributed to the demographic transition and, in particular, to a strong contraction of the fertility rate, from a value of 4.8 live births per woman in 1980 to 2.4 in 2010 (Ordorica, 2006; Partida, 2006).

In recent years, the population growth rate of the 95 most populated cities in the country, those with 100,000 or more inhabitants in 2010, surpassed the national total, which translates into an increase in their demographic share: in 1980, they concentrated 58% of the national population, a percentage that increased to 62% in 2000 and 64% in 2010. This increase can be attributed to the migratory flow that originates from rural communities and small cities and ends up in these urban areas (Aguado, 2006; Sobrino, 2010a).

However, not all the cities experienced population dynamism between 2000 and 2010, considering that 20 of them had a growth rate below the national total, an annual average of 1.4%, with the most relevant cases being those of the metropolitan areas of Mexico City and Ciudad Juárez, both millionaire metropolises. In contrast, the cities with the fastest demographic growth pace were Playa del Carmen, Cancun, Puerto Vallarta, San Cristóbal de las Casas, San Juan del Río, Reynosa, Manzanillo and Pachuca: all of them had an annual average population growth rate of more than 3%.

In 2010, the 95 cities with 100,000 or more inhabitants formed the vertebral column of the national urban system, both due to their role in terms of population concentration and the fact of being the recipients of the bulk of the country's economic activity. Between 2000 and 2010, the population share of these cities in the national total increased from 62 to 64%, while, in the economic perspective, in 1998 they generated 90% of the national GDP of the industrial, trade and services sectors, a share that dropped to 88% in 2008. These percentages allow us to conclude that their economic concentration is higher than their demographic concentration thanks to the use of agglomeration economies and other advantages for the localization of economic activities (Beeson, 1992; Feser, 2002) and, also, that there is a certain tendency toward the decentralization of the economic activity, in favor of small cities and even rural communities.

As already mentioned in the first part of this document, urban competitiveness relates to the capacity of cities to receive productive investments that have an impact on the labor urban market and the local economic structure, while producing potential effects in other social, political and

environmental activities in the city. The promotion of these investments relies on a series of factors known as *competitive advantages*.

The notion of competitiveness does not imply the recognition of the situation of an urban area at a given point in time, but rather of its evolution over a given period. In other words, it has more to do with the *dynamic* of the city, rather than its *structure*. Therefore, an approach to measure it is through the construction and use of a measurement of economic performance that has the capacity to compare the economic growth of a city against that observed in other cities.

The term competitiveness has been used to quantify and qualify the degree of integration of territories into the globalization stage, considering that this stage creates the need for comparative analysis on different geographical scales. The competitiveness of a country has been conceived as the capacity of a nation to generate economic growth and increase its participation in international trade (Bannock *et al.*, 1998). This capacity depends on three key elements:

a. Microeconomic performance of businesses;

b. Formulation and implementation of clear and explicit public policies for the promotion of commercial trade; and

c. Existence of an urban system that supports the localization of productive investments and as a network for the transmission of information and innovations.

There are two main alternatives for the empirical study of territorial competitiveness (Kresl 2012). The first consists of using a *benchmarking* or comparative assessment method, through the quantitative collection and statistical processing of variables associated with the attraction of productive investments, the potential accumulation of competitive advantages and the life conditions of the population. This method quantifies the accumulation and potential use of competitive advantages for long-term economic performance. Its main strength lies in a certain level of stability of results over time, but also the evidence of specific changes in the competitive performance of some territories. Its main weakness is the lack of an objective form to determine which variables are statistically significant as competitiveness indicators. Comparative analysis through the use of this method depends on the use over time of the variables and the statistical instrument, typically factorial analysis. This method has been used to measure competitiveness among countries (IMD, 2012), among cities in different countries (Ni and Kresl, 2010), or among the main cities of the urban system in Mexico (Cabrero and Orihuela, 2012; Sobrino, 2010).

The second alternative consists of quantifying mid-term economic growth and, then, exploring its causality through the use variables associated with competitive advantages. This methodology is based on the assumption that territorial competitiveness is related to three elements:

i) Local economic growth;

ii) Growth characteristics; and

iii) Benefit of that growth for the local economy and the resident population.

The advantage of this methodology is that it requires less information and provides a statistical significance of the variables that explain local economic growth, through the ordinary least squares method. Its main weakness lies in the measurement of growth adopted, absolute or relative, and the selection of the variables for analysis. This alternative has been used for the study of competitiveness among countries (ECLAC, 1995), cities in the United States (Kresl and Singh, 2012) and cities in Mexico (Sobrino, 2003).

In order to illustrate the differences between both methods, we will now describe the results of their application for the 1998-2008 period in the 35 most populated cities in the country in 2010. The *benchmarking* exercise was conducted with the use of five variables:

i. Logarithm of the local GDP in 2008;

ii. Logarithm of the GDP per capita (GDPPC) in 2008;

iii. Growth rate of the local GDP between 1998 and 2008;

iv. 2010 Quality of life index; and

v. Employment gross rate in 2008.

The local GDP variable assesses the size of the local economy and the potential use of agglomeration economies. The GDP per capita variable estimates the level of economic efficiency of the city. The GDP growth rate is an indicator of macroeconomic dynamism. The quality of life index estimates the living conditions of the resident population. Finally, the employment gross rate shows the behavior of the labor urban market.

The Kaiser-Meyer-Olkin (KMO) and Bartlett tests of sampling adequacy concluded that the variables used in the factorial analysis were appropriate for an exercise of the main components. The former showed a value of 0.660, and the latter showed a significance level of 0.000. The exercise led to a component with a self-value higher than 1 and an explained variance of 54%. The explanatory variables of competitiveness in the benchmarking exercise were the GDPPC and the Quality of life index. This means that the long-term competitive advantages of the main cities in the country are related to *economies of scale and social equipment*.

On the other hand, in the mid-term dynamics exercise, four variables were used to quantify local dynamism:

i. Growth in the number of workers employed in the manufacturing industry between 1998 and 2008;

ii. Growth in the number of workers employed in retail trade, 1998-2008;

iii. Growth in the number of workers employed in services to producers, 1998-2008; and

iv. Change in partial labor productivity, 1998-2008.

The growth in the number of workers employed in each city and sector was compared against the population growth for the same city.

The period of analysis, 1998-2008, was characterized by the stabilizing stagnation of the domestic economy. The country's total GDP went from 7.4 to 10 trillion pesos, at 2005 constant prices, which meant an annual average growth rate of 3%. The participation of the 35 cities of study in the total national GDP declined from 75% to 72%. The number of workers employed by the manufacturing industry of the country grew from 4.2 to 4.7 million workers employed between 1998 and 2008, while the number of workers employed in retail trade grew from 2.9 to 5 million, and those employed in services for producers went from 1.4 to 2 million. As can be observed, retail trade experienced the largest absolute and relative growth in terms of occupational demand. The stabilizing stagnation of the economy in Mexico is also reflected in the partial labor productivity indicator, considering it declined from 550,000 pesos in 1998 to 500,000 in 2008, both at 2005 constant prices.

The competitive performance of the cities was different in the long-term perspective compared to the mid-term one. The long-term competitiveness, which resulted from the *benchmarking* exercise, was based on the historical accumulation of competitive advantages, while the mid-term one was linked to public intervention, but especially to the performance of the domestic economy. For purposes of this chapter, we are not that interested in studying the economic performance of cities in particular or their specific position in the *ranking of cities*, but rather in identifying general trends that contribute to policy guideline proposals for territorial development, from the perspective of local economic behavior and sustainable development. The conclusions reached based on the results of measuring local economic performance are the following (see Table 3.1):

First, there was no correspondence between the competitive position of the city in the *benchmarking* exercise and the *mid-term* analysis. The correlation between both lists was -0.076, with a level of statistical significance of 0.666. This means that the historical potential accumulation of competitive advantages was related to the evolution of the labor urban market that occurred during the 1998-2008 period. Second, the city size did not point to any association with competitive performance. In the *benchmarking* exercise, with the 10% population size increase, the competitive position increased by 0.73 units, with the variations in the population logarithm explaining 29% of the variations in competitive performance. In the mid-term exercise, on the other hand, variations in population size only explained 2% of the variations in competitive performance and, with the 10% increase in population size, the competitive position declined by 0.11 units.

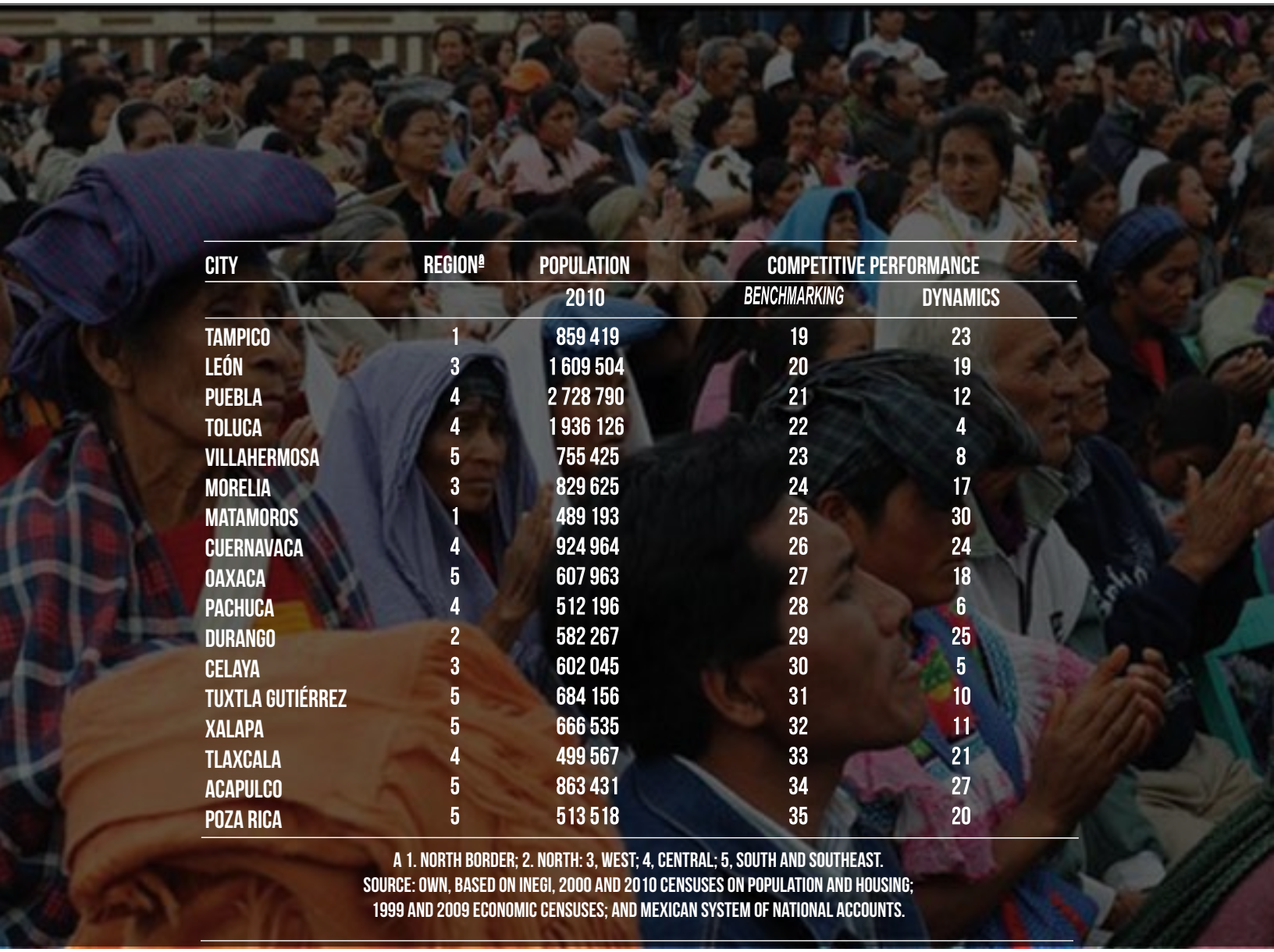
Finally, third, the competitive performance of the city had some relationship with its geographical location. In general terms, the cities in the North Border region had a high competitive performance in the benchmarking exercise, but a low performance in the mid-term exercise, while the Central region specialized in high competitive performance cities in the mid-term exercise, the South and Southeast region in low performance cities in the benchmarking exercise, and the West region urban subsystem in mid competitive performance cities in both exercises.[1]

Table 3.1

MEXICO: COMPETITIVE PERFORMANCE OF MAIN CITIES, 1998-2008

CITY	REGION[a]	POPULATION	COMPETITIVE PERFORMANCE	
		2010	*BENCHMARKING*	DYNAMICS
MONTERREY	1	4 106 054	1	14
CHIHUAHUA	1	852 533	2	16
MEXICO CITY	4	20 116 842	3	29
GUADALAJARA	3	4 434 878	4	13
HERMOSILLO	1	784 342	5	32
SALTILLO	1	823 128	6	26
REYNOSA	1	727 150	7	1
SAN LUIS POTOSÍ	2	1 040 443	8	9
QUERÉTARO	4	1 097 025	9	2
JUÁREZ	1	1 332 131	10	35
MÉRIDA	5	973 046	11	3
CANCÚN	5	677 379	12	31
TORREÓN	1	1 215 817	13	28
VERACRUZ	5	811 671	14	22
TIJUANA	1	1 751 430	15	33
AGUASCALIENTES	3	932 369	16	34
MEXICALI	1	936 826	17	15
CULIACÁN	2	858 638	18	7

1 The different regions were defined by grouping adjacent states:
i. North Border: Baja California, Coahuila, Chihuahua, Nuevo León, Sonora and Tamaulipas;
ii. North: Baja California Sur, Durango, Nayarit, San Luis Potosí, Sinaloa and Zacatecas;
iii. West: Aguascalientes, Colima, Guanajuato, Jalisco and Michoacán;
iv. Central: Federal District, Hidalgo, State of Mexico, Morelos, Puebla, Querétaro and Tlaxcala; and
v. South and Southeast: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatan.



CITY	REGIONª	POPULATION	COMPETITIVE PERFORMANCE	
		2010	*BENCHMARKING*	DYNAMICS
TAMPICO	1	859 419	19	23
LEÓN	3	1 609 504	20	19
PUEBLA	4	2 728 790	21	12
TOLUCA	4	1 936 126	22	4
VILLAHERMOSA	5	755 425	23	8
MORELIA	3	829 625	24	17
MATAMOROS	1	489 193	25	30
CUERNAVACA	4	924 964	26	24
OAXACA	5	607 963	27	18
PACHUCA	4	512 196	28	6
DURANGO	2	582 267	29	25
CELAYA	3	602 045	30	5
TUXTLA GUTIÉRREZ	5	684 156	31	10
XALAPA	5	666 535	32	11
TLAXCALA	4	499 567	33	21
ACAPULCO	5	863 431	34	27
POZA RICA	5	513 518	35	20

A 1. NORTH BORDER; 2. NORTH: 3, WEST; 4, CENTRAL; 5, SOUTH AND SOUTHEAST.
SOURCE: OWN, BASED ON INEGI, 2000 AND 2010 CENSUSES ON POPULATION AND HOUSING;
1999 AND 2009 ECONOMIC CENSUSES; AND MEXICAN SYSTEM OF NATIONAL ACCOUNTS.

The local economic performance in three out of five cities was significantly higher in specific economic sectors (industry, trade or services), while the other two showed a very similar dynamism in two or the three sectors. Among those cities with a heterogeneous intersectoral performance, one of the aspects that stood out was their better position in the tertiary sector, while in those cities with a homogeneous behavior the predominant dynamism mainly corresponded to the trade sector. It is worth mentioning that those cities with a heterogeneous behavior showed a better global economic performance compared to those with a homogeneous performance, which, in principle, would indicate the existence and utilization of localization economies.

The above-mentioned evidence on the use of localization economies is reinforced when position and specialization are related. Those cities that specialize in industry had a more positive performance compared to those that are not specialized in manufacturing production. This also occurred in the areas of trade and services, but it is worth mentioning that the biggest difference between the average position of specialized cities compared to non-specialized cities was found in the industrial sector, a situation that would indicate that it is in this sector where localization economies are used more intensely.

The association between local economic development and their population volume provides elements to identify the use of size-related competitive advantages (territorial and distributive). The results allow us to establish population ranges where we can find a broader use of these type of advantages for each socioeconomic sector: in the case of the industry, the most successful cities had, in general, a population size between 500,000 and 1.5 million inhabitants, while, in the case of trade, the lower value was also 500,000, but the highest was 1 million inhabitants. Finally, in the case of services, the minimum size was 2 million inhabitants.

The above means that the economic performance of cities with a population between 100,000 and 500,000 inhabitants is rather *stochastic* (*v.g.* determined both by predictable factors and random elements) and, therefore, the success in attracting investments mainly lies in the use of localization economies but also, in some cases, on the creation of quality-based competitive advantages.

Thus, the competitive position of urban areas during the 1998-2008 period led to a *higher territorial inequality* in their levels of development: the most successful urban areas were those with a population size of 500,000 or more inhabitants and/or located in the North Border and Central regions. They took advantage of their size-related competitive advantages, but also of the trickledown effects generated by the vicinity and proximity to the United States, or by the relationship with Mexico City, the main city in the country.

On the other hand, the cities with less than 500,000 inhabitants and/or located in the North and South and Southeast regions showed the most negative figures in the game of investment attraction. Their economic foundations have strong ties to the trade sector, nut no significant dynamism was achieved in it; they also failed to implement an economic restructuring of other sectors of activity.

3. Urban competitiveness, energy use and sustainability

Energy balance is an information system to determine the energy supply and demand in a territory in a specific time period. This quantification must be related to a measurement unit. The gross domestic primary energy supply in Mexico, in 2008, was 7,367 petajoules, and its share of the world's supply was 1.5%. Of this amount, 44% was generated from oil, 39% from natural gas, 5% from hydroelectric power and the remaining 12% from other sources (see Table 3.2).

The world's average oil production in 2008 was 81.8 million barrels per day, with Saudi Arabia as the main producer, with a share of 13%, followed by Russia, the United States, Iran, China and Canada. Mexico ranked number seven, concentrating 4% of the world production. The world`s proven oil reserves were 1.3 trillion barrels, 1% of which were located in Mexico. In recent years, the country experienced a decline in its production, as well as a decline in its proven reserves, a situation that has raised yellow flags in connection with the availability of this fuel in the mid-term.

In late 2008, the world's proven natural gas reserves were 185 trillion cubic meters, with a total production of 3 trillion cubic meters. The main producers were Russia, the United States, Canada, Iran, Norway, Algeria and Saudi Arabia. Mexico ranked number 17, with 1.8% of the total production, while its concentration of reserves was 0.3%. The imbalance between the country's production and reserves, once again, shows a landscape full of challenges in the mid-term.

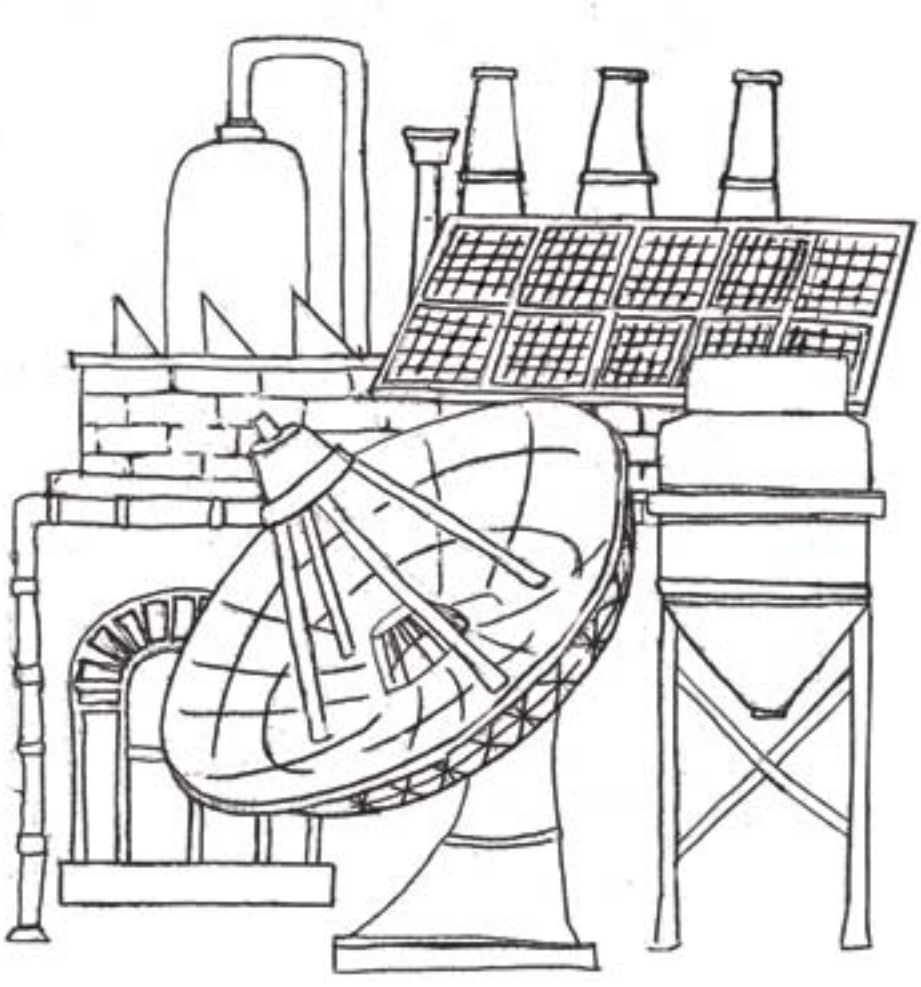


Table 3.2

MEXICO: GROSS DOMESTIC PRIMARY ENERGY SUPPLY BY SOURCE, 1998-2008 (petajoules)

SOURCE	2000	2008	2000	2008
			PERCENTAGES	
TOTAL	5 991	7 367	100.0	100.0
COAL	246	301	4.1	4.1
HYDROCARBONS				
OIL	2 856	3 212	47.7	43.6
CONDENSATES	142	91	2.4	1.2
NATURAL GAS	1 988	2 851	33.2	38.7
ELECTRICITY				
NUCLEAR	100	107	1.7	1.5
HYDROELECTRIC	253	388	4.2	5.3
GEOTHERMAL	58	70	1.0	1.0
WIND	1	3	0.0	0.0
BIOMASS				
SUGAR CROP	98	98	1.6	1.3
FIREWOOD	249	246	4.2	3.3

SOURCE: SENER, 2009: 97

In 2008, the world's primary and secondary generation of electric power was 20,201 terawatt-hours, and Mexico produced 1.3% of the total, a volume similar to Australia or Taiwan. Nations show variety in relation to the source used to generate electricity, considering that, for example, Italy and Mexico obtain more than three quarters from hydrocarbons (secondary energy), while Brazil, Canada and Venezuela obtain more than 60% through hydroelectric plants (primary electricity).

The gross domestic primary energy supply (GDPES) is obtained by summing up the primary production and the commercial energy balance. In 2008, Mexico imported 1,804 petajoules of energy, but its exports reached 3,759 petajoules, mainly oil-related. Oil revenues represented about 13% of the total amount of exported goods and services for the country.

Mexico's GDPES in 2008 was 7,367 petajoules, and it is a measurement of the energy domestic consumption. That amount represented 1.5% of the world's total supply, and the country was in the 14th position, below the United States, China, Russia, India, Japan, Germany, France, Canada, the United Kingdom, South Korea, Brazil, Italy and Indonesia. The primary energy

supply in the country constituted mainly of raw oil and natural gas, which accounted for 83%.

The GDPES, or national consumption, has two primary destinations:

i. Energy sent to transformation or intermediate consumption centers; and

ii. Energy used for final consumption, either in the form of fuel or raw material. Of the 7,367 petajoules, 81% was destined for recirculation and transformation centers (intermediate consumption), and the remaining 19% for final consumption. Primary energy transformation centers include refineries, gas plants and power plants. They are known as transformation centers because they use primary energy to convert it into secondary energy (gasolines or electricity).

Mexico's total energy consumption was 4,815 petajoules in 2008 (see Figure 3.1). Transportation consumed 50% of this amount, a situation that reflects the need to analyze different alternatives toward sustainable use in this sector in the urban areas of the country. These alternatives must include aspects related to the volumes and typologies of mobility, as well as cultural displacement patterns.

For example, in Mexico City, in 2007 an average of 22 million daily journeys were made, not considering the people walking; 68% of those were made by public transportation and 32% by private transportation. In the case of the latter, there were 4.7 million journeys by car, which means an occupation average of 1.4 travelers per car. From the total number of journeys, only 16% were made in public transportation that does not damage the environment (subway, electric bus, electric train and bicycle). Mobility patterns must have efficient and effective units of public transportation, with good accessibility to the desired lines and origin-destination routes, and with the environmental requirements necessary to provide less atmospheric pollution.

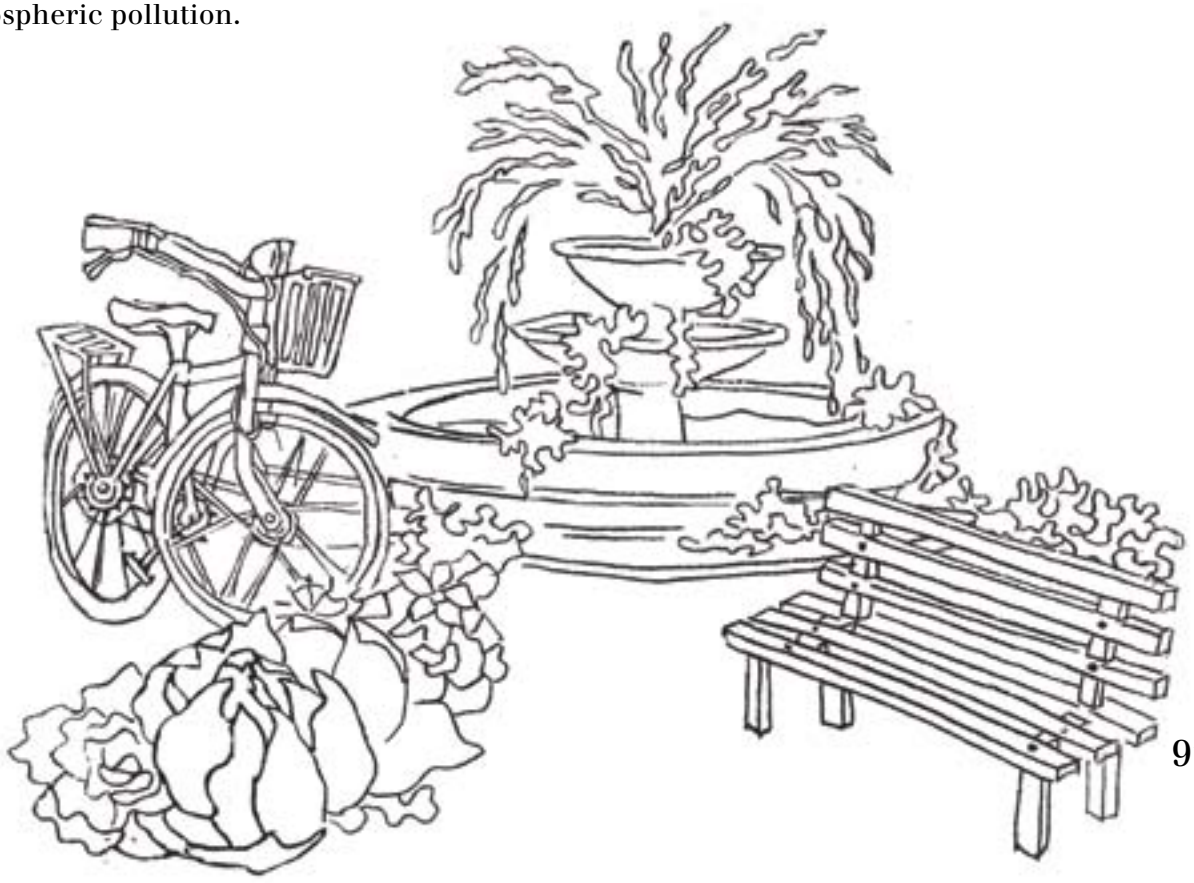
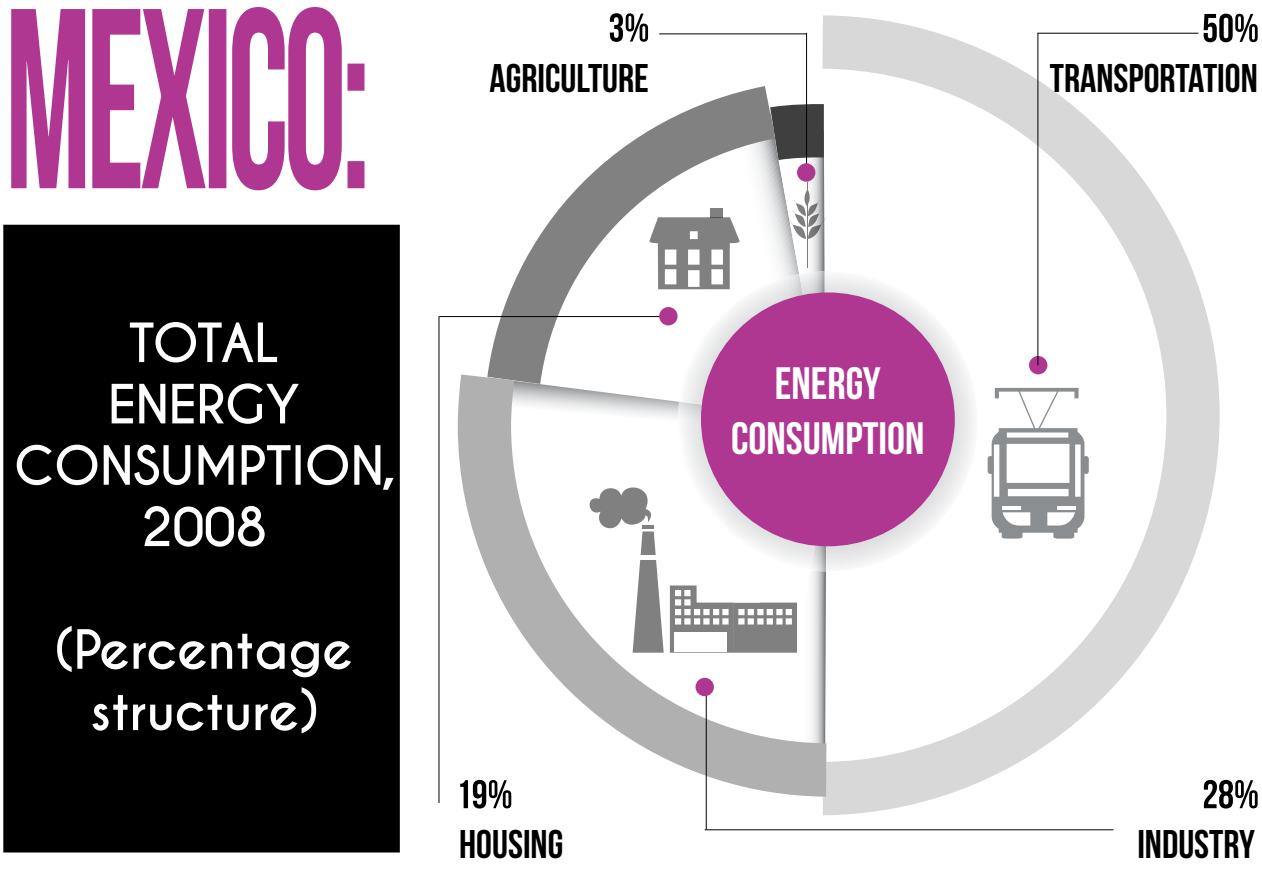


Figure 3.1



SOURCE: MINISTRY OF ENERGY, 2009; P. 101.

