

CITY DESIGN, PLANNING & POLICY INNOVATIONS: THE CASE OF HERMOSILLO

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Graduate School of Design



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ABSTRACT

This publication summarizes the outcomes and lessons learned from the Fall 2017 course titled “Emergent Urbanism: Planning and Design Visions for the City of Hermosillo, Mexico” (ADV-9146). Taught by professors Diane Davis and Felipe Vera, this course asked a group of 12 students to design a set of projects that could lay the groundwork for a sustainable future for the city of Hermosillo—an emerging city located in northwest Mexico and the capital of the state of Sonora. Part of a larger initiative funded by the Inter-American Development Bank and the North-American Development Bank in partnership with Harvard University, ideas developed for this class were the product of collaboration between faculty and students at the Graduate School of Design, the Kennedy School's Center for International Development and the T.H. Chan School of Public Health.

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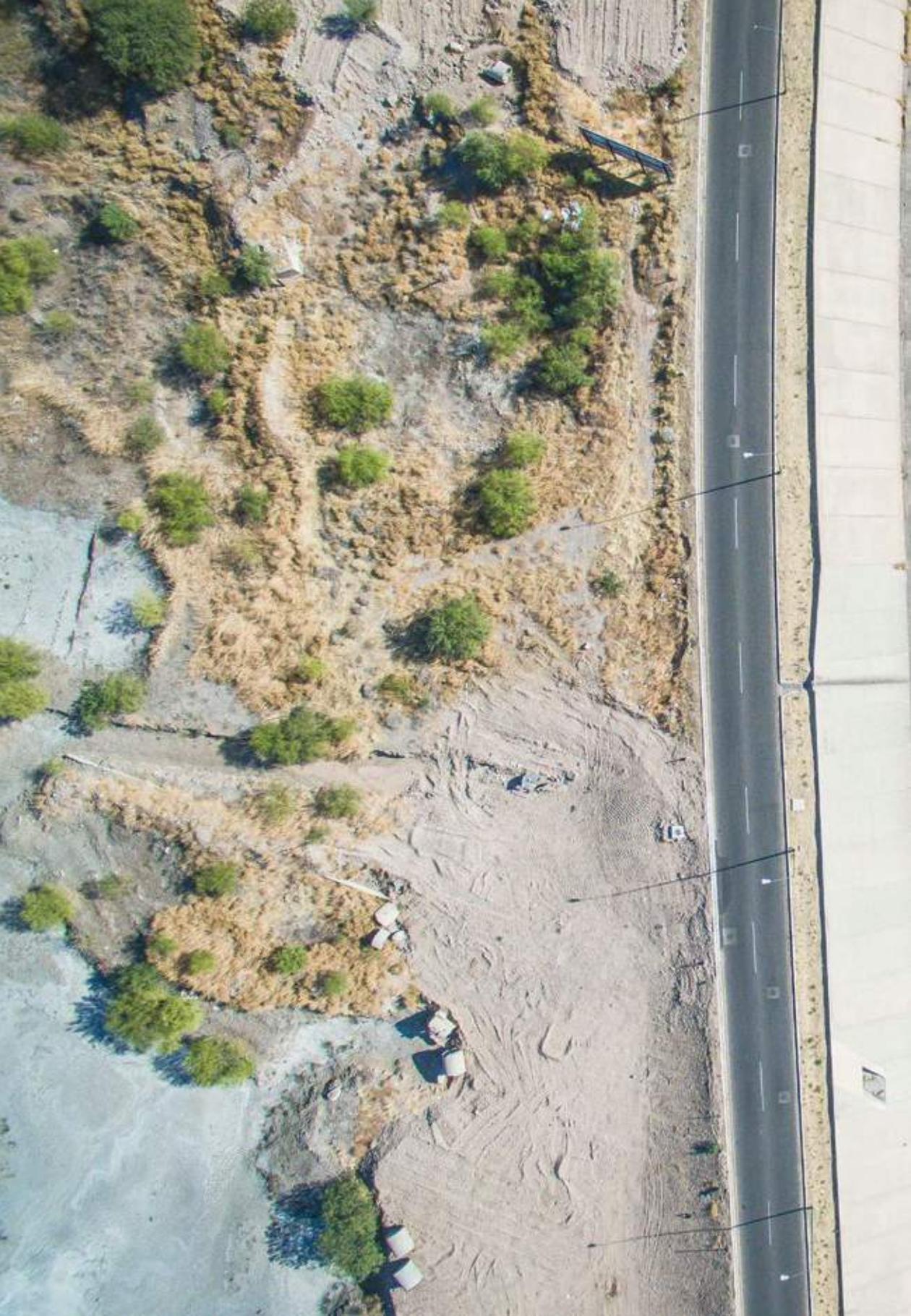
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FOREWORD

In 2017, 55% of the world's population lived in cities. By 2050, two out of every three people will live in urban areas (UN DESA, 2018). This trend mirrors that of Latin America, where 80% of the population lives in urban areas. Cities are centers of innovation, creativity, and productivity, connecting people, ideas, and capital. Cities are also engines of economic growth and prosperity (Glaeser, Rosenthal, and Strange, 2010). Even though cities comprise less than 5% of the total land mass, they produce 80% of global GDP. Moreover, the possibilities for economies of scale and agglomeration in cities create the conditions for social mobility.

However, serious problems persist in cities. Urban areas have not yet closed existing deficits in access to infrastructure and urban public services, housing, and the quality of urban life. According to estimates by UN-Habitat, 880 million people reside in marginal neighborhoods in developing countries. In the Latin American and Caribbean (LAC) region, 113 million people live in precarious settlements which lack basic services, are in high-risk areas, are located on the periphery of cities, and are disconnected from sources of employment.

The LAC region is considered the most violent region in the world. Despite being home to only 9% of the world's population, 33% of the world's homicides are committed there. In 2017, 42 LAC cities were among the most violent in the world, with the world's 10 most violent cities located in the region. In addition, cities will need to address other problems such as ageing populations. By 2050, 25% of the population in all the regions in the world, except Africa, will be 60 years of age or older (UN-Habitat, 2016).

Although urbanization has increased productivity and generated higher incomes and better living standards for millions of people in LAC, there is still much to be done to maximize the benefits of human agglomeration for economic growth and social development. For example, a better organized urbanization process—based on evidence and thorough analyses of urban dynamics—could help reduce the massive inequalities across the region and lay the foundations for more environmentally sustainable development.

Mexico is confronting all these challenges. Its urban system comprises more than 384

cities, 95 of which have populations of over 100,000 inhabitants. By 2030, the country is expected to have 961 cities, with 112 of them having over 100,000 inhabitants. Mexico has experienced accelerated urban growth. The size of the country's urban population multiplied 55 times between 1900 and 2010. Currently, 77.8% of Mexicans live in urban areas. The country's occupancy model was characterized by a disproportionate expansion and a fragmented and unplanned urban footprint. While the country's urban population doubled from 1980 to 2010, the size of urban areas grew seven times. This expansive model of urban development has affected wellbeing and productivity, especially for the population living far away from their jobs, resulting in longer commuting times.

In line with the new Urban Agenda and the Agenda 2030, since 2010, the Inter-American Development Bank (IDB) has been rethinking urban development from a comprehensive sustainability perspective and a more integrated approach. The Bank's Emerging and Sustainable Cities Program (ESC) applies a methodology for establishing the strategic priorities and actions that cities should adopt to accomplish their

medium to long-term urban sustainability objectives. The program focuses on three essential dimensions of urban development: 1) environmental sustainability and climate change, 2) sustainable urban development, and 3) fiscal sustainability and governance.

To face the challenges brought forth by urbanization, Mexico, with IDB support, financed an important technical cooperation program for municipalities based on the ESC methodology. The ESC program has been implemented in the cities of La Paz, Xalapa, Campeche, Lázaro Cardenas, Tapachula, Salina Cruz, Coatzacoalcos, and Hermosillo. Also, with the IDB's support, the Mexican government has embarked on important reforms in environmental and land use planning. Currently, the IDB is supporting the country in the implementation of the General Law on Human Settlements, Land-Use Planning, and Human Development (*Ley General de Asentamientos Humanos y Ordenamiento Territorial y Desarrollo Urbano*, or LGAHOTDU).

As part of the program in Mexico, the IDB presents the book "City Design, Planning and Policy Innovations: The Case of Hermosillo",

which summarizes the results of the work done through the ESC program in the city of Hermosillo in collaboration with the North American Development Bank and Harvard University. The book is the result of innovative approaches based on multisectoral and interdisciplinary collaboration between academia, practitioners, local government, civil society, and development agencies. The work on Hermosillo brings together state-of-the-art economic and urban analyses (such as municipal-level economic complexity analysis and growth diagnostics¹, transport-oriented developed strategies for the city, and the innovative new models of participatory processes implemented through digital platforms²), conducted by the Graduate School of Design and the Center for International Development at Harvard University, a team of IDB's urban specialists, local technicians, government officials, international firms, and civil society.

This book summarizes a set of proposals and methodologies that will enable the city to reverse existing unsustainable urban development trends. We hope that the dissemination of this knowledge will incentivize the development of new approaches to urban problems

in LAC cities that bring together academics, practitioners, and multilateral institutions. At the IDB, we understand that cities will play an increasingly prominent role in the region's development and its people's prosperity. With initiatives like this one, we hope to improve lives and contribute to a better future for our cities.

Mexico City, Mexico
November, 2018

Notes/References

1 – The Center for International Development adapted the scale of its Growth Diagnostics and Economic Complexity methodologies at the municipality level to better understand the distortions limiting economic growth and productive diversification in Hermosillo. This exercise marks the first time these methodologies are applied at the city level.

2 – To develop the Plan to Revitalize the Historic Center known as "Idea Hermosillo," the firm Ecosistema Urbano designed and implemented a digital platform adapted to the context of the city to develop the participatory process for the city of Hermosillo, as well as civil society in Hermosillo.













INTRODUCTION:
SETTING

THE
STAGE

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Diane E. Davis

Harvard's Involvement

As the curator of the Mexican Cities Initiative at the Graduate School of Design (GSD) and Head of the Faculty Committee on Mexico at the David Rockefeller Center for Latin American Studies (DRCLAS), I was thrilled when Felipe Vera and his colleagues at the Inter-American Development Bank (IDB) reached out with the possibility of jointly undertaking a research and class-based project focused on the city of Hermosillo in Mexico. At the GSD, we are always eager to find real world opportunities for Planning and Design students to undertake hands-on work in cities around the world.

On that count alone, this opportunity was a no-brainer. Students would have the chance to work with high level officials both in the city of Hermosillo and at the IDB to help craft a new revitalization plan for the city, drawing on both local knowledge and global best practices. Yet, as a scholar who has devoted most of her academic life to studying Mexico City and other large metropolises in the Global South, the prospects of turning to this medium-sized city in northern Mexico, and examining its urban and economic development potential, had an additional appeal. For one, it allowed us to focus our attention on an insufficiently-studied but eco-

nomically, politically, and historically significant region of Mexico, nestled close to the United States-Mexico border. For another, Sonora—the state in which Hermosillo serves as the capital—can be considered iconic in Mexico’s historiography, primarily because four of the nation’s immediate post-revolutionary presidents (during the 1920s and 1930s) came from this state. Reaching out to this historically and politically influential but relatively under-studied region—in urban design and planning terms—would help serve DRCLAS’s aims of ensuring that the Mexico Faculty Committee would truly embrace student and faculty work all over Mexico, and not merely its most referenced and largest cities. Furthermore, we were lucky enough to have had an expert on this date and region, Dr. Gabriela Soto Laveaga, recently joining Harvard’s History of Science Department. In this context, I knew that our students were going to be well-prepared for undertaking significant work in Hermosillo.

Just as significantly, the selection of a medium-sized city like Hermosillo signaled a turning point in thinking among development specialists, including the IDB. This change was motivated in part by recognition that those environments



CREDITS: Inter-American Development Bank (2016-2018).

most conducive to innovation and new forms of thinking might be the smaller, less problematic cities that already come with a certain array of historical advantages ripe for exploration. Indeed, unlike Mexico City and Guadalajara for example—where immense sprawl, high degrees of informality, and accelerating rates of poverty have upped the ante for urban and economic development specialists—Hermosillo is blessed with an array of factor endowments linking to its location, manufacturing heritage, numerous universities, and agricultural tradition, all

of which put it in a relatively good position to move forward if new ideas could be focused on the development of new economic synergies. That Hermosillo embodied unrealized potential was precisely the reason the IDB selected it as a targeted site for its Emerging and Sustainable Cities Program (ESC).

Those environments most conducive to innovation and new forms of thinking might be the smaller, less problematic cities that already come with a certain array of historical advantages ripe for exploration.

The facts are impressive. Hermosillo is Sonora's capital and the state's largest city, as well as the main economic center for the state and region. As of 2015, the city had a population of 812,229 inhabitants, making it the 16th largest city in Mexico. Much of the city's population and economic growth are due to its strong industrialization, especially in the automotive industry. In 2013, Hermosillo was ranked as

one of the five best cities to live in Mexico,¹ and in 2016 it also ranked as the seventh most competitive city in the country according to the Mexican Institute for Competitiveness (Instituto Mexicano para la Competitividad—IMCO), based on its geographical location, high quality educational institutions,² governmental capacity, the embrace of innovation, and international relations.³ Its reputation in this regard built on earlier assessments, including a 2017 Standard & Poor's evaluation that rated the municipality of Hermosillo as class A/stable, based on its administrative practices, financial flexibility, and limited financial risks.⁴

Part of Hermosillo's economic success to date owes to location. With the state of Sonora bordered on the north by the United States and hosting a significant pacific port (Guaymas) on its Western coast, Hermosillo's economy has been increasingly oriented toward international trade. Most of this has focused on the U.S. market since the 1980s, owing in large part to an automobile-assembly plant and the growth of light-industry—export-oriented assembly plants known as *maquiladoras*—which produce clothing, automobile parts, electronics, and processed foods. In recent years, the aero-



CREDITS: Inter-American Development Bank (2016-2018).

space industry has targeted Hermosillo as a site for further development and investment,⁵ and IT-related industries are growing. In many ways, Hermosillo could be considered a relatively stable 'middle-class' city with a stable work force and a strong work ethic, built on years of innovating new forms of livelihood in the midst of an unforgiving desert. The latter also explains why Hermosillo's economy grew around its role as a market and service center for nearby copper mines and farmlands where cattle are raised and irrigated crops of fruit, wheat, cotton, corn (maize), and beans have grown successfully.

The fact that innovation unfolded around agriculture as much as industry is reflected in that Sonora is the home to the storied Green Revolution that produced amazing advances in agricultural productivity. That these particular scientific innovations originated in Sonora owes partly to the top-tier academic research institutions involved in agricultural studies there. But it also owes to the history of active state intervention. In the 1930s, Sonora benefitted from a number of national policies aimed at developing the cities on the border with the United States and to build a number of dams to help develop agriculture and general water supply.