The industrial sector is the second main consumer of energy in Mexico, with a share of 28%. The most utilized energies in the country's industrial production are dry gas, electricity and fuel oil, which provide three quarters of the total requirement. The industrial areas that have more absolute consumption of energy are the iron and steel industry, and cement, which used 32% of the industrial energy consumption in the country in 2008.

There is no relationship between energy consumption and contribution to the GDP; on one hand, the industries of sugar, cement, iron and steel and petrochemical consumed 41% of the energy demanded by the industry as a whole, but only generated 5% of the industrial GDP of the country in 2008. On the other hand, the industries of construction, automobile, tobacco and aluminum generated 30% of the industrial GDP, but they only demanded 2% of the energy. The threat of global warming has turned energy savings and energy efficiency in the productive process into the main options for an industrially competitive and environmentally sustainable production

Housing constitutes the third main consumer of energy in Mexico. In 2008, housing accounted for 19% of total consumption, with an annual average consumption of 35,326 gigajoules per each of the 25.5 million dwellings in the country. The main forms of energy consumptions in dwellings are cooking, hot water, lighting, heating, cleaning an entertainment. The main sources of energy are electricity and gas, but firewood consumption is the main input for the resident population in rural communities. The consumption of conventional energy, gas vs. firewood, needs to be over-

taken to contribute to the reduction of energy inequality among dwellings in the country, specifically in the dichotomy of the urban-rural population.

The agricultural sector absorbed 3% of the final consumption of energy in the country. This sector is characterized by a high internal heterogeneity, having, on one hand, a modern technological production dedicated to the production of goods for export and, on the other, a traditional self-subsistence sector, with production concentrated on corn. This heterogeneity is also related, in a complementary way, to the negative effects that the North American Free Trade Agreement with Canada and the United States has had for the Mexican countryside, where one of them is the increase in internal and international migration from the states that were once important producers of agricultural goods.

Energy intensity is an indicator that has been used to measure the availability and use of energy in a territory. This index measures the quantity of energy to produce one GDP monetary unit. If territories are compared, then the energy intensity will show which of them is more efficient in the use of energy. If a territory is compared over time, then the energy intensity will show if that territory is moving toward efficacy in a more sustainable development. In operational terms, this indicator is obtained from dividing the GDPES by the GDP.

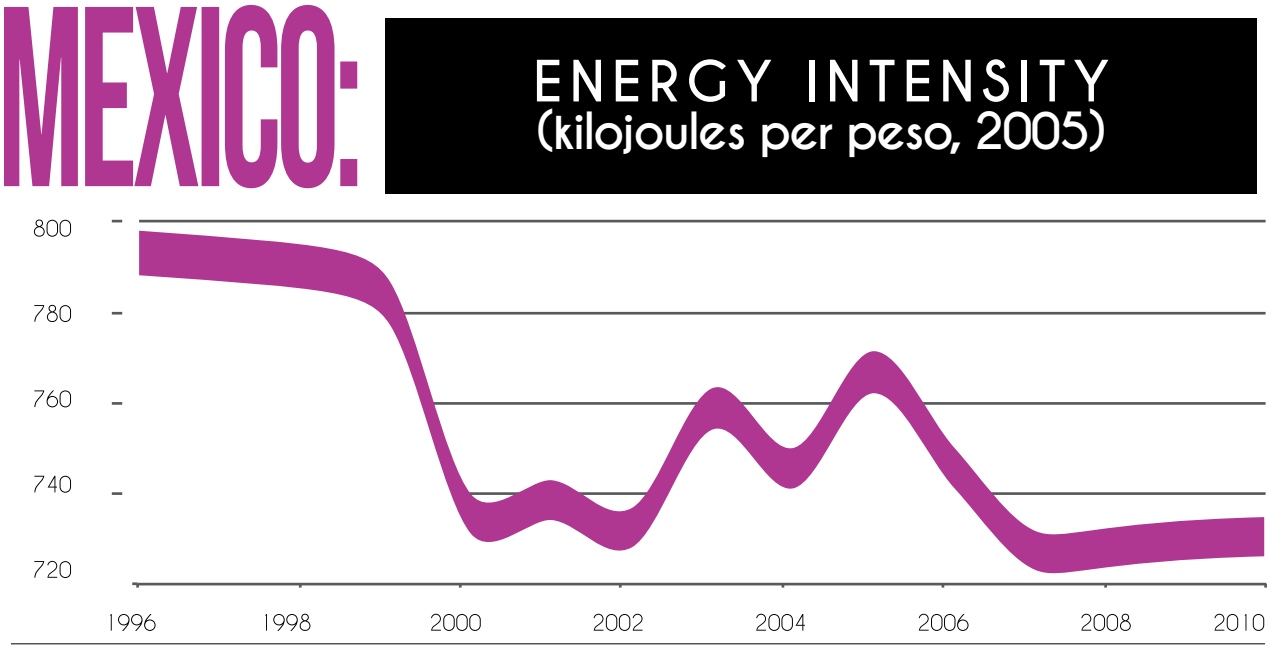
With the GDPES of 7,367 petajoules generated by Mexico in 2008 and its GDP of 10.1 trillion pesos at 2005 constant prices, its energy intensity was 727 kilojoules per peso produced. That energy intensity had an erratic behavior, although with a declining tendency in terms of use of energy per GDP unit generated (see Figure 3.2).

Between 1998 and 2002, there was a considerable reduction in the energy intensity of the country as a response to programs of energy saving and the effects of the economic contraction in the United States, which occurred in 2001. Between 2002 and 2006, there was an increase in energy use by GDP unit generated, which resulted from the null pursuit of the governmental policy for energy saving. Finally, the country's energy intensity declined again between 2006 and 2008. In 2008, 8% less energy was consumed to produce a GDP unit compared to 1998.

A second index is that of energy consumption per inhabitant. This index can evaluate the efficiency and efficacy in the generation and use of energy in a territory, but here it compares the demographic volume (while the energy intensity index considered economic importance). The calculation is obtained by dividing the GDPES by the total population. The consumption of energy per inhabitant in 2008 was 79.5 gigajoules, with a behavior over time similar to that of energy intensity (see Figure 3.3).

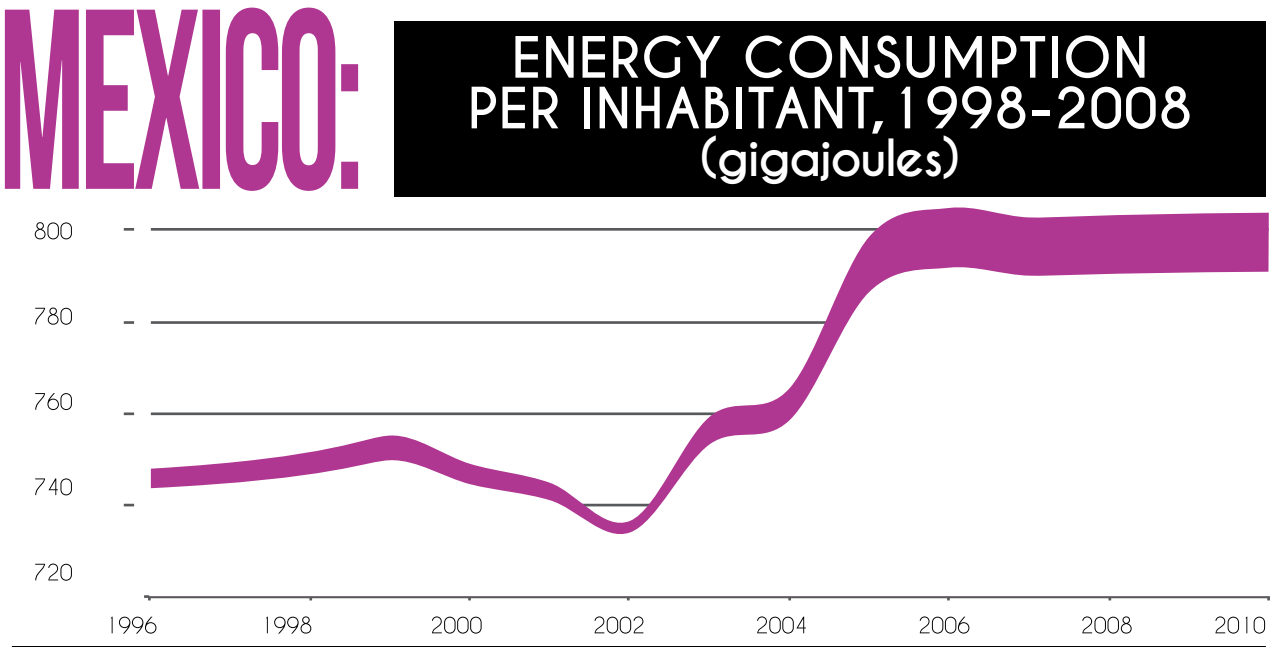
The consumption of energy per inhabitant index clearly raises concerns due to the lack of a public policy for the production, saving and management of energy in Mexico. It is worth remembering that the bulk of the country's primary and secondary production of energy is obtained from hydrocarbon combustion, with the consequent emission of greenhouse gases. These data indicate that the federal government and the Mexican society are not moving forward on the actions suggested in the Kyoto Protocol.

Figure 3.2



SOURCE: OWN, BASED ON SENER, 2009: 97; AND INEGI, 2012.

Figure 3.3



SOURCE: OWN, BASED ON SENER, 2009: 97.

Oil production in the country is highly concentrated in the maritime platforms of the Gulf of Mexico, an area known as the "Campeche Lead". Ciudad del Carmen, one of the 95 main cities in the national urban system, operates as the center for the management and administration of production, and also as an area of temporary residence for the workers of those platforms. This city is the main administrative center for 60% of primary energy production of Mexico. Together with Ciudad de Carmen, there are other five cities, located in the area of the Gulf of Mexico, where another 7% of primary energy is produced. The remaining 33% is generated in municipalities that do not have a city of 100,000 or more inhabitants.

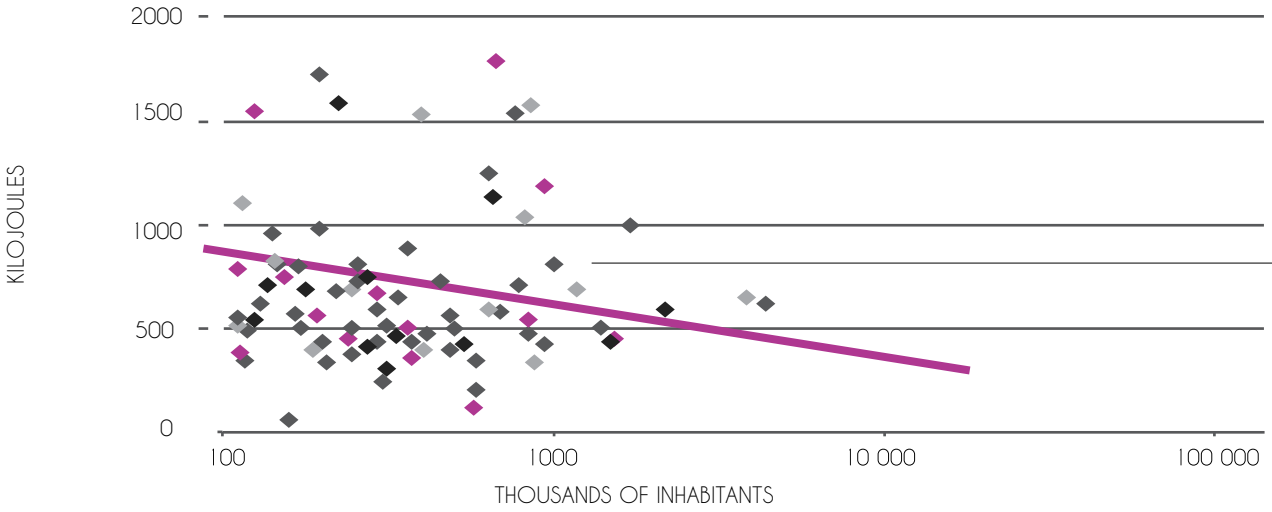
On the other hand, 40 of the largest cities in the country contain plants to transform primary into secondary energy, where the most important are refinery plants and thermoelectric centers. 84% of energy transformation is carried out in these 40 cities, which includes seven of the nine millionaire cities (in 2008). In Mexico City, there is about one fifth of the national transformation of primary energy.

In the 95 cities, the total consumption was 5,839 petajoules, or 79% of the total Their combined energy intensity was 672 kilojoules, 8% less than in the national context, which represents a *more efficient use of energy in the economic activity of urban areas*. On the other hand, the energy consumption by inhabitant was 87 gigajoules, 31% more than in the national context, which indicates a significant difference in the way of life and energy consumption conditions between the people living in cities and in rural areas.

The 95 largest cities of the country have a wide variation in their energy intensity, from 61 to 7,703 kilojoules. The cities with more intensity are those with a productive structure highly specialized in the transformation of energy (refineries and thermoelectrics) or in the manufacturing industry, while those with the lowest values are specialized mainly in the tertiary sector. Due to the tendency of urban areas to the tertiarization of their economy as the city size increases, a lesser energy intensity is expected. This relationship is statistically significant for the largest cities in the country (see Figure 3.4).

Figure 3.4

MEXICO: ENERGY INTENSITY BY CITY SIZE, 2008



SOURCE: OWN, BASED ON SENER, 2009: 97; AND INEGI, 2009 ECONOMIC CENSUSES.

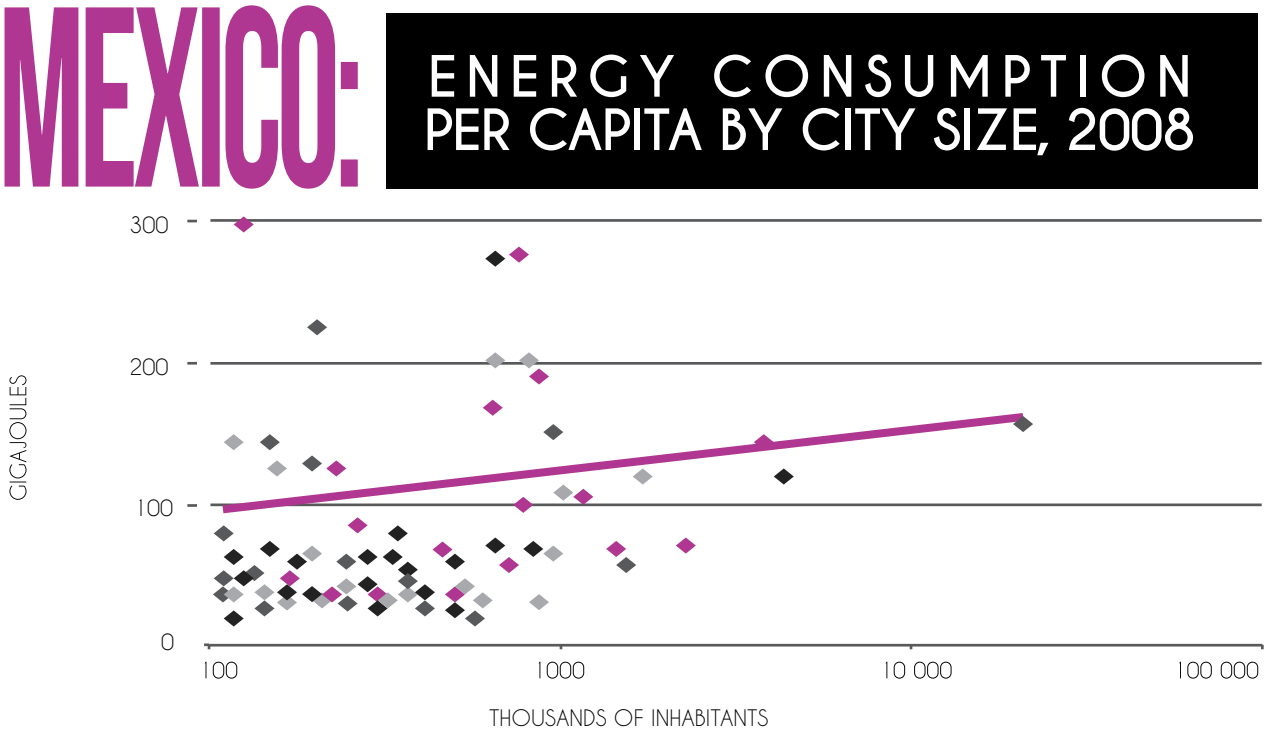
While it is true that there is less energy intensity as urban size increases, the relationship between city size and energy consumption per inhabitant is also statistically significant; the more people in the city the more consumption per inhabitant. In other words, the larger the city the more complex the economic, social and cultural pattern related to the use of energy by the resident population (see Figure 3.5). The variation range in the consumption of energy per inhabitant goes from 19 to 1,042 gigajoules; in millionaire cities, those values range between 57 and 156 gigajoules.

These results show a paradox and different challenges to urban sustainability depending on the population size:

i. The smaller the city size the more the energy demanded by its economic structure, but as the city size increases, economies of scale are achieved in the productive use of energy; and

ii. In contrast, the residents of small cities consume, on average, less energy than those of large cities, who experience a higher average use of energy in transportation as a result of the increase in travel distances and traffic jams, but also due to consumption patterns in households.

Figure 3.5



SOURCE: OWN, BASED ON SENER, 2009; AND INEGI, 2009 ECONOMIC CENSUSES.

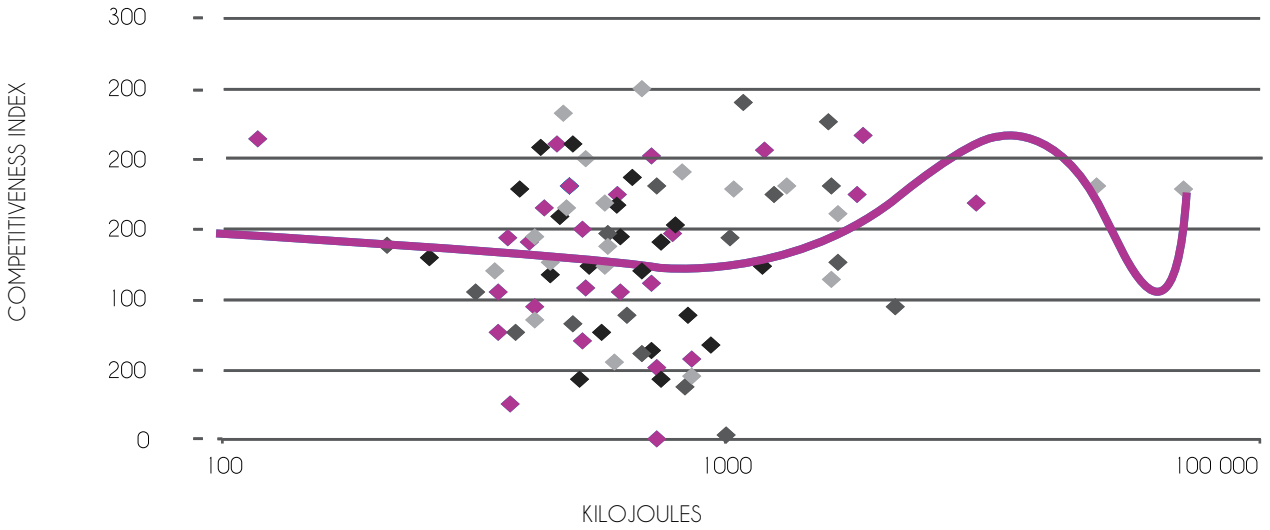
As already explained, urban competitiveness relates to the degree in which a city, compared to other competing cities, can attract productive investments that translate into the creation of jobs and an increase in income, while improving and consolidating its cultural and recreational appeal, social cohesion, governance and an environment appropriate for its resident population. Based on this concept, we infer that competitiveness is a relative term, inasmuch as it compares the performance or actions of a territory based on what other territories do or don't do. It also quantifies and qualifies the potential of that territory not only to attract productive investments, which may be public or private, but also to retain its resident population by providing them with employment opportunities and quality of life, and even to serve as a destination for domestic and international migratory flows.

The competitiveness index for each city, taken from the benchmarking exercise shown in Table 3.1, was related to their energy intensity and their energy consumption per inhabitant, with the purpose of identifying the degree of association between energy and competitiveness. The first relationship was not statistically significant (see Figure 3.6). There were cities with high competitive performance and high energy intensity, which were related to a productive structure mainly specialized in the industrial sector, but also cities with a low competitiveness index and high energy intensity, which indicates low-efficiency production processes from the standpoint of energy consumption.

Thus, the competitive performance of Mexican cities is not related to the energy intensity in their productive processes. The "U" shape in the relationship shows the *differential challenges* for cities in the country in relation to competitiveness and sustainable economic processes: the competitive performance can be improved with the use of technologies that generate less energy consumption. However, technologies should be introduced to maintain a favorable competitive position by reducing the energy consumption per dollar of production.

Figure 3.6

MEXICO: ENERGY INTENSITY-COMPETITIVENESS RATIO OF CITIES, 2008



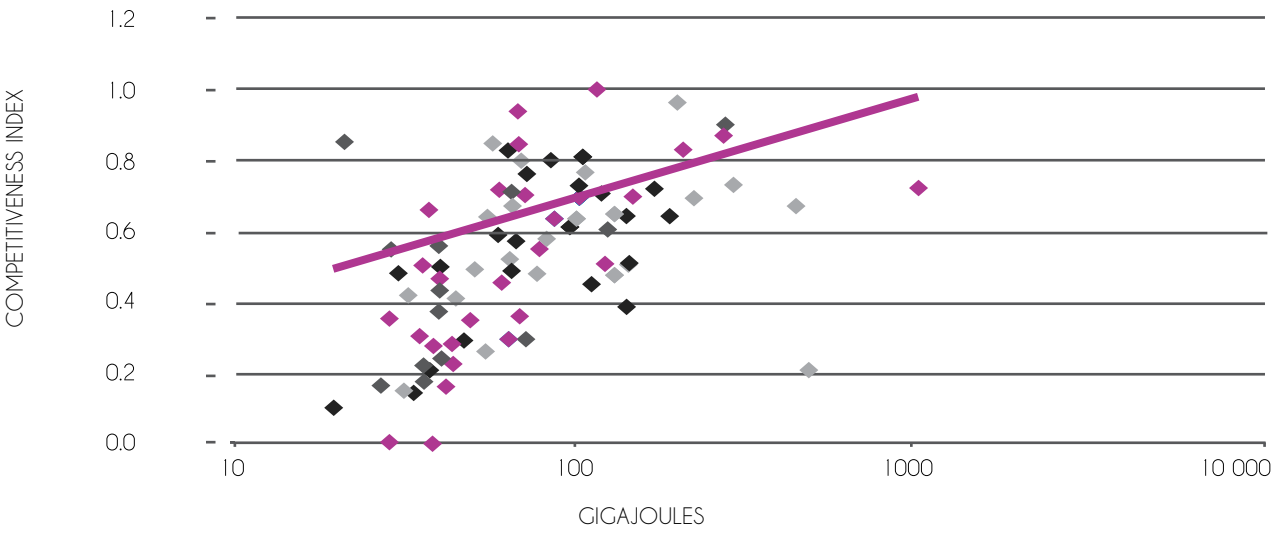
SOURCE: OWN, BASED ON SENER, 2009; AND INEGI, 2009 ECONOMIC CENSUSES.

In contrast, the association between *competitiveness and energy consumption per inhabitant* was statistically significant and with a positive sign, which indicates that the bigger the competitive performance the bigger the energy consumption per inhabitant. In other words, the most successful cities in the game of productive investment attraction, generation of employment and living conditions for their resident population also have a bigger consumption of energy consumption per inhabitant (see Figure 3.7).

These results show that Mexican cities have not introduced yet a sustainable, more efficient and effective consumption of energy. This brings us back to the lack of a national policy in this context and, therefore, the few achievements made in isolated cities would be the result of local actions with the involvement of key local actors.

Figure 3.7

MEXICO: RELATIONSHIP BETWEEN ENERGY CONSUMPTION PER CAPITA-COMPETITIVENESS OF CITIES, 2008



SOURCE: OWN, BASED ON SENER, 2009; AND INEGI, 2009 ECONOMIC CENSUSES.

4. Policy guidelines to improve the relationship between competitiveness and sustainable urban development

Energy flows through different dimensions of human activity. The economic, social and environmental implications of energy production and use lead to the establishment of a link between energy and sustainability, as well as an analytical perspective between energy and competitiveness. It is necessary to understand the particular context of each country, region and city in the energy-competitiveness-sustainability triangle, which reflects the absence of a single criterion of sustainability, as well as the lack of a concept of competitiveness that only refers to elements of the economic growth of the territory.

Mexico is an example of a nation with important paradoxes in the area of energy. It is a net energy export country, but lacks an integral and long-term policy in this aspect. The country's energy supply is based on oil, but its production and proven reserves have diminished year after year. The primary energy sources have mainly been localized in the region with the lowest level of development in the country, where there is an important net regional exchange with no benefits for the producing territory. The consumption of energy per inhabitant increases as the city size increases, but there has been no promotion of a national urban transportation policy. People living in rural areas maintain firewood as their main source of energy. In cities, there are two contrasting forces: the bigger the size the more efficiency in the use of energy in economic activities, but also the more consumption of energy per inhabitant. Competitiveness is not related to a more efficient use of energy, but to other competitive advantages related to the scale of the city.

Sustainable development has been a concern for scholars and academics, but until now it has not been a concern for large corporations, and much less for the federal government. The discourse of the public sector is full of *slogans* about sustainability, but actions are minimal, with low social impact.

Because of this situation, government and civil society in some cities have initiated actions toward environmental protection and more effective and efficient use of energy. Mexico City is one of them, where some green actions have been implemented to provide better conditions of mobility for the population, and transforming their use of public transportation. The success of these programs depends, on one hand, on the change of attitudes and cultural patterns of the population. There have been attempts to introduce an environmental conscience, where the formulation and implementation of effective public policies should be at the forefront. There is no doubt that the most important and most simple way to reduce global warming is through the efficiency and efficacy in the use and consumption of energy (Krupp and Horn, 2008: 190-231). The triangle energy-competitiveness-sustainability should be seen as an opportunity for local economic promotion that identifies chances for innovation and use of technologies that contribute to energy saving. The unlimited private use of a *finite social good* can no longer be thought possible.

Economic promotion consists of the group of actions and strategies undertaken by local governments to attract productive investments, mainly in innovative sectors, where those investments mean the generation of well-paid jobs (Moretti, 2012). Local economic promotion has been emerging as another substantive function of local governments in the 21st century (Malecki, 1997; Otgaar et al., 2012). The success in the economic promotion of the city has been linked to the concept of competitiveness.

If local governments fail to look after the economic growth of their cities, then there is a risk of having stagnant and non-competitive productive structures that do not generate sufficient quality jobs, and fail to take advantage of the physical and human capital in which investments have been made and that have accumulated. Detroit may be the clearest example of the failure of several local administrations and key agents to inhibit the consequences of the closing of the large automotive companies that made up the economic foundations of the city, as well as the private sector and the government's inability to promote the necessary restructuring necessary for the sustainability of that metropolis.

In contrast, the cities of Santiago de Chile, Mexico, Lima, Sao Paulo, Buenos Aires and Panama have laid the foundations for the successful promotion of their metropolitan economies, and have emerged as the best and most competitive cities to do business in Latin America (América Economía, 2014; Ni et al., 2014). The key has been a combination of assertive government actions and the active participation of private agents, coupled with the correct recognition of the sectors and economic activities where *comparative advantages* are maximized and *competitive advantages* are generated.

Technological development and globalization have promoted the decentralization of manufacturing production and the centralization of the coordination and provision of services of a higher order. For example, those cities that specialize in services to producers take advantage of the agglomeration economies generated by the market size and the availability of infrastructure for the generation and transmission of ideas and knowledge. Other cities that specialize in services evolve thanks to the growth of specific activities and functions such as tourism, government or a higher education offer.

Both within Mexico's urban system and the network of metropolises in Latin America, it is possible to find the combination of cities with a neo-industrial development that are mainly dedicated to the export of goods, cities with an economic structure that mainly relies on the provision of services of a higher order, especially of those with the largest population sizes, or cities that utilize environmental capital and historic landmarks for the development of tourist activities.

The challenge for the economic future of cities will lie in the promotion of *low-carbon economic growth*. Also, changes in the population structure due to the existence of large age groups poses different challenges to urban sustainability. Their child population will continue to represent a constant share of the population, and will need to have access to education opportunities that allow children to obtain both training for their adult and labor life, and learning and experiences for the adoption of attitudes and practices linked to sustainability (see Chapter 2). The population ages 15 to 64 will experience a significant absolute growth, and their contribution to sustainable urban development will depend on the capacity of the city and the country to generate quality jobs that are linked to the low-carbon production of goods and services.

Finally, the elderly population will experience a really significant absolute growth, and this population cohort will only be able to support, and benefit from, sustainability to the extent they have access to the inclusive and sufficient public services and support required to meet their needs, in particular those related to health services, social welfare, financial security and enabling socio-spatial environments. We should not lose sight of the place of residence in the city of the elderly, for whom physical accessibility is even more important for the full exercise of their rights.

4.1. Key actions

The following are some of the main government actions for the promotion of the economy of the city:

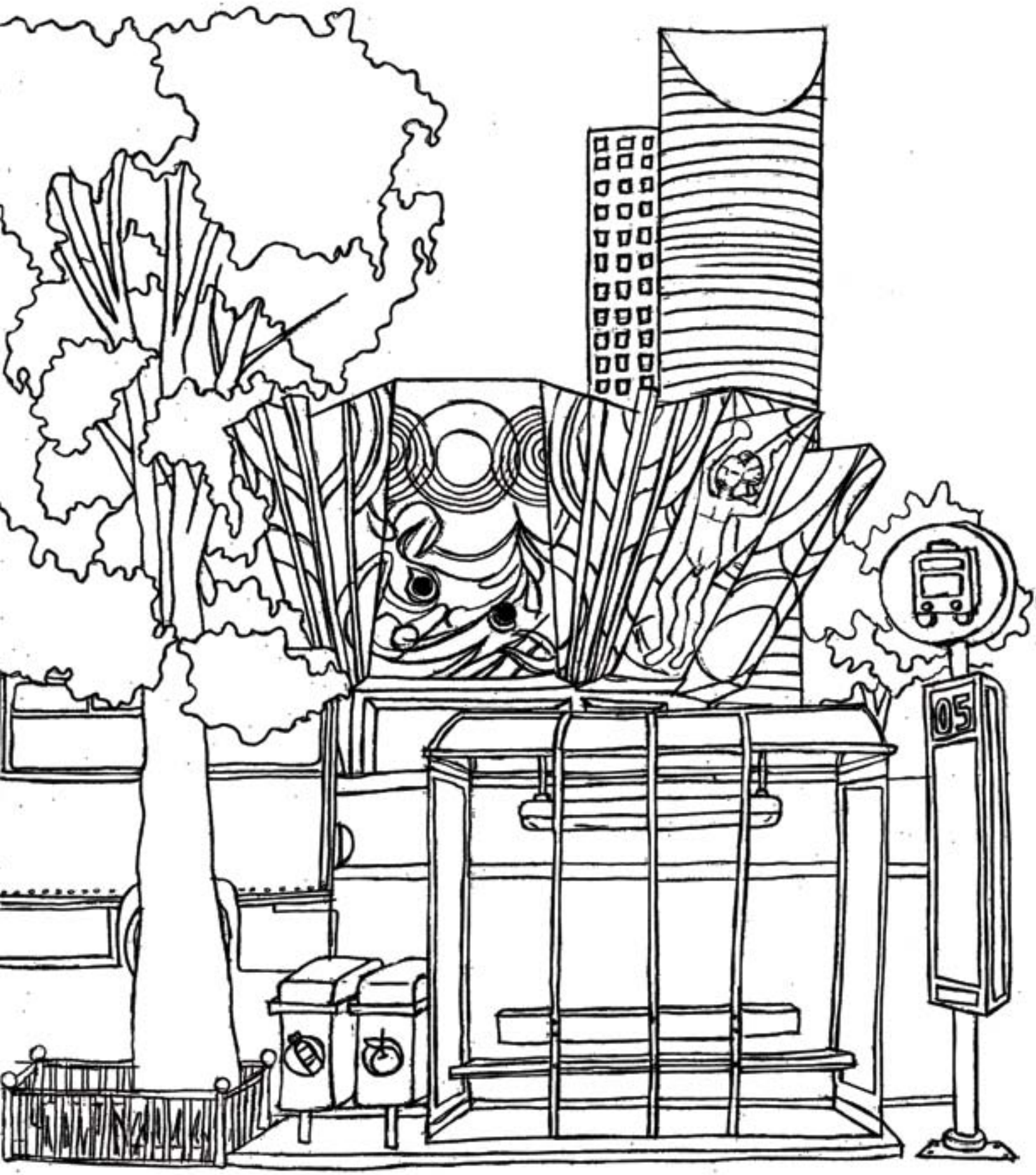
• Build productive infrastructure, especially for the distribution of the different forms of energy and the transmission of information.

• Consolidate the economic sectors where the city has a proven economic vocation, that is, promoting productive specialization, but without neglecting the opportunities represented by the promotion of new economic activities, especially in innovative sectors. That consolidation and promotion can be done through strategic planning exercises with the participation of the public and private sectors.

• Create and strengthen the *city brand*, which should highlight the best things the city can do to improve its position in the national and global network of metropolises. This city brand requires the design of investment portfolios, conducting economic feasibility studies and promoting the city at the regional, national and international levels.

The attraction of productive investments and the creation of employment are undisputable indicators of the competitiveness of the city, but the rational use and utilization of the physical, human and environmental capital in the production of goods and services is an essential requirement to advance toward sustainable urban development.

The Latin American network of metropolises faces a big challenge in the near future, which requires the promotion of local economic growth driven by investments, but with actions aimed at environmental protection. This duality must be present both in the territorial policies of central governments and the plans and programs of local governments to promote the economy of the future. In some countries like Mexico, efforts made so far have had some success from a sectoral standpoint, considering that the country has managed to reduce the participation of the environmental cost with respect to its GDP (INEGI, 2012). The challenge lies in advancing toward more sustainable urban development, that is, toward a better local economic performance without more environmental pressure.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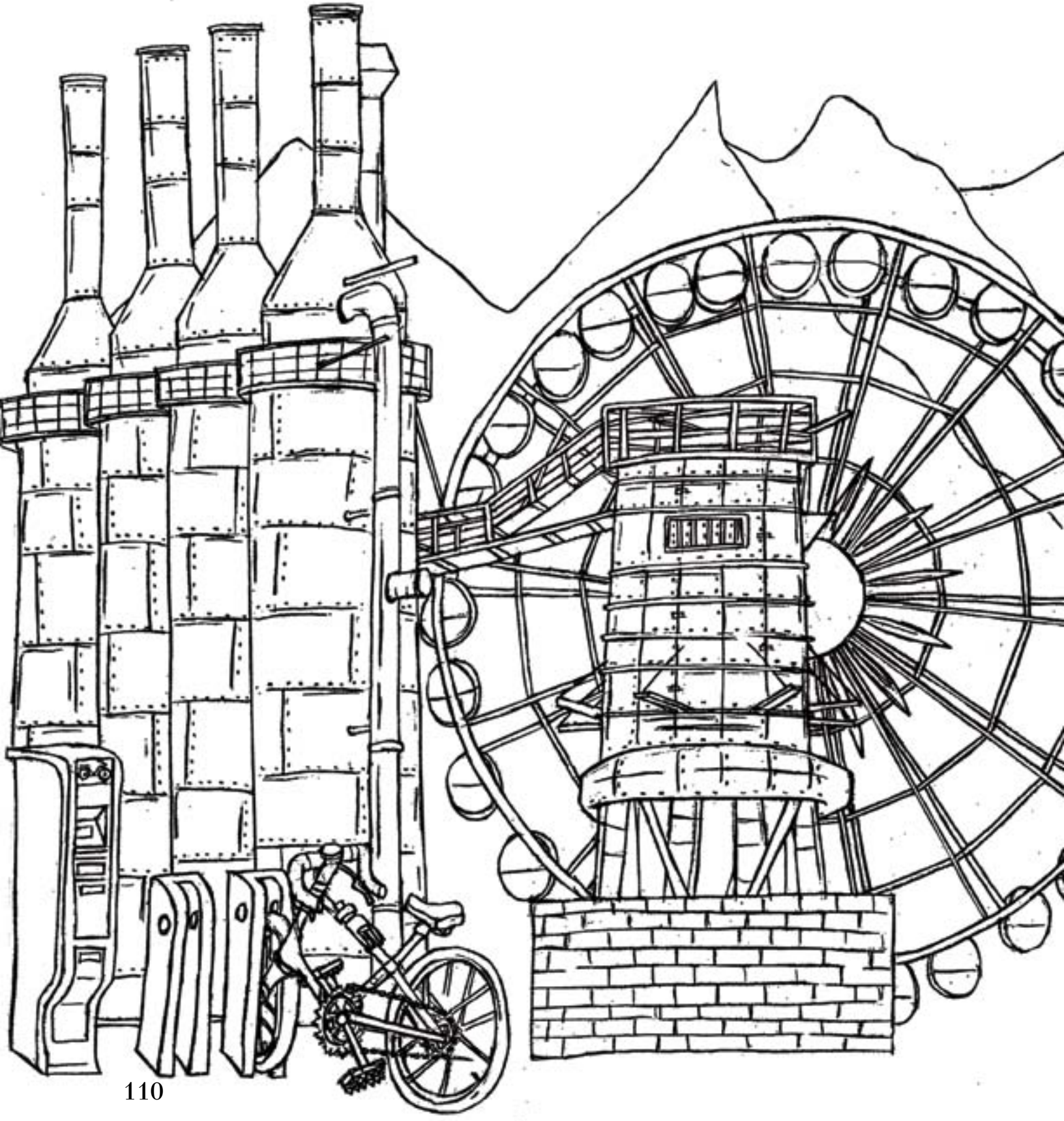

4. Environment, poverty and resources

Introduction

The distribution of the population in a country is a reflection of history and the response to global economic, environmental and even cultural changes (Sklair, 1991; García Canclini, 1999; Bauman, 2007). Both processes affect all the different scales, from the local to the global. This global interdependence and the new scale of urban systems demand, as stated by Berry (2007: 3), a fundamental response in connection with the role of domestic urban policy.[1] Therefore, based on what this author suggests, it is also necessary to answer the question: *What do we understand by, and what is the scope of, an urban settlement or city?*[2] But there is another adjective, which has now become unavoidable, that refers to *sustainability*. Sustainability requires thinking about the relationship between population and resources, today and tomorrow. The context is that of urban aspects, poverty and environmental deterioration.

The process of production and reproduction of human groups in the geographic space is expressed in a differentiated dynamics of growth and distribution of the population in a certain territory. Spatial differentiation, the humanized space (as the French would call it), is the result of the combination of multiple historical, economic, cultural, political and environmental factors, among others (Morrill & Dormitzer, 1979; Claval, 1998). These factors change diachronically and vary synchronically, which explains a higher or lower level of vulnerability, depending on the capacities of human groups to obtain food, use exosomatic energy, maintain water in quantity and quality as an element of life, and create conditions of inhabitability, among other things (Diamond, 2013).

Unlike previous stages, where human groups and their productive and reproductive activities were directly related to the reproduction cycles of nature, and yields where based on land fertility and the quality of soil, today obtaining productive inputs depends, to a larger extent, on the capacity to obtain resources not only from the surrounding region, but other more distant regions. This means taking ownership of the carrying capacities of rural (and urban) areas in other regions or countries, without taking into consideration (or paying for) the social, economic and environmental impact that such actions generate. But, before analyzing the changes that stem from a global economy, let's think about the idea of carrying capacity that existed twenty years ago. Thus, the viability and prosperity of a community or human agglomeration not only depend on the *natural endowments*[3] of our immediate environment or its carrying

1 Berry (p.8) identifies four types of roles (which I am paraphrasing here): 1) Reactive: a role where nothing is done until a problem appears or a dysfunctionality is perceived; 2) Predictive: a role where attempts are made to modify trends based on current identified trends; 3) Opportunistic: a situation similar to that of a private business that seeks favorable opportunities in terms of viability and lower risk; and 4) Strategic: a role that defines objectives based on an image of the future, and requires sufficient control and power to ensure that the inputs mobilized will produce the results desired.

2 See Champion, 2007; Parr, 2007.

3 As several pioneering regional economists affirmed. See Perloff and Wingo, 1964.

capacity, but on different elements such as the openness of its economy, its physical and functional proximity to the main innovation nodes, or its integration into different networks, among many other factors (Precedo, 2003).

In effect, the logic of population distribution and the location of economic activities in the territory should be the abundance of natural resources, and one would have to assume that the presence of, and access to, environmental resources and services would create advantages for certain settlements to thrive compared to those that do not have them.[4] However, the viability of a settlement or town also depends on aspects such as their attraction capacity, which is not only related to their size, but also to their location in relation to other settlements and transportation and communication networks (Geyer, 2002a:57; Aguilar and Graizbord, 2014), as well as their "power" and the development of their institutions (Acemoglu and Robinson, 2012; see chapters 2 and 5).[5]

Parallel to the process of distribution of the population and economic activities, demographic growth is coupled with an increase in the number and proportion of the population living in poverty, especially where economic growth is not enough to create jobs and accommodate the new workforce (which has been the case of Mexico for many decades). On the other hand, this growth and the physical expansion of these settlements result in an increase in the demand for public and private goods and services and, therefore, pressures on ecosystems and the immediate environment.

The following questions arise from the processes described in the previous paragraphs:

- What are the characteristics of the urbanization process in the early decades of the 21st century, and how is the demographic growth distributed in the territory?

- How do these dynamics exert pressure on resources and how will the different spaces be affected in the mid-term?

The answer to these questions leads to another more important question: What should be the role of domestic urban policy in the process of facing these challenges?

Pacione (2011:3) considered that the trends and growth patterns of cities have been affected by a process of transition into a global and eminently urban society. And he wondered if this urbanization process characterized by an unprecedented scale and growth can sustain a level of urban development like the one we have today, especially in developing countries, and also if the growing demands of urban populations, whose levels of income and consumption are higher compared to their rural origins, can be met.

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4 Water provision is, without a doubt, an example of that. In our country, however, that is not the case. See Graizbord, González and López, 2013.

5 As a result of the agglomeration diseconomies created in larger cities (Geyer, 2002b:73), middle-sized and small cities experience a trickle-down effect in the urbanization process, which reinvigorates their relative and absolute growth in the National Urban System as a whole and the regional context where they exist.

But also, and as a result of the above, the kind of impact these population concentrations have on local ecosystems and the global ecosystem (and vice versa), as well as the effects that global change has, or will have, in these agglomerations (Romero Lankao, 2008:5; Sánchez, *et al.*, 2008). On a global scale, there is certainty about climate change and the increase in the planet's average temperature but, at the same time, local and regional spatial differences only create more uncertainty, considering the specific impacts of these changes are little less than predictable, even though we know that *inaction will only lead to huge human and material costs* (Stern, 2007; Galindo, 2009; see last paragraph in Chapter 2 and Chapter 5).

This chapter is divided into six sections. Three of them deal with the relationship between population and resources, which are addressed from the perspective of natural capital. The fourth section is a fairly general but systematic overview of the efforts made by intergovernmental agencies and bodies since Stockholm, in 1972, to address anthropic effects on resources and the environment. The fifth section explores different dimensions of the "complex human interaction" with the environment, and the last one suggests the use of the *regional scale* to achieve sustainability.

1. The population-resources relationship

The recent call to hold an international discussion in Port Elizabeth, South Africa, in June of 2014, with the theme *Population and climate compatible development*, organized by Lead Southern and Eastern Africa and funded by UNFPA, starts with the following text:

> *The world' population grows at unprecedented rates. With a growth of 78 million inhabitants each year, we can expect the world population to reach 9 billion by 2050. Our ability to respond in the long-term to the needs of this population is severely compromised by unsustainable lifestyles and the impact of climate change on the natural resources of the planet and the possibilities for development, which poses a challenge to achieving sustainability.*
>
> *Understanding the complex network of interconnections between population, climate change and development is the key to develop innovative solutions that adapt to the changing world and strengthen the path toward a sustainable future.*

There are two key aspects to highlight in these paragraphs. First, the world's population volume is mentioned in quantitative terms, and attention is brought to the challenge of meeting the needs of this population in the long term (by 2050, the year in which the world's demographic growth is expected to stabilize), but this is only related to something difficult to analyze, that is, the "complex mesh of interconnections between population, climate change and development", no more and no less! Of course this is all about the relationship between population and resources (Weisman, 2014; Graizbord, 2006), as well as the way in which both categories have been addressed in the literature, beyond the Neo-Malthusian formula of I = PAT (impact = population x abundance x technology).[6] Second, no reference is made of the spatial dimension, without which it is almost useless to talk about these issues, because neither the population nor resources are homogeneously distributed on the Earth's surface.

6 This formula appears in Ehrlich and Holdren (1971). We should remember the Ehrlichs' book entitled The Population Bomb (1968), and the title they thought of originally: Population, resources, environment. See Ehrlich and Ehrlich (2009), which suggests a review of Malthus in the light of the world's population today.

Ignoring the "where" is not an omission exclusive of population scholars. For economists, spatial differentiation does not seem to have any importance either. The "where" is the *leitmotif* of geography, but what are the aspects that this science provides and highlights as fundamental for the analysis of the complex relationship between population and resources in the context of climate change and development?

To be fair, the following is another paragraph of that same document that suggests arguments that require a careful analysis:

> *The current debate about the relationships between population dynamics and climate change is often limited to the argument about size. This reflects an incomplete understanding of the causes and consequences of climate change.*
>
> *The relationship between population size and growth and the emission of greenhouse gases is more complex! It must be assessed in the context of broader development trends, including increases in consumption and urbanization levels.*

This quote states that the current debate about the links between population dynamics and climate change is limited to the issue of size. Instead, decision-makers often fail to consider environmental impacts as part of the population analysis. I cannot believe that, after the Erhlichs' call about the "demographic bomb", people still insist on this relationship in a simplistic manner, which seems to be the case here.[7] The truth is that, in the current context of climate change, as an environmental problem of the 21st century, a century where we could easily see temperatures never seen before on Earth since the last interglacial some 140,000 years ago, we can say that, today, our planet is quite a different place compared to what it was *"back in the day"*: before the industrial revolution. To begin with, as stated by Cowie (2007: 206): "back then there were not 6 billion humans, and rising, nor the population grew like it does today. Nor was the planetary landscape so managed or the global commons, both atmosphere and oceans, perturbed by human action".

The relationship, as the paragraph quoted continues, is a *complex* one, it must be *contextualized* in a broad development trend, and it must be related to demand and consumption, as well as to urbanization levels. Still, there is room to highlight the omission of an approach that fails to establish a distinction between *levels of aggregation* (*i.e.* the collective, the social vs. the individual, the personal decision, the individual or couple and the community, the global and the local, to mention just a few).[8] At no time can we accept that human reproduction is exclusively

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7 Even an explicit text about population growth and the need to control it makes reference to the conceptual, methodological, political and public policy difficulties involved (see Wire, 2009). Even in the simple proportional relationship proposed by Ehrlich and Holdren (1971) between environmental impact and population (I=PAT), where the population volume is weighed by per capita consumption (wealth or income and consumption patterns, which are even culturally affected) and technology (energy inefficiency, or even efficiency), the implications are not easy to analyze. Of course, the idea is based on the logic that, quantitatively speaking, two similar persons could have an impact on the environment that is twice as much as just one of them, which seems reasonable, regardless of whether we admit the fact that the relationship is now more complex and multifactorial.

8 A simple relationship between food production and the size of the world population can be found in the following data: While the total food production index went from 98 in 1978-80 to 122 ten years later, the per capita production in that same period increased from 100 to 104 (for both, 1979-81=100). Of course, in those regions with a larger demographic growth, per capita production declined, even though the total increased (see Chart 3.1 in Simmons, 1997:108, with WRI data from 1993).

inherent in the biological nature of the species. However, while the decision to have children is a personal matter for couples, reproduction and population growth are *social issues* and, in specific scales and contexts, they can be an issue of survival for the group or a public policy issue.[9]

The way in which population distribution, its structure or its composition by age or gender, migration and growth vary spatially speaking, relates to the nature of the places (the context of/on a given scale). Of course, the disciplinary boundary between geography and other sciences interested in these topics is vague, while the geographic approach focuses on the *scale* and the *spatial variations* of phenomena and variables. Just like the study of population cannot be isolated from the fundamentals of human ecology, it would also seem that it has not been able to detach itself from the two essays by Malthus about the economic principles of population (1798 and 1803).[10]

It is worth remembering that two are the ideas that serve as a basis for the argument and have "bothered" those interested in the study of the population so much: the fact that the population has a tendency to grow faster than the livelihoods at its reach, and also that the measures to control these differences can be "preventive" or "positive" in nature. The former refers to a tension between population and resources, and the latter refers to aspects related to social practices that affect mortality and fertility. Positive practices arise from phenomena beyond the control of individuals (such as wars, disease, poverty or food shortages), while preventive practices stem from moral (individual) or ethical (social) decisions related to sexual and reproductive practices.

Generally speaking, the anti-Malthusian reaction has followed three lines of thinking. The first one refers to the apparent confusion between the moral and the scientific (and even the Catholic Church has participated in it). The second has to do with poverty, and there is no assurance that Marx's position about the reasons that explain it as a result of the injustice of the social institutions of capitalism, and not as a result of population growth (which apparently has been possible precisely thanks to the Industrial Revolution), refers to the same, even though this criticism had a huge influence among the "populationists". The third main criticism is based on the empirical confirmation of the mistaken prediction in connection with the population growth dynamics[11] and the unforeseen power of technology to also geometrically drive the

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9 We would have to analyze the demographic, and moral, logic behind China's Draconian measure to implement the "one-child" policy to reduce its population growth, which had an impact on individual freedoms and, as already seen, distorted the gender balance with different social and spatial effects (even psychological and from the standpoint of international migration).

10 The 1789 version is "Ensayo sobre el Principio de la Población", FCE, Mexico, 1951. In particular Chapter 2: The different ratio in which population and food increase - The necessary effects of these different ratios of increase - Oscillation produced by them in the condition of the lower classes of society - Reasons why this oscillation has not been so much observed as might be expected - Three propositions on which the general argument of the Essay depends -- The different states in which mankind have been known to exist proposed to be examined with reference to these three propositions. Available at: www.marxists.org/reference/subject/economics/malthus/.

11 Only in some cases. In the beginning, the quote does not necessarily confirm it is wrong to think about exponential growth. Even 200 years ago, it was really unthinkable that the Earth's human population would reach 9 billion. And even less that we would face thresholds in terms of globally available resources, nor that we could have a negative impact on the environmental services provided by nature, and a negative and anthropocentric impact on the climate of the planet.

world's food production capabilities.[12] From there the insistence that political issues, and not the shortage of food in this planet, are to blame for famines.[13]

Today, it would seem that population scholars should not have to bother with the apparently reactionary position of Malthus, who made his critics believe his arguments, a situation that hindered the development of demography as a science. Instead, we should consider his power of argumentation, which has persisted for so long and has led to a permanent debate that has already lasted for two centuries.[14]

In addition, we should look, with a different set of eyes, at the relationship between population, or the populations, and ecosystems, recognizing the finite nature of our planet and its resources, as well as the limited capacities of ecosystems to assimilate extractive practices or those that generate waste on the current scale, *i.e.*, its character as *spaceship Earth*.[15] There are other opinions that are also an important wake-up call in this population–environment relationship. In a best seller from 2009, Friedman (2015: 77-88) adopts another view on the demographic dynamics. "...[The] demographic explosion is coming to an end", he categorically

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12 To some extent, the truth is that, as affirmed by Daly (1977), in his eagerness to grow, "man has ceased to live within the annual solar budget and has become addicted to living off his capital of terrestrial stocks of low entropy (fossil fuels, minerals)."

13 Back in the 1980s, Kidron and Segal (1984) considered that not all the countries had secured their food production. Some countries in Africa are protected by their farming land and systems, but many suffer persistent draughts and, in general, the data showed that the food production per capita had dropped by more than 20% since the 1960s. In general, the countries in North America, Europe and Australia are the only ones with food security. However, the fact is that the "growing volatility of climate… will only worsen the pressure on over-specialized [commercial] crops" (Hawken, *et al.*, 1999: 197), a crop system characteristic of those countries. China and Russia are considered to have a minimum capacity, while Japan, for instance, has an extreme deficit. In fact, China is today the world's biggest cereal importer. The following quote from Brown (2004: 10-11) is quite enlightening: "Perhaps the largest agricultural setback in recent times has been the steep decline in the production of cereals in China since 1998. Ten years ago, in Who is going to feed China?, I projected that China's large grain production would peak and then decline. But I did not anticipate that it would drop by 50 million tons between 1998 and 2004".

14 Now that the discussion about climate change has shifted to the issue of adaptation, and it is well known that it will have severe impacts, first and foremost, on poor populations, regions and countries, we may have to subject Malthus "to a new trial and execution", as Irvine and Ponton (1988), members of the British Green Party, stated in his defense. Or maybe we should admit with them that "demographic pressure is not only a third world problem". (Reprinted in an abstract in Dobson, 1999: 66-67).

15 We owe this concept to Boulding (1996). Here, it is worth resorting to Daly (1977). This influential author, although not as much as he should be, presents, in one paragraph, a brief history of the human species on Earth, precisely talking about its growth: "As population grew, man needed more food and undertook the work necessary to produce it, employing draft animals to help. As population continued to grow man became more reluctant to share his food-producing land to grow fodder for draft animals. Instead, he began to feed tractors with fossil fuels and increased the ability of the land to support a larger population. Also, new products were produced and standards of individual consumption increased along with population, further increasing man's addiction to living off his terrestrial capital.. Some big problems emerge from this addiction... [Daly points to a fundamental one:] Whenever the net energy yield becomes zero (that is, it costs as much energy to mine a ton of coal as can be got from a ton of coal) then it becomes nonsensical to continue mining that energy source." (Reprinted as an abstract in Dobson, 1999: 162).

cally affirms. Based on UN projections (p.79), he shares the signals sent by current trends and explores the social impact on lifestyles and ways of living, highlighting women's role in this process and the changes they experience, both personally and socially.

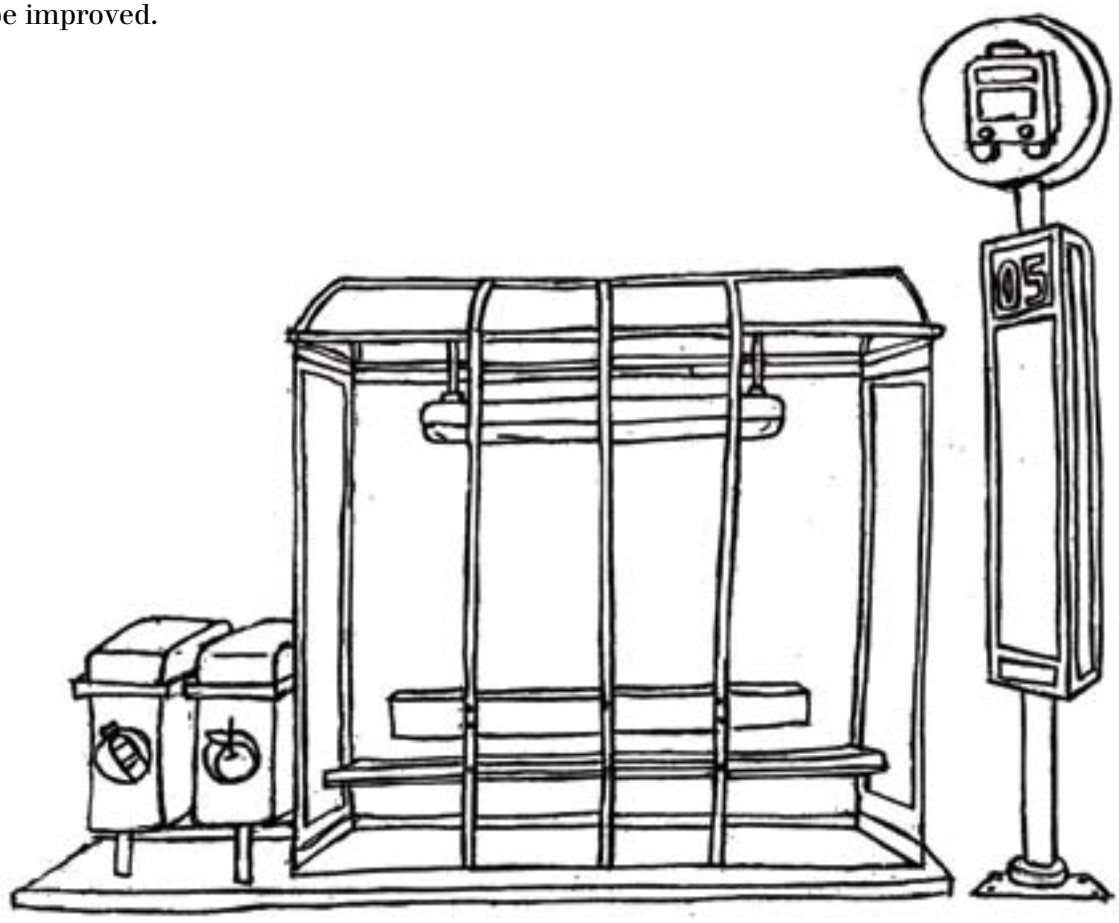
The following quote is noteworthy:

> *The crude reality is that a reduction in greenhouse gases requires a more limited general consumption of fossil energy.*
>
> *Therefore, the more population there is in the planet, the bigger the per capita decrease necessary to achieve safe emission levels.*

On his part, Zlotnik (2009:35) points to the sacrifice that the biggest consumers must make, but there are other important aspects in his argument:

> *Existing disparities in energy use stemming from sharp differences in per capita incomes add complexity to the argument, but do not invalidate the fact that current levels of population growth cannot be maintained over the long run without endangering the sustainability of the planet, particularly if standards of living are to be improved for a growing population.*

This would seem to be valid, even if we do not expect that the above-mentioned standards can be improved.



2. Population and its environmental impact

The exponential population growth experienced in the last two hundred years, which we see as natural in a short-term vision, is not necessarily a typical phenomenon. We have seen the Mexican population double twice: from 25 to 50 and from 50 to 100 million in fifty years, between 1950 and 2000. Today, in spite of the ideology that affirmed that "to govern is to populate", which later changed to "responsible parenthood" and then to "small families live better", it is now possible for the current growth rate to guarantee, for the time being, that the population will not grow beyond 135-140 million, a number that will be reached by the middle of this century. The problems have more to do with distribution than growth, or at least that is the way it should be. But this is not the case in all the regions of the world. And neither would it be possible to think, in all of them, that a stabilized population will solve the environmental impact issue, because the dilemma lies in *restricting the consumption pattern*, which poses two types of problems: it is unfair for the *"newcomers"* (*i.e.* emerging countries: China, India), and inacceptable for the "rich" (*v.g.* developed countries: USA, Germany). Apparently, the dilemma in inescapable for mankind (Bauman, 2007: 35), because consumption has moved away from the *need* and, therefore, from *satisfaction* and even *wellbeing* (Offer, 2006: 279, 36).

The scenarios for the future population are based on the consideration of current growth rates, which have already declined, and also on the fact that higher income and education indicators result in lower fertility rates.[16] In this regard, populations in poor countries will have higher growth rates compared to the developed world, and the same will happen in rural regions, where children are some sort of insurance for the elderly. Another addition to the growth in the environmental impact related to the demographic dynamics is rural-urban migration, as well as that from poor to rich or industrialized countries. In both cases, this new location of the population that moves from rural to urban areas and/or often times also from poor to rich countries, implies an increase in the demand for drinking water and the use of exosomatic energy and therefore, impacts on the environmental footprint, given the differences in consumption patterns.

In summary, human ecology must be considered as part of the population analysis, that is:

i. The way in which the population reflects the amount of biomass and, therefore, the impact the human population has on other species. Food production for the world's current population, with such a big food demand, has led this activity to dominate biologically productive land in the temperate areas of the planet (Cowie, 2007: 327). The technology applied in this sector has led to a one-half reduction of the land area required. If we followed the agricultural practices we had 40-50 years ago (Ibid., Fig. 7.7, p.329), the problem of soil degradation would be solved.

16 In Spanish there is usually no distinction between the terms fecundidad (fecundity) and fertilidad (fertility). However, fecundidad refers to the number of descendants produced by an individual or couple, while fertilidad refers to the reproduction capacities of a population. The former is individual in nature, and the latter has to do with the collectivity.

ii. *The supply of energy related to the negative effects on the carbon cycle and other cycles that ensure life.* More than one half of global warming in recent decades can be attributed to anthropogenic CO2 emitted by burning fossil fuels. In the last 50 years, the global increase has been 350%. Over time, if nothing is done, there is a risk of affecting the thermodynamic balance of the biosphere (Cowie, 2007: 330-4). The other greenhouse gas is methane, whose emissions currently account for 15% of the total. In this case, there is also a direct relationship with the population, because it is generated in rice fields and cattle-breeding areas. Alternative sources of energy are currently more expensive than conventional ones or they are insufficiently developed, and their widespread use (wind, solar, geothermal, among others) will depend on the price and the availability or relative scarcity of oil and gas. Finally, deforestation generates emissions, while the opposite, the preservation of forests and jungles, which is still an incipient effort, allows for the capture of carbon.

iii. *Health, or the relationship with those species that affect humans.* Climate change affects human health through processes mediated by disturbances or the degradation of ecosystems. The interest in this relationship has shifted from the nineteenth-century concern to heat up rooms in homes and workplaces in the winter, or to cool them down during the hot summer in hot regions, but also the burning of wood inside precarious homes in rural areas, to a concern over the impact of climate changes on vulnerable populations, age groups (elderly people, children, women) and the indigenous population, which are generally associated with poverty. This impact occurs in several ways. It has effects related to the hydrologic cycle, which creates hydrometeorological events of a greater intensity or duration; it affects crops; increases the reach of pathogen vectors that affect humans and other species, and has an impact on the quantity and quality of water for human use, among many other consequences.

iv. *The availability of foods that have an impact on vegetable and animal species harvested by humans.* The world's food security increased in the last 3 to 4 decades of the last century, thanks to the mechanization of farms and the use of fertilizers and pesticides. Grain production (corn, wheat, rice) has multiplied by four, while the per capita consumption reached a plateau at approximately 300 kg/year since the 1980s (due to the world's population growth); meat production also multiplied by five, with an average consumption that went from 17 kg in 1950 to 39 kg in 2002; global annual fisheries production also multiplied by five during the second half of the 20th, but the average per capita consumption reached a plateau since the 1960s, at approximately 15-17.5 kg, despite the fact that the supply has grown since the 1980s due to the expansion of aquaculture, from 7 to 36 million tons in 2000 (Cowie, 2007: 360). However, average figures hide the differences between countries and also between income groups. But that has not been the case in certain regions or countries, mainly in Africa and Asia. The world's estimated 850 million inhabitants considered to be underfed or malnourished according to FAO (2004) are in India (25%), the countries in Sub-Saharan Africa (24%), Asia Pacific (19%), China (16%), Latin America (6%), North Africa (5%), and other countries (4%). And only 1% in developed countries (Cowie, 2007: Fig. 7.13, p. 373).