In addition to its industrial and administrative functions, easy access to the coast has helped Hermosillo become a winter resort of sorts, largely because of its nearby sandy beaches at Kino Bay. Although the current drug trade has problematized mobility between the city and the western coast, an extensive highway network keeps access to the coast and the border relatively streamlined. Both highway infrastructure and railroads link Hermosillo with the border cities of Mexicali, Baja California, and Nogales, Arizona, to the north, and with Guadalajara and Mexico City much further to

the southeast. Hermosillo also has an international airport, an important feature in a globalizing scenario where international investors and firms prioritize ready access to the city.

In terms of governance, Hermosillo's status as the capital of Sonora gives it a lot of institutional and political advantages, particularly in terms of access to investment programs and resources, as well as power structures that matter in urban decision-making. In addition to its role as the capital city of a relatively prosperous state, Hermosillo is advantaged with extraordinarily extensive municipal boundaries. In Mexico, decisions about housing, property development, and other major urban infrastructural investments are usually made by municipalities. In many cities across Mexico, particularly large cities like Guadalajara and Monterrey, the metropolitan area is comprised by a large number of municipalities (8 and 12, respectively). These politico-territorial configurations make coordinated planning extremely difficult, getting in the way of smart decision-making about infrastructure investments, housing location, and other key services. But Hermosillo is a single municipality that comprises 14,880.2 square kilometers (5,745.3

square miles) and expands almost all the way to the western coast. This allows planners and policymakers to coordinate a range of activities across scale and sector, including tourism, agriculture, and industry, simultaneously.

But all is not perfect in Hermosillo, and there are many aspects of its history, location, environment, and city form—when combined with potential economic liabilities associated with the vicissitudes of industrial transformation—that could hold the city back. First and foremost, Hermosillo sits smack dab in the middle of the Sonoran Desert. Temperatures can be unbearable and can have an impact on economic productivity. More significantly, the city—and the entire region—is experiencing a water crisis. Although efforts have been undertaken to create access to other sources of water in distant parts of the state, such efforts are costly and have produced political conflict with other cities in Sonora competing for access to the same sources of water (Bannister, 2010). The automobile industry, which has long been the driver of economic growth and prosperity, as well as the source of well-paying jobs, is itself entering a period of crisis, first emerging after the 2008 recession, but that may still have some

bearing on plant operations in Hermosillo. For example, in 2012, the Ford Motor Co. invested \$1.3 billion US dollars for the expansion of its Hermosillo Stamping and Assembling Plant.

Hermosillo's status as the capital of Sonora gives it a lot of institutional and political advantages, particularly in terms of access to investment programs and resources, as well as power structures that matter in urban decision-making.

Yet today, scarcely a few years later, Ford is actively moving away from its focus on traditional automobile production, and pursuing technology led autonomous vehicles and software development in ways that challenge traditional plant operations. Although this does not necessarily mean that Ford will close or remove its operations in Hermosillo, it does suggest that any future role for the plant may require major investment to retool its assembly lines.

Finally, the urban fabric of the city is suffering from several looming problems that could hold back its capacity to reinvent itself as a new, more service-oriented economy connected to high-tech industries and other key sectors that hold the potential to foster strong economic growth, including investments in upgrading the built environment that facilitate greater connectivity and generate sectoral synergies. Downtown Hermosillo is not well connected via either public or privately-provided transport to all the city's neighborhoods, and its small commercial activities remained stagnant while also occupying key properties in high-value locations near the historic center, thus limiting overall urban change. Given insufficiently dense land-use, car ownership is on the rise, contributing to pollution and other environmental problems. Finally, several recent real estate developments—undertaken both for market and for social housing—have expanded the urban footprint far into the city's periphery in ways that undermine centralities and create more demand for infrastructural investments in water, transit, and electricity, all of which put a large drain on the public budget.



Former Mayor of Hermosillo, Manuel 'Maloro' Acosta and the students during the final review of the Harvard GSD class in December 2017. CREDITS: Andreina Seijas.

It is these challenges that have drawn Harvard's GSD and the IDB into partnership. Our students were charged with proposing new planning and design visions for the city of Hermosillo, Mexico. In preparing for this challenge, they devoted 14 weeks of the semester to the study of the city, and to an assessment of its contemporary conditions, historical legacies, and future opportunities. In an upcoming section, we will provide more details on the process, but suffice it to say that their work built directly on resources generated from a wide range of actors and institutions.

Throughout the semester, including a field trip to Hermosillo, our students interacted with local stakeholders, experts at the IDB and the North American Development Bank (NADBANK), and a larger circle of policymakers and academics with knowledge of Hermosillo. Much of their preliminary questioning was built around “Rethinking Hermosillo,” a report pulled together by a student team from Harvard’s GSD over the summer of 2017 under the supervision of Diego Arcia, Felipe Vera, and other urban development specialists at the IDB. Just as significantly, students’ efforts were advanced by concurrent work on innovation, economic development, agriculture, and global competitiveness conducted by other faculty at the Harvard Kennedy School of Government, the Harvard T.H. Chan School of Public Health, and the Faculty of Arts and Sciences. The sum total of all this work—built on a rich and productive interaction between Harvard University and the IDB—is reflected in this edited volume.

We owe a debt of appreciation to those who provided institutional and financial support for this initiative and for this publication, including the IDB and DRCLAS. We also owe heartfelt thanks

to the many, many people who contributed to this effort as guest lecturers, as policy experts representing institutions like NADBANK and the IDB, and as gracious hosts in Hermosillo, representing the views of the private sector, civil society, and local government. Among this large group of generous and welcoming individuals, we especially want to thank:

- From Hermosillo: the former mayor Manuel Ignacio ‘Maloro’ Acosta Gutiérrez, and current mayor Célida López, Lourdes Angelina Muñoz Fernández, Carolina Espinosa Guerrero, Lupita Peñuñuri, Rodrigo Sánchez, Eduardo Hinojosa, Mauricio Madrid, Manuel Molina, Marcela Orozco, Pedro Soria, José Luis Deschamps, Eduardo Lemenmeyer.
- From the IDB: Verónica Zavala, Tomás Bermúdez, Tatiana Gallego, Nora Libertun, Andrés Blanco, Diego Arcia, Joyce Valdovinos, Adriana Chávez.
- From Harvard University: Ricardo Hausmann, Miguel Ángel Santos, Douglas Barrios, Ramon Sanchez, Gabriela Soto Laveaga, Rahul Mehrotra, Enrique Silva, Belinda Tato, Anita Berrizbeitia, Juan Santamaría, Rubén Segovia, Jorge Silva,

Claudia Tomateo, Surella Segu, Shaney Peña-Gómez, Astrid Cam Aguinaga, Dení López.
 – Others: Christopher Zegras, Braulio Torres, Verónica Herrera, Gabriel Díaz Montemayor, Ulises Navarro.

And last but not least, I would like to especially thank Felipe Vera, my co-conspirator in this project, and Andreina Seijas, our intrepid and masterful teaching and research assistant, for helping make this course and this publication a success.

Cambridge, MA
 July 2018

Notes/References

1 – Of course, one needs to take this claim with a grain of salt. Another study published in the Mexican newspaper *Excelsior* ranked it as the third-highest city for quality of life in Mexico in 2012, showing just how arbitrary some of these statistics are.

2 – Hermosillo hosts the main campus of the state's University, Universidad de Sonora, which is ranked among the top 10 of the 175 institutions of higher education in the country (Polchert, 2014). This flagship university offers four career options in the IT area alone. Currently, of the 23,000 students in the engineering field, over 30% are related to IT. In addition to several other major universities, it is also home to a branch of the prestigious Tec de Monterrey.

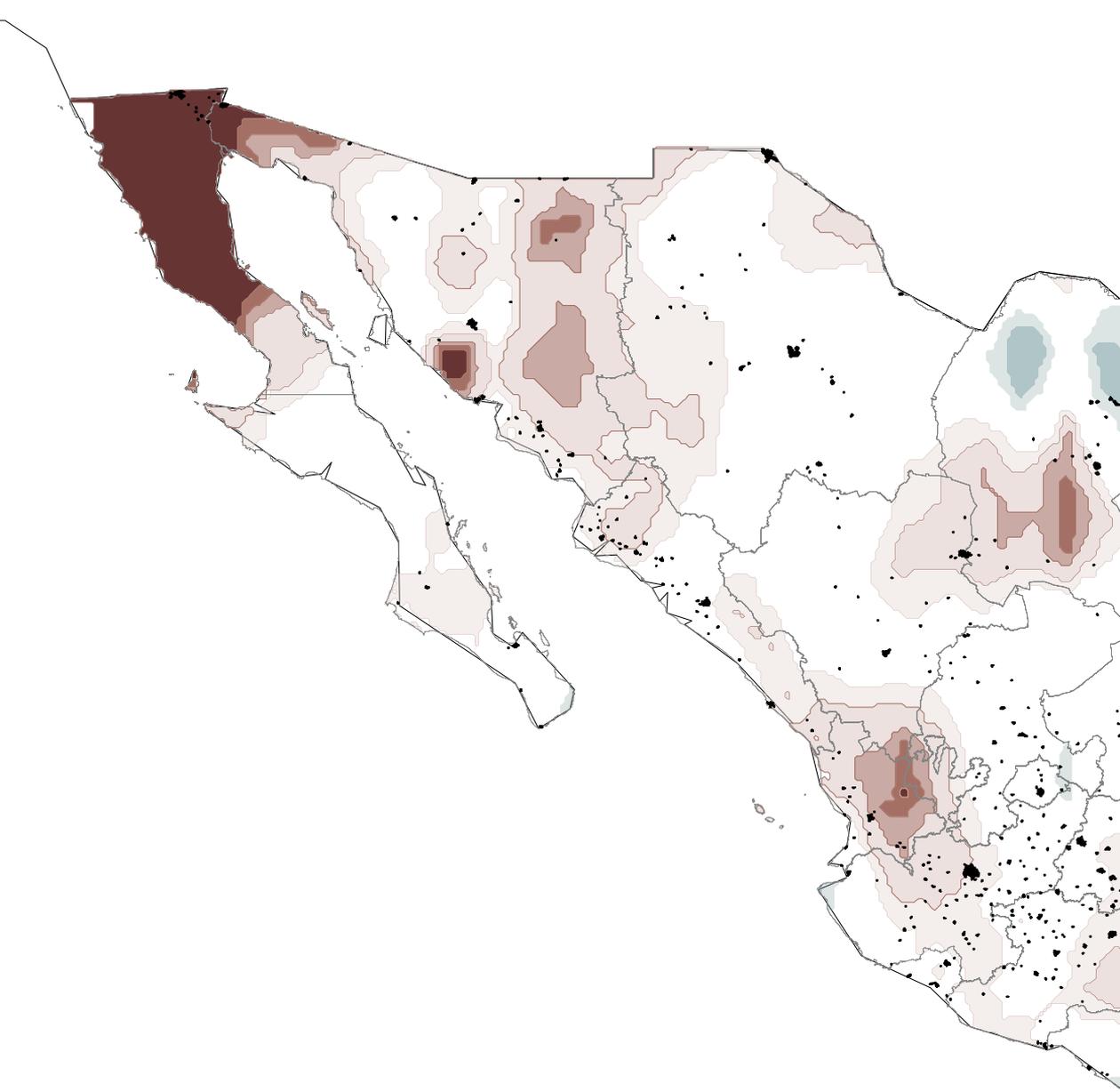
3 – According to recent global industry reports (Polchert, 2014), the region's IT industry is booming with more than 300 companies generating 5000 jobs in the state. These companies have taken advantage of the educated workforce, IT educational programs, low operational costs, training, quality of life, and infrastructure that Hermosillo has to offer. Much of this is due to the government's focused efforts to promote the aeronautical and IT industries. The presence of companies like Lanix, nearsoft, Teleperformance, and Tiempo Development is evidence of the success of this promotion.

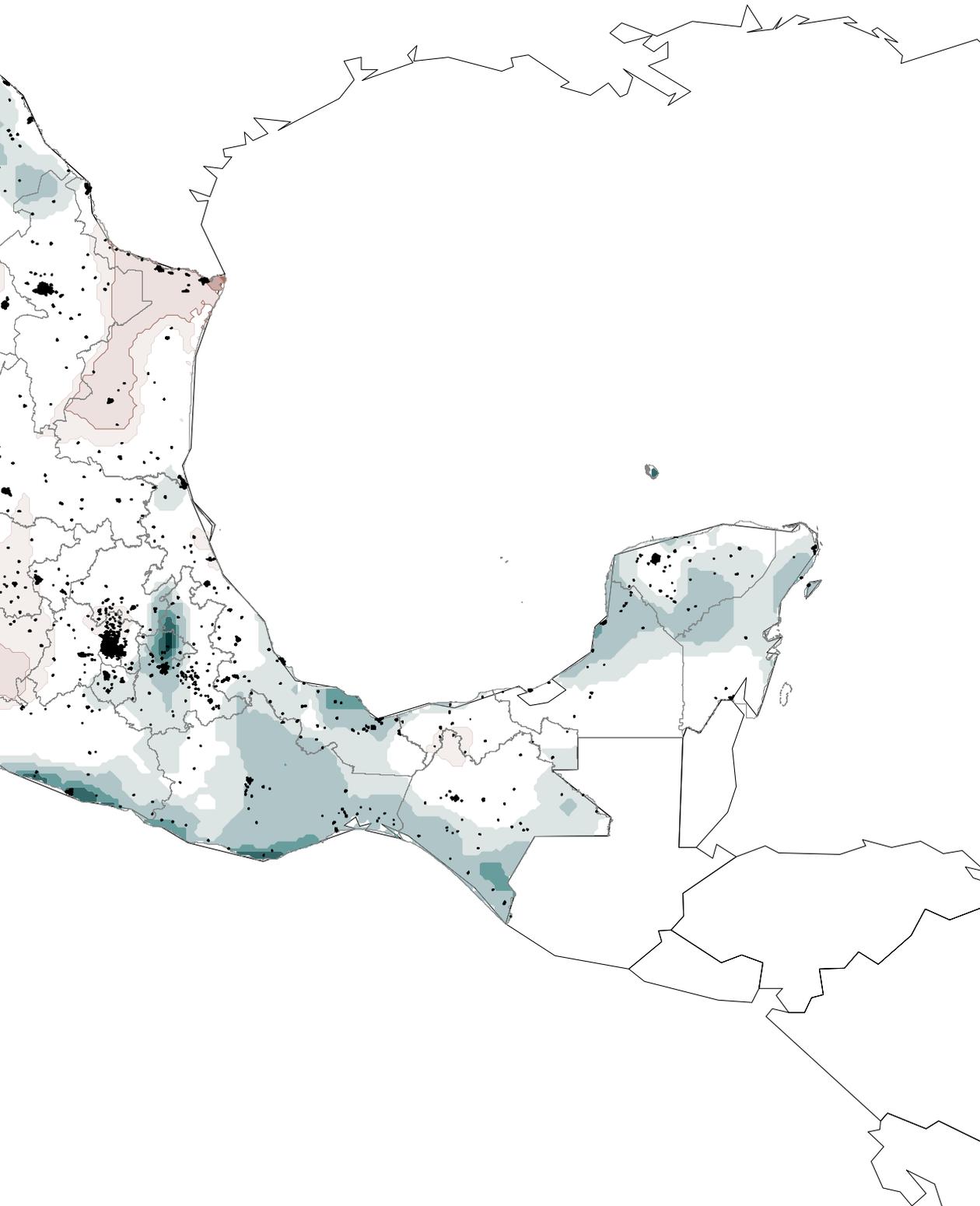
4 – Standard & Poor also noted that the financial management of the municipality has been prudent, with adequate documentation of practices and prudent debt levels—at about 33% of gross income.