> In addition, farming practices have had a cost, and it cannot be said they are sustainable. They have generated erosion, toxic impacts and resistance to agrochemicals used. The consumption of seasonal agricultural products has changed, and the virtual energy component necessary for their production has increased, no less than the volume of water, a farming input essential for irrigation purposes (Cowie, 2007:368). The future does not look promising due to two factors: first, that most productive ecosystems are over-exploited and, second, that population growth and the culture of intensive use of fossil energy, but also agricultural practices, are not sustainable from the standpoint of food security (*Ibid*.: 370).

These considerations lead us to think that population growth, which will mainly occur in developing countries, will undoubtedly contribute to increase the emission of greenhouse gases (due to the generally inefficient use of fossil energy). During the 19th and 20th centuries, CO2 emissions were mainly generated by industrialized or developed countries, and very few by the less developed ones. By the end of the 20th century, and for at least half of this century, the situation has been reversed, considering that the population of developed countries is no longer growing, and in developing and recently industrialized countries there is a steady growth. We will have to wait for two changes to occur so that, before year 2100, we can see a reduction in population growth rates in the poorest countries: a reduction in infant mortality and an increase in life expectancy. (Friedman, 2015: 79-82). Therefore, it will be in the latter that emissions will grow to the point where, as a whole, they will account for more than one half of global emissions, which poses a scenario different from the one we have today in global negotiations around climate change and its mitigation. But there are two paradoxes: the demand for goods and services is generated in the former (if we exclude China and India), and it will be in the poor and developing countries where emissions will have bigger repercussions and more investments and efforts to adapt to the impacts expected will be required.

3. Resources or natural capital?[17]

It is said that the degradation experienced by the environment is the result of institutional flaws (Swanson, 1996: 4). The importance of institutional development comes from a seminal paper written by Hardin (1968), which led to a vast literature that questioned the "tragedy of the commons" or the hopeless tendency to exploit resources, mine them, when individuals or corporations have free access to them.[18] According to Ostrom (2000), there is a distinction between free access and common use resources. The latter achieve a level of sustainability through the development of institutions that express the organization of the social group that maintains them as communal property or agrees to their use based on cooperative principles. In the international scene, Young (1997) highlights the need and the options faced by mankind for the development of intergovernmental systems that protect free-access global goods such as the oceans, the atmosphere, the poles and, in general, the environmental services provided by nature.

If the goal is to sustain the production of goods and services indefinitely, it is necessary to think in terms of the concept of *natural capital*, that is, to accept the idea that we must use or *live off the interest and not touch the capital* (Gilpin, 1996: 206). However, this would also require the acceptance of the concept of "strong sustainability", which opposes the use of a different type of capital (physical, financial, human, etc.) to replace or complement natural capital. According to Hackett (2001: 335), strong sustainability optimizes the economy based on the ecologic and environmental capacity. The latter conditions the economic activity and not the other way around, which, in any event, would be far from being realistically acceptable. *There is, and if there is, what is the acceptable or middle point?* (Graizbord, 2006: 503).

If, as it was the case, regional development was based on *natural endowments*, and wealth was based on the *stock of resources*, the solution was to rationalize its use and, in this regard, yields depended on scarcity. The reader should note that here we are referring to a regional scale, and not necessarily to a city or metropolitan area. In other words, as we have insisted in other chapters, we understand the challenge of the sustainable city as a problem not limited to the urban sphere, as will be seen in the following paragraphs. Conventionally speaking, the goods and services produced by using resources that are depleted or become scarce can be replaced. However, in the analysis of natural resources (Neher, 1990: 84), these are valued for the ecologic benefits and the amenities they generate and, at the same time, for their exploitation. Thus, we consider the value of the *stock* and, at the same time, the value of the flows of goods they produce. The question then is: How can we strike a balance between the short-term benefits of the flow generated by the exploitation of the natural environment (which includes renewable and non-renewable resources) and the concomitant and long-lasting environmental damage of the *stock*?

In general terms, a resource is something that is directly or indirectly capable of meeting a human need. According to the economists, there are three categories: capital, work, and natural resources. Capital refers to the type of resource produced not for direct consumption, but rather for the purpose of creating or achieving a more efficient production process.

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17 For an extended version of this discussion, see Graizbord, 2006: 491-507.

18 The term "tragedy of the commons" may not be the best. Maybe it would be better to speak of the tragedy of "common resources" or, in more general terms, of the tragedy of "the common", which makes a clear reference to the concept of common property.

Work includes the physical and mental production capacities of men (as mankind) to carry out their activities and produce goods and services. Natural resources constitute the *stock* of live or inert materials that are found in the physical environment and have an identified potential use for human beings (Hussen, 2000: 4, cited in Graizbord, 2006: 501).

The science of economics considers that resources used for direct consumption experience changes, but are used as production factors, that is, as means to produce satisfactors. Of course, this notion is strictly anthropocentric, as stated by Hussen (2000: 4), which implies that they are not considered as having an intrinsic value or any value other than the economic value defined by human (and, therefore, commercial) needs. But in addition to that, resources are of interest for the economy simply because they are scarce. Finally, as production factors, resources are used combined and are, or can be, (according to Solow 1991, cited in Hussen, 2000: 5) replaceable. In other words, none of them is considered *by itself* as absolutely essential for the production of goods and services, which does not eliminate the fact they are scarce.

And this leads to some basic questions: What to do in order to meet the human needs of goods and services in in a world of scarcity? How to maximize the group of goods and services available at a given point in time? How can we justify the need to ration the limited resources? One answer is in (Hussen, 2000: 6-7):

a. Make decisions and define priorities: *choose*;

b. Consider the associated costs and, therefore, sacrifice something to obtain something else: *opportunity costs;*

c. Minimize waste by using the best possible or available "technology": efficiency; and

d. Reduce the conflict caused by the allocation and distribution of scarce resources, in which case the market system can be the means or mechanism for that: *social rules or institutions.*

But the stock of resources (renewable and non-renewable) does not guarantee life in the planet. The *environmental services provided by nature*, that is, the *natural capital*, is what guarantees sustainability. The idea that an economy can continue to function without natural capital is behind the notion of the discount rate and the effect technical progress can have on it. The notion of the discount rate refers to people's preferences for current consumption (benefit) compared to future consumption (benefit). Thus, people will be willing to substitute their current consumption (benefit) for future consumption (benefit), but only as long as they obtain a "premium" through a discount rate: sacrificing one peso of current consumption requires a compensation that exceeds the value of a peso of future consumption. Thus, future consumption is discounted at a certain discount rate that indicates the substitution of current consumption for consumption at a later date. The question is: Why is future discounted? The answer is because people are short-sighted or because the future is uncertain. An individual is more short-sighted and faces more uncertainty than society, and gives less importance to the future, so the matter becomes more social than ethical, because the decision affects the wellbeing of future generations. Thus, choosing or determining the discount rate is crucial: the bigger the uncertainty the higher the rate, but a lower or a low discount rate favors future generations. However, according

future generations. However, according to Hartwick-Solow, this is not a serious problem, because the effect of a positive discount rate may be affected by the technical progress growth rate and, therefore, it is not immoral or wrong to use a discount rate, especially if the premium is carefully used to maintain the sum or *stock* of the different types of capital (physical, human, environmental) constant.

There would be six possible reasons to think that this rule about sustainability, or optimal (*v.g.* efficient) inter-temporal route, has weak foundations (Hussen, 2000: 185-186):

i. It assumes that the capital generated by men and natural capital are substitutes when, in any event, they are *complementary;*

*ii. I*ntergenerational efficiency requires that all goods and services reflect *their social value.* However, it ignores or assumes that there is no difficulty in solving the distortions caused by externalities;

iii. Some economists argue that the idea of a positive discount rate is wrong and fails to take in consideration the wellbeing of future generations *in all of its dimensions* (Perrings, 1991, cited in Hussen, 2000: 186);

iv. The approach followed by this rule fails to explicitly consider the *scale*, that is, the size of the human economy in relation to natural ecosystems;

v. The economic process is conceptualized as something separated from environmental systems, without understanding the complex interactions that exist between both systems.

It also underestimates the fact that human activities can cause irreversible damages to the natural environment (and ecosystems); this, acknowledging that there is uncertainty about the risks that these effects can cause on life-supporting systems and the quality of human life. Thus, contrary to what Hartwick-Solow's approach suggests about sustainability (the probability of substitution and the role of technical progress), an economy as a system could hardly continue to operate without natural capital. At least that is the position of the strong approach of environmental economics.[19] And this means, on one hand, considering *intergenerational equity* and, on the other, maintaining natural capital constant; in other words, the preservation of natural resources and the relentless defense of environmental conditions.

19 Represented by Boulding (1996) and his idea of ecological boundaries; Georgescu-Roegen (1993) and his concept of energy as a limiting factor; and Daly (1996) and his steady-state economy approach.

With these principles, the rules or policy criteria should be the following (Hussen, 2000: 188):

a. The rate of exploitation of natural resources *should not exceed* their regeneration rate.

b. Waste emission (pollution) should be kept at or below the waste-absorptive capacity of the environment (ecosystem). However, there are persistent emissions whose rates *should be zero* since the ecosystem has no capacity to absorb them, or because the time it takes to absorb them is huge (*i.e.* DDT, radioactive substances, CFC, among others).

c. The extraction of non-renewable resources (fossil energy) should *be consistent* with the development of renewable substitutes. According to Hussen (2000: 188) this is the equivalent, paradoxically, of Hartwick's rule of substitution.

As can be inferred from the above, economic considerations are ignored and therefore, the usefulness of this approach to orient public policies may be limited, which leaves the sustainability issue unsolved! And here we can quote Hussen's question: Is sustainable development a helpful term or a vague and qualitatively void concept? But this also leads us to the (*intra and intergenerational*) equity vs. efficiency dilemma and the issue of the trade-off between both remains unsolved.

4. Some historical background

The concern over sustainable development is not new. In 1971, the Secretary of the United Nations Conference on the Human Environment requested a report on the "state of the planet". This report, entitled *One Earth*, was presented in Stockholm in 1972. Years later, in 1987, the World Commission on Environment and Development of the United Nations, led by Norwegian Dr. Gro Harlem Brundtland, presented the report Our Common Future. The importance of this document not only lied in the fact of launching the concept of *sustainable development* defined as *that development that meets the present needs without compromising the needs of future generations*, but its inclusion in all the UN programs, which became a precedent for the Earth Summit held in Rio de Janeiro in 1992.

In essence, sustainable development is a process of change where the exploitation of resources, the direction of investments, the orientation of technological development and institutional change must be in *harmony and promote* the current and future potential to meet present and future human needs. We are far from achieving this ideal, and far from solving the two issues implicit in the statement:

• The concept of *needs* implies focusing our attention on *poverty and inequality*, which are key to solving the issue of *intra- and intergenerational* justice;

• The idea of *future* means imposing *limits on current consumption*, and, consequently, on *environmental pressures* (here and now) to ensure that ecosystems and the global ecosystem maintain the ability to provide the environmental services required to guarantee meeting the needs of future generations, that is, the issue of *intergenerational justice*.

4.1. Environmental pressures

In 1992, with a widespread global awareness that human activities could endanger life on the planet, a second conference, "The Earth Summit", was held in Rio de Janeiro with the participation of representatives of almost all the countries in the world. At this summit, a guiding document called Agenda 21 was drafted together with recommendations for its implementation.[20] Ten years later, in 2002, a third meeting, "Rio+10", was held in in Johannesburg with the aim of assessing the achievements made in connection with the objectives of Agenda 21. And ten years later, in June 2012, the "Rio+20" meeting was held with the purpose of:

"…shaping an ambitious sustainable development framework to meet the needs of both people and planet, providing economic transformation and opportunity to lift people out of poverty, advancing social justice and protecting the environment".

A review of the resolution approved by the United Nations General Assembly (http://www.un.org/es/comun/docs/?symbol=A/RES/66/288) included in "The future we want" does not seem to leave anything out. It is important to stress the idea of a "green economy" that United Nations agencies such as UNEP (2011) have advocated as a growth model based on urban economies and, in the interest of this publication, a summary of the *recommendations* from the sustainable cities section is presented here:

20 The conceptual basis for the preparation of Agenda 21 came from resolution 44/228 of the United Nations General Assembly of December 22, 1989. As a result of negotiations of 172 nations at the Earth Summit held in Rio de Janeiro in June 1992, the drafting of Agenda 21 was agreed together with a global plan of action to promote sustainable development and the establishment of the Rio Declaration on Environment and Development. The topics addressed are divided into 40 extensive chapters under four main sections: a) Social and economic dimensions; b) Conservation and management of resources; c) Strengthening the role of social groups and d) Means for implementation. Available at: http://www.rolac.unep.mx/agenda21/esp/ag21inde.htm;http://www.un.org/spanish/conferences/cumbre&5.htm..

i. Encourage cities to promote economically, socially and environmentally sustainable societies.

ii. Promote sustainable development policies that support inclusive housing and social services; a safe and healthy living environment for all, particularly children, youth, women and the elderly and disabled; affordable and sustainable transport and energy; promotion, protection and restoration of safe and green urban spaces; safe and clean drinking water and sanitation; healthy air quality; generation of decent jobs; and improved urban planning and slum upgrading. We further support sustainable management of waste through the application of the 3Rs (reduce, reuse and recycle).

iii. Include disaster risk reduction, resilience and climate risks in urban planning.

iv. Achieve a balance between urban development and rural regions.

v. Increase the number of metropolitan regions, cities and towns that are implementing policies for sustainable urban planning and design in order to respond effectively to the expected growth of urban populations in the coming decades.

vi. In the case of urban planning, consider the involvement of multiple stakeholders, as well as the full use of information and sex-disaggregated data, including on demographic trends, income distribution and informal settlements.

vii. Improve municipal administrations so they can fulfill the important role of setting a vision for sustainable cities.

viii. Drive the planning of mixed-use areas, and encourage non-motorized mobility, including the promotion of pedestrian and cycling infrastructures.

ix. Promote partnerships among cities and communities, considering the important role they play in promoting sustainable development.

x. Strengthen cooperation mechanisms or platforms, partnership arrangements and other existing implementation tools to advance the coordinated implementation of the *Habitat Agenda*, with the active involvement of all relevant United Nations entities and with the overall aim of achieving sustainable urban development.

There is no doubt that this is a broad program that, among other aspects, in addition to the financial one, requires institutional development and the creation of management bodies that do not exist or that, if they do, require strengthening without delay.[21]

In the interim between Stockholm (1972) and *Rio*+20 (2012), international meetings on gender, population and habitat, among other things, were organized, and several global environmental agreements were reached. Thus, in the 1980s, and after confirming that the problems were far more serious than previously reported in *Stockholm*, scientific research revealed the presence of substances that deplete the ozone layer. People began to realize that biodiversity loss was occurring at an unusual pace; that species were being extinguishing at a rate never seen before, and that the accumulation of greenhouse gases (GHGs) could cause major changes in global climate, which could mean substantial changes in life on the planet.

It also became evident that the illegal trade of species posed a threat, which led to the signing of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973) and the Ramsar Convention (signed in 1971); the Vienna Convention (1983) and the Montreal Protocol (1987) for the elimination of substances that deplete the ozone layer, and it was understood, on a global level, that it was necessary to negotiate a new generation of international agreements related to biodiversity, climate change, the fight against desertification and droughts, and control of chemical contaminants.[22]

Despite these initiatives, over the course of the last three decades forests have disappeared at an unprecedented rate, the accumulation of greenhouse gases in the atmosphere has increased, air and water pollution has intensified, plant and animal species have disappeared, and vector-borne diseases of animal origin have grown explosively. Soil degradation has increased poverty and hunger and has led to the abandonment of the countryside in favor of cities. All this continues today (Melnick, McNeely and Kakabadse, 2005).

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21 In a report prepared for the Metropolitan Environmental Commission (Graizbord, et al. 2010: 89-96), several strategies and actions were proposed based on the following five dimensions, for the purpose of strengthening the institutional development of this metropolitan body and attempting to ensure the implementation of its environmental sustainability agenda: i. Metropolitan coordination; ii. Rationalization of powers; iii. Financial and administrative consolidation; iv. Relationships with other government agencies; and V. Dissemination of activities.

22 The Kyoto Protocol on climate change of the United Nations Framework Convention on Climate Change (UNFCCC), as well as an international agreement to reduce the emissions of six greenhouse gases that cause global warming: carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O), and three other fluorinated industrial gases: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF6), by an approximate percentage of at least 5% over the 2008-2012 period, compared to 1990 emissions. This goal, of course, has not been fully met, and the differences between countries are striking. The Protocol was initially adopted on December 11, 1997, in Kyoto, Japan, but only came into force until February 16, 2005. By November 2009, 187 states had ratified the Protocol. However, the USA, the world's bigger emitter of greenhouse gases, did not ratify the Protocol. And now we are entering a post-Kyoto era, where a series of commitments have been made to undertake national efforts, based on each country's capacities, which will be formalized at the COP 20 to be held in Paris in December 2015.

4.2. Poverty

To date, several international initiatives have been launched (by the World Bank and ECLAC) to *link* environment to poverty and/or human development (UNDP, 2010). In September 2000, "at the dawn of the new millennium", the United Nations General Assembly promoted a strategy: the *Millennium Development Goals* (MDGs) for poverty reduction. The *Rio+20* resolution, which was already mentioned above, is related to poverty and multiple other issues such as health, food and education, among others. It also recognizes that, three years from the deadline to achieve the Millennium Development Goals (2015), while it is true that some progress has been made in terms of reducing poverty in some regions, this progress has been uneven, and in some countries the number of people living in poverty continues to grow, with women and children being the most affected groups, especially in the least developed countries (such as those in Africa).

It considers that the sustained, inclusive and equitable economic growth of developing countries is a prerequisite to eradicate poverty and hunger and achieve the Millennium Development Goals. In fact, the signatories recognize that, in order to eradicate poverty and address the root causes and challenges it involves, *integrated, coordinated and coherent strategies at all levels* are essential. And while it is true that in these proposals poverty is considered to be related not *only* to the income and consumption of individuals, but to key environmental factors (resources) and institutional development, the relationships between environment, poverty and resources have not been addressed appropriately.

A review of the way in which environmental issues have been approached in strategies to reduce poverty reveals the narrow view of public services and the use of resources; their focus on terrestrial ecosystems, ignoring the coastal and marine ecosystems; the omission of the causes of disasters; the exclusion of sectoral linkages beyond agricultural or forestry activities; the concern over the effects of sanitation and pollution on health, ignoring the links with water and vector-borne diseases; and the limited development of indicators to systematically monitor the links between poverty, [resources] and environment, among other important issues.

In any event, poverty, as well as environmental conditions and deterioration, do not manifest themselves in a homogeneous manner all throughout the world, nor between continents, let alone between and within countries.

5. Multiple and complex interrelationships

Population growth patterns have been approached from a broad geographic perspective that considers processes such as urbanization, industrialization and the use of resources (Johnston *et al.*, 2000: 600). Likewise, population is included in the spatial analysis based on a matrix of relationships between population, resources, location of activities, administrative structures, settlements of different sizes and economic-spatial functions, markets and central locations, institutions, and even values, motivations and social goals or objectives (Isard, 1960: 2). A more recent perspective that comes both from human (Simmons, 1997: 28-29) and physical geography (Gregory, 2000: 178) considers that the distribution and the "size" of the population are important to understand the reciprocal influence between environment and population, and between natural environment and culture: the way in which people affect the natural conditions of the ecosystems and the way in which the population is impacted by the changing environment.

As pointed out by Brown (1987: 19-20) "[historically], crop expansion has been closely related to population growth. In response to demographic pressures, farmers *moved from valley to valley and from continent to continent* [the italics are mine], gradually expanding the farming area. Today, one tenth [and at present almost one quarter] of the Earth's surface is cultivated, and the promising [border] settlements have almost completely disappeared". From this perspective, it is worth pointing to some implications of a world population that more than doubled in the last 50 years of the 20th century, from 2.5 to 6 billion, but took 10,000 years to go from 4 million to one billion after the Industrial Revolution.[23]. And had it not been for economic and technological changes, it would not have been able to survive and reproduce and, we must acknowledge, reach the levels of consumption that we have witnessed in some cases, but which are now as questionable as the size of the population.

Developments in the use of fossil fuels during the 19th and 20th centuries intensified food production, and the area of farming land expanded quickly. The demand for food and its relative satisfaction allowed millions of people to find ways to make a living linked to occupations in the industry (Simmons, 1997: 29), that is, in urban areas. But this growth has not been evenly distributed.

One first difference is the distinction between countryside and city or between urban and rural populations. Urban growth since the 1950s, at least in Mexico, and the unbelievable growth of African and Asian cities between 1990 and 2006 (as graphically illustrated by Thonke, 2010: 17 in a science magazine published by UN-HABITAT) show the displacement of the population problem in the world.[24] On the other hand, the current population growth of some regions and countries is negative, null or very slow. That is the case of countries in Europe and North America (and some in Latin America, such as Uruguay), while in others growth is accelerated, like in Africa, some Asian countries and the Middle East. One explanation is the uneven development of the *demographic transition* where, for different reasons, mortality and fertility rates have changed. But by the end of the 20th century, with a 1.68% annual rate, the world's population would double in 40 years.

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23 Growth rates began to increase, especially at the onset of the 18th century (Simmons, 1997: 30).

24 Annual average growth rates of 7% or more are found in cities such as Fez in Morocco, (7.4%), Dire Dawa in Ethiopia (7.8%), Nakuru in Kenya (13.3) and Karaj in Iran (8%), or Guangzhou, Chongqing, Dongguan and Shenzhen in China (7.7%, 11.3%, 13.1% and 20.8%, respectively). Those cities with 7% rates would double their population in less than ten years, seven years in those with rates of approximately 10%, and five or three years in those that maintain rates of 13% or more. In Latin America, middle-sized or large cities such as Port au Prince (before the 2010 earthquake), Maracaibo, Ciudad Juarez and Tijuana, or Santa Cruz in Bolivia, have average annual rates of 4-5%, which are still very high.

And without underestimating historicist or economic explanations, it is worth noting that, when it comes to explaining these differences, culture is as important as figures (Simmons, 1997: 34).[25]

The regions and countries with high growth rates are the poorest, where the average income is declining. Biomass is the main source of energy. In addition, in those economies with high average incomes, the use of fossil energy is really high and continues to increase with the consequent environmental impact, in such a way that differences in material levels between rich and poor countries or regions of the world have clear consequences for the relationships between population and environment.

The complexity of the population-environment interaction in a context of spatial diversity, different types and quantities of resources and cultural multiplicity, leads us to think about the need to see the world, and our own place, differently compared to the conventional paradigm. As stated by Simmons (1997: 41), it is necessary to:

i. Include biophysical, socioeconomic, historical and political factors in our analytical framework;

ii. Simultaneously consider different processes at different spatial and temporal scales (local and global, fast and slow, short, medium and long term);

iii. Discuss the structural changes in natural and human systems that neither follow linear paths nor are kept in balance;

iv. Compare the count of measurable phenomena with those that cannot be quantitatively measured and, therefore, require not only numerical basis judgments, but judgments based on ethical criteria.

25 In general, culture is some sort of social fabric that encompasses the different forms and expressions of a given society. Therefore, customs, practices, ways of being, rituals, types of clothing and behavior standards are aspects included in culture. Rules should also be explicitly added. With the contribution of anthropology, culture should include: material goods, symbolic goods (*i.e.* ideas), institutions (*e.g.*, in the sense of channels through which power circulates: school, family, government), customs, habits and laws. Thus, we can affirm that every society has a culture, and every culture is put into practice by the people that relate to each other. All societies have a culture expressed in them, in response to which we can say that *society equals culture*. They are the two sides of the same coin. Culture is the collective production of a universe of meanings in constant change. Culture cannot be seen as something appropriable. It is a collective production of a universe of meanings transmitted from one generation to another. In the Latin originally spoken in Rome, culture originally meant "the tilling of land". Available at: (http://www.monografias.com/trabajos13/quentend/quentend.shtml#ixzz3hWTaIYCd; http://www.monografias.com/trabajos13/quentend/quentend.shtml#ixzz3hWSEhKYx;http://definicion.de/cultura/#ixzz3hWQhD4g6

5.1. Time and space

It is a fact that human activities have produced measurable changes in most biogeochemical cycles.[26] Changes occur in timescales that do not correspond to those in these cycles, in such a way that they have affected climate, the ozone layer in the stratosphere, soils and, therefore, food production and mineral contents in oceans, such as phosphor used in fertilizers, which allows for higher rates of photosynthesis by marine plankton, affecting their ability to sequester carbon from the atmosphere. The positive interaction between the different cycles allows human action to accelerate the changes (Simmons, 1997: 87-97), to the extent that some of them affect ecosystems or landscapes on local or regional scales and in short time frames, which often hides their overall and long-term impact.

Another aspect that stems from human action are the levels of *resource appropriation* that affect the functioning of ecosystems and have, both in per capita and overall terms, different local impacts in the *short-term* and *global* impacts in the *longer-term*.[27] Another one is that of inequity in the use of resources in consumptive and non-consumptive terms.[28] The contrast in per capita terms is obvious but, on the aggregated global scale, that is no longer the case in absolute terms, affecting both the levels of provision of materials and waste disposal. Even in the case of the non-material use of the resources or services provided by nature in recreational and tourist activities, the current practice shows levels of manipulation that jeopardize the stability of environments and ecosystems (Simmons, 1997: 105).[29]

But what is the *appropriate* level of analysis? Open systems (such as spatial units: regions, cities, metropolitan areas) are characterized by flows that cross their borders or political-administrative boundaries, which are often ill-defined (or defined by historical reasons that are no longer relevant) but crucial if one attempts to analyze the dynamics of growth in the territory based on this relationship between economy and environmental system or natural environment (Isard, 1972, cited in Braat and Steetskamp, 1991: 270).[30]

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26 Within the planetary "noosphere", the energy of the sun that enters and flows through the different systems, such as the aquatic system, allows for the creation of cycles, such as the hydrologic cycle. Other chemical elements present in living or inert matter allow this energy to flow and recycle, constituting biogeochemical cycles that make life possible on the planet. Among the most important ones are the carbon and nitrogen cycles. In sufficiently large magnitudes, human activity has modified part of these cycles, creating problems for different life forms and even the human species (Butcher et al, 1992, cited in Simmons, 1997: 87).

27 China has become the world's largest CO2 emitter, even though its increasing per capita level is not among the highest in the group of industrialized or developing countries. However, its largest cities, like Beijing and Shanghai, have reached higher per capita emissions than many European cities or New York and San Francisco, for example.

28 In simple terms, the non-consumptive use of a resource is one that does not alter its volume or quality. The examples in the case of water would include those uses that take advantage of its flow: hydropower, watermills or navigation. In contrast, when the use of the resource does alter its volume or quality, its use is consumptive.

29 Finitude or limits to their exploitation (Turvey, 1954) and the need to regulate their use were already recognized in the 1950s with the collapse of fisheries. That is where the debate around common use resources began (Gordon, 1954). However, the original formalization of the dynamics of populations is something we owe to Lotka (1925).

30 The capital of an economy is its inventory of real assets that produce goods or services in the future. Isard formalized the relationship between economy and environment for regional development.

In the context of development sustainability, *time* involves inter-temporal negotiations, intergenerational equity and long-term planning, where the horizon is arbitrarily defined as a convenient time in the future or is considered as qualitatively infinite. *Space*, on the other hand, in the range of the biosphere, considers global, regional or continental, national and regional systems. The determinants of these spatial boundaries adopt three forms: the physical properties of a system (*natural endowments*); the self-imposed limits (*institutional development*) and the technological level (*the complementation or factor substitution capacity*).

In this analytical framework, proposed by Braat and Steetskamp (1991), it is possible to unconditionally accept the idea of living in a "healthy" planet and inherit it to future generations, but it is not easy to decide how to distribute the benefits and burdens internationally, inter-regionally or locally (Elster, 1992).[31] In order to illustrate the difficulties faced in the design of environmental policy as a result of the spatial and sectoral (and temporary) interdependencies of the different elements and factors, we include the following proposal from Braat and Steetskamp (269-288 1991) of a set of *strategies for the development of a region* (conceived as an open system):

a. Shifting from local (*exploitation of resources*) to external resources *(import primary products).*

b. Using renewable fuel resources up to a limit (*extinction*) and replace them with alternative external fuel resources.

c. Providing space (*location*) and supplies (*water and energy*) for those activities that import primary products and export intermediate or final consumption goods.

d. Shift the use of a renewable resource from one function to another: forests for timber, for pulp, for outdoor recreation, even offering or applying subsidies to support this *functional transformation*.

e. Shift from *extensive-grazing* uses to *intensive-feedlot* uses in livestock farming (and perhaps in agricultural production, using hydroponics, for example).

31 The integration of the costs of exploiting resources and nature, in general, and the benefits of protecting it is a complicated issue. According to Peskin (1991: 179), the conventional system of national economic accounts has deficiencies in:

i. The way of measuring economic and social performance;

ii. It is inconsistent when it comes to dealing with wealth and ignores variables that might explain economic activities; and

iii. It has not developed a reliable accounting system that takes into account or properly identifies the environmental expenditure/benefit.

5.2. Urbanization

We have entered the *urban world* and we live in the urban century (Kourtit et al, 2015: 4.). What do these statements mean? The authors highlight three different eras:

1. Despite all the negative opinions about cities, it is a fact that the evolution that has taken place over the last two centuries has led the population to move in the direction of urban agglomerations;

2. The pace of the urbanization movement and process has accelerated in unprecedented ways, to the extent that, by the middle of this century, 75% of the world population will be urban, compared to 10-20% two centuries ago;

3. The current urban model dictates changes in transportation, accessibility and connectivity for the city inhabitants. The *urbanite* leads his economic activities, life and personal work, in his family and in society, in a way we could have never imagined three decades ago (not to mention the beginning of the second half of the 20th century).

Today, population growth means *urbanization*. It is all about growth and urban concentration and, at present, all (or almost all) of the urban growth occurs in developing countries. An analysis of urban growth trends in the developing world reveals that environmental problems are expressed on *different geographic scales*, but also that they are *cross-cutting* and touch upon economic and social aspects, including cultural and political ones (see the Introduction and Chapters 1 and 2).[32]

A clear example of the above in almost all the cities of the Third World, as pointed out by Pacione (2011: 17), is that of contaminated water and urban riverbeds, which look more like drainage ditches. Floods, water shortages and the contamination of shallow water and aquifers pose a threat to the urban population in general and vulnerable groups in particular. Thus, the main requirements to solve urban environmental problems are the *provision of drinking water and wastewater disposal and treatment*, with the aim of fighting the effects of pathogens that raise morbidity and mortality levels (Pacione, 2011: 19), a situation that has a negative impact on productivity and the quality of life in general.

The fact of considering this variable, which runs across scales and sectors, would seem justified when it comes to thinking about a *territorialization* of public policy. In effect, one problem faced by public management or decision-making processes is that of *allocating (to whom, when, how and where) the benefits and burdens* of every action, in order to reduce unfair effects (Elster, 1992). Therefore, regionalizing, based on the availability of a vital resource (such as water), is justified because the decisions in connection with our economic and social (*who*) future (*when*), which are currently sectoral and geographically fragmented (*how*), affect the ecosystems in which we live (*where*) and vice versa. With a spatially *degraded* hydrologic system, limits will be imposed on the capacity to make informed decisions about the future of the economy and society in general.

32 Se toman ideas desarrolladas por Graizbord, González, López y Corona (2014), presentadas en una reunión de la Somede (http://xiireuniondemografica.ibero.mx/programa.html) de las que se publicó solo el resumen (http://xiireuniondemografica.ibero.mx/pdf/resumen_corto/15.1.2.pdf).