5 – According to Polchert (2014), the city is now considered to be one of the most important clusters of the aeronautical industry in Mexico, with 45 companies generating more than 7000 jobs.



CREDITS: Inter-American Development Bank (2016-2018).





HMO HERMOSILLO

Hermosillo is in the state of Sonora, 280 kilometers from the border with the United States, in the Northeastern part of Mexico. It is the capital of Sonora and the largest city in terms of demographics.

IMPORTANT DATES



May 18th
1700
Founding



September 27th
1821
Independence



210 M.A.S.L.
Altitude

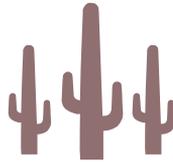


386.9 mm
Average Annual
Precipitation

POPULATION (Census 2010)

Sonora
Hermosillo

2,622,000 hab
799,165 hab



311,000 km²
Sonora Desert
Surface Area



2.1 m²
Green Area
per Habitant

TERRITORY (Surface Area)

Sonora
Hermosillo

179,354 km²
168.2 km²



3,352 hab/km²
Population Density



24.2°C
Average Annual
Temperature



1,889km

HERMOSILLO

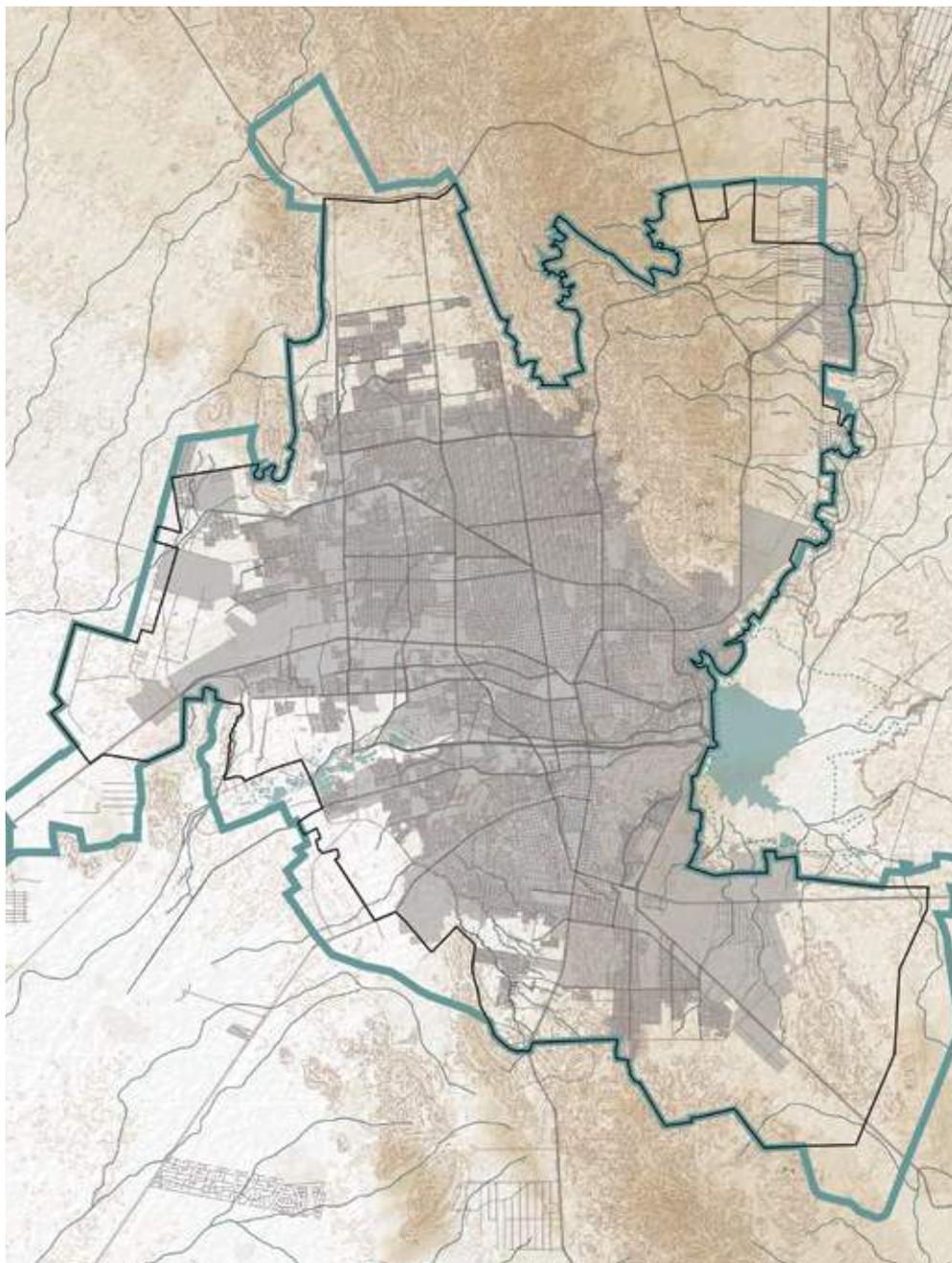
MEXICO CITY



27.9 Average Age



19.7% Vacant Housing
11% Precarious Housing
11% Informal Housing



CREDITS: Inter-American Development Bank 2016 (left and right).





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PREPARING
FOR

ACTION
IN EMERGING
CITIES

— Foundational
Materials

Planning
Emerging
Cities
in Latin
America

With 81% of the population of Latin America and the Caribbean (LAC) now living in cities, the region is now the second most urbanized on the planet. Reaping the benefits brought about by agglomeration, economies of scale, and demographics, urbanization has been an important driver in the region's economic transformation, but the dividends have not been equally shared. Fast growth has often outpaced development, leading to deficits in housing and basic services, insufficient quality infrastructure, and environmental degradation through air, water, and soil pollution.

Latin America's cities are also the most unequal across continents. Moreover, directly related to LAC's early agrarian-migration urbanization drivers and subsequent weak industrial modernization, LAC countries display somewhat low levels of income, human capital, productivity, and technology adoption, relative to their high levels of urbanization (BBVA Research, 2017). Urbanization has also led to a loss in social cohesion, spatial and social segregation, and a rise in inequality and insecurity. Lastly, new challenges associated with climate change externalities, increased vulnerability to natural disasters, and changing behaviors and societal patterns—such as changing consumption preferences, new employment models, and an aging population—call for a new approach to development.

— Established and Emerging Cities in LAC

Despite having two of the five largest megacities in the world (Mexico City and São Paulo), more than half of LAC's urban population lives in cities of less than one million. Megacities remain engines of growth in the region. However, low densities and uncontrolled dispersion have often led to poorer standards of living brought about by poor mobility, pollution, and high property markets, among others. Medium size cities, therefore, hold the promise of a more livable and inclusive environment, a promise to be realized only through good planning and management practices.

Although the concept of a secondary city may vary,¹ it is usually linked to its population size (relative to the largest cities in the same country), its functional and its economic role. Many secondary cities in LAC—such as Curitiba, Panama City, or Guadalajara—have dynamic economies and play a critical role in setting an alternative urbanization path in the region.

In 2010, the Inter-American Development Bank's (IDB) Emerging and Sustainable Cities Program (ESC) established that out of the 645 cities in LAC with populations between 100,000 and two million inhabitants, 242 had population and economic growth levels greater than their national average. These cities were home to 74 million people and produced 17% of the region's GDP. ESC has assisted 77 emerging cities in the region to conduct rapid sustainability diagnostics, studies and the preparation of action plans² containing prioritized interventions and a set of strategies for their short, medium, or long-term implementation.

In Mexico, the IDB partnered with BANOBRAS—a state-owned development bank—and assisted the development of studies and action plans for secondary cities of diverse nature, including Xalapa, in the state of Veracruz, Campeche, in the state of Campeche, or La Paz, in Baja California. ESC is also supporting action planning in urban areas hosting Special Economic Zones, such as Lázaro Cárdenas, Coatzacoalcos, Salina Cruz and Tapachula. But perhaps the most exceptional studies were the ones undertaken for Hermosillo, which—in partnership with the local government, NADBANK, and Harvard University—aimed at comprehensively addressing the city's economic development and urban regeneration agendas while incorporating socially inclusive and environmentally sound principles.

—Lessons from the Emerging and Sustainable Cities Program (ESC)

ESC provided a comprehensive analytical framework to guide action-oriented urban development, helping cities focus on their more immediate and urgent needs, emphasizing strategies that

are well-planned, integrated, and cross-sectoral that can improve quality of life for citizens and help materialize a more sustainable, resilient, and inclusive future. City planning also provides an opportunity to develop a more complete canvas of opportunities which provide a continuum for collaboration and growth.

CITY PLANNING WITHIN THE TERRITORY

While planning capacity has increased in institutions and municipalities across LAC, results are often constrained by administrative jurisdictions and mandates, impacting the ability that a metropolis has to address complex and intertwined social, economic, and political needs, and dynamic and rapidly changing environments. Beyond immediate boundaries, urban plans are rarely well integrated with economic development planning processes—which are often defined by central institutions. As a result, a city's capacity to leverage its competitiveness is limited. Finally, urban planning and development policies are in many cases still not cohesive with other nationally determined policies (including housing and transport policies, among others), resulting in suboptimal, often unsustainable growth.

— Territorial Planning

Riddled by fragmented institutions, financial flows, and data systems, many countries in the region have been unable to establish an overarching framework capable of providing policy coherence and a comprehensive approach to dealing with land use, provision of services and infrastructure, economic development, allocation of scarce resources, and environmental amenities in their territory.

For example, Mexico's expansive urban growth had a negative impact on several developmental aspects. Housing policy was not complemented with mechanisms to ensure access to well-situated, developed land; this generated residential segregation, progressively more costly services and long commutes,

decreased productivity, and affected environmental conditions in many cities across the country. The establishment of the Department of Agricultural, Territorial, and Urban Development (SEDATU) in 2013—an office responsible for the design and implementation of metropolitan, urban, agricultural, and housing development policies, as well as the administration of national lands—and the promulgation of the General Law on Human Settlements, Land-use Management, and Urban Development in 2016, represented major milestones in the government's strategy to reform territorial and urban development policy.

Despite having two of the five largest megacities in the world (Mexico City and São Paulo), more than half of LAC's urban population lives in cities of less than one million.

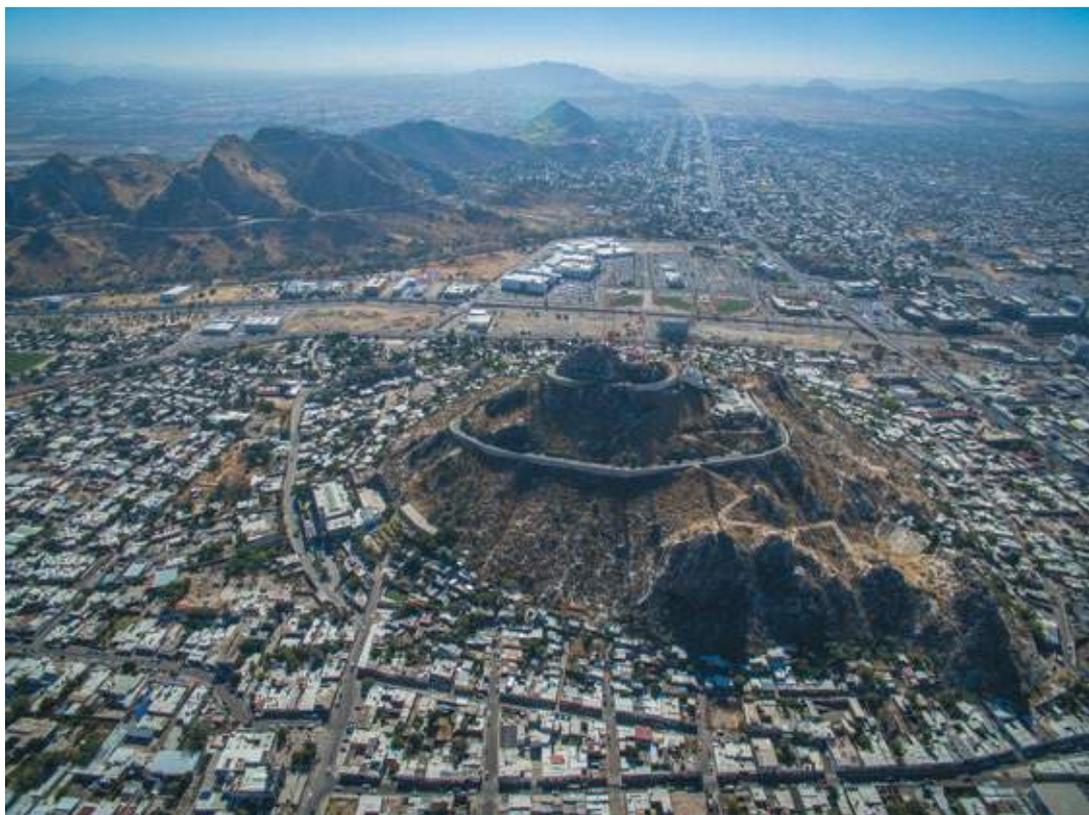
The persistence of regional disparities in the development of the territory remains another major hurdle in LAC, where urban primacy is prevalent. This includes large countries like Mexico, as well as Argentina—where the second largest city in the country represents a mere fraction of the capital city's metropolitan population (24% and 11%, respectively). It also relevant in smaller countries. In Costa Rica, for example, the metropolitan area of San José is home to 60% of the country's total population and produces 70% of country's GDP; in Chile, Santiago's metropolitan area represents 41% of the total population. The concentration of opportunities in primary cities not only reflected in the form of employment, but also in the convergence of educational and health institutions and essential services, can lead to stagnation in secondary cities.