Since the end of the first decade of this century, the process has shifted to megaregions as the new scale (Faludi, 2009), although that trend is older than that in functional terms. Let us remember the discovery of Gottmann (1961) in the 1950s about the "megalopolis of the northeastern seaboard of the United States". Contant and Nie (2009) suggest a new *planning approach*, where the *megaregion* is a new concept in the field of urban and regional planning. A *megaregion* can be defined as a *multidimensional* space, where the links of networks among cities, metropolitan areas and rural areas are structured, that is characterized by a set of interconnected activities, with common resources, a cultural identity and economic opportunities. In this regard, Contant and Nie(2009: 15) raise the following question: Can the *megaregion* be a useful construct to understand, plan and solve the challenges of the 21st century?

As affirmed by Higgins and Savoie (1997: 3), societies and their economies cannot be understood without an analysis of the *interdependence* and the *overlap* between space, time, economic structure and society. As a matter of fact, countries and national economies *are interrelated sets of spaces* (regions), each of them with their own economic, social, political and power structures. Therefore, the explanation of their performance (economic, social and political) will vary, to a large extent, due to the degree in which these spaces (regions) are integrated as national economic, social, political and administrative systems. When the performance of the group is not satisfactory, an intervention is required in these (regional or local) spaces, and not only on the macro and microeconomic levels of the economy. In this regard, the regional economy makes an attempt to rely on the scale of megaregions to include development, policy and regional planning assessments and analyses, all of which turns it into an integrating factor or a catalyst of social sciences in general. That is how it was suggested by Isard in 1960, when he proposed his *Methods of Regional Analysis*, the first textbook in this area of knowledge, also known as *regional science*.

According to Higgins and Savoie (op. cit.: 5-6), space has been traditionally seen from four different perspectives:

a. The first considers, implicitly or explicitly, that (*geographic*) *space is homogeneous*, but recognizes that there may be a set of spaces or geographical areas with different *endowments*, physical and human, which creates opportunities for geographic specialization, according to absolute or comparative advantages. From here the theory of international and interregional trade (see Krugman and Obstfeld, 1995).

b. The second fails to consider the friction of distance, because it assumes a *costless and instantaneous mobility of all the factors of production*, but recognizes that the different resource endowments of regions and specialization as the basis for regional trade also entail a cost to cover the "distance" that separates these spaces. Therefore (even though analytical parsimony is affected), transportation costs and limited mobility must be taken into account. These considerations appear in the theory of yields of rural (Von Thünen, 1966) and urban land (from Alonso, 1964; Mills, 1967).

c. According to the third perspective, the *uneven distribution of resources and population* requires making decisions as to what activities will be carried out, how and where. Proximity to markets and to resources, as well as production and transportation costs, will be considerations in these decisions (Weber, 1909). Today, access to information and technological developments are also elements that add to the determinants of population distribution and the location of productive activities (Norton, 2000). That is the basis for the *location theory* (Krugman, 1996), including the *central place theory* (Christaller, 1966; Lösch, 1954), and the rules about the city size (Richardson, 1973; Henderson, 1974) and *hierarchy in urban systems* (Berry, 1970).

d. The *boundaries of political-administrative units and borders* define spatial units such as nation states, states, provinces, municipalities and districts. According to this fourth perspective, these barriers affect decision-making processes in the areas of trade, monetary, fiscal, price, wage and salary and land use policies, among others. And these differences are precisely what leads to the analysis of policies in *subnational or supranational spaces* (like the European Union), although the specific analysis of cultural, social or political (and even environmental) differences has not been sufficiently developed on the different scales, from the local to the global.[33]

5.3. The local and the global

These extreme scales represent analytical approaches of regional economics or two aspects of the development or evolution of the "new economic geography" (Fujita et al., 1999: 3). In the first case, we are talking about a methodological aspect within the discipline related to the definition of "place"; in the second case, we are talking, on one hand, about the result of the explicit consideration of technological changes and, on the other, the economic growth possible with the expansion of the world capitalist system (Wallerstein, 1974), which have transformed the market and modified the man-nature relationship, that is, the value of natural resources and their economic use by society.

On the *local* scale, Harvey (1996: 207-209) affirms that, depending on their economic, social and political forms of organization, as well as their specific environmental circumstances, different societies have produced particular ideas about *space* and *time*. And while it is considered that both concepts are social constructs, there is still a lot of confusion in the debate. Thus, it is accepted that space and time are shaped through *social relationships and*

33 Taylor (2013) recently argued about the need to write History (capitalized) not on the basis on nation states (*i.e. artificial* homogeneous areas), but through *cities* (as concentrations of dynamic flows of goods, services, ideas, values, knowledge), such as Athens, Rome, Babylon, Tenochtitlan, Amsterdam, Paris, New York, Tokyo and Shanghai, among many others. This author, precisely leads the GaWC group, which was created in 1998 to promote the study of the *world's system of cities as nodes of a global network* of exchange of goods and knowledge (ideas): *"Thus instead of the traditional stuff on the rise and fall of empires – narratives of war and peace between great powers – I have been focusing on how cities are implicated in the huge advancements humans have made since such settlements first appeared many millennia ago.… Cities are revealed as being world-changing loci, with an innovative capacity that will be vital in producing a resilient global society necessary to carry us safely through the 21st century…"* Available at: http://elgarblog.com/2013/01/23/cities-are-extraordinary-by-peter-taylor/.

practices, even though it is often said that they occur in a *pre-fabricated* space-time frame, like the latter was a continent of the former. In fact, it is not clear that space and time can be dealt with as separate qualities in the analysis of our being or in the attempts to explain how the world works in general. Formally speaking, however, both time and space are dealt with separately as explanatory variables, but also as dependent variables (Giddens, 1990; Crosby, 1997).[34] According to Harvey, the concepts of space and time are fundamental to almost everything we think and do, including how we see the world around us and how we theorize about it.[35]

Harvey makes an attempt to find responses through an extensive and impressive review of existing literature in disciplines such as history, geography and anthropology. The latter two disciplines have some limitations for the regional analysis. In synthesis, it can be said that anthropologists have conducted their studies about particular societies or human groups in certain places, but in doing so they have not put enough emphasis on the analysis of the physical environment that sustains a particular social group, and with which it interacts, nor have they shown any interest in comparing or looking for similarities between one group/place and another. Physical geographers, on the other hand, are more aware of the physical environment, but underestimate the social and cultural structures and the political and administrative framework that characterize the social group and define its interactions or relationships with the environment.

According to Harvey (*op. cit.*: 208-209), the concepts of space and time provide the reference for us to adopt a spot, to define our situation and position with regard to what happens around us or in the rest of the world. Thus, he affirms, space and time cannot be discussed without invoking the term *place*. There is, Harvey continues, a countless number of words (*i.e.* surroundings, locality, location, local, neighborhood, district, region, territory) that describe the *generic* qualities of the place. Other terms (*i.e.* city, town, village, megalopolis, etc.) designate particular types of places, and some others (*i.e.* home, nucleus, community, nation) evoke strong connotations of place, so it would be difficult to talk about one without the other. But the term *place* also has broad metaphorical meanings ("the place of art in social life," "our place in society", "the place of man in the universe") that psychologically make us feel that we belong to something and are recognized by others. Or else, they allow for the expression of norms to locate people, events and things in the "right" place or the subversion of those norms by defining new places: "in the outskirts", "along the border", through which one can then give an opinion or take action. This profusion of meanings and ambiguity, Harvey (*op. cit.*: 118) affirms, can be useful to explain the processes of "socio-ecological" change that affect:

i. The environment in which we live (air, water, land and landscapes);

ii. The ecosystem that supports life in general [and the environmental services it provides]; and

iii. The quantity and quality of the stock of natural resources (renewable and non-renewable) that allow for the development of human activity.

34 Also as analytical categories.

35 Somehow, methodologically speaking, spatial statistics integrates space and time into some of its techniques, such as the spatial-temporal correlation: Anselin, 2005. Some examples of its application in Mexican cities can be found in Garrocho and Campos, 2015a.

5.4. Globalization

On the other end, we have the global scale, where human life occurs on the planet. Global changes affect the local in a *spatial-temporal continuum*. Thus, the "socio-ecological" link identified by Harvey raises an analytical interest in globalization processes.[36] Regardless of the ideological-cultural, economic (Sklair, 1991. Chapter 5) or psychological impacts it has on the lifestyle and quality of living of individuals in their immediate environment (on the local), globalization jeopardizes global environmental resources and services and, therefore, this begs the question of whether the scale achieved by human activities and production processes today is consistent with the desire to make human existence on Earth sustainable and viable, or with the need to secure it without reaching unacceptable consequences (Heal, 2000: 169).

6. The regional, or is sustainability possible here and now?

The reader should note that the question in the heading of these conclusions is far from the questions raised by *The Limits to Growth* team in 1972, to wit: What would happen if population growth remains out of control? And, yet, it somehow resembles the additional questions raised: What will happen if growth in the world's population continues unchecked? What will be the environmental consequences if economic growth continues at its current pace? What can be done to ensure a human economy that provides sufficiently for all and that also fits within the physical limits of the Earth? That question was then defined with respect to the scale, but also with respect to intra and intergenerational equity (*today and tomorrow*), with the phrase "sufficiently for all" (Meadows *et al.*, 1972: 19).

To put the discussion in context and explore regional demographic changes, as well as changes in human activities from the perspective of economic geography, it would be worth summarizing the "real life" factors that, according to Higgins and Savoie (1997: 7-10), *have not been systematically considered*, either by the approaches of neoclassical economics or the different Marxist schools of thought:

1. *All societies or social groups live in particular places.* Cultures are defined in terms of space, a fact that has not been explicitly recognized by regional economists.

2. *These spaces are almost always smaller geographically than a nation state*. No country can be considered as sufficiently homogeneous to be studied as a single society or culture.[37]

3. *Groups of interest coexist in most countries*. They differ among themselves and sometimes express themselves in a conflictive manner and occupy different social and political spaces.

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36 This last topic, the interaction with the environment, affects the basic principles of the two main traditional branches of both physical and human geography and aims to bring them together. See, for example, the physical geography book by Gregory (2000), which consistently addresses the aspect of human activities and their mutual impact with the biophysical and biogeochemical elements of ecosystems.

37 Perhaps with the exception of a few very small nation states, such as the Vatican, Monaco, Grenada, Malta, Liechtenstein or San Marino, among others.

4. *Economic and social interests* of particular societies in particular spaces are closely tied to the dominance of economic values and therefore, to the structure of the economy. Thus, a commonality of interests arises when people live in the same place and work in the same activity or sector.

5. People develop stronger *loyalties* to the "place" than to the activity or sector in which they work. Knowing how to behave in that environment creates a pull in most of the people who live in it. This means that mobility could never be costless, instantaneous or painless, even if transportation were free, or if appropriate infrastructure and equipment exist in a different place. This fact should be taken into consideration in the calculation of the impact of certain policies (such as those of "jobs for workers" or "workers to work" [or social housing]) on the welfare of a particular society.[38]

6. Most people do not think of welfare in terms of nation states. Their national pride changes if they live in a retarded space (region) [environment], if they (or their families) are unemployed, ill-housed, impoverished or have deficient or inexistent public municipal services, and are unable to get education and health services. Thus, the criterion should be that of public policies aimed at much smaller spaces [areas] than the nation state.

7. As a result of a combination of *market failure and public policy failure*, the market does not work well, as the theory suggests. There is no assurance that a rise in the national income of a particular group, sector or region will produce social wellbeing. Thus, the criterion should be that of *ad hoc* policies with measures that are appropriate to each case.

8. *The harmony of interests* is not automatic and unlimited in a national economy or society. If a group or sector of the economy is prosperous, it can increase its consumption, but if the supply is inefficient and highly protected (like it was during the era of industrialization as a result of import substitution), then there will be sectors or groups that will oppose this protectionist scheme and will demand an openness that will not necessarily benefit all.

9. These conflicts tend to be translated into *spatial terms*. Depending on the differences in competitive capacities, some sectors or regions will be better prepared than others to face challenges and seize opportunities. Thus, there will be winning and losing sectors, regions and social groups.

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38 The reader is encouraged to imagine the violent and "empty" environment of housing developments 30 to 50 kilometers away from the nearest town where the market, school, church, health center, or workplace are located. Developments like this have been built in recent decades in Mexico in the context of an irresponsible housing policy, to say the least, designed to serve the interests of real estate capitals and developers (refer to Chapter 2).

10. There is also an *overlap between the structure of the national economy and regional development*. Changes in the occupational and industrial structure go, or may have gone, hand-in-hand with regional development. However, that development does not occur in all regions at the same time, nor in all sectors. Today, the fluidity in the location of the world's economic activities makes changes faster and more unpredictable within a country, and these changes affect regional space more differently than economic sectors. The same happens with the diffusion of innovations, because it is not possible to explain what is going on in the country without knowing what is going on in its regions or cities. One example of that is the dynamics proposed in Geyer and Kontuly´s (1993) model of "differentiated urbanization".

11. There cannot be a trade-off between an equitable policy for regional development and a policy for the efficiency of the national or urban economy, because there are strong *complementarities* between the two. In fact:

    a. Countries with a high per capita income tend to have small regional disparities, while those with a low per capita income tend to have large disparities between their regions and cities;

    b. Countries with large inter-regional and inter-urban inequalities tend to have high inflation rates and unfavorable unemployment rates, while those with small gaps between regions and cities tend to have a favorable combination of inflation and development;

    c. Slow-growth regions tend to have higher economic fluctuations, with shorter growth periods and longer depressions than high-growth regions, which tend to have greater stability with long growth periods.

That is it on Higgins and Savoie. The point here is if, as they say, "regional convergence is achieved with sustained growth rates over long periods", although they also argue that "there is no evidence of a general movement toward *equilibrium* in a free market economy in the sense of regional balance…".

The experience in the evaluation of regional policies developed by Higgins and Savoie at the time is addressed by Fujita *et al.*, (2001: 9) with "two helpful questions" that, I might add, are also *still valid* for purposes of this discussion:

1. When is a spatial *concentration* of economic activity sustainable? In other words, in what conditions can the advantages obtained from agglomeration economies be sufficient to maintain concentration?; and

2. When is a systemic equilibrium without spatial concentration [or dispersion] unstable? In other words, under what conditions do small differences among locations snowball into larger differences, causing the symmetric equilibrium between two identical locations to break?

This is a technical-analytical level that we cannot address here, although there are multiple reasons to consider it in the context of a *sustainable urban development* policy. In fact, we would have to point to two tendencies in this regard: the possibility (although remote) of finding successful cities in depressed regions with degraded resources, and vice versa; and the impossibility for a general policy to have harmonic and successful results in all cities or in all regions. Therefore, we would have to wonder if the *green economy* initiative and model that takes into consideration the opportunities offered by cities (UNEP, 2011) will be enough to offset these tendencies, or if it is necessary to take into consideration the interrelationships we have discussed throughout this book.[39]

The discussion about the differences or inequalities in economic development between countries and regions in the context of a globalized economy is addressed in the model of "endogenous growth" or "new growth theory", where technological innovation is endogenously determined by public and private sector investments in the economic system, and is not exogenous to the system, as assumed in the conventional theory. In other words, if investments in human capital and innovation by the public and private sectors are appropriate, then it is possible for an economy to attain a constant and sustained growth rate in output and consumption (Barbier, 1999: 127).

The original question is: why is it that the long-term economic growth rates of poor countries as a whole do not converge with those of rich countries? The answer is straightforward: "Poor countries fail to achieve high growth rates because they *fail to generate or use new technological ideas* to reap greater economic opportunities" (Barbier, *op Cit*.: 126.). According to Romer (cited in Barbier, *op. cit*.: 127), they fail to do so because "the feature that will increasingly differentiate one geographic area [city, region or country] from another will be the quality *of public institutions*." (Diamond, 2013; see Chapter 2). Those with more competent and effective mechanisms to support collective interests, especially those related to the production of new ideas, will be more successful, in such a way that the difficulties faced by poor countries in the process of achieving the wellbeing of their populations can be attributed to "the flaws of the politicians" and weak institutions (Acemoglu and Robinson, 2012). In fact, the literature reports that, with relatively low levels of initial physical and human capital, national efforts are less effective in reducing poverty and responding to economic growth (Datt and Ravillon, cited in Pernia and Quising, 2003: 14).

But this is not the whole story: "In many poor economies the depletion and degradation of natural resources -such as crop lands, forests, fresh water and fisheries- contribute to this institutional instability and disruption. Resource scarcities can cause social conflicts that disrupt the institutional and policy environment necessary for producing and using new ideas and for absorbing useful knowledge from the rest of the world" (Barbier, *op cit*.: 128; see Chapter 5) -or traditional communities!, we might add-, which means that scarcity may not necessarily limit economic growth, but can have an indirect negative effect on the *innovation potential*.

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39 "Cities can provide essential services, including health and education, at lower *per capita* costs thanks to the savings of scale yields. Savings can also be achieved in the development of vital infrastructure such as housing, water, sanitation and transportation. In addition, urbanization can reduce energy consumption, particularly in the areas of transportation and housing; and create interactive spaces that expand the cultural exchange and scope. Achieving these benefits requires proactive planning to address future demographic changes." A powerful argument in favor large cities is, without a doubt, that of Glaeser (2012).

However, endogenous growth theories have failed to address the contribution of natural resources to economic welfare or the role of innovations to overcome resource scarcity, although some economists like Stiglitz (1974), for example, or economists in the fields of environmental and ecological economics, have explored the effects scarce resources have on economic growth (Neher, 1990). To do this, they use $Q = KLRert$ type neoclassical growth models, that is, the aggregated product Q as a function of the physical capital stock K, labor force L, and resource input R, with r being the constant rate of technological progress in a given period t.

The results of these analyses are optimistic and conclusive (even with high population growth and a limited supply of natural resources): resources can effectively increase in such a way that a sufficient allocation of human capital to innovation ensures that, in the long-term, the depletion of resources can be postponed indefinitely, and it is possible to reach an endogenous growth rate to sustain, and even increase indefinitely, a certain *per capita* consumption (see Chapter 3). However, according to Barbier (op. cit.: 132), we can consider two scenarios in the case of countries or regions that maintain a high rate of resource exploitation:

i. One where the long-term innovation rate surpasses any resource scarcity adverse effects, in such a way that net innovation is positive; and

ii. Another where the long-term effects resulting from resource scarcity can affect innovations, that is, disrupt social and technical innovation to the extent of annulling it (which could, but does not necessarily mean, the collapse of the economy).

The economies (national and regional) trapped in this second scenario would be behind those that do not face resource scarcity or those that manage to overcome the barriers to innovation. And that reason is enough to:

i. Stop and reverse exploitation; and

ii. Accelerate the implementation of the agreements reached last July in Addis Ababa, Ethiopia, during the *Third International Conference on Financing for Development* (http://www.un.org/esa/ffd/ffd3/conference.html), where attempts were made to find the formula to transfer resources (from environmental debtors) to the most vulnerable, who will inevitably experience the relentless effects of climate change.[40]

40 Declaration of agreements:

i. Assessing the progress made in the implementation of the Monterrey Consensus and the Doha Declaration and identifying obstacles and constraints encountered in the achievement of the goals and objectives agreed therein, as well as actions and initiatives to overcome these constraints;

ii. Addressing new and emerging issues, including in the context of the recent multilateral efforts to promote international development cooperation:

** The current evolving development cooperation landscape;*

** The interrelationship of all sources of development finance;*

** The synergies between financing objectives across the three dimensions of sustainable development; and*

iii .The need to support the United Nations development agenda beyond 2015, reinvigorating and strengthening the financing for development follow-up process. Can we expect results without delay?

5. Four public policy recommendations in connection with local governments

Introduction

In this chapter we present four public policy recommendations that strengthen the skills of local governments in planning and developing sustainable cities:

i. Establishment of national and regional programs for the training, supervision, evaluation and certification of municipal treasurers and urban planners;

ii. Development and implementation of a national land-use planning strategy;

iii. Integrate a demographic perspective into urban and regional planning; and,

iv. Implementation of regional strategies to promote the creation of metropolitan authorities.

Each recommendation includes the background, consequences and foundation of the problem. These recommendations were chosen based on their relevance and feasibility of implementation in Mexico and Latin America in general.

1. Establishment of national and regional programs for the training, supervision, evaluation and certification of municipal treasurers and urban planners

1.1. Institutional capabilities of local governments

Mexico has experienced a few cases of success; however, urban planning is characterized by inefficient urban infrastructure, inequalities in access to public services, lack of territorial planning, intergovernmental *contradictions and conflicts, obsolete and contradictory* legal frameworks, and a centralized financial system with important *political links* at different levels of government (Cabrero, 2005).

The main problems observed in the way local administrations function have to do with the existence of ambiguous and insufficient regulatory frameworks, *obsolete* management systems *and a low level of specialization* among mayors and public officers (Guillen *et al.*, 2007).

In 2005, Cabrero (2005) defined the main administrative weaknesses of Mexican municipalities. Within the regulatory framework, the author was able to identify that, during the first decade of the 21st century, 64% of municipalities lacked a basic regulatory system, 80% did not have rules for planning and definition of actions, 52% did not have provisions to regulate the delivery of public services, and 20% lacked basic strategic planning. Among the merely administrative weaknesses, Cabrero identified that 50% of municipalities did not have administrative areas specialized in expenditures evaluation and oversight, 65% lacked a Human Resources department, 17% did not have a computer for administrative work and most municipalities acknowledged that their actual collection was 75% below reported income. Finally, with regard to specialization levels, the same study identified that 18% of mayors had completed middle or higher education, as well as the fact that 50% of public officers lacked prior experience in public administration.

More recent data (Arellano *et al.*, 2011) shows that the situation among Mexican municipalities has not changed radically in the last decade: only 38% of mayors have a bachelor's degree, 12% have a high-school diploma, 15% completed middle school and 24% finished elementary school. While mayors have little experience in government activities, 50% had a former job in the private sector. In average, heads of area have a primary school education level. Most people work in the areas of security and public services, but are often led by officials with less training. Prevailing personnel hiring schemes create *instability and a high turnover* among civil servants; hence, their actions are improvised.

In 2009, 47% of all municipal workers were non-unionized and only 31% had a contract. The study by Arellano *et al.* also found that there were severe regulation issues: less than 50% of the country's municipalities had essential rules, such as public works, land zoning and land use, participation and planning. In spite of the fact that most municipalities had good governance and police regulations, within city halls and public security areas regulations are no updated. Only one third of the total number of municipalities have some type of partnership with other municipalities or the state government, and such partnerships only exist in traditional areas, like the provision of basic services. Smaller municipalities with higher levels of backwardness are *less likely* to establish partnerships.

The *financial dependency* of local governments has remained at historically high levels. Data available from 2014 shows that local governments do not make the fiscal efforts required to increase their own revenues due to a lack of clarity in the integration and allocation of federal transfers to states and municipalities, as well as from states to municipalities; low local collection levels that strengthen dependency on federal resources; and an inefficient design of local revenue laws and regulations, mainly derived from a lack of awareness of their powers and the public cost resulting from a higher tax collection (World Bank, 2010).

A large number of states fail to collect the main taxes they are supposed to collect, a situation that limits their tax-collection capabilities and reduces their fiscal efforts. In practice, property tax is the only tax collected by a few municipalities. The latter situation is also related to opacity in public resource allocation, which discourages investment and reduces legal certainty for private investment, with heterogeneous and unclear accounting structures that make it difficult to know, with complete certainty, what the final destination of public resources is (World Bank, 2004).

One of the primary causes of instability of municipal management in Mexico is the fact that, except for two federal states, the administrative terms of municipal presidents, who are appointed via elections, are of three years without the possibility of reelection for consecutive terms. While the legal framework does not ban the continuity of junior officials, who are not appointed via elections, what has historically happened is virtually a full turnover of municipal authorities with every new administration (Guillen *et al.*, 2007).

High personnel turnover prevents the creation of experienced municipal top-level officers with the capacity to engage in the mid-term planning of municipal government initiatives. In addition, Mexico does not have a professional career or certification for municipal officials. This is probably due to the fact that there are no training programs for stable and high-quality municipal officials (*e.g.* career civil servants). There is only one federal body, with limited capacity, that provides training to municipal treasurers (*e.g.* INDETEC), and only a few states have institutions dedicated to training municipal officials in general (*e.g.* IHAEM, in the State of Mexico).1 Most training courses for municipal officials are sporadic, and no formal training programs exist. There is no evaluation, follow-up and accountability (Graizbord, 2013; Graizbord, 2011).2

Notwithstanding the above, there is evidence that a few municipalities in the country, despite economic, legal and administrative limitations, show a high degree of innovation and management capabilities. A good example can be found in the 4,074 cases identified through the Government and Local Management Award granted by the *"Centro de Investigación y Docencia Económicas* (Center for Economic Research and Teaching or CIDE, in Spanish)" during the 2001-2011 period (Carrera, 2015) (see Table 5.1). Such experiences are a clear example that Mexican town halls develop public policies through a broad variety of programs not only linked to the privileges and responsibilities directly granted by the law, but also in areas where the main responsibility belongs to other government spheres, such as health and education.

1 INDETEC: Instituto para el Desarrollo Técnico de las Haciendas Públicas ("Institute for the Technical Development of Public Finance"); IHAEM: Instituto Hacendario del Estado de México ("State of Mexico Public Finance Institute").

2 El Colegio Mexiquense, A.C., located in the Metropolitan area of Toluca, is one of the few higher education institutions that offer a master's degree in Municipal Development.

Table 5.1

MEXICO:

PROGRAMMES THAT PARTICIPATE IN THE GOVERNMENT AND LOCAL MANAGEMENT AWARD, BY TOPIC (2001-2011)

CLASSIFICATION	NO. OF PROGRAMS	%
TOTAL	4 074	100
SOCIAL POLICY	610	15
ADMINISTRATIVE MODERNIZATION	549	13.5
MUNICIPAL DEVELOPMENT	476	11.7
MUNICIPAL INFRASTRUCTURE	411	10.1
EDUCATION	340	8.4
ENVIRONMENTALCONSERVATION	303	7.4
PUBLIC SERVICES	300	7.4
PUBLIC HEALTH	285	7
PUBLIC SECURITY	267	6.6
CITIZEN PARTICIPATION	259	6.4
URBAN PLANNING	130	3.2
TRANSPARENCY AND ACCOUNTABILITY	95	2.3

SOURCE: CARRERA AND FERNANDEZ (2015).

In Table 5.1, it is possible to see that the main areas where municipal administrations make efforts to improve are the following: social policy, administrative modernization, municipal development and municipal infrastructure (Carrera and Fernandez 2015). The areas where less improvement is sought are: transparency, citizen participation and planning or evaluation. Only 3.2% of the initiatives submitted were related to urban development.

1.2. Training and certification regional strategy

An alternative to building the institutional capacities of municipal governments is to establish a selection, training, supervision, evaluation and certification national system for municipal officials more tightly connected to urban planning and municipal and urban development: municipal treasurers and heads of urban planning.

This strategy has been tested in Mexico and several Latin American countries with different levels of success. Different authors and specialists had already suggested this strategy. At present there are some initiatives, such as that of the Lincoln Institute of the University of Wisconsin, which is trying to create a de *facto* regional program in this area. The need to strengthen and encourage these types of strategies through national and international agreements and to foster collaboration among national, state and local governments, universities and the private sector is emphasized in this chapter.

National consensus must be reached in order for state and municipal governments to join an initiative and a national agreement, so that local urban policy leaders will have at least a minimum level of training. The existence of a *national certification program for municipal officials* is also necessary. Universities, school consortiums and institutions should play a central role here. A *Latin American program* that certifies municipal officials could create a critical mass of decision-makers on urban and metropolitan affairs to lead the future toward sustainable cities.

The current legal framework needs to change so that the certification process can be implemented through commitments and agreements. In the 1980s, for example, a Fiscal Coordination Law was adopted that allows for state and municipality participation in the national fiscal system, without losing their sovereignty and autonomy.

It is a fact that, considering the predominant political and corruption motivations inside municipal governments (albeit not only on this level of government), political and economic groups and actors that profit from decisions made by local governments would actively oppose this measure. However, from the perspective of sustainable cities and future generations, *the costs of not intervening or allowing existing corruption networks to continue are incalculable* (see the last paragraph in Chapter 2). Hence, municipal strengthening strategies must stem from national (and international) consensus. All the different stakeholders have a role to play in this priority.

As far as contents are concerned, efforts to strengthen municipal governments must include technical assistance and oversight of local management for urban development, including planning instruments, promotion and development instruments, funding instruments, cost and benefit redistribution instruments and instruments for citizen participation.

2. National land-use planning strategy

2.1. Factors related to the lack of territorial planning in Mexico

As revealed by a study of the World Bank (2004), it is appropriate to say that *illegal* land occupation, more specifically urban land, enabled a basically *pacific transition* between the agrarian Mexico and the *urban* Mexico, allowing communal land owners to generate some kind of economic profit within an urbanization process where their productive capacity in the field was lost or reduced.

However, it is possible to prove that current restrictions to land commercialization in the Mexican law have *increased the price of land* and, therefore, *have limited the offer of accessible land* for the poorest families. The consequences are speculation all over the country, the emergence of a black market that affects the most vulnerable populations and an accelerated reduction of land reserves availability for urban development (Brambila, 2007).

The Mexican government's participation in territorial planning has led to one of the most significant land titling efforts in Latin America, but it still suffers severe limitations. The geographic and demographic analysis on urban growth already presented in previous chapters shows that the social aspect of land tenure regularization has been invalidated. The actions of illegal occupation and later regularization, once again, have political purposes (compared to the 1970s). Inconsistent urban and land-use policies have aggravated the negative externalities associated with urbanization, namely, environmental degradation, urban expansion and areas without access to services.

Forty years of land tenure regularization efforts have produced two *types of speculation* with urban land. The first is *structural speculation*, where urban developers (e.g. builders, constructors) purchase buildings, either directly or indirectly, in an effort to influence urban development policies. Wholesale brokers, who commonly belong to political organizations, ensure the "lawfulness and urban order" of plots and common use land acquisition. The role of these political brokers is that of negotiating with urban and agrarian authorities their full possession or the assignment of common use land to private companies. The second type of speculation is a *circumstantial* one, where individual investors and family members buy and sell their land expecting to benefit from urban growth.

Part of this situation stems from the lack of coordination in the early 21st century between different government levels with regard to urban administration. For example, the law establishes that public services cannot be provided to illegal settlements, although it is common to find that many of them indeed have such services (usually the first is public transportation, managed by the *bus transportation "octopus"* (monopoly), with enormous political power in Mexico).

Government actions aimed at territorial planning focus on *corrective* activities instead of *preventive* ones (and typically immerse in a context of strong complicity). For this reason, conflicts related to the calculation of taxable income, due to the lack of records (titles) and rapid urbanization, are common.

2.2. Recommendations for the territorial planning of urban development

Does speculation exist because prices are high or are prices high because speculation exists? According to urban economics theories, speculation exists because prices are high, and prices are high because the offer of urban land is low (inelastic). Therefore, the main public policy recommendation on regularization is to identify mechanisms that will make the offer of urban land *more elastic*. The second general public policy recommendation is to use regularization as a *policy instrument* for urban development. You will find a description of specific recommendations on both points below.

In order to achieve a larger elasticity in urban land offer, it is important to take legal, economic and institutional aspects into account. With regard to the legal framework, according to both state and federal government *strict regulations*, it is necessary *to transfer* decisions about land use *to municipalities*. It is key to avoid duplication of responsibilities and attributions in the area of land use at different government levels. In order for municipalities to assume their responsibilities on urban development, it is unavoidable that the Federal Government and state governments be effective in the execution of their duties.

Excessive, and often times unnecessary, *regulation has to be reduced* to minimize historic backwardness in collective regularization. Overregulation favors corruption. Another recommendation is to strengthen *conflict resolution* mechanisms, both for groups and individuals, reconciling stakeholders' opposing interests and interests in expropriation processes. Transparency, accountability and social participation are key elements.