— Rural-Urban Linkages

Acknowledging the importance of functional links across space and sectors is central to ongoing structural changes in urban and rural areas. Given the extensive flow of people that migrated from rural to urban areas over the past 40 years, cities today depend on rural areas for food, water, energy (in many cases renewable), and the preservation of the environment. Conversely, rural areas, now more than ever, need to be connected to the trading markets and services that cities provide. However, in many instances, territory planning has not yet established these much-needed interactions across space and sectors; sites still lack the continuum of services, people, products, and information, that would ultimately lead to more integrated economic growth.

As highlighted by McGranahan et al (2004), intense pollution and resource pressures originate in urban centers and have major impact on the surrounding regions. Moreover, given LAC patterns of development, peri-urban zones are often far more environmentally unstable than other urban areas. Faced with the additional threat brought by the effects of climate change, a few cities have started to act. However, action requires capacity and accountability on the part of local governments, particularly in regard to land use planning and management. One such case is the city of Medellin, Colombia, which has been able to incorporate urban and rural complementarities as part of its strategy to protect and enhance its environmental assets. The strategy includes an initiative that promotes the development of green corridors, and another that aims to protect water and flora in watersheds through the payment of ecological services to its rural population.

From an economic standpoint, differences among urban and rural populations and urban-rural interdependence in relation to commuting, employment, and income generation are more nuanced in LAC. According to Davila (2002) a substantial proportion (40%) of rural household incomes in the region is derived from non-farm occupations. Yet, in the case of Chile, 20% of the agricultural labor force is supplied by urban households, highlighting that there are gradients of 'rurality' and greater in-



CREDITS: Inter-American Development Bank (2016-2018).

terdependence than what might appear if viewed from a purely sectoral perspective. More important, perhaps, is the role that urban centers can play in the transformation of produce from immediately adjacent rural areas, if efficient logistics and freight, and/or access to dynamic markets are in place.

— Systems of Cities

Small and intermediate cities play a key role in realizing the full potential of links between rural and urban sectors. A system of cities can leverage the full potential of a country's interdependent and interconnected cities, find a balance between the spatial concentration of activity and diseconomies arising from congestion, promote inter-industry linkages, specialization, and product differentiation, boost trade and access to markets, and help endogenous growth within the territory.

— Metropolitan Governance

The biggest urban management challenges are often associated with metropolitan areas. Rapid urbanization in LAC's cities, beyond established boundaries, has rendered traditional governing structures and institutions inefficient and led to a patchwork of administrative centers that lack a common vision or shared governance.

Metropolitan areas can be more productive than smaller cities in reaping the benefits of agglomeration. However, this requires a coordinated response. Some metropolitan areas have attempted to tackle this problem by adopting complex forms of organized multi-level governance. Yet, excessively hierarchical systems can also be stifling and less successful than other more collaborative systems of horizontal and vertical cooperation that involve all city actors.

As argued by Martinez and Gonzalez (2017), Bogotá's Special Planning Administrative Region has been able to bring the benefits of the system of cities into a regional context in a way that reconciles the two territorial planning approaches—system of cities and departmental—and contributes to addressing the fight against inequality, the consolidation of the internal market, the improvement in productivity and environmental sustainability.

In Mexico, the General Law on Human Settlements, Land Management and Urban Development of 2016 provided, for the first time, a legal and institutional framework to regulate metropolitan areas. In their analysis of Guadalajara, Blanco-Ochoa and Osorio (2016) describe how the creation of three Metropolitan Coordination Entities representing both government and civil society (the Metropolitan Coordination Committee, the Metropolitan Planning Institute, and the Citizen Metropolitan Council) were able to deliver comprehensive participative planning in the metropolitan area of Guadalajara.

— Cities in International Transport Corridors

Economic corridors are intended to attract investment and generate economic activities along a transport strip as well as in their areas of influence, which can be extensive. Cities, acting as nodes of growth and logistics, can play a key role in transforming transport into economic corridors. A popular model in Asia,³ where economic corridors have driven industrial development, brought about economies of scale and enabled lower distributions costs. This approach remains underdeveloped in Latin America, despite its importance for trade integration.

Small and intermediate cities play a key role in realizing the full potential of links between rural and urban sectors.

CONTEMPORARY AND RENEWED PLANNING PRIORITIES

— Localizing International Commitments

For countries in the region to fulfill their international commitments, these obligations need to permeate to the local level, transforming sectoral agendas into specific targets, defined in space and time. Cities' leadership in localizing key international commitments—such as Agenda 2030, the Paris Agreement on Climate Change, and the New Urban Agenda—will need to be part of their planning and budgeting processes and cut across multiple aspects, including basic services like housing, water,

and sanitation, key productive infrastructure such as transport and energy, and social services, such as education or health. Although most cities in the region have yet to prepare development plans that are linked to the Sustainable Development Goals (SDGs) agenda, there are worthy examples of cities that have made progress in this direction. In 2015 Colombia established a High-level Interinstitutional Commission for the Preparation and Effective Implementation of the Post-2015 Development Agenda and the SDGs and invited local and regional governments to participate in technical committees and work groups. As a result, in cities like Medellin, 70% of all indicators in the city's most recent development plan are derived from the 2030 Agenda.

Similarly, the National Confederation of Municipalities of Brazil has worked toward strengthening the role of local governments in the localization of SDGs. This partnership has centered on three actions: 1) the identification of indicators, which is done by the municipalities; 2) the preparation of guidelines and publications that define the role of local governments in the new development framework, and 3) the provision of capacity building for mayors and municipal staff.

Building Resiliency, Driving Carbon-Efficient Economies

While the localization of the Nationally Determined Contributions is also gathering momentum, a few cities are exploring adopting these contributions at municipal level. Buenos Aires and Quito are two examples. The implementation of a climate sensitive agenda has initiated drastic changes in spatial and sectoral planning. The construction of housing stock in the region has been largely driven by market forces, frequently resulting in low density development, sprawl, and the promotion of new units over retrofitting and renewal options. Similarly, transport agendas have long promoted the use of motorized and/or individual vehicular options over public transport and/or nonmotorized choices, options that cities like Bogota, Quito or San Jose are now pursuing.



CREDITS: Inter-American Development Bank (2016-2018).

Faced with repeated and impacting extreme weather events—ranging from hurricanes in the Caribbean to floods in Peru or Colombia—cities in LAC are starting to build resiliency through the rebalancing of sound and diverse ecosystems, using green-blue infrastructure that can meet multiple parallel needs (water sinks, linear parks), and a coherent land use policy. Panama City, for example, is in the process of implementing one such scheme in the Juan Díaz’s watershed. The city is combining remedial measures, the restoration of upstream reservoirs, and the development of city growth plans, which are commensurate to the carrying capacity of the area.

— Technology

Although the powers of digitalization, automation, mobile, and other technologies have been largely untapped in the region, their rapid development and deployment may facilitate a variety

of planning processes, ranging from data collection (i.e. drones) and processing (i.e. digitalization) to consultation and participation (i.e. mobile or cable technologies). Moreover, the region should explore the potential of technologies such as block chain in regularization and titularization in informal areas.

— The Contents of this Section

In considering these challenges and opportunities, this section will begin with a broader picture of urbanization in the region, and then zero in on Hermosillo and the Sonora region. It will provide background information on Hermosillo's overall socio-economic conditions and outline the programmatic framing that the IDB used to identify this city as a promising site for further work.

This section includes studies and policy proposals that were developed as inputs for the IDB's Action Plan and were later used for the Fall 2017 Harvard Graduate School of Design class, taught by professors Diane E. Davis and Felipe Vera. These contributions represent the work of both IDB specialists and external consultants that were hired to develop these inputs between 2016 and 2018.

The first chapter in the section is titled "Urban Innovation in the Americas: City Labs as a New Model for Transforming Cities." Written by Andrés Blanco, David Razu, and Sarah Benton from the IDB's Housing and Urban Development Division (HUD), this piece explores the importance of innovation in an urban development context and provides recent examples from Latin American cities that have been able to break the mold and design urban solutions that have been replicated in cities all over the world. By discussing the rise of urban innovation hubs and laboratories throughout the Americas—and presenting the IDB's own Cities LAB—it compels local governments to adopt a non-linear, experimental, and participatory approach to the issues and demands faced by Latin American cities.

The second chapter titled "Urban Expansion in Mexico: A Latin American Story" is written by Diego Arcia (IDB) and Enrique



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Silva (Lincoln Institute of Land Policy). It explores the underlying factors that explain urban expansion in Latin America and the challenges faced by Mexican cities. By analyzing Hermosillo's socio-economic context and the state of its services and infrastructure, the chapter outlines the main challenges that result from a low-density urbanization process and provides some recommendations for future planning and action.

The third chapter titled "Beyond Hermosillo: How water, wheat, and hybrid seeds placed Sonora on the world map", explores the history of the Sonoran region, rooted in a longstanding agricultural tradition that gave birth to the Green Revolution. By analyzing Hermosillo's history and its relationship with the rest of the state—particularly the vital role that agriculture and irrigation played in the state's growth—historian and Harvard professor of History of Science Gabriela Soto Laveaga invites us to rethink Hermosillo from its past into its future.



CREDITS: Inter-American Development Bank (2016-2018).

Written by Miguel Angel Santos and Douglas Barrios—two research fellows at the Harvard Kennedy School’s Center for International Development (CID)—the fourth chapter titled “Is There Life After Ford?” focuses on Hermosillo’s economic competitiveness and, specifically, the reasons behind the city’s economic stagnation. It sees the city’s overreliance on the automobile industry as a primary concern. Based on two methodologies developed at CID—the Growth Diagnostic and the Economic Complexity Analysis—this piece proposes alternative pathways for Hermosillo’s future economic growth. The chapter summarizes a collaboration between the CID and the IDB in the context of the Action Plan for the city of Hermosillo, which led this team of experts to implement these methodologies at the city-level for the first time. Aside from being a relevant input to the city’s Action Plan, this project laid much of the groundwork for GSD student reflections on how changes in the built form might interface with the need to strengthen the city’s future prospects by generating new sources of domestic and foreign investment in Hermosillo.

The final chapter of this section, “Searching for a New Urban Paradigm: Rethinking Hermosillo,” provides a thorough over-

view of the socio-economic and environmental challenges in Hermosillo. Produced by a group of architects and GSD alumni from three Latin American countries, it summarizes a broader report that was commissioned by the IDB in the summer of 2017 to offer a preliminary assessment of the city's problems and opportunities. The team that produced this report visited the city, spoke with major policy and planning stakeholders, undertook a socio-demographic and spatial analysis of the urban landscape, and scoured a range of data on issues related to sustainability, housing, and transport—all of which allowed them to provide a comprehensive analysis of which geographic or sectoral areas might be well served by further interventions. Their work was shared in the classroom setting and served as a basis for initial reflection and student discussion of potential interventions. In that sense, this chapter forms much of the foundational basis for the student work that is presented in Section 3 (“Planning and Design Visions for Hermosillo: Perspectives from Harvard University”).

In short, all the chapters included in this section laid the groundwork for the collaboration between Harvard University and the IDB and will hopefully introduce the reader towards a panoramic and comprehensive view of the region through the lens of one of its emerging cities: Hermosillo.

Notes/References

- 1 – Officially, UN-Habitat defines a secondary city as an urban area generally with a population of 100,000 to 500,000.
- 2 – The Action Plan is a technical document developed by IDB specialists and external consultants that includes a city's vision, an evaluation of its multi-sectoral sustainability, and proposed projects for improving its performance (Inter-American Development Bank, 2016).
- 3 – Examples include the Greater Mekong Subregion in Southeast Asia and the Delhi-Mumbai Corridor in India.





CREDITS: Inter-American Development Bank
(2016-2018) (left and right).



CREDITS: Inter-American Development Bank (2016-2018).



With more than 80% of its population living in cities, Latin America is one of the most urbanized regions in the world. Never before have so many people lived in urban centers and has it been so necessary to improve the way we understand, plan, and manage the city as a collective human project. The increased scale and number of cities brings about a whole array of new challenges that call for innovation in policy design and implementation.

Sarah Benton
Andrés Blanco
David Razu

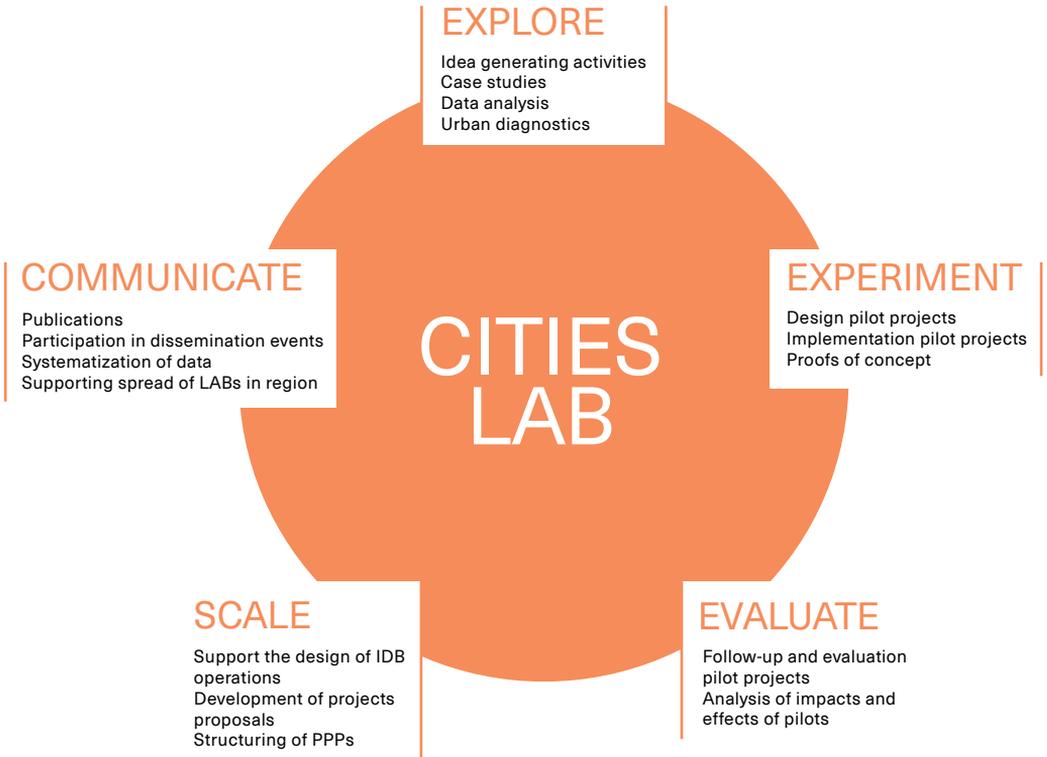
Urban Innovation in the Americas

— City Labs as
a New Model
for Transforming
Cities

From a general perspective, urban innovation is helping cities do things in a new, more efficient way. It is an adaptive process that requires issues to be reframed to better understand their roots, drivers, and consequences, so that solutions can be constantly redesigned and improved. It is a trial and error method as dynamic as the cities themselves, often rooted in the iterative process of design thinking. For example, such a method might include stages such as exploration, experimentation, evaluation, scaling-up, and dissemination. Since the issue at the center is the city, it is important to keep in mind that for any of these stages to succeed, they should be developed with the participation of the communities involved. Urban innovation cannot be crafted at a designer's desk or in the design room of an urban think tank, it must be conceived in the same way the city is formed: by its people.

If we consider the aqueducts of Rome or the creation of the automobile in the United States, it quickly becomes apparent that innovation is not new in the context of urban development. In fact, it might be hypothesized that innovation itself is the essence of city development, or a precursor for any form of advancement. What follows is an explanation and example of each of the aforementioned stages or 'moments' in the process of urban innovation.

During the exploration stage, the focus is on analyzing and reframing the urban problem, or problems, to be addressed. This involves identifying its causes and consequences, as well as the actors involved. A good example of exploring and reframing is a transit management approach that many cities took during the second half of the last century and the first few years of the current one. Constant population growth and sprawling urbanization due mainly to internal rural to urban migration in Latin American cities led to an increase in the number of cars in the streets and a corresponding rise in traffic jams (Gilbert, 2018). To urban planners in many cities, the solution was obvious: construct more and wider roads to accommodate more cars. However, we now know that no matter how wide a road gets, it will always be insufficient: it will induce its own demand. This approach was favored in many parts of Latin America, but one



IDB Cities LAB approach. CREDITS: IDB

South American city—the eighth-most populous city in Brazil—was able to reframe it by using a totally different method.

In 1974, Jaime Lerner—mayor of Curitiba, Brazil between 1971 and 1992—decided not to widen the roads for private cars, but rather to reduce them in order to introduce a new public transport system that reserved road lanes exclusively for buses. The fact that buses had the center lanes only for themselves made them faster and more efficient than private cars. Consequently, more people began using the bus instead of their personal vehicles. Curitiba’s exploration and reframing of the problem, and the consequent design of the solution, led to the invention of Bus Rapid Transit (BRT), a model that today serves more than 33 million passengers a day in 168 cities around the world (BRT+ Centre of Excellence & EMBARQ, 2018).



Elevated bus station tubes in Curitiba, Brazil.
CREDITS: Mario R. Duran-Ortiz. Attribution-ShareAlike
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Elevated bus station tubes in Curitiba, Brazil.
CREDITS: Mario R. Duran-Ortiz / Attribution-ShareAlike
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The second stage, experimentation, consists of putting ideas to work and testing them in a temporary way that allows for evaluation and redesign. Innovation is a learning-by-doing process in which the lessons distilled from each experiment have the potential to enrich and transform an idea before too much is invested in scaling it up. In the BRT example, when Lerner implemented the new system, he did not create exclusive lanes all over the city. Instead, he started with one axis from which lessons could be learned to then optimize and expand the system over time into a radial trunk and feeder system covering the city. A key innovation occurred in 1991, when bus stops were renovated into the iconic glass tube stations that are still used today. These tubes are aesthetically pleasing, as well as efficient in terms of design: they introduced bus-level platforms with multiple doors and external pay stations to reduce boarding time and increase bus frequency. Further adaptations and innovations occurred in 2010, including expanding to double-tube stations in some areas to meet capacity demands, and recycling rainwater to cool them (Lindau et al., 2010; Urbanização de Curitiba S.A., 2018).

Besides the lessons learned, experimenting provides information for evaluation. Community involvement is key during this phase in order to respond to local needs and to reflect on how the community has reacted and participated in the innovation. If the evaluation is satisfactory, it can be scaled-up in a way that incorporates lessons from the iterative process. In the BRT example, some of these lessons were the need for bus stations with closed terminals that provided shelter to passengers, while also allowing them to pay before boarding to increase efficiency and to switch to specially-designed buses.

Finally, dissemination is the last and very crucial stage. Not only should successful innovations be shared so others may learn and adapt them to their own local contexts, but also so that further innovation may occur. One successful case of dissemination is that of the Transmilenio BRT system in Bogotá, Colombia. Created in 2000, this system was modeled after the successful BRT system in Curitiba. It kept many of the same elements, like paying before boarding and putting the bus platform at the same level of the bus, but also adapted it to the local context (Zamora-Colín et al., 2013).



CREDITS: Inter-American Development Bank (2016-2018).

The implementation of a BRT system in Bogotá revealed that existing highways can enable this model in a context of greater urbanization, but existing land use designations and development can also hamper its performance. This is different from the Curitiba case, where the development of transit helped guide future development of the city. Nonetheless, Bogotá was able to successfully integrate its BRT system with its broad network of bicycle lanes, an innovative bike parking system at bus stations, and car-free Sundays on main highways. Through dissemination and sharing of innovative interventions and practices, more learning can occur, creating a feedback loop that spurs further innovation and creativity to build sustainable, inclusive, vibrant, and dynamic cities and communities.

— Urban Innovation: from Theory to Practice

From grassroots community organizations to government offices seeking to improve their city, the process of urban innovation takes place everywhere. Efforts to 'be innovative' come from the

public sector, from academia (research institutions, universities, and think-tanks), and from the private sector (mostly in the technology sector). These groups might organize under various names, like innovation hubs, innovation centers, or innovation laboratories, but the nomenclature is not what distinguishes them when dealing with urban innovation. Real differences are found in how the concept of innovation is applied to urban issues and city building, what approach or angle is taken, and what the end goal or product is. For some, the innovation is in how the organization manages projects/business (institutional change), and for others it is in the projects themselves (actions) or a combination of both. What they all have in common, however, is an iterative methodology rooted in various stages of innovation.

Urban innovation cannot be crafted at a designer's desk or in the design room of an urban think tank, it must be conceived in the same way the city is formed: by its people.

One example from the public sector that has successfully brought about innovative city projects and institutional change is Boston's Mayor's Office of New Urban Mechanics (MONUM). Established in 2010 with the goal of reinventing the future of city services and conducting pilot experiments to improve the quality of services offered to city residents, MONUM is an inspiration and a reference point for Latin American cities. Their methodology is simple: explore, experiment, evaluate. Their team brainstorms potential projects in collaboration with various city agencies, experiments with the ones that have most potential,

and measures their successes and failures. If the experiment is successful, they hand the project back to the pertinent agency or department to scale it up. What makes MONUM unique is that, while they operate collaboratively with city departments, they also operate independently and take the risk away from City Hall and local institutions (N. Jacob & S. Nguyen, personal communication, May 18, 2017). This allows them to experiment in avant-garde areas and innovate in ways that are not traditionally accepted in more conservative institutional settings.

Innovation is a mindset, a way of being or doing, an inherent process rooted in a certain attitude and perspective: one of being open and flexible to change and embracing what is new.

In line with Boston's approach, a second example of government innovation in city planning can be found in Mexico City. Established in 2013 as an "experimental office for civic innovation and urban creativity," (LABCDMX, 2018) the Laboratorio para la Ciudad was the first of its kind in the region. Through experiments and provocations, they see urban creativity and civic innovation as the keys to reimagining the relationship between city and citizens, making government more open and responsive, and reinventing spaces for people. Part of how they are innovating is through changing processes within government. With a multidisciplinary team, they are also testing pilot projects, working with external partners, and collecting good international practices and adapting them to local conditions (LABCDMX, 2018). This is one of hopefully many examples that, in the near

future and across Latin American cities, will foster more innovative solutions to shared urban problems across the region.

In an effort to support the spread of urban innovation and these types of labs in the region, Inter-American Development Bank (IDB) has created its own Cities LAB. Established in 2017 in the Bank's Housing and Urban Development Division (HUD) and under the umbrella of the Climate Change and Sustainable Development Department, this 'laboratory' aims to drive change both within the Bank's traditional structure and processes of operations and management, and in how city management and city planning are conducted in the region. This is done by assisting cities with the development of their own (civic) innovation labs or helping them pilot quick wins (or potentially failures) under the tactical urbanism model. The HUD Cities LAB approaches problems and/or demands in cities with a non-linear and iterative process of problem-solving, based in experimentation, and following through with interventions that are feasible, testable, and that add value.

Other innovation labs and centers have begun popping up across the region in the last few years, in countries such as Chile, Colombia, Paraguay, and Argentina, and the term 'innovation' has quickly become the new development buzzword. However, it is important to understand that innovation is a mindset, a way of being or doing, an inherent process rooted in a certain attitude and perspective: one of being open and flexible to change and embracing what is new. More importantly, urban innovation is a cycle, building on what has been done before to make a better impact on city development and the lives of urban dwellers today and into the future.





CREDITS: Inter-American Development Bank
(2016-2018) (left and right).

As of 2014, the population of Mexico City stood at 17,765,121 million—the outcome of 2.5% average annual growth since the 1990s. The consistency of the city's population growth contrasts with the rapid expansion of its urban footprint. In 1990, Mexico City covered an area of approximately 103,462 hectares. By 2014, that figure jumped to 210,020 hectares. While the population increased and the city's footprint expanded, its density dropped from 137.87 persons per hectare in 1990 to 110 persons per hectare in 2014 (Angel et al, 2016a).

Diego Arcia
Enrique Silva

Urban Expansion in Mexico

— A Latin
American
Story

In Cochabamba, Bolivia's third largest city, a slightly different story has taken shape. Between 2000 and 2013, the city's population grew at an annual rate of 2.7%, a drop from an annual rate of 4% from 1990 to 2000. Meanwhile, its urban land coverage grew at an annual rate of 5.9% between 1990 and 2000, and then dropped to 3.3% from 2000 to 2013. As the land coverage expanded from 1990 to 2000, the city's density dropped at an annual rate of -3.2%. This drop slowed down to -0.3% from 2000 to 2013 (Angel et al, 2016b).

More so than Mexico City, Cochabamba reflects the general trend in urban expansion in Latin America. Between 1990 and 2000, the average rate of urban population growth in the region was 4%, dropping to about 2.6% in the years between 2000 and 2014. Similarly, the expansion of the urban footprint grew on average above 5% between 1990 and 2000, slowing down to around 4% between 2000 and 2014. Although Cochabamba's decline in density was more drastic than the regional average, densities in cities across Latin America declined by -2% from 1990 to 2000 and by -1.8% from 2000 to 2014.

Cities have been adding more people, growing out, and becoming less crowded.

What does this statistical tale of two cities tell us about urban expansion in Latin America? While Mexico City and Cochabamba are two very different cities in terms of scale, history, and economics, they capture core trends in Latin America that planners and other professionals interested in urban social, fiscal, and environmental sustainability ought to understand and consider. At the most general level, both cities tell an interesting story about the relationship between population growth and urban expansion. Despite a downward trend in growth and



CREDITS: Inter-American Development Bank (2016–2018)

de-densification between 2000 and 2014, the populations of cities have increased and cities have expanded their land coverage; but expansion is happening at a rate that is faster than population growth. The difference in rates has come with a drop in population densities. That is, cities have been adding more people, growing out, and becoming less crowded.

The next layer of the story is one that elevates cities like Cochabamba to the fore of our attention. Within the context of Bolivia's—and Latin America's—system of cities, Cochabamba can be considered an intermediate city. It is neither small nor large in terms of population, geographic extension, or economic activity. It is in intermediate cities like Cochabamba where the rates of population growth, urban expansion, and decline in densities are highest. To the extent that urban expansion is a concern of urban planners and the object of land use regulations, questions arise: is there a relationship between the rates of expansion, drops in density, and the institutional capacity to plan and regulate land? If there is, are intermediate cities in

Latin America at a technical, political, and economic disadvantage as compared to larger cities that tend to concentrate human and financial resources? Ultimately, will Latin America's intermediate cities follow in the footsteps of their larger kin, which demonstrated an inability to absorb and manage the first wave of rapid urban growth in the region between the 1950s and the 1980s (Violich and Daughters, 1987)?

— The 'Underlying Factor that Explains Urban Expansion in LAC'

Before delving into the institutional dimensions and implications of urban expansion in Latin America, it is important to highlight the core dynamic that underpins this tale of two cities. The expansion of a city is not simply driven by the increase in its population. Urban expansion is also driven by an increase in household incomes, a decrease in transportation costs, as well as greater availability and competition for land that can be developed. The relationship between growth and density, however, is the inverse on several fronts. As Angel (2011) notes, "average density will increase when population increases, when household incomes decrease, when transport costs increase, when the share of buildable land decreases, and when agricultural rents on the urban periphery increase" (p. 6).

The condition that seems to explain the relationship between increase in city size and decrease in density is the confluence of rates of income inequality, availability of buildable land, and reduced competition between income levels for land. Building off Wheaton (1976), Angel (2011) ascertains that "the area of the city will increase and its density will decrease if income inequality is more pronounced and if a larger share of the population inhabits informal settlements" (p. 7). In broad terms, this means that urban expansion is being driven by a demand for housing, especially among low income households, that is not being met within built-up and serviced areas of a city. As a result, the poor are housing themselves or being housed where cheap, undesirable land is available. This tends to be at the periphery of a city

where government has not invested in basic services and road infrastructure, and often does not regulate land uses.¹

This situation resonates with what Salvadoran architect and urban planner, Mario Lungo synthesized over 17 years ago about urban expansion in Latin America:

Urban sprawl in most Latin American metropolitan regions presents a landscape of poverty, informal and illegal patterns of land use, and a lack of infrastructure, public facilities and basic services. This pattern contrasts with the U.S., where suburban sprawl is characterized by residential zones for high- and middle-income groups and highly-valued commercial and retail complexes that are well-connected by a transportation system favoring the automobile (Lungo 2001).

Aside from inequality, urban expansion in Latin America is also linked to weak and obsolete administrative boundaries and institutions. The growth of low-density urban footprints is also due to poorly functioning land markets. These markets are characterized by a lack of transparency over ownership, prices, and conveyances, which then result in inefficient and unequal allocations of land, as well as the benefits and burdens of urban development across a territory.

Planning and government fiscal practices are also culprits in urban expansion and poorly functioning land markets. The rigidity—oftentimes exclusivity—and inconsistencies in the application of land use regulations, as well as weak government capacity to fund infrastructure projects at a scale commensurate with demand, have conspired against the provision of affordable, serviced, and centrally located land for most low-income households in Latin America. In his most recent work on Brazil's flagship housing program *Minha Casa, Minha Vida*, Biderman (2018) not only chronicles how and why low-income households have tended to squat in poorly-regulated public lands at the edge of cities but, more importantly, how state policies have also financed and produced thousands of units of housing by encouraging development in cheap tracts of land with minimal services



CREDITS: Inter-American Development Bank (2016–2018).

and infrastructure that connects them to consolidated areas of the metropolitan region.² The placement of affordable housing at the edge of cities is not only an act of expansion, it also encourages additional development in the (poorly serviced) periphery.