Specific operation rules must be established for all the institutional aspects related to the agencies in charge of land regularization. Thus, regularization will become an urban and regional planning instrument in the country.

The Commission for the Regularization of Land-Tenure (CORETT), the Mexican institution in charge of this area, can contribute to territorial planning through the promotion and coordination of actions aimed at the creation of the necessary land reserves to fulfill land and urban development requirements.

The regularization of human settlements located on social property or in private possession may be executed in a constructive way, *without having to change the current legal framework*. CORETT has done it with success in a few programs (such as "Suelo Libre" and "Lotes con Traza Urbana"), but this is not done in a systematic or mandatory fashion throughout the country.

For regularization of land-tenure to contribute to urban development and territorial planning in a positive way, it is important to define the powers of administrative units in such a way that organizations have no questions about their own responsibilities regarding the processes for the inclusion or exclusion of plots in urban and regional plans. Another recommendation is to *review the agrarian legislation*, to enable CORETT's participation in preventive inclusion of common and communal lands in urban development.

It becomes paramount to strengthen CORETT's role as a *promoting and coordinating* body for land regulation actions. Thus, CORETT's activities should be executed in coordination with the three levels of government. It is necessary that actions be specifically included in both urban and rural sectoral public policies in order to strengthen the Commission's coordinating capacity.

Mexico must modify and assess its information system on *settlements* by decree so that, in addition to its administrative functions, the progress of regularization throughout national territory can also be assessed or monitored. To develop *integrated information* systems to identity the need for regularization efforts by the different government agencies. Better co-ordination, unification of criteria, agreement on actions and improved alignment of government actions on behalf of land order throughout the country will be the main benefits.

Geo-referencing. At least irregular towns and polygons should be geo-referenced. Urban development plans must have reliable maps that include the geographic location of illegal settlements to guide actions on territorial planning and, thus, anticipate the development of new illegal settlements.

In addition, it is imperative to design efficient data systems and *dynamic databases* that can be managed by local units in order to keep CORETT's list of beneficiaries up-to-date, as well as to keep track of the progress of regularization and territorial planning. For example, the development of an online data system is both feasible and low-cost, and can be shared by both local units and central offices. If online databases are shared, every time a local unit updates its information, data will also be automatically updated at the central level as well. Being able to share databases would also allow for the automatic generation of reports and, thus, the different local offices would be able to track their individual performance and compare it to other local units, but there is more: they would be able to share information and experiences through online (oral or written) communication systems. Different government agencies (the Mexican Institute of Social Security, state healthcare services), civil society organizations, as well as the private sector, are already using such low-cost technologies.[3]

It is important to create local and national institutions to coordinate the land-use management and urban development actions of private, public and social agents. At present, we do not have a *single government institution* in charge of that.

3 Perhaps the most successful case of public use of technologies and large online interrelated databases in Mexico is the Ministry of Finance and Public Credit. This proves it is possible to work according to our proposal.

A territorial planning policy must include, at least, the four following components:

a. Regularization. Regularization must have defined goals and timeframes, enabled by the decentralization of regularization efforts. However, plot titling processes must be completed first.

b. Relocation. Public and land registries must be unified, updated and linked. Delimitation, updating and registration with the Public Registry of Property are also necessary, as well as the simplification of administrative and legal processes, such as strengthening justice and conflict resolution systems.

c. Incentives for organized growth. For urban management to shift toward sustainable cities, housing and land-use systems must be reformed to increase market liquidity, broaden the range of formal housing products, provide basic infrastructure, foster associations between common land owners and urban developers, and expand the low-cost housing market through lower standards of subdivision and programmed urban development processes.

d. Incentives to remain legal. The housing market needs to be strengthened through diversified housing systems. An equity market that includes revitalization of central zones,

3. Integrate a Demographic Perspective into Urban and Regional Planning

3.1. Assessment: How is urban and regional planning done in Mexico?

Urban management decisions have immediate consequences on urban development and the demographic dynamics of urbanization. Several studies (Cabrero, 2005; Graizbord, 2011; Arellano *et al.*, 2011) have demonstrated the *tight relationship* that exists between weak urban management and lack of urban development throughout the national territory.

The absence of urban development planning limits the access of populations living in poverty to employment, work, education and health *opportunities* (Garrocho, 2011). In this regard, the decisions made by local administrations affect children's opportunities for education, employment and job opportunities for youths and health access for all groups, in particular the elderly. The lack of access to basic public services translates into changes in morbidity and mortality patterns, migration and mobility trends, household composition and co-residence patterns, and even in the fertility differentials of various urban groups (World Bank, 2010).

Mexico's failure to conduct urban planning has a *high cost* in terms of generating poverty and areas of insecurity, lack of access to health, education, employment and work for marginal populations.

One of the most troublesome aspects of urban policy is the *complexity*, *ambiguity* and inaccuracy of the legal framework that is associated to the allocation of urban responsibilities among Mexican government institutions.

Section III, article 115, of the Constitution establishes that: "III. Municipalities, with the support of the states whenever necessary and according to the law, will be in charge of the following public services:

a) Drinking water and sewage systems,

b) Public lighting,

c) Cleaning,

d) Markets and supply centers,

e) Cemeteries,

f) Slaughterhouses,

g) Streets, parks and gardens,

h) Public security and traffic, and

i) Any other services determined by local legislations based on the territorial and socioeconomic conditions of municipalities, as well as their administrative and financial capacity". It is worth mentioning that certain aspects of municipal responsibilities may vary depending on the legal framework of the corresponding state.

The Mexican legal framework assigns municipalities decision-making responsibilities and obligations on *land* use and *location* of urban amenities. The two of them are directly related to urban growth and development. Decisions about the location of *work* and *supply* centers and *housing*, as well as *transportation routes*, have an immediate impact on selective *migration* patterns toward cities and urban *mobility* trends.

However, in Mexico, except for a few central municipalities, most lack *financial, technical and staff capacity*, preventing them from fulfilling the responsibilities established in the legal framework. In addition, there are no agencies or organizations to provide municipalities with *technical assistance* to assess, plan, implement and evaluate public works and urban development in general. Thus, urban planning and public works have depended on *networks of complicity and corruption*, with a trail of impacts on the urban development of municipalities, towns and even the large metropolises in the country.

Consistent with the centralist tradition of the country, most municipalities share a common feature: they have a situation of hierarchical subordination to, and not a *constructive cooperation* with, states. In many states, state governments control highly profitable services, such as water supply and transportation, even when they belong to municipalities.

As a result of a constitutional reform in 1983 aimed at the institutional strengthening of municipalities, the Federal Government decentralized a few urban functions, such as urban planning and some related to housing, health, education, and more recently, security. Nevertheless, the Federal Government still preserves most effective functions (and budgets) of overall policies in the same areas.

This is the reason why we commonly find health and education programs, and even programs against poverty, which *duplicate and triplicate* efforts among the three levels of government. A misled legal framework tied up to operative inefficiency of municipal governments that translates into a lack of urban development throughout the entire country.

The immediate causes of the institutional incompetence of municipal governments to conduct and execute urban planning relate both to the legal and fiscal framework and the nature of municipal management in Mexico.

To what extent do local governments have the *effective capacity* to execute the necessary urban planning that is necessary to face urbanization and metropolization processes? What are the overall institutional capacities of local governments in Mexico? What *legal and financial instruments* do municipal governments really have and how do they use them? What *capacities* do municipal governments need to develop competitive metropolitan areas (between municipalities)?

Finally, can local governments *lead urban development* in the cities and metropolises of the country? Considering the distinct competencies on different government levels (municipal, state and federal): Is it possible to attain urban development in democracy or does urban development require some degree of *centralization* when it comes to decision-making? These are just a few questions that demand an answer. In the following section, we present and discuss *the main challenges* faced by municipal governments when it comes to leading urban development. We will review a few success cases and analyze the legal and fiscal framework that regulates municipal activities; we will also make reference to a couple of *windows of opportunity* to strengthen municipal management in Mexico; however, such experiences are equally applicable to several Latin American countries.

As shown in previous chapters, numerous municipal governments in Mexico are incapable of urban planning, generating *incalculable costs* for future generations. Missing urban development throughout the country has stemmed from the lack of coordination between the different government levels, and the corresponding economic and social costs are yet to be estimated.

The paradox is that municipal governments do have instruments to mitigate the impact of urban growth on future generations; that is, *to build sustainable cities today* but, in general, they don't use them at all or don't use them in the appropriate way. Public management instruments must be used to encourage urban development (and, thus, increase access to opportunities) including: local public finance, control of land-use, design of public services and a legal framework that regulates local public administration, as well as urban, metropolitan and regional development.

3.2. Urban planning with a demographic perspective

Many initiatives in Mexico and Latin America have sought to incorporate a *demographic perspective* to regional and urban planning. Noticeably, the United Nations Population Fund developed a manual and decided to test it in Mexico and Colombia. It is important to offer continuity and to expand these initiatives to provide a demographic approach to urban planning.

The demographic approach involves taking into consideration not only population growth trends, but composition and geographic distribution as well. Among other aspects, a demographic perspective for *sustainable urban planning* must consider population aging and access to opportunities for youths and women (particularly if their situation is vulnerable). The leading principle of the demographic approach is the fact that the urban structure, access to public services and the geographic distribution of social and economic opportunities are mechanisms for the *redistribution of benefits and burdens* derived from living as a society, enabling the reduction of inequality.

The primary responsibility of municipal governments is to accomplish the effective construction of a strong and competitive institutional and economical local environment and to ensure wellbeing among the population through inclusive public services.

A demographic perspective in regional planning requires taking into consideration the volume or size of local populations and the pace at which they grow, in addition to their structure, distribution and mobility (*v.g. market studies*). The same approach simultaneously takes into account the demographic, environmental, social and economic dynamics of local populations.

This demographic perspective of planning is important, because it seeks to focus planning priorities on the quality of life of the population and ensures coherence between the objectives of plans and the guarantee of rights, the reduction of inequalities and the inclusion of vulnerable or disadvantaged groups. In other words, with this approach, it is possible to *calculate the human cost* of urban policy decision-making based on political interests or corruption.

The demographic perspective enables the anticipation of needs by analyzing the trends in demographic dynamics (*e.g. demand*); it assists municipalities in defining policies, programs and actions that are required to address such needs and to ensure the rights of present and future generations (*v.g. supply*).

A demographic perspective also enables the assessment of progress in terms of fulfillment of needs. Thus, it is possible to implement corrective actions so public actions can be adapted to the ever-changing needs of the population.

4. Implement Regional Strategies to Promote the Creation of Metropolitan Authorities[4]

4.1. Current situation

To what extent are local governments capable of creating the urban planning that is necessary to face urbanization and metropolization processes? Municipalities, which are considered by the Mexican constitution of 1917 as the basic unit of territorial government, have always played a strategic political and cultural role; despite that situation, there have been historical institutional and financial weaknesses. Ever since the early 21st century, municipalities in metropolitan areas have concentrated more than 50% of the total population and almost 80% of the country's Gross Domestic Product (see Chapters 1 and 3). However, the local authorities of metropolitan areas face several challenges. Except for a few experiences, municipalities lack the economic, financial, and even technical capacity for government decision-making that allow for the planning and optimization of urban development and the reduction of the economic and environmental costs (present and future) of their own decisions.

The debt capacity of municipalities is limited because their main sources of revenue consist of conditioned federal transfers in a context where public expenditures are decentralized; at the same time, tax collection continues to be centralized by the Federal Government. The municipal tax collection capacity is minimum. They also lack sufficient administrative capacity to *mobilize actors* in their own jurisdiction and to control urban growth within the context of a "culture of unlawfulness" that puts participative planning and decision-making at risk (see Chapter 2). Last but not least, they must address the poor urban population that is continuously growing in illegal settlements, incapable of paying their growing demand for public services.

Regardless of their geographic, demographic or economic size, municipalities located in the largest metropolitan areas of Mexico focus their efforts on two key objectives: building a *strong and competitive economic environment* and improving the wellbeing of the population through *service provision*. That is how they intend to provide economic opportunities for development and to improve their own income generation capacity to face the demands posed by demographic growth and the ever-changing population structure.

Demographic changes and the expansion of urban land have forced local authorities to deal with matters beyond their geographic borders, such as fresh water supply, drainage, transport routes and basic services, like solid waste treatment, among others. The main problem regarding geographic limits is that, by constitutional mandate, municipalities are free and sovereign; hence, *cooperation* among municipalities is not contemplated in the legal framework. It is a major *legal constraint* for the creation of *metropolitan authorities* (transportation, for example), because their authority would be above the municipalities.

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4 Boris Graizbord (2008), "El gobierno de las zonas metropolitanas en México: de la teoría a la práctica", in Raoul Blindenbacher and Chandra Pasma (comps.), *Diálogos sobre gobierno local y zonas metropolitanas en países federales*, Colección de cuadernos, Volumen 6, Forum of Federations.

A few "good practices" do stand out amidst such a major limitation. The combination of efforts between the three levels of government has occasionally led to the creation of coordinating metropolitan organizations, with one or many specific goals. Commissions for the metropolitan area of Mexico City, which ha been in operation for two decades, are a good example. León and Silao are good examples of municipalities where two towns from the dynamic Bajío Region have responded to urban and industrial growth pressures with cooperation initiatives among municipalities. Another example is the effort to consolidate a competitive metropolitan economy, led by politically aware and sensitive mayors, in the municipalities of two states belonging to the La Laguna metropolitan region, in response to the stagnation of the *maquila* sector.

4.2. Metropolitan authorities?

As can be seen in the previous examples, the growing interest in the creation of new *metropolitan cooperation* bodies, and the strengthening of already existing ones, are implicit in the "development between municipalities" proposal set forward by the federal authorities in charge of enforcing laws and regulations regarding current urban development. However, these initiatives are still emerging and *it is necessary to foster* institutional metropolitan agreements for management and administration throughout the 59 metropolitan areas of the country.

However, municipal governments face *three dilemmas* in front of such possibility. The *first dilemma* is: To what extent can the municipality *delegate authority* in an external municipality (in the present and in the future)? This question is important because the constitutional mandate of municipalities is to regulate the goods and services of the local population and not those of the urban population settled in adjacent or neighboring municipalities. In regards to such dilemma, it is necessary to strengthen the capacities of municipal governments to calculate the present and future costs and benefits of decisions on growth and urban development. Urban decisions are currently made by municipal governments (according to the law) by calculating both the costs and benefits of investment, for example, in infrastructure, for the present population in the municipality, without considering future populations and the environmental and territorial impact on broader land units. Calculations and decisions made by local governments would be *completely different* if future costs and impact on different scales were taken into account (environmental, economic and of any kind) in government actions.

The *second dilemma* is: How to develop *competitive* metropolitan areas and achieve an equal and efficient distribution of services among the population of the city at the same time? The fact that a government model that could be applied in all of the metropolitan areas of the country does not exist is commonly accepted, but it is also accepted that higher government units have a role to play when it comes to the control of air pollution, water supply and drainage systems, mass transportation systems and income redistribution to increase the fiscal capacity of the lowest income communities. Nevertheless, many would be in favor of the advantages of a group of differentiated local governments, instead of a centralized and bureaucratic metropolitan government that encompasses an entire area instead of a metropolitan zone. They think that if every government level is autonomous within its own area of competence, political spaces will open, as well as a new opportunity for *cooperation*, instead of *competition* (or *cooperative competition*: Garrocho, 2013). Decentralization, in terms of the participation of multiple local governments in just one metropolitan area, can also be an *efficient and effective* structure that will add more services and fulfill the needs of different consumers just as a heterogeneous demand.

The *third dilemma* is: How to achieve coordination not only between municipalities but also between the different levels of government, including state and federal governments? Municipalities, however, are not specifically urban types of governments, because their jurisdictions and responsibilities include both rural and urban areas. Usually, the geo-political jurisdiction does not match urbanized land, because municipal demarcation was pretty much created in the early 20th century (due to historic reasons that are just irrelevant now). As a matter of fact, *as a rule of thumb*, the expansion of cities and metropolises goes beyond the political-administrative demarcation of municipalities which, in practical terms, makes the establishment of territorial planning and urban development programs more difficult. The fact is that municipalities have set themselves as the historic foundation of the country's territorial organization. Nevertheless, in institutional terms, urban development management and territorial planning are c*oncurring responsibilities of the three levels of government.*

While conflicts of land and conflicts in terms responsibilities and duties in intergovernmental coordination exist almost naturally in any federal system, the Mexican case is pretty unique. Regulations not only exist in every single level of government, but laws, plans and programs are not necessarily coordinated and negotiated and, in many cases, contradict each other.

In a complex and uncertain environment, such as the metropolitan area of Mexico City, with its more than 20 million people, and other two metropolitan areas in the country within the five-million inhabitant range, standardization and a distant administration can lead to inefficiencies and cause some areas and population groups to lack proper services, or the location of services to make them too expensive to use or, in extreme cases, impossible to use.[5] Some may argue that local authorities will always have the chance of benefiting without further effort and refrain from providing social assistance to the poor in the form of public services, but others will admit that providing certain services would be more efficient if a central form of organization was used on *large scale*. In addition, local authorities always respond to the pressures of the demand, and seldom promote development in an active way or in compliance with quality standards, due to limited financial management and human resources. This being the case, is there a chance that everybody is better off with a centralized regime?

In terms of *administrative federalism*, the alternative between a completely centralized or decentralized allocation of powers and the issue of which population and which citizens must be grouped to provide a collective good, has not yet been sorted out in Mexico. A legal framework is required to *distribute responsibilities in terms of functions*: the central government could control the legislation, while the other levels of government could become managers and administrators of service provision. However, it seems that local governments in Mexico have an additional burden in terms of providing basic public services to the population within their jurisdiction: become spokespersons of the country's economic development policy and the national strategy for climate change adaptation. In other words, to become *transmission belts* from the global to the local.

The recent interest in the impacts of climate change and the active role the Mexican Government intends to play may perhaps also require an effort to build awareness of the fact that environmental topics are characterized by their multisectoral and interdependent nature, and that, therefore, they not only involve global and national environments, but reach the local sphere as well.

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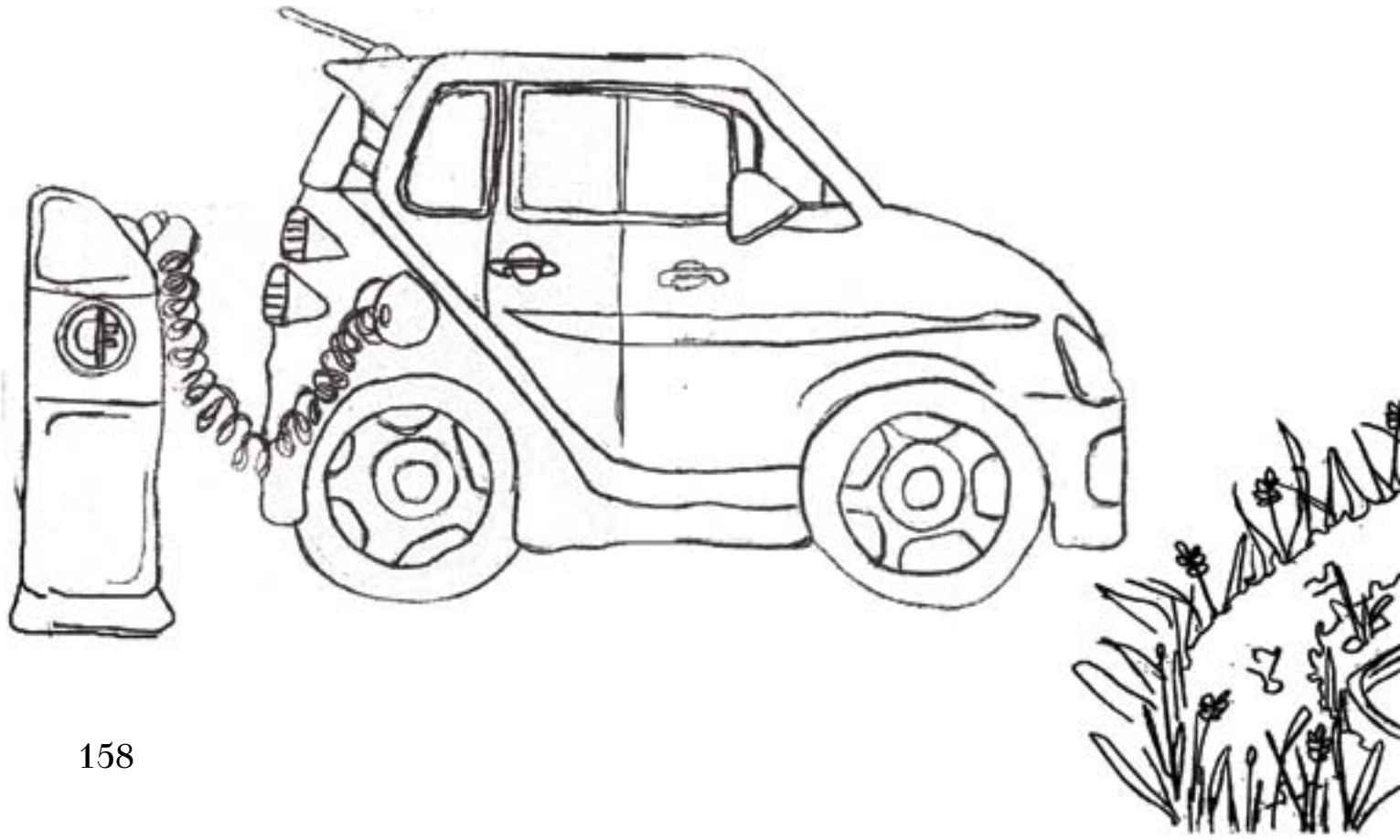
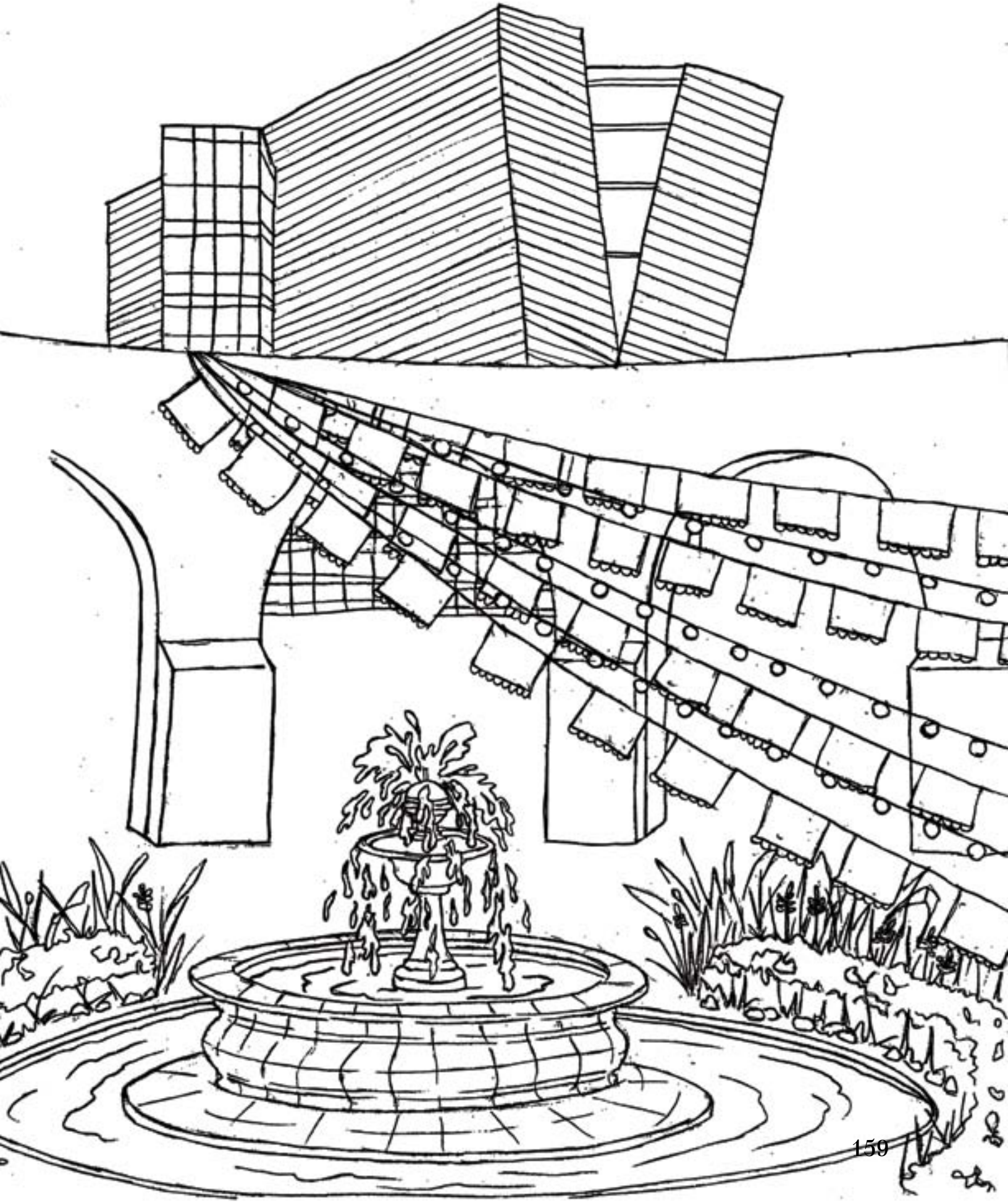
5 Si el servicio es gratuito en el punto de oferta, el costo más tangible de utilizar un servicio o adquirir un bien es el costo de trasladarse al punto de oferta: el costo de transporte. El costo de transporte determina quién utiliza qué servicio y con qué oportunidad y frecuencia. Por eso, la localización de las oportunidades urbanas y el diseño del transporte son políticas de redistribución de beneficios y cargas entre la sociedad (véase Capítulo 2).





Final Remarks:

Position on sustainable cities for Mexico

Throughout the book, we have shared a conceptual, theoretical and operational *position* on sustainable cities -initially for Mexico but perhaps also for Latin America and the Caribbean. This *position*, which requires a process of continuous improvement and construction, is characterized by the following premises:

i) **The engines for economic growth and human development in Mexico are our cities. In order for them to be** *competitive* **they must be** *sustainable*. Three out of four Mexicans lived in cities in 2010, and the number is only increasing. Cities are a source of *opportunities*, but they can also be a source of *problems* if they are not managed appropriately. This occurs when public policy and institutions are dysfunctional, when the socio-spatial distribution of opportunities and development costs are unjust, and when cities destroy the environment. Whatever occurs in cities will outline the future of Mexico in terms of economic growth, poverty and inequality reduction, demographic modulation, environmental sustainability and human rights. We must accept a new paradigm that underscores the *benefits* of urbanization, as well as its *risks*. We acknowledge that no country has been able to satisfactorily develop without powerful cities, and that there is no *automatic* correlation between growth or city size and the problems a city faces. Our position is not one that seeks to *halt* urbanization, but one that tries to *make the best* of the opportunities offered, and minimizes contingencies. The question is: how will we reach competitive, fair and responsible cities, while still protecting the environment? In other words: how will we build *sustainable cities*? All sustainable cities require the support of a strong agricultural sector: they are two sides of the same coin.

ii) **Sustainability in cities must be a** *guiding principle*, **not something we should strive to** *achieve*. We understand that sustainable urban development is a *guiding principle for* public policy, and not an ideal state that must be attained as soon as possible. It is, then, a permanent process, a process of continuous improvement, a long-term ideal. We have identified five *goals of the highest level*, four *fundamental public policy tools*, and five *evaluation criteria* that will allow us to measure the advances made in our urban sustainable development policies. The *goals of the highest level* are:

a. Poverty reduction;
b. Inequality reduction;
c. Rational use of resources and natural capital;
d. Promotion of low-carbon economic growth; and
e. Increased access to urban opportunities.

Our *central policy tools* are:

i. To offer high quality public services that are inclusive;
ii. Land use control;
iii. Solid and robust local public finance; and,
iv. Urban and metropolitan laws and regulations.

Our *criteria for evaluation* are:

i. Efficiency (*i.e.* cost-benefit relationship, in general terms);
ii. Equality (*i.e.* access to urban opportunities; improvement of life conditions and quality of life);
iii. Effectiveness (*i.e. how* our strategies will help us achieve our highest level goals);
iv. Time frames (*i.e.* opportunities that may arise and duration of a policy: "*when*"); and
v. Territorial scales (i.e. spatial scales at which the policies will be applied: "where").

iii) **Urban sustainability is multidimensional and requires a coordination and balance of policies, strategies and actions.** The key dimensions considered here are: *social, economic, environmental, political, demographical, mobility-related, those related to access to urban opportunities, as well as institutional*[1]. These dimensions are all equally important and are not only highly *interrelated*, but also *overlapping*. They are represented separately in order to more easily define them as *analytical categories* (see Figure I.1 in the Introduction to the book). Coordination of (public and private) policies, strategies and actions in different dimensions can generate important *synergies* and *multiplying effects*. However, if they are undertaken without coordination they may dilute any achievements and, in some cases, even *offset*[2] them. Coordination between local governments is *crucial* for a country that is predominantly urban, where 62.6 million people (55.7% of the total population of the country) lived in 59 metropolitan areas in 2010. In this same year, 11 cities with more than one million inhabitants were metropolitan areas (*i.e.*: cities led by several municipal governments; cities guided by several *pilots*).

iv) **We require spatially integrated public policies**. In order to be successful (socially, economically, environmentally), public action must be c*orrectly located* on at least three different levels: the *sectoral* level (strategic sectors), the time level (they must take place at the right moment in time) and the spatial level (the right place, at the right scale). If that location fails on any of these three levels, the social effort will fail. Public policies will be more efficient if they include a space-time-sector perspective, that is, if public policies are *spatially integrated* (and take into consideration the interdependency and overlaps that occur between space, time, economic structure and

1 We are refering to both *formal institutions* (*e.g.* governments) and the *rules of operation of a society* (e.g. systems of incentives, norms, regulations, values, traditions, laws, beliefs, power relations, cultural interests and practices, that formally and informally delimit the type of interactions and behaviors of individuals and public and private organizations) (*see* Chapter 2).

2 For example: advances made in water treatment may be offset by an increasingly irrational use of this resource or due to mistakes made by a new administration.

society). In Mexico, this requires a *shift in paradigm* with regards to developmental planning: we must conceive the country, first and foremost, in *spatial* terms (different scales: megaregions, cities, neighborhoods) and then in *sectorial* terms. First, we must define the *where*, and then the *what*. This vision allows us to more easily identify: in *what* to invest (social criteria), *when* to invest (time criteria), *where* to invest (spatial criteria), *how much* to invest (scale criteria) and *what* the *results* should be (not through artificially separated sectors, but through spatially integrated scales). In addition to this, space as an *articulating node* for public policy allows us to *evaluate* with greater certainty advances made in terms of urban sustainability. On the other hand, *purely sectoral* evaluations (artificially broken down into non-related activity sectors) will frequently lead to *false positives:* sectors that seem to fare well *individually*, but that are not producing the expected benefits to society; for instance, education without employment, employment without opportunities, opportunities without justice, justice without GDP, or GDP without equality. Without a sense of *where*, everything occurs anywhere or in a non-place. This, in turn, is inoperative, even paradoxical, in terms of public policy. Space and time are essential to nearly everything we think and do.

v) Sustainable cities are a key component in the shift from a traditional economy to a highly competitive industrial and post-industrial economy. Governments can play a part in this process by promoting the necessary spatial transformations for development and not only sectoral changes. Increased concentration (*i.e.* density, distance reduction, greater accessibility, interactions and connectivity) will continue to be key in the social and economic advancement of countries, regions and cities. This implies selecting intervention scales that go beyond current political-administrative limits –which are often dysfunctional– as well as making localization decisions, modulating different flow types (*e.g.*: people, merchandise, ideas) and a socio-spatial redistribution of the benefits and burdens of development, among many other things. It is worth noting that cities are rarely adequate units for environmental management. Also, cities are not autonomous entities that can achieve sustainability solely through endogenous change processes.

Urban centers connect with much more than their surrounding regions; they are intensely linked to international and national flows and networks of trade, capital and innovations. The global dynamics of urban development tend to weaken and diminish local efforts aimed at advancing the sustainability of cities. The city in itself is not a closed system, and it exerts a strong environmental pressure on larger geographic areas. The correct scale for sustainability analysis is not the urban area, but the area of influence in which the ecological footprint and raw material and waste exchanges occur. Perhaps the most adequate scale would be the megaregion, understood as a multidimensional space in which network links among cities, metropolitan regions and rural areas are structured by a series of activities interconnected through common resources, cultural identity and shared economic opportunities.

vi) **We should not confuse the problems that occur *in* the cities with the problems *of* the city**. The former are problems *located* in cities because this is where society concentrates. However, they stem from the current social order (*i.e.*: they are *structural* problems). The second ones are problems generated or exacerbated by the *poor operational and management practices* of cities (*e.g.* land use conflicts, inefficient and highly-polluting transportation systems, irrational management of natural resources, dysfunctional governments, uncompetitive local economies). A recurring example of this frequent confusion is to consider that cities *generate poverty* when there is *no single piece of evidence* suggesting this. Cities are a space for opportunities and positive pulsations, but they are also a place where a synthesis of *social relations* occurs. The city does not generate poverty, *much the contrary*: the city *mitigates* and provides opportunities for the poorest members of society (including agricultural migrants), and offers them urban opportunities including the *right to the city*.

Successful cities attract populations that are seeking better opportunities to build their futures and follow their life plans (a large part of this population is comprised by women; many of these opportunities are *meager*; a large part of these migrants are *ill-equipped* to take advantage of these opportunities). Many of those who come to the city are poor because of structural social issues; *the city did not make them poor*. Eliminating poverty requires a *deep change* in social organization: *it is not enough* to improve how the city operates, notwithstanding the importance of urban effects. Structural changes, however, may take *too long*, and waiting for things to happen before taking action is, perhaps, the *most costly* (*and conservative*) stance we can take.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Bibliography

Acemoglu, D. and J. A. Robinson (2012), *Por qué fracasan los países*, Editorial Paidós, Mexico.

Aguado, D. (2006), *Las ciudades más visibles: migración intraurbana en México, 1995-2000,* El Colegio de México, master's degree thesis, Mexico.

Aguilar A. G. (2009), "Urbanización Periférica e Impacto Ambiental. El Suelo de Conservación en la Ciudad de México", in A. G. Aguilar and I. Escamilla (Coords.), *Periferia Urbana. Deterioro Ambiental y Reestructuración Metropolitana*, Miguel Ángel Porrúa, Instituto de Geografía-UNAM, Mexico, pp. 21-52.

Aguilar A. G. (2013a), "La Distribución Territorial de la Población en México. Elementos Esenciales para una Nueva Ley General de Población", in L.M. Valdés (Coord.), *Hacia una Nueva Ley General de Población*, Universidad Nacional Autónoma de México, Mexico, pp.181-200.

Aguilar, A. G. (2013b), "Sostenibilidad Urbana y Política Urbano-Ambiental. La Ciudad de México y el Suelo de Conservación", in A. G. Aguilar and I. Escamilla (Coords.), *La Sostenibilidad en la Ciudad de México. El Suelo de Conservación en la Ciudad de México*, Miguel Ángel Porrúa, Universidad Nacional Autónoma de México, Mexico, pp. 23-66.

Aguilar A. G. (2014), "El Reparto Poblacional en el Territorio. Tendencias Recientes y Desafíos Futuros", in J. L. Ávila, H. Hernández, and J. Narro (Coord.), *Cambio Demográfico y Desarrollo de México*, Universidad Nacional Autónoma de México, Mexico, pp. 193-219.

Aguilar, A. G. and A. Vieyra (2009), "Megaciudades, deterioro ambiental y desarrollo territorial", in M. A. Massiris (Coord.), *Geografía y territorio. Procesos territoriales y socioespaciales. Aproximación desde Iberoamérica*, Universidad Pedagógica y Tecnológica de Colombia, Tunja, pp.181-210.

Aguilar, A. G. and B. Graizbord (2001), "La distribución espacial de la población. Concentración y dispersión", in C. Gómez de León and C. Rabell (Coords.), *La población de México. Tendencias y perspectivas sociodemográficas hacia el siglo XXI*, Consejo Nacional de Población, Fondo de Cultura Económica, México, pp. 553-604.

Aguilar A. G. and I. Escamilla (Coords.) (2009), "Introducción", in *Periferia Urbana. Deterioro Ambiental y Reestructuración Metropolitana, México*, Miguel Ángel Porrúa, Instituto de Geografía-UNAM, 399 pages.

Aguilar A. G. and B. Graizbord (2014), "La Distribución Espacial de la Población, 1990-2010: Cambios Recientes y Perspectivas Diferentes", in C. Rabell (Coord.), *Los Mexicanos. Un Balance del Cambio Demográfico*, Fondo de Cultura Económica, Mexico, pp. 783-823.

ALADI [Asociación Latinoamericana de Integración - Latin American Integration Association] (2003), *La brecha digital y sus repercusiones en los países miembros de la ALADI*, ALADI, SEC, Estudio 157, Rev. 1, July 30.

Allingham, M. (2014), *Distributive Justice*, Routledge, New York.

Alonso, W. (1964), *Location and Land Use*, Harvard University Press, Cambridge.

Álvarez, P. and R. Herrera (2014), "La Dispersión de la Población y la Pérdida de Biodiversidad", in J. L. Ávila, H. Hernández, and J. Narro (Coords.), *Cambio Demográfico y Desarrollo de México*, Universidad Nacional Autónoma de México, Mexico, pp. 289-315.

América Economía (2014), *Las mejores ciudades para hacer negocios en América Latina*. Available online: [http://rankings.americaeconomia.com/mejores-ciudades-para-hacer-negocios-2014/ranking]

Anselin, L. (2005), *Exploring Spatial Data with GeoDa: A workbook,* Center for Spatially Integrated Social Science, University of Illinois.

Anzaldo C. and E. Barrón (2009), "La Transición Urbana de México, 1900-2005", in CONAPO, *La situación demográfica de México 2009*, Mexico, pp. 53-65.

Arellano Gault, D. and W. Lepore (2009), "Poder, patrón de dependencia y nuevo institucionalismo económico: Límites y restricciones de la literatura contemporánea", in *Gestión y política pública*, vol. 18, No. 2, pp. 253-305.

Arellano, D., E. Cabrero, M.J. Montiel and I. Aguilar (2011), "Gobierno y administración pública municipal: Un panorama de fragilidad institucionalizada", in E. Cabrero y D. Arellano, (Coords.), *Los gobiernos municipales a debate. Un análisis de la institución municipal a través de la Encuesta* INEGI 2009, Centro de Investigación y Docencia Económicas, Mexico, pp. 29-108.

Ávila, J. L. (2014), "El Desafío de la Dispersión y Aislamiento de la Población Rural", in J. L. Ávila, H. Hernández and J. Narro (Coords.), *Cambio Demográfico y Desarrollo de México*, Universidad Nacional Autónoma de México, Mexico, pp. 259-287.

Banco Mundial [BM] (2004), *La Pobreza en México: Una Evaluación de las Condiciones, Tendencias y Estrategia del Gobierno (Resumen y Mensajes Principales)*, Washington. Available at: http://siteresources.worldbank.org/INTMEXICOINSPANISH/Resources/b_resumen.pdf (last accessed on July 25, 2014).

_____ (2010), *Sistemas de ciudades: la urbanización, motor del crecimiento y el alivio de la pobreza*, Red sobre Desarrollo Sostenible, Unidad de Coordinación para el Sector Urbano y los Gobiernos, Washington. Available at: http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/UrbanStrategy_web_Spanish.pdf (last accessed on August 5, 2014).

Bannock, G., R. Baxter and E. Davis (1998), *The Penguin Dictionary of Economics*, Penguin Books, London.

Barbier, E. (1999), "Can Poor Countries Attain Endogenous Growth?", in T. Homer-Dixon, *Environment, Scarcity, and Violence*, Princeton University Press, Princeton, pp. 127-132.

Barry, N. P. (1995), *An introduction to modern political theory*, Macmillan, London.

Barton H. (2000), "Conflicting perceptions of neighbourhood", in Barton, H. (Ed.), *Sustainable Communities: the Potential for Eco–Neighbourhoods*, Earthscan, London, pp. 3–18.

Bauman, Z. (2007), *Vida de Consumo*, Fondo de Cultura Económica, Mexico.

BBVA Research, (2011), *Situación Inmobiliaria México*: enero 2011, Mexico.

_____(2014), *Situación Inmobiliaria México: segundo semestre 2014*, Mexico. Available at: https://www.bbvaresearch.com/wp-content/uploads/2014/11/1411_SitInmobiliariaMexico_2S14.pdf (last accessed in July 2015).

Becker, E., T. Jahn and I. Stiess (1999), "Exploring uncommon ground: sustainability and the social sciences", in E. Becker and T. Jahn (Eds.), *Sustainability and the Social Sciences, A Cross-Disciplinary Approach Integrating Environmental Considerations into Theoretical Reorientation*, Zed Books, London, pp.1–22.

Beeson, P. (1992), "Agglomeration Economies and Productivity Growth", in E. Mills and J. McDonald (eds.), *Source of Metropolitan Growth*, Center for Urban Policy Research, New Jersey, pp. 19-35.

Bejarano J. A., C. Echandía, C., R. Escobedo and E. León (1997), *Colombia: inseguridad, violencia y desempeño económico en las áreas rurales, Fonade*, Universidad Externado de Colombia, Bogota.

Benítez, R. (2009), *"La crisis de seguridad en México"*, in *Nueva Sociedad*, No. 220, pp. 173-189.

Berry, B. (1970), "Latent Structure of the American Urban System", in B. J. L. Berry (ed.), *Classification of Cities*, San Francisco, Chandler.

Berry, B. (2007), "Approaches to urban policymaking: a framework", in H. S. Geyer (ed.), *International Handbook of Urban Policy*, vol. 1, Contentious Global Issues, Edward Elgar, Cheltenham, pp. 3-9.

Biart, M. (2002), "Social sustainability as part of the social agenda of the European community", in Ritt, T. (Ed.), *Soziale Nachhaltigkeit: Von der Umweltpolitik zur Nachhaltigkeit?* Arbeiterkammer Wien, Informationen zur Umweltpolitik 149, Vienna, pp. 5–10.

Bluestone, B., M. Stevenson and R. Williams (2008), *The Urban Experience*, Oxford University Press, New York.

Bouillón, C., L. Arianna and N. Lustig (2003), "Rising Inequality in Mexico: Household Characteristics and Regional Effects", in *Journal of Development Studies*, vol. 39, No. 4, pp. 112-133.

Boulding, K. (1996), "The Economics of the Coming Spaceship Earth", in H. Jarret (Ed.), *Environmental Quality in a Growing Economy*, The Johns Hopkins University Press, Washington.

Braat, L. and I. Steetskamp (1991), "Ecological Economic Analysis for Regional Sustainable Development", in R. Costanza (Ed.), *Ecological Economics*, Columbia University Press, New York, pp. 269-288.

Brambila Paz, Carlos (2007), *Análisis de los Impactos de las Acciones de la Comisión para la Regularización de la Tenencia de la Tierra* (CORETT), (manuscript) Evaluation report submitted to SEDESOL, Mexico.

Bramley, G. and Morgan, J. (2003), "Building competitiveness and cohesion: the role of new housebuilding in Central Scotland's cities", in *Housing Studies*, vol. 18, No. 4, pp. 447-471.

Bramley, G. and S. Power (2009), "Urban form and social sustainability: the role of density and housing type", in *Environment and Planning B Planning and Design*, vol. 36, No. 1, pp. 30–48.

Bramley G., N. Dempsey, S. Power, C. Brown and D. Watkins (2009), "Social sustainability and urban form: evidence from British cities", in *Environment and Planning A*, vol. 41, No. 9, pp. 2125-2142.

Brand, B. and M. Thomas (2005), *Urban Environmentalism, Global Change and the Mediation of Local Conflict*, Routledge, New York.

Brook, L. (2004), *Research Report 11: Environmental Exclusion Review, Office of the Deputy* Prime Minister, London. Available at: http://www.china-up.com:8080/international/case/case/478.pdf (last accessed in July 2015).

Brown, L. (1987), *Edificando una sociedad perdurable*, Fondo de Cultura Económica, Mexico.

_____ (2004), *Excediendo el crecimiento de la Tierra*, Earth Policy Institute, Washington.

Burgess, E. W. (1928), "Residential segregation in American cities", in T*he Annals of the American Academy of Political and Social Science*, vol. 140, November, pp. 105-115.

Burgess, R. (2003), "Ciudad y Sostenibilidad. Desarrollo Urbano sostenible", in M. Balbo, R. Jordán, and D. Simioni (Comp.), *La Ciudad Inclusiva*, Cuadernos de la CEPAL, No. 88, Comisión Económica para América Latina, Santiago de Chile, pp. 193-213.

Burton, E. (2000a), "The compact city: just or just compact? A preliminary analysis", in *Urban Studies*, vol. 37, No. 11, pp. 1969–2001.

_____ (2000b), "The potential of the compact city for promoting social equity", in K. Williams, E. Burton and M. Jenks, (Eds.), *Achieving Sustainable Urban Form*, Taylor & Francis, London, pp. 19–29.

Burton, E. and L. Mitchell (2006), *Inclusive Urban Design: Streets for Life*, Architectural, Oxford.

Buscaglia, E. (2013), Vacíos de poder en México: El camino de México hacia la seguridad humana, Penguin Random House, Mexico.

Cabrero, E. (2005), "Between New Public Management and New Public Governance: The case of Mexican Municipalities", in *International Public Management Review,* vol. 6, No. 1, pp. 76-99. Available at: http://www1.imp.unisg.ch/org/idt/ipmr.nsf/ (last accessed on July 26, 2014).

Cabrero, E. and I. Orihuela (2012), "Territory and Urban Competitiveness in Mexico", in J. Sobrino (Ed.), *Urban Competitiveness. A Global and for Mexico Perspective*, El Colegio de México, Mexico pp. 207-235.

Carrera Hernández, A. and R. Fernández Mejía (2015), "Elementos para discutir sobre el fortalecimiento municipal", in C. Brambila (2015) *Prioridades de Investigación sobre Pobreza y Desarrollo: México 2020*, Escuela de Gobierno y Transformación Pública, Tecnológico de Monterrey, Mexico, pp.120-150.

CEPAL [Comisión Económica para América Latina y el Caribe – Economic Commission for Latin America and the Caribbean] (1995), *Análisis de la competitividad de las naciones,* Santiago de Chile.

_____ (2003), *Los caminos hacia una sociedad de la información en América Latina y el Caribe*, Libros de la CEPAL, No. 72, July 2003, Santiago de Chile.

_____ (2012), *Población, Territorio y Desarrollo Sostenible*, Santiago de Chile, 241 pages.

_____ (2013), *Consenso de Montevideo sobre Población y Desarrollo*, PLE-1/ES, Montevideo, 27 pages.

Cerezo, A. (2012), "Cities Without Violence Against Women are Safer Cities for All: Fighting Gender-Based Violence in Urban Areas", in *Universitas Forum*, vol. 3, No. 1, pp. 1-5.

Champion, A. (2007), "Defining 'urban': the disappearing urban-rural divide", in H. S. Geyer (ed.), *International Handbook of Urban Policy*, vol. 1, Contentious Global Issues, Edward Elgar, Cheltenham, pp. 22-37.

Chan, E. and G. K. L. Lee (2008), "Critical factors for improving social sustainability of urban renewal projects", in Social Indicators Research, vol. 85, No. 2, pp. 243–256.

Christaller, W. (1966), *Central Places in Southern Germany*, Prentice Hall, London.

Claval, P. (1998), *An introduction of regional geography*, Wiley-Blackwell, Oxford.

Coleman J. S. (1988), "Social capital in the creation of human capital", in *American Journal of Sociology*, vol. 94, supplement, pp. S95–S120.

CONAGUA [Comisión Nacional de Agua – National Water Commission] (2014), *Estadísticas del agua en México*, Edición 2014.

CONAPO [Consejo Nacional de Población – National Population Council] (2001), P*rograma Nacional de Población 2001-2006*, México.

_____ (2008), *Programa Nacional de Población 2008-2012*, Mexico.

_____ (2011), *Diagnóstico socio-demográfico del envejecimiento en México*, Mexico.

_____ (2012), *Índice de Marginación por Localidad, 2010*, Mexico, 342 pages.

_____ (2014), *Programa Nacional de Población 2014-2018*, Mexico.

CONEVAL [Consejo Nacional de Evaluación de la Política de Desarrollo Social - National Council for the Evaluation of Social Development Policy] (2007), *Los mapas de pobreza en México*, Mexico.

_____ (2013), *Medición de la pobreza en México y en las entidades federativas 2013*, Mexico.

_____ (2012), *Informe de Evaluación de la Política de Desarrollo Social en México 2012,* Mexico.

Contant, C. K. and K. L. De Nie (2009), "Scale Matters: Rethinking Planning Approaches across Jurisdictional and Sectoral Boundaries", in C. Ross (Ed.), *Megaregions. Planning for Global Competitiveness*, Island Press, Washington, pp.11-17.

Corbacho, A. and G. Schwartz (2002), *Mexico: Experience with Expenditure Pro-poor Policies,* Working Paper WP/02/12, International Monetary Fund (January), Washington.

Cowie, J. (2007), Climate Change. Biological and Human Aspects, Cambridge University Press, Cambridge.

Crosby, A. (1997), *The Measure of Reality*, Cambridge University Press, Cambridge.

Daly, H. (1977), "The Steady-State Economy: What, Why, and How?", in D. Pirages, *The Sustainable Society: Implications for Limited Growth*, Praeger, New York, pp. 107 -114.

Daly, H. (1990), "Sustainable growth: An impossibility theorem", in *Development*, ¾.

Daly, H. (1996), *Beyond Growth: The Economics of Sustainable Development*, Beacon Press, Boston.

Damián, A. (2010), "La pobreza en México y en sus principales ciudades", in G. Garza and M. Schteingart (Coords.), *Nuevos procesos y modelos del desarrollo urbano y regional en México,* El Colegio de México, Mexico.

Dávila, E., G. Kessel and S. Levy (2002), "El sur también existe: un ensayo sobre el desarrollo regional de México", in *Economía Mexicana (nueva época)*, vol. 11, No. 2, pp. 205-260.

Dellepiane-Avellaneda, S. (2010), "Review article: Good governance, institutions and economic development: Beyond the conventional wisdom", in *British Journal of Political Science*, vol. 40, No. 1, pp. 195-224.

De Mauleón, H. (2015), *La ciudad que nos inventa*, Cal y Arena, Mexico.

Dempsey, N. (2006), *The Influence of the quality of the built environment on social cohesion in English neighbourhoods*, Oxford University, Oxford.

_____ (2008), "Does quality of the built environment affect social cohesion?", in Urban Design and Planning, No. 161, pp. 105–114.

Dempsey, N., G. Bramley, S. Power and C. Brown (2011), "The Social Dimension of Sustainable Development: Defining Urban Social Sustainability", in *Sustainable Development*, vol. 19, No. 5, pp. 289-300.

Diamond, J. (2013), *Colapso: Por qué unas sociedades perduran y otras desaparecen*, Debolsillo, Mexico.

Dobson (1999), *Pensamiento Verde: Una Antología*, Editorial Trotta, Madrid, pp.159-165.

DOF [Diario Oficial de la Federación – Federal Official Daily Gazette] (1983), *Plan Nacional de Desarrollo 1983-1988*, Secretaría de Gobernación, May 31st, Mexico.

Douglas I. (2006), "Peri-Urban Ecosystems and Societies: Traditional Zones and Contrasting Values", in S. D. MacGregor and D. Thompson, *The Peri-Urban Interface, Earthscan*, London, pp. 18-29.

Drakakis, S. D. (1995), "Third World Cities: Sustainable Urban Development 1", in *Urban Studies*, vol. 32, No. 4-5, pp. 659-677.

Duany, A. (2003), "Neighbourhood design in practice", in P. Neal (ed.), *Urban Villages and the Making of Communities*, Spon, New York, pp. 84–101.

Dutta, S., B. Lanvin and S. Wunsch-Vincent (Eds.) (2014), *The Global Innovation Index 2014: The Human Factor in Innovation*, Cornell University, INSEAD, World Intellectual Property Organization (WIPO), Ithaca and Geneva.

EC [European Commission] (2004), *Urban Design For Sustainability: Final Report of the Working Group on Urban Design for Sustainability to the European Union Expert Group on the Urban Environment*, Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

Ehrlich, P. (1968), *The Population Bomb, Ballantine*, New York.

Ehrlich, P. and J. Holdren (1971), "Impact of population growth", in *Science*, No. 171, pp.1212-1217.

Ehrlich, P. and Ehrlich, A. (1989), *How the rich can save the poor and themselves*, FAO, Rome.

_____ (2009), "The Population Bomb Revisited", in Electronic Journal of Sustainable Development, vol. 1, No. 3, pp. 63–71.

Elster, J. (1992), *Local Justice*, Russell Sage Foundation, New York.

Esquivel, G. (2008), *Income Inequality Dynamics in Mexico since NAFTA*, United Nations Development Programme, Regional Bureau for Latin America and the Caribbean, RPPLAC Working Paper 03/2008.

Esquivel, G. and G. Cruces (2011), "The Dynamics of Income Inequality in Mexico since NAFTA", in *Economía*, vol. 12, No. 1, pp.115-188.

Faludi, A. (2009), "The Megalopolis, the Blue Banana, and Global Economic Integration Zones in European Planning Thought", in C. Ross (Ed.), *Megaregions. Planning for Global Competitiveness*, Island Press, London, pp.18-34.

Farole, T., A. Rodríguez-Pose and M. Storper (2011), "Cohesion policy in the European Union: growth, geography, institutions", in *Journal of Common Market Studies*, vol. 49, No. 5, pp. 1089-1111.

Feser, E. (2002), "Tracing the Sources of Local External Economies", in *Urban Studies*, vol. 39, No. 13, pp. 2485-2506.

Fischer-Kowalski, M. and H. Haberl (1993), "Metabolism and colonization: modes of production and the physical exchange between societies and nature", in *Innovation in Social Science Research*, vol. 6, No. 4, pp. 415–442.

Forrest R. and A. Kearns (2001), "Social cohesion, social capital and the neighbourhood", in *Urban Studies*, vol. 38, No. 12, pp. 2125–2143.

Forsse, L. (Ed.) (2006), *Sustainable Urban Development in Sweden*, Formas, Stockholm.

Friedman, George (2015), *Los próximos 100 años. Pronósticos para el siglo XXI*. Barcelona: Océano Exprés.

Fujita, M., P. Krugman and A. Venables (2001), *The Spatial Economy*, The MIT Press, Cambridge.

Fukuyama, F. (2000), *The Great Disruption: Human Nature and the Reconstitution of Social Order*, Profile, London.

Gabriel, P. (1925), "La segregación de los leprosos", in *Revista Boie*, November, pp. 11-27.

Galindo, L. M. (2009), *La economía del cambio climático en México*, SEMARNAT, Mexico. Available at: http://www.cepal.org/dmaah/noticias/paginas/2/35382/Sintesis2009.pdf.

García Canclini, N. (1999), *La globalización imaginada*, Paidós, Barcelona, Buenos Aires, Mexico.

García, H. and R. Madrigal (1999), "Redes sociales y vejez: apoyos formales e informales en el área metropolitana de Monterrey", in *Papeles de Población*, vol. 5, No. 19, enero-marzo, pp. 217-242.

Garrocho, C. (1995), A*nálisis socioespacial de los servicios de salud: accesibilidad, utilización y calidad*, El Colegio Mexiquense, Mexico.

_____ (1997), "Moral, técnica y servicios públicos de salud", in *Ciudades*, No. 33, pp. 59-63.

_____ (2011), "Pobreza urbana en asentamientos irregulares de ciudades mexicanas: la trampa de la localización periférica", in E. Cabrero (Coord.), *Ciudades Mexicanas: desafíos en concierto*, Conaculta, Mexico pp.159-209.

_____ (2013), *Dinámica de las ciudades de México en el siglo XXI*, UNFPA, CONAPO, El Colegio Mexiquense, Mexico.

Garrocho, C. and J. Campos (2006), "Un indicador de accesibilidad a unidades de servicios clave para ciudades mexicanas: fundamentos, diseño y aplicación", in *Economía Sociedad y Territorio*, vol. VI, No. 22, pp. 349-397.

_____ (2015a), Segregación socioespacial de la población mayor en la Ciudad de México, 2000-2010, in CONAPO, *La situación demográfica de México 2015*, Mexico (in press).

_____ (2015b), "Segregación Residencial de los Adultos Mayores: relevancia del tema para México, marco teórico y políticas urbanas", in G. Aguilar and I. Escamilla, *Segregación Residencial Urbana*, UNAM, Mexico (in press).

_____ (2015c), *Segregación urbana de la población mayor: espacio, situación y alternativas de política*, El Colegio Mexiquense, Mexico (in press).

Garrocho, C., G. Aguilar, C. Brambila, B. Graizbord and J. Sobrino (2014), *Hacia una cultura de las ciudades sostenibles*, ALAP, CONAPO, UNFPA, ONUSIDA, PROTERRITORIOS, Mexico.

Georgescu-Roegen, N. (1993), "The Entropy Law and the Economic Problem", in H. Daly and K. Townsend (eds.), V*aluing the Earth: Economics, Ecology, Ethics*, The MIT Press, Cambridge. (or) (1986), "The Entropy Law and the Economic Process in Retrospect", in *Eastern Economic Journal*, XII: 3-25.

Geyer, H. S. (2002a), "On urban systems evolution", in H. S. Geyer (Ed.), *International handbook of urban systems: studies of urbanization and migration in advanced and developing countries*, Edward Elgar, Cheltenham, pp.38-66.

_____ (2002b), "The urban future", in H.S. Geyer (Ed.), *International handbook of urban systems: studies of urbanization and migration in advanced and developing countries*, Edward Elgar, Cheltenham, pp.67-86.

Geyer, H. and T. Kontuly (1993), "A Theoretical Foundation for the Concept of Differential Urbanization", in *International Regional Science Review*, vol. 15, No. 2, pp. 157-177.

Gibbs, David and Krueger, Rob (2007), "Containing the Contradictions of Rapid Development? New Economy Spaces and Sustainable Urban Development", in Krueger, Rob and Gibbs, D. (Eds.), *The Sustainable Development Paradox: Urban Political Economy in the United States and Europe*, The Guilford Press, New York, pp. 95-122.

Giddens, A. (1990), *The Consequences of Modernity*, Stanford University Press, Stanford.

Gilpin, A. (1996), *Dictionary of Environment and Sustainable Development*, Wiley, Chichester.

Glaeser, E. (2012), *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*, Penguin Books, London.

Global Urban Competitiveness Project (2005), *Mission Statement and Activities of the Global Urban Competitiveness Project*, Ottawa (mimeo).

Goodland, Robert (1995), "The Concept of Environmental Sustainability", in A*nnual Review of Ecology and Systematics*, vol. 26, pp. 1-24. Available at: file:///C:/Users/GIGABYTE/Documents/respaldo/1%20A%20Mis%20Documentos/Documents/ADocuments/A%20A%20A%20A%20A%20A%20LIMA/TEXTO_LO%20SOCIAL/MOVILIDAD_URBANA/The%20Concept%20of%20Environmental%20Sustainability_1995.pdf (last accessed on July 25, 2014).

Gordon, H. (1954), "The Economic Theory of a Common Property Resource", in *Journal of Political Economy*, No. 62, pp. 124-142.

Gottmann, J. (1961), Megalopolis: T*he Urbanized Northeastern Seaboard of the United States,* The Twentieth Century Fund, New York.

Graizbord, B. (2006), "Geografía y ambiente: de los recursos naturales al capital natural", in J. L. Lezama and J. B. Morelos (Coords.), *Población, Ciudad y Medio Ambiente en el México Contemporáneo*, El Colegio de México, Mexico, pp. 489-516.

_____ (2008), "El gobierno de las zonas metropolitanas en México: de la teoría a la práctica", in R. Blindenbacher and C. Pasma (comps.), *Diálogos sobre gobierno local y zonas metropolitanas en países federales*, Colección de cuadernos, vol. 6, Forum of Federations.

_____ (2010), "Objetivos del milenio, pobreza y medio ambiente", in J. L. Lezama and B. Graizbord (Coords.), *Los grandes problemas de México, vol. 4, Medio Ambiente*, El Colegio de México, Mexico, pp. 295-336.

_____ (2011), "La ciudad como sistema ¿sustentable?", in J. Arroyo and I. Corvera (comps.), *Desarrollo insostenible. Gobernanza, agua y turismo*, UdG, UCLA, Profmex-World, Juan Pablos, Mexico, pp. 23-43.

_____ (2013), "Planning for Adaptation in a Megacity: A Case Study of the Mexico City Metropolitan Area", in G. Martine and D. Schensul (eds.), *The Demography of Adaptation to Climate Change*, UNFPA, IIED, El Colegio de México, Mexico and London.

Graizbord, B. et al. (2010), *Agenda de sustentabilidad ambiental para la zona metropolitana del Valle de México*, Comisión Ambiental Metropolitana, Mexico.

Graizbord, B., J. L. González and O. López (2013), "Desigualdades regionales, acceso al agua y cambio climático", in *Coyuntura Demográfica,* No. 4, pp. 87-94.

Graizbord, B., J. L. González, O. López and B. Corona (2014), "Urbanización por megaregiones. Una escala de análisis de la relación territorio-recursos", lecture delivered at the 12th National Meeting of the Mexican Society of Demography (SOMEDE), Universidad Iberoamericana, May 28, 29 and 30, 2014 (http://xiireuniondemografica.ibero.mx/programa.html), see summary at (http://xiireuniondemografica.ibero.mx/pdf/resumen_corto/15.1.2.pdf).

Gregory, K. (2000), *The Changing Nature of Physical Geography*, Arnold, London.

Guillén, T., L. González Pantoja and P. Rojo (Coords.) (2007), *Gobierno de proximidad. La capacidad y el ingenio de la gestión local mexicana*, Centro de Investigación y Docencia Económicas, Secretaría de Gobernación, El Colegio de la Frontera Norte, Mexico.

Hackett, S. (2001), *Environmental and Natural Resources Economics*, Sharpe, Armonk.

Hall, P. (2003), "The Sustainable City in an Age of Globalization", in Fusco Girard, L. (Ed.) *The Human Sustainable City: Challenges and Perspectives from the Habitat Agenda*, Ashgate, London, pp. 55-69.

Ham, R. (2012), "Consecuencias y caminos del envejecimiento demográfico", in B. García and M. Ordorica, (Coords.), *Sociodemografía: Los grandes problemas de México*, El Colegio de México, Mexico.

_____ (2003), *El envejecimiento en México: el siguiente reto de la transición demográfica*, El Colegio de la Frontera Norte, Mexico.

Hardin, G. (1968), "The Tragedy of the Commons", in *Science*, No. 162, pp. 1243-1248.

Harvey, D. (1996), *Justice, Nature & the Geography of Difference*, Blackwell, Oxford.

Haughton, G. and C. Hunter (1994), *Sustainable Cities*, Regional Policy and Development Series 7, Jessica Kingsley Publishers, London.

Haughton, G. (1999), "Environmental justice and the sustainable city", in *Journal of Planning Education and Research*, vol. 18, No. 3, pp. 233–243.