— Mexico: A Closer Look at Urban Expansion in Latin America

Mexico and its cities present a great opportunity to look more clearly at the drivers and challenges of urban expansion in Latin America. The challenges caused by urban expansion in Mexico are not minor, especially in smaller and so-called intermediate cities. In 2010, the country's Urban National System (SUN) identified 348 cities with a combined total 81.2 million inhabitants. Of these cities, 95 had populations of 100,000 inhabitants or more, which represents an overall population of 71.8 million. By 2030, SUN and the Nacional Population Council (CONAPO) estimate that Mexico will have 961 cities, almost three times the current number, and 112 of them will have over 100,000 inhab-

itants and will concentrate 83.2% of the country's population. Estimates for the same year project a total of 114 million people living in cities in Mexico, an increase of 40.8% approximately. It is also estimated that 88 million people will live in cities of over 100,000 inhabitants.

The main characteristics of this 2030 urban scenario point to:

- An expected aggregate increase in population from 21 million to 34 million from cities that hold between 1 to 5 million inhabitants.
- A rise in the number of cities that have between 15,000 to 50,000 inhabitants, which will grow from 249 to 747. The expected population for cities within this range will increase from six million to 19.2 million.
- An estimated increase of 'intermediate' cities from 84 to 94, representing approximately 30 million people.

Mexican cities have also experienced a decrease of their average urban density, approximately 23 houses per hectare, which is equivalent to 80 inhabitants per hectare. According to the National Housing Commission (Conavi), cities with over one million inhabitants have average densities of 125 inhabitants' houses per hectare; those between 500,000 and one million, average 93 inhabitants per hectare; those between 100,000 and 500,000, average 73 inhabitants per hectare; and those between 50 and 100,000 average 66 inhabitants per hectare. The decline in density is a consequence of the urban expansion process, driven largely by an increase in low-occupancy housing supply along the periphery of cities (SEDATU, 2014) and the flight of residents from the inner city.

In this past decade, Mexico had the third highest urban expansion rate of OECD countries, mostly around the metropolitan peripheries. Between 2000 and 2010, in metropolitan areas with at least 500,000 inhabitants, the inner cities registered an average population density decrease of 7.5%, in contrast to an average increase of 6.8% (OECD, 2015) in areas over 10 kilometers from the inner city. These figures point to an important consumption of land, vast amounts of unused land within cities, and an increase in travel time and distances (UN Habitat, 2016).

For the last 30 years, the Mexican urban population has doubled while the build-up area has been expanded by a factor of seven, indicating a disproportionate growth. In some cities, the build-up area has grown by a factor of 25 the original size while the population only tripled. It is interesting to notice that in the 11 main metropolitan areas, urban areas expanded nine-fold their original size (SEDESOL, 2012). This expansion process has been driven in part by the changes in the federal housing policy, especially following the introduction of poorly designed, massive housing estates in monofunctional neighborhoods on the outskirts of cities. Between 2006 and 2011, seven million low-cost houses were built as a result of housing policy reform and aided by macroeconomic stability (Yoonhee and Zangerling, 2016). The large majority of these single-use developments have taken place in the outskirts and adjacent rural areas of cities, where land prices are lowest.

Urban expansion and its consequences cannot be understood without consideration of the national and local territorial planning system and practices.

The main problem presented by this kind of distribution in density and land use is the effect it has on mobility and on the efficiency of the public transport system. The concentration of housing developments in peri-urban areas is opposite to the efficiency of a public transport system in compact cities with mixed land uses. These low-density, single use, isolated patterns have also moved people farther away from their places of work and from



Single-Family Housing in Hermosillo. CREDITS: Inter-American Development Bank (2016-2018).

services, increasing traffic congestion and generating a higher carbon footprint, losses in productivity, and lower levels of well-being (OECD, 2015).

This has been the case in Hermosillo, Sonora, where workplaces are located at the opposite ends from working class housing areas. This has become a challenge for public transport planners and operators, who have to decide whether to provide coverage for new housing developments in the outskirts and decrease frequencies in the city center or to leave new developments without coverage. There are also financial consequences for the public transport system, such as higher operational costs. Consequently, new developments have poor public transport coverage. This has created the need for private entities to set up their own employee transportation systems, generating more dysfunctions in the public transport system in the city, and making operators less willing to provide service to those areas (Inter-American Development Bank, 2018).



Urbanization of the periphery. Miguel Alemán District, Hermosillo, Sonora. CREDITS: Inter-American Development Bank (2016-2018).

In Hermosillo, one consequence of the former is that only 19% of the city's transport routes operate at intervals of 10 minutes or less, while most of the routes have intervals of up to 75 minutes. The extremely long waiting times have promoted the increase in the private car share in the city's mobility: in 2015, private cars accounted for 51% of the trips to work, a very high proportion by Mexican standards and compared to the 19% reported in the metropolitan area of Mexico City (INEGI, 2017). This has very negative impacts in mobility (increased congestion) and the environment (increased emissions).

Under the Inter-American Development Bank's Emerging and Sustainable Cities (ESC) program, Hermosillo's growth and urban form have been reassessed from an environmental sustainability perspective by putting together an Action Plan.³ This document puts forward a set of articulated actions to tackle mobility, urban development, and the provision of urban services in the city, while aiming to revitalize and redensify the traditional center. In general terms, the strategy seeks to strengthen and

increase efficiency of the urban system and the installed infrastructure through intensive and intelligent use (see the chapter titled “Hermosillo on a Human Scale”).

The urbanization process in Mexican cities will continue to put pressure on the border between urban and rural areas, with possible impact and loss of forest land, natural conservation areas, and key elements within the production of natural goods and services. Costs for providing infrastructure will increase,⁴ as will the cost of providing services for people living in peripheral zones that have little or no access to basic services or social infrastructure. These changes will also be aggravated by the limited funds available in municipalities. Moreover, urban sprawl also generates environmental impacts. Although Latin American cities are not the main source of Green House Gas (GHG) emission globally, studies conducted by the ESC have shown that Mexican cities have the largest share of GHG emissions, compared to a sample of 70 cities across the 26 countries in the region, showing even higher levels than some more developed countries. In cities like Hermosillo, 34% of GHG emissions are associated with the transport sector, and these numbers will only keep rising.

Over the past decade, the transport sector in Mexico has caused the highest increase in GHG emissions—a result of the accelerated urban expansion, the associated growth in housing, and the subsequent increase in vehicles, with an average annual growth of 4.1% (Inter-American Development Bank, 2014). This urban expansion also impacted the use of land, shifting from agricultural use and forest land to urban use. In Xalapa, the loss of forests between 2008 and 2012 reached approximately 400 hectares, while the urban land in the same timeframe increased to 300 hectares. By 2050, the growth of the urban area in Xalapa is estimated at 6,980 hectares, representing 88% of current urban use (5,053 hectares); forest land is expected to decrease from 1,183 hectares⁵ to 473 hectares. In Campeche, the scenario is a little bit more critical, given that forest land will be reduced by 35%, from 6,547 to 3,145 hectares by 2050 (Inter-American Development Bank, 2014). The loss of forests and natural areas could increase exposure to hydro-meteorological phenomenon

and the effects of climate change.⁶ Overall, the urban development pattern is not sustainable from an environmental perspective because it is based on the excessive consumption of natural resources, which threatens the ecological equilibrium of the surrounding areas.

As noted earlier, urban expansion and its consequences cannot be understood without consideration of the national and local territorial planning system and practices. In Mexico, the legal framework for Land Use and Urban Planning has been divided into two parallel and disjointed legal bodies: one that responds to the management of human settlements, focused on controlling rapid urbanization; and another aimed at the rural sector, focused on the ecological dimension (Wong, 2009). This has made it difficult to regulate the use of land and articulate territorial policies by the actors that manage the territory. Moreover, the use of planning tools is not widespread. For example, of the 384 urban centers that make up the National Urban System, only 51% have updated Urban Development Plans, and 54% of them were drafted before 1999. At a municipal level, only 523 out of 2,463 municipalities have Urban Development Plans (Inter-American Development Bank, 2018; SEDATU, 2014).

Plans alone do not guarantee an effective control of urban expansion, but the absence of planning tools does contribute to high dispersion across territory, disorderly growth, and lack of adequate attention to the needs of urban populations. Plans constitute the navigation chart for the cities and are an indispensable instrument for the development of an integrated vision of the city and its management. When conjugated with a strengthening and adequate follow-up of control systems, the development and implementation of relevant land management instruments and a transition from a sectorial model towards a comprehensive vision could help reshape the urban expansion of cities.

Seventeen years ago, Lungo (2001) urged planners and government officials to pay closer and better attention to the role of urban land regulation in engendering fast-paced, but low density, low quality urban expansion. He called out at least two relevant aspects that are pertinent to today's debates on urban



CREDITS: Inter-American Development Bank (2016-2018).

expansion. On the one hand, we need to ‘understand the economic impacts of regulation’; on the other hand, we need to “design and implement mechanisms that effectively regulate the rights and responsibilities of landowners.”

These are not simple tasks to undertake, since they shake up a whole set of traditions and practices that are well entrenched in Latin America—namely the sanctity and inequitable distribution of private property. There are also institutional challenges and a legacy of underinvestment and disempowerment that undermine the capacity of local governments—even when there is a will—to manage land uses and negotiate with the private sector to forgo, at times, the highest and best uses of a plot of land. Fortunately, great progress has been made in the quality and the debate around urban development and land policy at the national and local levels in several Latin American countries. The holistic approach that has been adopted to analyze and address the challenges and opportunities faced by the municipality of Hermosillo is a promising turn in this overall shift to produce more sustainable and equitable cities in Latin America.

Notes/References

1 – According to the Atlas of Urban Expansion (Angel, 2016), more than 85% of the variations in the extent of cities worldwide is explained by their populations and their per capita incomes. Population and income growth in less developed countries can and probably will lead to more than tripling their urban extent by 2050.

2 – This dynamic has also been documented and analyzed extensively for the Chilean and Mexican housing programs.

3 – The Action Plan is a technical document developed by IDB specialists and external consultants that includes a city’s vision, an evaluation of its multi-sectoral sustainability, and proposed projects for improving its performance (Inter-American Development Bank, 2016).

4 – Analysis conducted by the World Bank shows that municipalities with lower density had almost 1.5 times more municipal expenditure on public works and infrastructure per capita in 2010 (Yoonhee and Zangerling 2016).

5 – These numbers correspond to 2012 (Inter-American Development Bank, 2018).

6 – 15% of Mexican territory, 68% of its population and 71% of its GDP are exposed to adverse climate change impact (INEGI, 2015).



CREDITS: Inter-American Development Bank (2016-2018).



On May 28, 2013 more than 20,000 protestors flooded the streets of Ciudad Obregón in Sonora, Mexico. They gathered to demonstrate against the construction of a massive aqueduct that would divert water from the Yaqui River to the Sonora River and bring relief to the water-starved capital city of Hermosillo. Protestors, many of them native Yaqui, led blockades up and down the state's highway 15, Western Mexico's main north-south artery. Ultimately, they were unsuccessful in stopping the aqueduct, despite claiming a constitutional right to 50% of the water in the basin.

Gabriela Soto Laveaga

Beyond Hermosillo

— How Water, Wheat,
and Hybrid Seeds
Placed Sonora on
the World Map

The social movement against the Independencia / Novillo-Hermosillo Aqueduct—known by their slogan “Say No to the Novillo”—illustrated that key tensions between the city of Hermosillo and the rest of the state stemmed from an obvious fact: much of Sonora, in particular the capital, is located in arid terrain. Water supply has always been a critical issue, but recent droughts linked to climate change, coupled with rapid urbanization, have imperiled the growth and survival of this capital city. As with many large urban centers far from natural sources of water, Hermosillo’s existence is entangled with the state’s rural and semi-urban spaces that also compete for water. The pursuit of water becomes more crucial when we consider that Sonora is Mexico’s major producer of wheat and a leader in the production of other staple crops. Moreover, southern Sonora is home to one of the globe’s leading agriculture science research stations.

Indeed, the Green Revolution was launched from Ciudad Obregón. Yet in the twenty-first century, as other regions have moved beyond water transfer techniques that dominated in the twentieth century—i.e., dams, hydraulic pumps, aqueducts, etc.—to more sustainable forms of water management, Sonora, in particular Hermosillo, seems intent on replicating twentieth-century water solutions. To understand how southern Sonora came to dominate agriculture we must briefly examine Sonora’s historical role within Mexico. Specifically, we must understand how agriculture and irrigation came to define the area, and how Hermosillo’s growing urban footprint is redefining it again.

This short essay places current and ongoing water struggles within a historical context by focusing on three crucial moments of Sonora’s history: the foundation of an irrigation company that placed Sonora on the international map in the late nineteenth century, the arrival of the Rockefeller Foundation in the 1940s, and the emergence of an agricultural research station that has acquired today a global reach and significant scientific power. These examples illustrate how Ciudad Obregón’s global impact has often outpaced Hermosillo’s. Put another way, without Ciudad Obregón and agriculture, Hermosillo would be a very different city.

— Irrigation Companies and Development of Sonora

Though geographically distant from Mexico City, Sonora has played an outsized role in Mexico's politics and its economy, in particular its agricultural development. A Mexican scholar once wrote that "*en Sonora irrigar es sinónimo de desarrollo agrícola*" or, in English, "in Sonora agricultural development is synonymous with irrigation" (Velasco Toro, 1988). Indeed, water—and more water—was needed to develop this arid region, especially after the creation of the U.S.-Mexico border in 1848. After the war with the United States, Sonora transformed from a remote, sparsely-populated frontier space to a pivotal border state. Though Sonora's mineral and agricultural wealth attracted both Mexicans and North Americans, it remained relatively undeveloped until the late 1880s.

This changed in the late nineteenth century, when trends to open up large tracts of land for agriculture boosted the creation of cities like Ciudad Obregón. Both Washington in the north and Mexico City in the south simultaneously invested significant capital to design and build infrastructure projects based on agriculture in, respectively, the southwestern United States and northern Mexico. Cultivation of the land became synonymous with progress, sometimes in problematic ways. For example, land belonging to Native Americans, such as the Yaqui, was often forcefully taken. Then as now, water—or rather the promise of water—propelled growth in the region and brought both entrepreneurs and immigrants to Sonora. While solidly a national project, the roots of the region's irrigation are part of a larger transnational history that entailed the development of Arizona and California on the northern side of the border.

Technology in the guise of dams, later hydraulics and pumps, transformed the land on a scale never seen before. With technology, Sonora was envisioned as a space that could be transformed from arid desert to lush agricultural fields. The main concern then became, how to bring people to the area; in fact, the emergence of Ciudad Obregón in the late nineteenth cen-

ture is linked to this vision and in particular to the work of an irrigation company.