Hawken, P., A. Lovins, H. Lovins (1999), *Natural Capitalism*, Brown and Company, New York.

Heal, G. (2000), *Nature and the Marketplace*, Island Press, Couelo.

Hedrick-Wong, Yuwa and Choong, Desmond (2014), *MasterCard 2014 Global Destination Cities Index*, MasterCard, New York.

Henderson, V. (1974), "The Sizes and Types of Cities", in *American Economic Review*, No. 64, pp. 640-656.

Higashino, K. (2013), *La salvación de una santa*, Ediciones B, Barcelona.

Higgins, B. and D. Savoie (1997), *Regional Development Theories & Their Application*, Transaction, New Brunswick.

Hilbert, M. and J. Katz (2002), *Building an Information Society: A Perspective from Latin America and the Caribbean*, Serie Libros de la CEPAL, No. 72 (LC/G.2199-P), Comisión Económica para América Latina y el Caribe, Santiago de Chile.

Hodge, R. A. and P. Hardi (1997), "The need for guidelines: the rationale underlying the bellagio principles for assessment", in P. Hardi and T. Zdan (Eds.), *Assessing Sustainable Development: Principles in Practice*, International Institute for Sustainable Development, Winnipeg, pp.7–20.

Holden E. and K. Linnerud (2007), "The sustainable development area: satisfying basic needs and safeguarding ecological sustainability", in *Sustainable Development*, vol. 15, No. 3, pp. 174–185.

Hopwood, B., M. Mellor, G. O'Brien (2005), "Sustainable Development: mapping different approaches", in *Sustainable Development*, vol. 13, No. 1, pp. 38–52.

Hunter, L. (2000), *The Environmental Implications of Population Dynamics*, RAND Program of Policy-Relevant Research Communication, 98 pages. Available at: www.rand.org.

Hussen, A. (2000), *Principles of Environmental Economics: Economics, Ecology and Public Policy*, Routledge, London.

IMCO [Instituto Mexicano para la Competitividad – Mexican Institute for Competitiveness] (2013), *Nos cambiaron el mapa: México ante la revolución energética del siglo XXI*, Mexico.

INEGI [Instituto Nacional de Estadística y Geografía – National Institute of Statistics and Geography] (2009), *Censos Económicos 2009*, Mexico. Available at: http://www.inegi.org.mx/est/contenidos/espanol/proyectos/censos/ce2009/default.asp?s=est&c=14220

_____ (2010), Censo de Población y Vivienda 2010. Available at: http://www.inegi.org.mx/est/contenidos/proyectos/ccpv/cpv2010/Default.aspx

_____ (2012), *Sistema de Cuentas Nacionales de México. Cuentas Económicas y Ecológicas de México 2012*, Mexico.

IMD [Institute for Management Development] (2012), *World Competitiveness Yearbook*. Available at: [http://www.imd.org/research/publications/wcy/index.cfm].

Irvine, S. and A. Ponton (1988), "A Green Manifesto, London: Macdonald Optima" (reprinted as 'Explosión demográfica', in A. Dobson (1999), *Pensamiento Verde: Una Antología*, Editorial Trotta, Madrid, pp.65-69).

Isard, W. (1960), *Methods of Regional Analysis; an Introduction to Regional Science*. Cambridge, Published jointly by the Technology Press of the Massachusetts Institute of Technology and Wiley, New York.

_____ (1972), *Ecologic-economic Analysis for Regional Development; Some Initial Explorations with Particular Reference to Recreational Resource Use and Environmental Planning*, Free Press, New York.

ISD [Instituto para la Seguridad y la Democracia – National Institute for Security and Democracy] (2014), *Una aproximación a los costos de la violencia y la inseguridad en México*, Mexico.

Isunza-Vizuet, G. and Méndez-Bahena, B. (2010), *El desplazamiento de población por violencia en ciudades de México*, IPN, Mexico.

Jacobs, J. (1961), The Death and Life of Great American Cities, Penguin, Harmondsworth, London.

Jacobs M. (1999), "Sustainable development as a contested concept", in Dobson, Andrew, (Ed.), *Fairness and Futurity: Essays on Environmental Sustainability and Social Justice*, Oxford University Press, Oxford, pp. 21–45.

Johansen, R., Z. Neal and S. Gasteyer (2014), "The view from a broken window: How residents make sense of neighbourhood disorder in Flint", in *Urban Studies*, October. Published online: October 2, 2014. Available at: http://usj.sagepub.com/content/early/2014/10/01/0042098014552768.abstract (last accessed in July 2015).

Johnston, R., *et al*. (2000), *The Dictionary of Human Geography*, Blackwell, Oxford.

Kay, A. (2005), "Territorial justice and devolution", in *British Journal of Politics and International Relations*, vol. 7, No. 4, pp. 544–560.

Kearns A. and R. Forrest Ray (2000), "Social cohesion and multilevel governance", in *Urban Studies*, vol. 37, No. 5/6, pp. 995–1017.

Khalil, M. and Zhen-Wei Qiang, Christine (2009), "Overview", in: WB (World Bank), (2009), *Information and Communications for Development 2009: Extending Reach and Increasing Impact,* Washington.

Kidron, M. and R. Segal (1984), *The New State of the World Atlas, Simon & Schuster*, New York.

Kourtit, K., P. Nijkamp and H. Scholten (2015), "The Future of the New Urban World", in *International Planning Studies,* vol. 20, No. 1-2, pp.4-20.

Kresl, P. (2012), "Urban Competitiveness: a Review of Theory and Practice", in J. Sobrino (ed.), *Urban Competitiveness. A Global and for Mexico Perspective*, El Colegio de México, Mexico, pp. 35-45.

Kresl, P. and B. Singh (2012), "Urban Competitiveness and US Metropolitan Centers", in Urban Studies, vol. 49, No. 2, pp. 239-254.

Krugman, P. (1995), *Development, Geography*, and Economic Theory, The MIT Press, Cambridge.

_____ (1996), T*he Self-Organizing Economy*, Blackwell, Oxford.

Krugman, P. and M. Obstfeld (1995), *Economía Internacional*, McGraw-Hill México.

Krupp, F. and M. Horn (2008), *Earth: the Sequel*, W.W. Norton & Company, New York.

Legovini, A., C. Bouillón and N. Lustig (2005), "Can Education Explain Changes in Income Inequality in Mexico?", in F. Bourguignon, F. H. G. Ferreira and N. Lustig (Eds.), *The Microeconomics of Income Distribution Dynamics*, The World Bank/Oxford University Press, Washington-Oxford, pp. 275-312.

Leydesdorff, L. and H. Etzkowitz (2003), "Can 'the Public' be Considered as a Fourth Helix in University-Industry-Government Relations?", in *Science and Public Policy,* vol. 30, No. 1, pp. 55-61.

Lister R. (2000), "Strategies for social inclusion: promoting social cohesion or social justice?" in *Social Inclusion: Possibilities and Tensions,* P. Askonas and S. Angus (Eds.), Macmillan, Basingstoke, pp. 37–54.

Littig, B. (2002), "The case for gender-sensitive socio-ecological research", in *Work, Employment and Society*, vol. 16, No. 1, pp.111–132.

Littig, B. and E. Grießler (2005), "Social sustainability: a catchword between political pragmatism and social theory", in *International Journal of Sustainable Development*, vol. 8, No. 1 and 2, pp. 65-79.

Lösch, A. (1954), *The Economics of Location*, Yale University Press, New Haven.

Lotka, A. (1925), *Elements of Physical Biology*, Williams and Wilkins, Baltimore.

Loyo, A. (2010), "Política educativa y actores sociales", in Alberto Arnaut and Silvia Giorguli (Coords.), *Los grandes problemas de México VII*, El Colegio de México, Mexico.

Lustig, N., L. F. Lopez-Calva and E. Ortiz-Juárez (2012), *Declining Inequality in Latin America in the 2000s: The Cases of Argentina, Brazil, and Mexico*, The World Bank, Latin America and the Caribbean Region Poverty, Equity and Gender Unit, Washington.

MacGregor S. D. and D. Thompson (2006), "Contemporary Perspectives on the Peri-Urban Zone of Cities in Developing Areas", in S. D. McGregor and D. Thompson D., *The Peri-Urban Interface*, Earthscan, London, pp. 3-17.

MacIntyre, S., S. MacIver and A. Sooman (1993), "Area, class and health: should we be focusing on places or people?", in *Journal of Social Policy*, vol. 22, No. 2, pp. 213-234.

Malecki, E. (1997), Technology & Economic Development, Longman, Harlow.

Marmot, M. and R. Wilkinson (Ed.) (2005), *Social determinants of health*, Oxford University Press, Oxford.

Maskell, P. (2001), "Towards a knowledge-based theory of the geographical cluster", in *Industrial and Corporate Change*, vol. 10, No. 4, pp. 921-943. Available at: http://web65.rollins.edu/~tlairson/pek/knowclusters.pdf (last accessed on August 5, 2014).

Maslow, A. H. (1954), *Motivation and Personality*, Harper, New York.

McGranahan, G. and D. Satterthwaite (2003), "Urban Centers: An Assessment of Sustainability", in *Annual Review of Environmental Resources*, vol. 28, No. 1, pp. 243-274.

Meadows, D. et al. (1972), *The Limits of Growth*, Universe Books, New York.

Meegan R. and A. Mitchell (2001), "It's not community round here, it's neighbourhood: neighbourhood change and cohesion in urban regeneration policies", in *Urban Studies*, vol. 38, No. 12, pp. 2167–2194.

Melnick, D., J. McNeely and Y. Kakabadse (eds.) (2005), *Environment and Human Well Being: A Practical Strategy*, New York, United Nations Development Program (UN Millennium Project Task Force on Environmental Sustainability), Earthscan, London.

Mills, E. (1967), "An Aggregative Model of Resource Allocation in a Metropolitan Area", in *American Economic Review*, No. 57, pp. 197-210.

Moretti, E. (2012), *The new geography of jobs*, Houghton Mifflin Harcourt, New York.

Morrill, R. and J. Dormitzer (1979), T*he Spatial Order. An Introduction to Modern Geography,* Duxbury Press, North Scituate.

Nash, V. and I. Christie (2003), *Making Sense of Community*, Institute for Public Policy Research, London.

Neher, P. (1990), *Natural Resource Economics*. Conservation and Exploitation, Cambridge University Press, Cambridge.

Newman, P. and J. Kenworthy (1999), *Sustainability and Cities: Overcoming Automobile Dependence*, Island Press, Washington.

Ni, P. and P. Kresl (2010), *The Global Urban Competitiveness Report 2010*, Edward Elgar, Cheltenham.

Norton, R. (2000), *The Geography of the New Economy*, Regional Research Institute, West Virginia University. Available at: (http://www.rri.wvu.edu/Norton).

Nussbaum, M. and A. Sen (2002), *The Quality of Life*, Clarendon Press, Oxford, New York, Auckland.

NYC (2008), *Sustainable Urban Site Design*, prepared by: Department of Design & Construction Office of Sustainable Design, Gruzen Samton Architects LLP and Mathews Nielsen Landscape Architects PC, Department of Design + Construction, New York.

OECD [Economic Organization for Cooperation and Development] (2004), *The Economic Impact of ICT Measurement, Evidence and Implications*, Paris.

_____ (2013), *Informe de Resultados de PISA 2012*, Nota País, Mexico, Paris.

Offer, A. (2006), *The Challenge of Affluence*, Oxford University Press, Oxford.

Omann, I. and J. H. Spangenberg (2002), "Assessing social sustainability, the social dimension of sustainability in a socio-economic scenario", Lecture delivered at the *Seventh Biennial Conference of the International Society for Ecological Economics*, March 6–9, Tunisia.

O´Sullivan, A. (2006), *Urban Economics*, McGraw-Hill Higher Education, New York.

Ordaz, J. L. (2009), *México: impacto de la educación en la pobreza rural*, CEPAL, Serie Estudios y Perspectivas, No. 105, Mexico.

Ordorica, M. (2006), "La demografía en los primeros años del siglo XXI: una visión hacia el proceso de envejecimiento", in *Papeles de Población*, No. 50, pp. 23-35.

_____ (2012), "¿Cómo aprovechar el éxito de la política de población del último cuarto del siglo XXI para enfrentar los nuevos retos demográficos del XXI?", in *Papeles de Población*, vol. 18, No. 74, pp. 9-15.

Ostrom, E. (2000), *El gobierno de los bienes comunes*, Universidad Nacional Autónoma de México, Fondo de Cultura Económica, Mexico.

Otgaar, A., L. van den Berg, J. van der Meer and C. Speller (2012), "Urban Competitiveness and Sustainable Territorial Development: the Need for New Perspectives on Metropolitan Governance", in J. Sobrino (ed.), *Urban Competitiveness. A Global and for Mexico Perspective*, El Colegio de México, Mexico, pp. 257-286.

Pacione, M. (2011), "Introduction: Urban Growth Patterns - Trends and Policy Issues", in H. S. Geyer (ed.), International Handbook of Urban Policy, Issues in the Developing World, Edward Elgar, Cheltenham, pp.3-36.

Pánuco-Laguette, H. and M. Székely (1996), "Income Distribution and Poverty in Mexico", in V. Bulmer-Thomas (Ed.), *The New Economic Model in Latin America and its Impact on Income Distribution and Poverty*, Macmillan Press, London, pp. 185-221.

Parr, J. B. (2007), "Spatial definitions of the city: four perspectives", in *Urban Studies*, vol. 44 (2), pp. 381-392.

Partida, V. (2006), "Situación demográfica nacional y estatal", in CONAPO, *La situación demográfica de México 2006*, Mexico, pp. 11-17.

PEF [Poder Ejecutivo Federal – Federal Executive Branch] (1995), *Programa Nacional de Población 1995-2000*, Mexico.

Pennington M. and Y. Rydin (2000), "Researching social capital in local environmental policy Contexts", in *Policy and Politics*, vol. 28, No. 2, pp. 233–249.

Penninx, R., K. Kraal, M. Martinello and S. Vertovec (2004), "Introduction: European cities and their new residents" in R. Penninx; K. Kraal; M. Martinello; S. Vertovec (eds.), *Citizenship in European Cities: Immigrants, Local Politics and Integration Policies*, Ashgate, Aldershot, London, pp. 1–16.

Perloff, H. and L. Wingo (1964), "Natural Resource Endowment and Regional Economic Growth", in J. Friedmann & W. Alonso (Eds.), Regional Development and Planning. A Reader, The MIT Press, Cambridge, pp. 215-239.

Pernia, E. M. and P. F. Quising (2003), "Trade Openness and Regional Development in a Developing Country", in *The Annals of Regional Science,* vol. 37, No. 3, pp. 391-406.

Peskin, H. (1991), "Alternative Environmental and Resource Accounting Approaches", in R. Costanza (Ed.), *Ecological Economics*, Columbia University Press, New York, pp. 176-193.

Pierson, J. (2002), Tackling Social Exclusion, Routledge, London.

Porter, M. E. (1998), "Clusters and the new economics of competition", in *Harvard Business Review*, November/December, pp. 77-90. Available at: http://www.wellbeingcluster.at/magazin/00/artikel/28775/doc/d/porterstudie.pdf?ok=j (last accessed on August 5, 2014).

Precedo Ledo, A. (2003), "La ciudad en el territorio: nuevas redes, nuevas realidades" in L. López Trigal et al. (Coords.), *La ciudad: Nuevos procesos, nuevas respuestas*, Universidad de León, León, pp. 15-33.

PR [Presidencia de la República - Presidency of the Republic] (1995), *Plan Nacional de Desarrollo 1995-2000*, Gobierno Federal, Mexico.

_____ (2001), *Plan Nacional de Desarrollo 2001-2006*, Gobierno Federal, Mexico.

_____ (2007), *Plan Nacional de Desarrollo 2007-2012*, Gobierno Federal, Mexico.

_____ (2013), *Plan Nacional de Desarrollo 2013-1918*, Gobierno Federal, Mexico.

Putnam R. D. (1993), Making *Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press, Princeton.

Putnam R. D., (2000), *Bowling Alone*, Simon and Schuster, New York.

Qiang, C. Z-W (2009), *Telecommunications and Economic Growth*, World Bank, Washington.

Ratcliffe, P. (2000), "Is the assertion of minority identity compatible with the idea of a socially inclusive society?", in P. Askonas and A. Stewart (eds.), *Social Inclusion: Possibilities and Tensions*, Macmillan, Basingstoke, pp. 169–185.

Rawls, J. (1971), *A Theory of Justice*, Oxford University Press.

Reardon, S. F. and D. O'Sullivan (2004), "Measures of Spatial Segregation", in *Sociological Methodology*, vol. 34, No. 1, pp. 121-162.

Relph, E. (1976), *Place and placelessness*, Pion, London.

RF (The Rockefeller Foundation) (2014), *Transforming cities: Visions of a better future*, The Rockefeller Foundation, Bellagio. Available at: http://www.rockefellerfoundation.org/uploads/files/8df48364-75ca-4570-918e-512fa0796b88-transforming.pdf (last accessed in July 2015).

Richardson, H. (1973), *The Economics of Urban Size*, Heath, Lexington.

Rodríguez-Oreggia, E. and R. Tuirán (2006), "La cooperación intermunicipal en México", in *Gestión y Política Pública*, vol. 15, No. 2, pp. 393-409.

Rogers, J. (2008), "Sustainability and the "World Class" City: What is being sustained and for whom?" in M. Jenks, D. Kozak, and P. Takkanon (Eds.), *World Cities and Urban Form. Fragmented, Policentric, Sustainable?*, Routledge, New York, pp. 57-70.

Romero Lankao, P. (2008), "Urban Areas and Climate Change: Review of Current Issues and Trends", in *Issues Paper for the 2011 Global Report on Human Settlements.* Available at: http://www.ral.ucar.edu/staff/prlankao/GRHS_2011_IssuesPaperfinal.pdf (last accessed on August 8, 2015).

Sánchez R., et al. (2008), "Introduction to the Issue Urban Responses to Climate Change", *UGEC View Points* 1: 4-5.

Saraví, G. A., (2008), "Mundos aislados: segregación urbana y desigualdad en la ciudad de México", in *Eure*, vol. 34, No. 103, pp. 93-110.

SCT [Secretaría de Comunicaciones y Transportes – Ministry of Communications and Transport] (2013), P*rograma Sectorial de Comunicaciones y Transportes*, Mexico.

Satterthwaite, D. (1999), "Sustainable Cities or Cities that contribute to a Sustainable Development?", in D. Satterthwaite, (Ed.), *The Earthscan Reader in Sustainable Cities*, Earthscan-Routledge, London, New York, pp. 80-106.

_____ (2007), *The transition to a predominantly urban world and its underpinnings,* United Nations Population Division, United Nations, New York. Available at: http://pubs.iied.org/pdfs/10550IIED.pdf (last accessed on August 5, 2014).

Secretaría de Energía [Ministry of Energy] (2009), *Balance Nacional de Energía 2008*, Mexico.

SEDESOL [Secretaría de Desarrollo Social – Ministry of Social Development] (2012), La expansión de las ciudades 1980-2010, Mexico.

_____ (2013), *Programa Sectorial de Desarrollo Social*, Mexico.

SEDESOL and CONAPO (2012), *Catálogo Sistema Urbano Nacional 2012*, Mexico.

SEDESOL, CONAPO and INEGI (2012), *Delimitación de las zonas metropolitanas de México 2010*, Mexico.

SEMARNAT [Secretaría de Medio Ambiente y Recursos Naturales – Ministry of Environment and Natural Resources] (2013-2014), *Informe de la Situación del Medio Ambiente en México. Compendio de estadísticas Ambientales. Indicadores Clave y de Desempeño Ambiental,* Edición 2012, Mexico, 365 pages. Available at: http://app1.semarnat.gob.mx/dgeia/informe_resumen14/02_ecosistemas/2_2.html

Sen, A. (2009), *The Idea of Justice*, Harvard University Press, Cambridge.

Shaftoe H. (2000), "Community safety and actual neighbourhoods", in *Sustainable Communities: the Potential for Eco–Neighbourhoods*, H. Barton Hugh (Ed.), Earthscan, London, pp. 230–243.

Silburn R., D. Lucas, R. Page and L. Hanna (1999), *Neighbourhood Images in Nottingham: Social Cohesion and Neighbourhood Change*, Joseph Rowntree Foundation, York. Available at: http://www.jrf.org.uk/sites/files/jrf/F489.pdf (last accessed in July 2015).

Simmons, I. (1997), *Humanity and Environment. A Cultural Ecology*, Longman, England.

Sklair, L. (1991), *Sociology of the Global System*, The Johns Hopkins University Press, Baltimore.

Sobrino, J. (2003), *Competitividad de las ciudades en México*, El Colegio de México, Mexico.

_____ (2006), "Competitividad y empleo en las principales metrópolis de México", in J. Lezama and J. Morelos (Coords.), *Población, ciudad y medio ambiente en el México Contemporáneo*, El Colegio de México, Mexico, pp. 333-380.

_____ (2010), "Ciclos económicos y competitividad de las ciudades", in G. Garza and M. Schteingart (Coords.), *Los grandes problemas de México. II. Desarrollo urbano y regional*, El Colegio de México, Mexico, pp.127-171.

_____ (2010a), *Migración interna en México durante el siglo XX,* CONAPO, Mexico.

Stern, N. (2007), *The economics of climate change*, Cambridge University Press, Cambridge.

Stiglitz, J. (1974), "Growth with Exhaustible Natural Resources: Efficient and Optimal Growth Path", in *Review of Economic Studies, Symposium on the Economics of Exhaustible Resources*, pp. 123-138.

Stoker, G. (1998), "Governance as theory: five propositions", in *International Social Science Journal*, vol. 50, No. 155, pp. 17-28.

Storper, M. (2013), *Keys to the city: how economics, institutions, social interaction, and politics shape development,* Princeton University Press, New Heaven.

Swanson T. M. (1996), "The economics of environmental degradation. An institutional approach", in Timothy Swanson (Ed.), *The Economics of Environmental Degradation. Tragedy for the Commons?*, Edward Elgar, Cheltenham, pp. 1–28.

Szekely, M. (2005), "Pobreza y Desigualdad en México entre 1950 y 2004", in *El Trimestre Económico*, vol. LXXII, No. 288, pp. 913-931.

Talen, E. (1999), "Sense of community and neighbourhood form: an assessment of the social doctrine of new urbanism", in *Urban Studies*, vol. 36, No. 8, pp. 1361–1379.

_____ (2001), "Reconciling the link between new urbanism and community", Lecture delivered at the *American Planning Association 2001 National Planning Conference*, New Orleans.

Taylor, P. (2013), *Extraordinary Cities*, Edward Elgar, Cheltenham.

Thonke, M. L. (2010), "The [Millennium] Goals through Smart graphics", in *Urban World*, vol. 2, No. 3, pp. 13-17.

Titmuss, R. M. (1987), *The philosophy of welfare: selected writings of Richard M. Titmuss*, in: B. Abel-Smith (Ed.), Allen & Unwin, London.

Turkington R. and Sangster, K., (2006), "From housing to social mix: housing's contribution to social sustainability", in *Town and Country Planning*, vol. 75, No. 6, pp. 184–185.

Turok, I. (2005), "Cities, Competition and Competitiveness: Identifying New Connections", in N. Buck, I. Gordon, A. Harding and I. Turok (Eds.), *Changing Cities,* Houndmills, Palgrave, pp. 25-43.

Turvey, R. (1954), "Optimization and Sub Optimization in Fishery Regulation", in *American Economic Review*, No. 54, pp. 64-76.

UN [United Nations Organization] (2000), *Protocol to prevent, suppress and punish trafficking in persons*, especially women and children, General Assembly, Geneva.

_____ (2004), *UN Convention against transnational organized crime and its protocols*, United Nations Office on Drugs and Crime, New York.

_____ (2013), *Violence against women. Intimate partner and sexual violence against women*, Fact sheet N° 239, October, Geneva.

UNDP (2010), *Human Development Report 2010, 20th Anniversary Edition, The Real Wealth of Nations: Pathways to Human Development, United Nations*, New York.

UNEP (2011), *Towards a green economy: Pathways to sustainable development and poverty eradication*. Available at: www.unep.org/greeneconomy.

UNFPA (United Nations Population Fund) (2007), *State of world population 2007: Unleashing the Potential of Urban Growth*, New York.

_____ (2012), *Population Matters for Sustainable Development*, The United Nations Population Fund, New York, 25 pages.

_____ (2014), Lead Pan African International Session, Port Elizabeth.

UNFPA, UNISDR and UN-HABITAT (2012), Linkages Between Population Dynamics, Urbanization Processes And Disaster Risks: A Regional Vision Of Latin America, United Nations Population Fund, United Nations Human Settlements Program, International Strategy for Disaster Reduction, 44 pages.

UN-HABITAT [United Nations Programme for Human Settlements] (1996), An *Urbanizing World: Global Report on Human Settlements*, 1996, Oxford University Press.

_____(2008), *State of the World's Cities 2010/2011: Bridging The Urban Divide*, United Nations Human Settlements Programme, Nairobi.

_____ (2008), *State of the World's Cities 2010/2011: Bridging The Urban Divide*, Earthscan, London, New York. Available at: http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2917 (last accessed on August 8, 2014).

_____ (2013), *Planning and Design for Sustainable Urban Mobility. Global Report on Human Settlements*, New York, 317 pages.

UN-ICT Task Force (2002), United Nations Information and Communications Technologies (ICTs) Task Force, *Global Database*. Available at: http://www.unicttaskforce.org/globaldatabase/database.asp (last accessed in July 2015).

Urban Task Force (1999), *Towards an Urban Renaissance: Full Report*, Printer and Controller of HMSO, Queens, London.

Vitousek, P., A. Harold, L. Jane, M. Jerry (1997), "Human Domination of Earth's Ecosystems", in *Science*, vol. 277, No. 25. Available at: http://webspace.pugetsound.edu/facultypages/kburnett/readings/vitousek.pdf (last accessed on July 31st, 2014).

Von Thünen, J. (1826), Der Isolierte Staat, translated into English (1966) as *Von Thunen's Isolated State*, Pergamon Press, Oxford.

Wallerstein, I. (1974), T*he Modern World-System*, Academic Press, New York.

Weber, A. (1909), *Über dan Standort der Industrien*, J.C.B. Mohr, Tübingen.

Weisman, A. (2014), *La cuenta atrás. ¿Tenemos futuro en la Tierra?*, Penguin Random House, Mexico.

WHO [World Health Organization] (2006), *Meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade*, UNICEF, WHO, Geneva.

Winchester, L. (2006), "Desafíos para el desarrollo sostenible de las ciudades en América Latina y el Caribe", in *EURE*, Vol. XXXII, No. 96, pp. 7-25.

Wilson, J. Q. and Kelling, G. L. (1982), "Broken Windows", in *Atlantic Monthly*, vol. 249, No. 3, pp. 29-38.

Wilson, W. J. and R. P. Taub (2011), *There Goes the Neighborhood: Racial, Ethnic, and Class Tensions in Four Chicago Neighborhoods and Their Meaning for America*, Vintage, New York.

Wire, T. (2009), *Fewer emitters, lower emissions, less cost. Reducing future carbon emissions by investing in family planning, A cost-benefit analysis,* LSE Operational Research and Optimum Population Trust.

Worpole, K. (2003), "The social dynamic", in P. Nealr (Ed.), Urban Villages and the Making of Communities, Spon, London, pp. 118–131.

Yiftachel, O. and D. Hedgcock (1993), "Urban social sustainability: the planning of an Australian City", in *Cities*, vol. 10, No. 2, pp. 139-157.

Young, O. (1997), "Rights, Rules and Resources in World Affairs", in Oran Young (Ed.), *Global Governance*, The MIT Press, Cambridge, pp. 1-23.

Zlotnik, H. (2009), "Does Population Matter for Climate Change?", in José Miguel Guzman, et al. (Eds.), *Population Dynamics and Climate Change*, UNFPA, IIED, New York, pp. 31-44.

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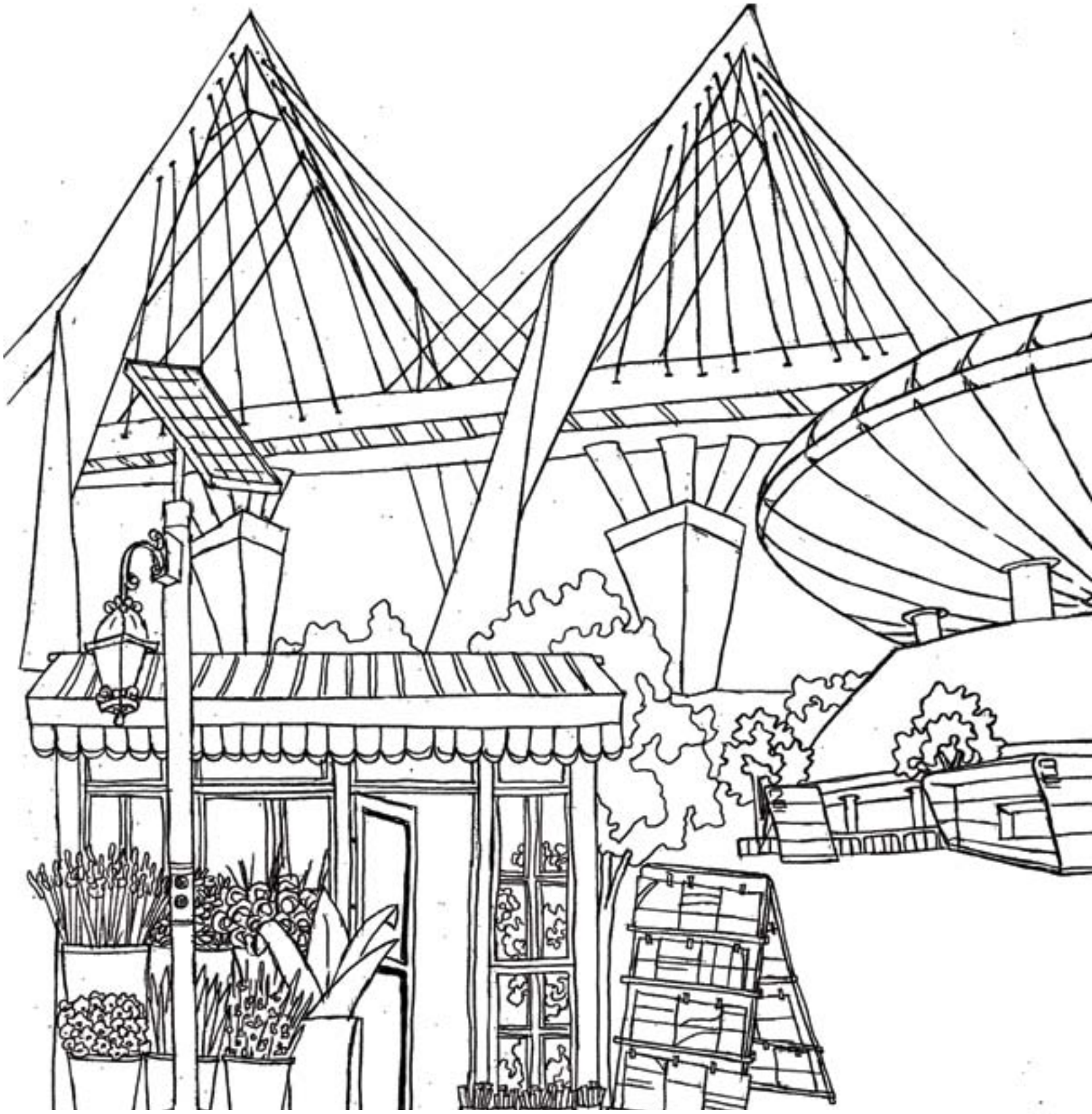

ALAP.

CONAPO
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EL COLEGIO DE MÉXICO 1940-2015 75 AÑOS

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