During the regime of progress-driven president Porfirio Díaz (1876-1910) the Yaqui Valley, where Ciudad Obregón sits today, was identified as a prime site for grand-scale development projects centered on agriculture and irrigation. Specifically, in 1890, the Mexican Ministry of Development recognized this area as a key space for not only irrigation but potential colonization. Settlers were highly encouraged as they were seen as vital in the aim to drive off the administration's enduring policy headaches, the Yaqui (Tinker Salas, 1992). This community had long lived, hunted, and planted in the area, their ancestral home. Moreover, they fought the encroachment of Mexico's expanding influence. But at the end of the nineteenth century even the fearsome Yaqui could not keep up with the power of the steam engine and Porfirio Díaz's determination to control the region. Thousands of Yaqui were then forcefully transported to labor on the henequen plantations of tropical, humid Yucatán. Despite an average precipitation of less than 30 centimeters, access granted to the Yaqui and Mayo rivers transformed the Yaqui Valley into one of the most agriculturally-wealthy spaces in Mexico.

To engineer the Yaqui Valley, president Porfirio Díaz parceled out land and gave a concession to a Sonoran named Carlos Conant, giving him the right "to colonize 300,000 hectares of land and provide concessions for water from the Yaqui, Mayo (in Sonora) and Fuerte (in Sinaloa) Rivers to open irrigation channels" in 1891 (Matson, 2011). By 1900, under the name of the Sonora and Sinaloa Irrigation Company, Conant completed nearly 40 kilometers of canals that sprouted out of the Yaqui River. Today in Ciudad Obregón, Conant is revered as the father of irrigation, yet during his tenure at the head of the company, bad investments led the company to declare bankruptcy. The company was later bought out by the Los Angeles-based Richardson Brothers Company, which had been given a concession to develop a rail line. In 1904, Richardson's subsidiary—*Compañía Constructora Richardson*—subdivided the land to develop it for real estate and farming. Realizing that the wealth of Sonora was indeed in agriculture, the *Compañía Constructora Richardson* established the Yaqui Valley

Experiment Station and began testing a variety of crops, looking to achieve better rice and wheat yields in the region. In time, crop and yield experimentation would come to dominate the area. In 1927 the *Compañía Constructora Richardson* was acquired by the Mexican government.

How did wheat come to dominate Sonora and, in particular, how did Mexican wheat seeds come to transform global farming?

By 1938, the wheat fields of Sonora were staples in government reports. One publication titled “Wheat in Mexico” published by the Ministry of Agriculture and Development described Sonora’s Yaqui Valley as the region with the “most intensified wheat production and in the best circumstances” (*Secretaría de Agricultura y Fomento*, 1938). This progress was possible because the “wheat mills belonged to the farmers [emphasis added] and the planted varieties were exceptionally good (idem). By 1942, the irrigated lands of the Yaqui Valley were so desired that a presidential decree reserved 1500 hectares as a form of compensation for small landowners who demanded better lands than those previously distributed to them (*Secretaría de Agricultura y Fomento*, 1943). One year earlier, a presidential accord proposed that some of the lands of the Yaqui Valley be reserved for cattle ranching and agriculture and given as a compensation to retired military personnel. In other words, wheat and water attracted not only foreigners but Mexicans as well. Foreigners, however, would also help shape the narrative of southern Sonora.

— Arrival of Rockefeller Foundation, 1943

Globally, the idea of agricultural development shifted in the twentieth century from national or, in some cases, imperial projects to geo-political concerns that most often reflected Cold War divisions. The belief that hunger had the potential to destabilize the world created a push for agricultural modernization plans that could ‘develop’ areas of the world that had ‘lagged’ behind; such efforts, of course, did not acknowledge the impact of imperial power in creating that lag.

As described in Nick Cullather’s *The Hungry World*, Rockefeller Foundation bureaucrat and plant pathologist E.C. Stakman “viewed agriculture research as an international mission, a biological corollary to the Good Neighbor policy” (Cullather, 2013). With this new view of the world, the Rockefeller Foundation—which previously had focused on promoting public health programs—switched its focus and significant philanthropic heft from medicine to agriculture. Mexico would become its laboratory. When bureaucrats from the Rockefeller Foundation toured Mexico’s agricultural fields in the early 1940s, they determined that Mexico needed to improve its corn, bean, and wheat varieties, as well as its agricultural management. In search of a location for an agricultural station where they could test out new varieties and new ways of developing the land, they alighted on Ciudad Obregón.

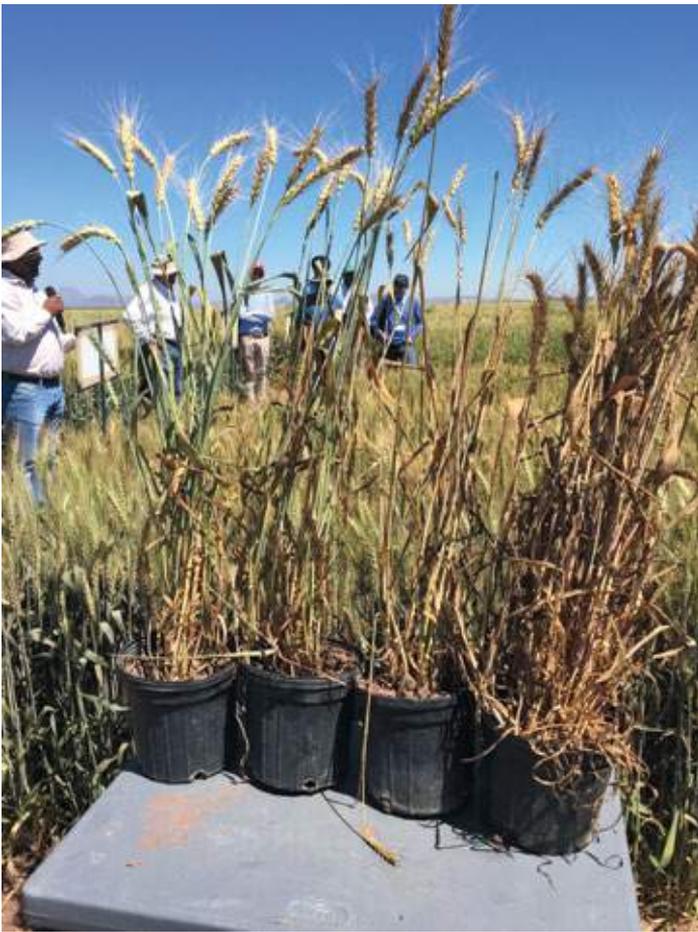
Their decision was made simpler because first, a vast network of irrigation canals branched out across the landscape and, second, an experimental station already existed in the region. Much of the history of the Green Revolution has centered on the Rockefeller’s agronomists (in particular Norman Borlaug) and their ability to develop strains of hybrid wheat in their experimental stations. Yet what is often not noted is that science in this area was facilitated by Sonorans’ long tradition of linking progress to agricultural development. In other words, locals were accustomed to experimenting in their fields, embracing new technology, and overcoming an often-inhospitable terrain to make the land yield crops.

— Green Revolution: From Ciudad Obregón to the World

While corn was the nation's staple crop, it was wheat that would launch Mexico into global scientific spheres. This decision was partly based on irrigation. The majority of corn farmers relied on rainfall while most wheat cultivation relied on irrigation, and controlling water was a crucial element for experimentation. It is worth noting how irrigation in the North quickly and dramatically altered Mexico's crop production. For example, in 1940 Mexico's wheat producing region was located in central Mexico and it produced 43% of the nation's wheat while the Northwest produced a mere 17% (Baranski, 2015). By 1964, Sonora was producing 71.5% of the nation's wheat. As other scholars have noted, this was mainly due to the expansion of wheat-growing land and the fact that 89% of wheat fields were irrigated by the early 1960s. So how did wheat come to dominate Sonora and, in particular, how did Mexican wheat seeds come to transform global farming?



Scientists in Sonoran wheat fields during the yearly Farmer's Day 2017. CREDITS: Author's own photo.



The impact of wheat research in Sonoran fields is felt on a global scale. CREDITS: Author's own photo.

When the Rockefeller Foundation entered Mexico, it did so under an agreement with the Mexican government to create a bi-national research organization named the Mexican Agricultural Program or MAP. MAP brought together Mexican and American scientists to educate farmers, train new generations of scientists, and develop new strains of wheat seeds. Some of the first hybrid wheat seeds were designed to be resistant to rust, a wheat fungus. But research quickly moved from plant diseases to finding strains that would have higher yields. Higher yielding crops could more directly address societal concerns of the time: hunger and over-population.

Reflecting on the contributions of the Mexican program, the Rockefeller Archive Center, where nearly a century of foundation program documents are archived, noted that "MAP opened up

new possibilities for the [Rockefeller Foundation] to contribute to the ‘well-being of mankind’ in Latin America, Asia, and Africa. It also revealed agriculture’s complicated relationship to broader social, economic, political, and environmental factors” (The Rockefeller Foundation, 2018). Most impact agricultural societies needed a high-yielding seed variety. Indeed, Mexico became a model for projects in other countries. It was all of these factors that pushed Borlaug to find strains that could potentially be planted in a variety of regions. Therein lies the importance of Sonora—and Ciudad Obregón in particular—to the transformation of wheat seed breeding.

We cannot rethink
Hermosillo without the
context of history and the
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To speed up the process of experimentation and cut his breeding time by half, Borlaug used Mexico’s varieties of microclimates and diverse geography to plant twice each year. In Winter, Borlaug planted wheat in Sonora, and in Spring he shuttled the seeds to central Mexico and planted wheat near Toluca. The two regions were geographically distant by more than two thousand kilometers, one (Ciudad Obregón) was at near sea level while the other (Toluca) was more than eight thousand feet above sea level; one was rainfed with low-fertility soil while the irrigated fields of the Yaqui Valley with their richer soil served as a rare contrast. The change in altitude and latitude generated seed varieties that adapted to vastly different conditions, were resistant to rust disease, and yielded more wheat. These seeds became the precursors to the seeds that drove the Green Revolution.



Marker found in an experimental station in the outskirts of Ciudad Obregón, Sonora which mentions the impact of Mexican agriculture research in the world.
CREDITS: Author's own photo.

More than a decade after these experiments, Mexican hybrid wheat seeds were introduced to India, Pakistan, Turkey, China and, eventually, to most countries in the developing world. Yet the Green Revolution might not have happened without Sonora's irrigation and the farmer's willingness to embrace new seeds and new technologies. Finally, we turn to the third component that transformed Sonora into a pivotal space for scientific research.

— Sonora and Agriculture Science

In 1956, Mexico achieved wheat self-sufficiency for the first time, and five years later, in 1961, the Office of Special Studies—the research arm of the Mexican Agricultural Program—was integrated into a new Mexican agency, INIA (National Institute of Agricultural Research)¹. It was in the guise of the INIA that the erstwhile research center in the outskirts of Ciudad Obregón continued outreach programs to farmers and the training of Mexican agronomists and scientists. A few short years later, the International Maize and Wheat Improvement Center (CIMMYT) was created with the goal of safeguarding both Mexico's and the world's food security. As such, the research station known as CENEB, or the Norman E. Borlaug Experiment Station, acquired new meaning. What began in the nineteenth century as a dream of development based on irrigation and future fields, developed into one of the central pivots for research on eliminating global hunger through scientific agriculture.

— Final Thoughts

A project such as Rethinking Hermosillo pushes us to reconsider what it means to live in a capital city located in an arid region in the twenty-first century. Put differently, we cannot rethink Hermosillo without the context of history and the relationship of the capital city to the rest of the state. Moreover, we cannot think of Hermosillo as a bounded urban space when its development in the twentieth century is tightly entangled with the region's agricultural tradition. To do so, would be to go against the area's history and the state's engine of development.

When we examine the vital role that agriculture and irrigation played in the state's growth, we must rethink our assumptions about water, urban growth, and the city-countryside divide. In other words, thinking about Hermosillo necessitates that we consider spaces like Ciudad Obregón. Specifically, what do legal and political battles such as *No al Novillo* reveal about the tensions between urban and rural spaces? What does it mean for the future of the region if water solutions mean simply diverting water?

To rethink Hermosillo—to really rethink it—we must move beyond twentieth century solutions to water, generate a different understanding of the land, and redefine the relationship between regions. On the world stage, Sonora, and to be exact Ciudad Obregón, is known as the birthplace of the Green Revolution. It is from the wheat fields of the experiment station that hybrid seeds for high-yielding dwarf wheat seeds were created. The entrepreneurial spirit of farmers is what often drives foreigners to the state. To reimagine a new city, new ties to the countryside must be forged.

Notes/References

1 – For key markers in Cimmyt's history, <https://www.cimmyt.org/cimmyt50/cimmyt-history/>





Thirty years after the arrival of the first auto plant, Hermosillo continues to ponder if there is life after Ford. The city, which had relied mostly on agriculture up until the early 1980s, experienced a significant transformation when the multinational motor company arrived in 1986. That year, Ford opened an assembly plant and a number of auto-parts suppliers sprang up, triggering the city's industrialization, and making its economy, productivity, and wages more complex. The development of intensive manufacturing turned Hermosillo into the fifth richest metropolitan area in Mexico by 1998. Seventeen years later (2015), it was still among the top 5% wealthiest municipalities, with poverty levels and informal employment rates well below the rest of the country. However, the economy of the capital of the Sonora State has clearly lost its dynamism over the past few years.

*This chapter is a summary of more comprehensive research work developed by a multidisciplinary team from the Center of International Development at Harvard University, led by Ricardo Hausmann and executed by research fellows Ana Grisanti, Jose Ramon Morales, Juan Obach, Johanna Ramos, Jorge Tapia, and the authors. The project was the result of a collaboration with the Emerging and Sustainable Cities Program (ESC) of the Inter-American Development Bank (IDB), and benefited from multiple exchanges with the ESC Mexico team. All opinions expressed are solely those of the authors and should not be considered a reflection of the opinions of the IDB.

Douglas Barrios
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Is There Life After Ford?

— Structural
Transformation and
Inclusive Growth in
Hermosillo, Sonora*

Even within the low-growth context that prevailed in Mexico between 2005 and 2015, gross domestic product (GDP) per capita in Hermosillo (1.3%) fell below the federal average (1.4%). Two distinctive periods in terms of growth performance are salient within that decade. Between 2005 and 2010 the economy grew at a rate of 1.3%, occupying the 66th percentile (among the top 34%) of all municipalities in Mexico. During the second half of the decade, growth remained roughly stable (1.2%) within a more dynamic country context, resulting in Hermosillo falling to the 47th percentile (53% of Mexican municipalities grew more). The situation worsened between 2013 and 2015, when output per worker fell by 7.2%.

What happened to Hermosillo? Can the existing economic structure sustain the municipality's high wages and guarantee future growth? What policy interventions are needed?

Seeking answers to these questions, the Center for International Development (CID) at Harvard joined efforts with the Emerging and Sustainable Cities Program (ESC) of the Inter-American Development Bank (IDB). In Hermosillo, we deployed two methodologies developed at CID as a framework to think about structural transformation leading to sustained and inclusive growth. The first methodology, the Growth Diagnostic, is an exhaustive series of tests aimed at identifying the most binding constraints to private investment and growth. The second, the Economic Complexity Analysis, detects productive capabilities embedded in the economic activities of a location and provides a sector roadmap for productive diversification that can be potentially conquered by redeploying existing know-how. The underlying notion is that opportunities in more complex sectors that can in turn sustain higher wages have a higher probability of success if they rely on a set of productive capabilities and know-how that are similar to those already in place.

These methodologies complement each other. They allow us to assess the extent to which private investment in the sectors and products with the greatest potential—as identified by the Economic Complexity Analysis—may have been inhibited by binding constraints such as a missing productive capability or in-



CREDITS: Inter-American Development Bank (2016-2018).

adequate supply of key public goods—as detected in the Growth Diagnosis. Making this connection explicit is precisely one of the most innovative components of our work in Hermosillo.

An additional innovative component of this work is that Hermosillo is the smallest sub-national unit where we have deployed our methodologies. Recently, CID was involved in similar projects in Mexico in which we had to adapt our working frameworks to make them relevant at the state level (Chiapas, Baja California, Tabasco, and Campeche). Hermosillo represents the first time that CID deployed its methodologies at the city level, forcing the team to forego some of the most common potential constraints that are invariant at the national or state level, and develop new ways to exploit variations at the municipality level. This essay summarizes our research efforts, presents preliminary insights into the fascinating question of what makes cities wealthier, and articulates those answers as policy recommendations.

— Hermosillo's Economic Structure: Engine Stagnation

When automobile production began in Hermosillo in 1986, it was not a common economic activity. Back then, only 13% of all countries showed a comparative advantage in automobile exports. Since then, the knowledge required to manufacture cars has become gradually more ubiquitous. By 2010, 50% of countries in the world exported auto motor vehicles competitively. And yet, car manufacturing still represented 64% of Hermosillo's output by 2013 and 51% of its exports by 2014. Over the last five years (2012-2017), the manufacturing sector, the vast majority of it concentrated in the automobile sector, has undergone a cumulative decline in both number of jobs (-7.3%) and median real wages (-5.9%). The parallel decline in wages and employment is indicative of a decrease in demand for the city's current manufacturing output (Figure 1). Paradoxically, the continued reliance on a sector that catalyzed accelerated industrialization 30 years ago is now a factor behind growth slowdown.

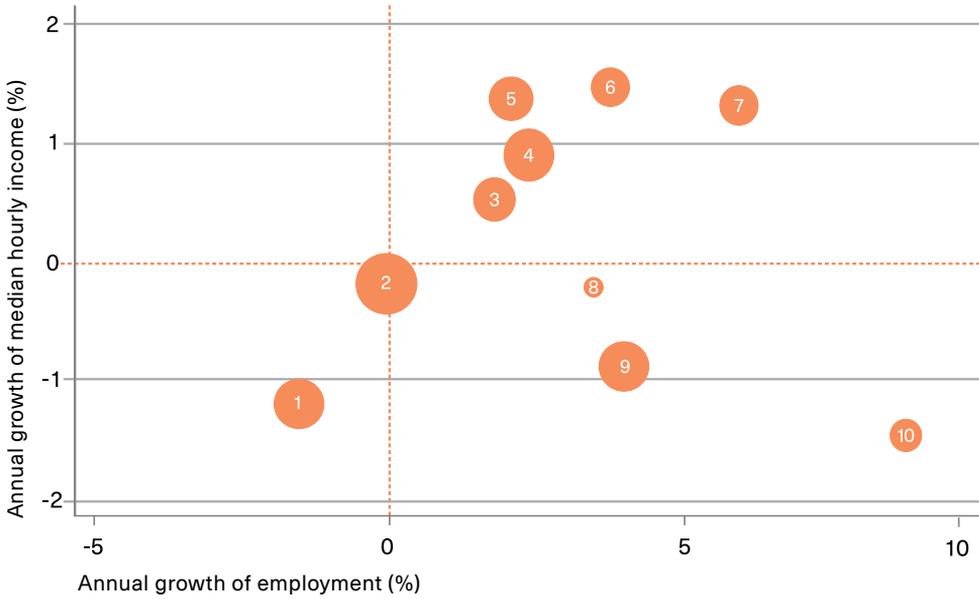
In order to test if these findings were unique to Hermosillo or part of a broader trend, we composed a peer-group of 10 comparable Mexican cities. These cities were selected using a hierarchical cluster methodology that considered the size of the city's workforce, the total value of its exports, its economic complexity, and the composition of its exports. When considering the performance of these peer-group cities, we do not observe a similar trend. Whereas the manufacturing sector in Hermosillo experienced a cumulative drop in employment (-7.3%) and median real wages (-5.9%), comparable cities displayed an average increase of 37.7% in the number manufacturing jobs and of 6.7% in the median real wages in the sector. The differences between Hermosillo and its peer-group also extend to their ability to reshape their economic structure. Consider for example Aguascalientes, a city that also displays a significant reliance on automobile production (57% of gross domestic product and 49% of exports). In 2004, the export basket of Aguascalientes had an average Economic Complexity (0.86) very similar to that of Hermosillo (0.79), and both were at the bottom rank of our peer-group of comparable cities (Figure 3).

Since then, Hermosillo and Aguascalientes have followed remarkably divergent trajectories.

The economy of the capital of the Sonora State has clearly lost its dynamism over the past few years.

In the 10 years spanning 2004 to 2014, while the composition of Hermosillo's export basket persisted, Aguascalientes leveraged its knowledge base and moved on to conquer more complex products. While in Hermosillo, 60% of its products with a comparative advantage in 2014 already existed before 2004 (33 out of 54 products), in Aguascalientes that figure did not reach 30%.

It is worth noting that in 10 years, the overall number of products exported in Aguascalientes did not increase, but the composition of the basket did move towards more complex goods. The share of highly-complex products (such as machinery) went from 23.4% to 37.8% of the export basket, while that of less complex ones (such as textiles and furniture) went from making up 34.0% to 16.2%. Aguascalientes was able to counteract the gradual loss in the Product Complexity Index (PCI) of its initial export basket by adding more complex products over the course of the decade (Figure 2). Meanwhile, the diversity of exports in Hermosillo not only dropped in absolute terms (going from 68 products in 2004 to 54 products in 2014), but the city was unable to develop new, more complex, products that would help in counterbalancing the inertial loss of PCI of its initial export basket. By 2014, Aguascalientes had triple the Economic Complexity of Hermosillo.



- 1. Manufacturing
- 2. Wholesale & Retail
- 3. Construction
- 4. Diverse Services
- 5. Social Services
- 6. Government
- 7. Hotels & Restaurants
- 8. Mining & Electricity
- 9. Professional & Financial Services
- 10. Transport & Communications

FIGURE 1. Job and wage trends by economic sector (2012-2017) in Hermosillo / The size of the bubble represents the number of workers. CREDITS: Own calculations based on ENOE 2012-2017, INEGI.

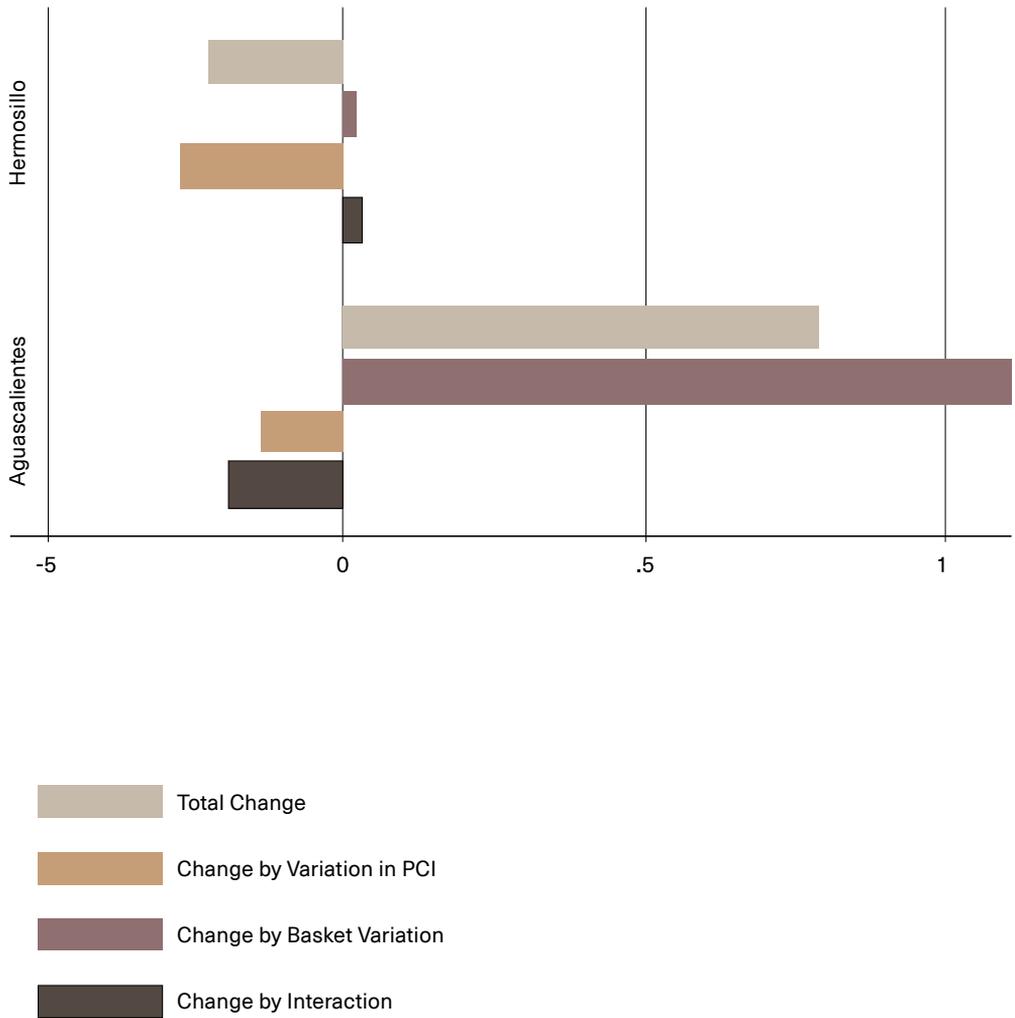


FIGURE 2. Breakdown of change in the Economic Complexity Index by variation in the Product Complexity Index (PCI) of the original export basket, variation in export basket composition and interaction of both changes (2004 and 2014) Hermosillo and Aguascalientes. CREDITS: Own calculations based on the Atlas of Economic Complexity.

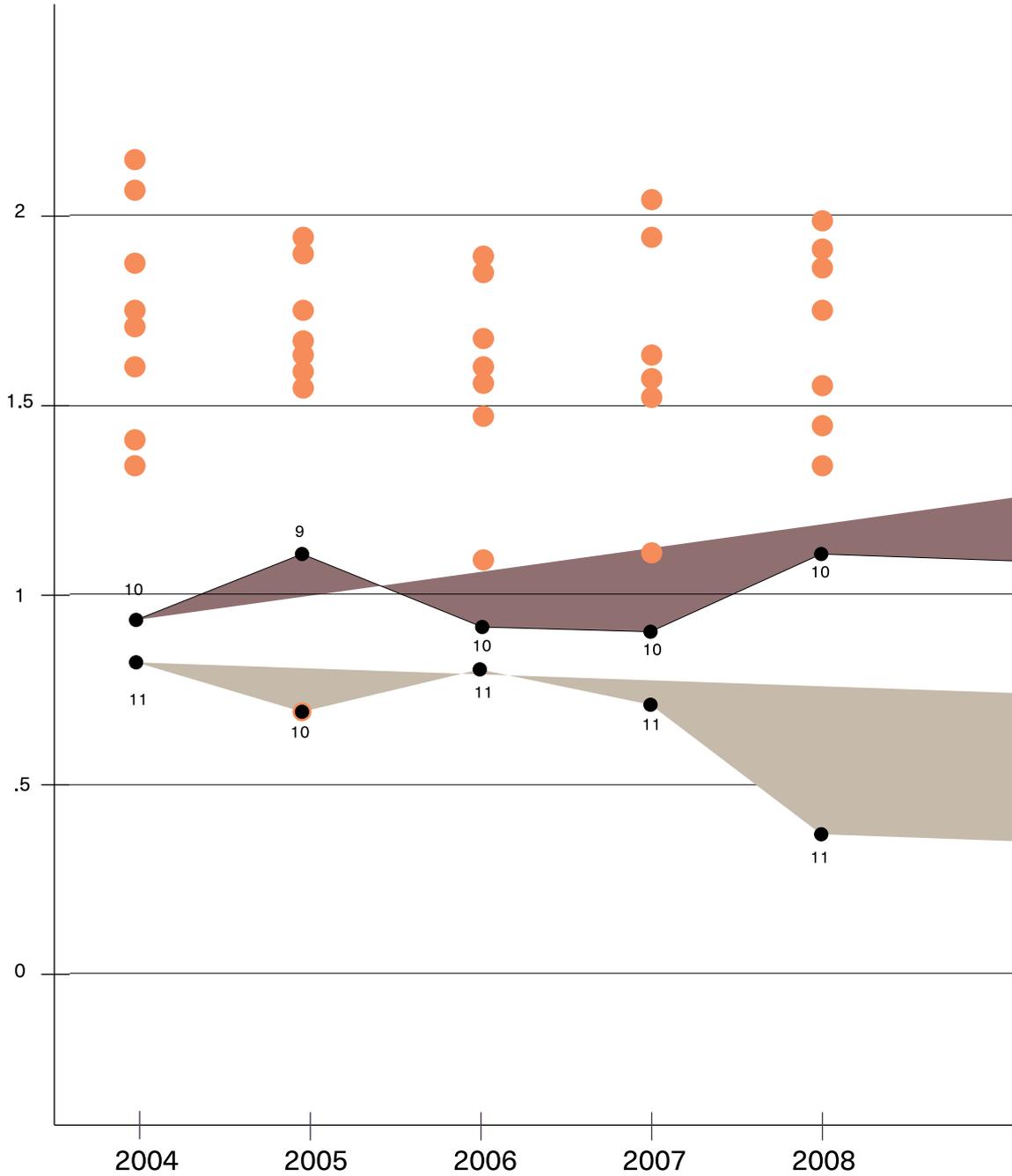
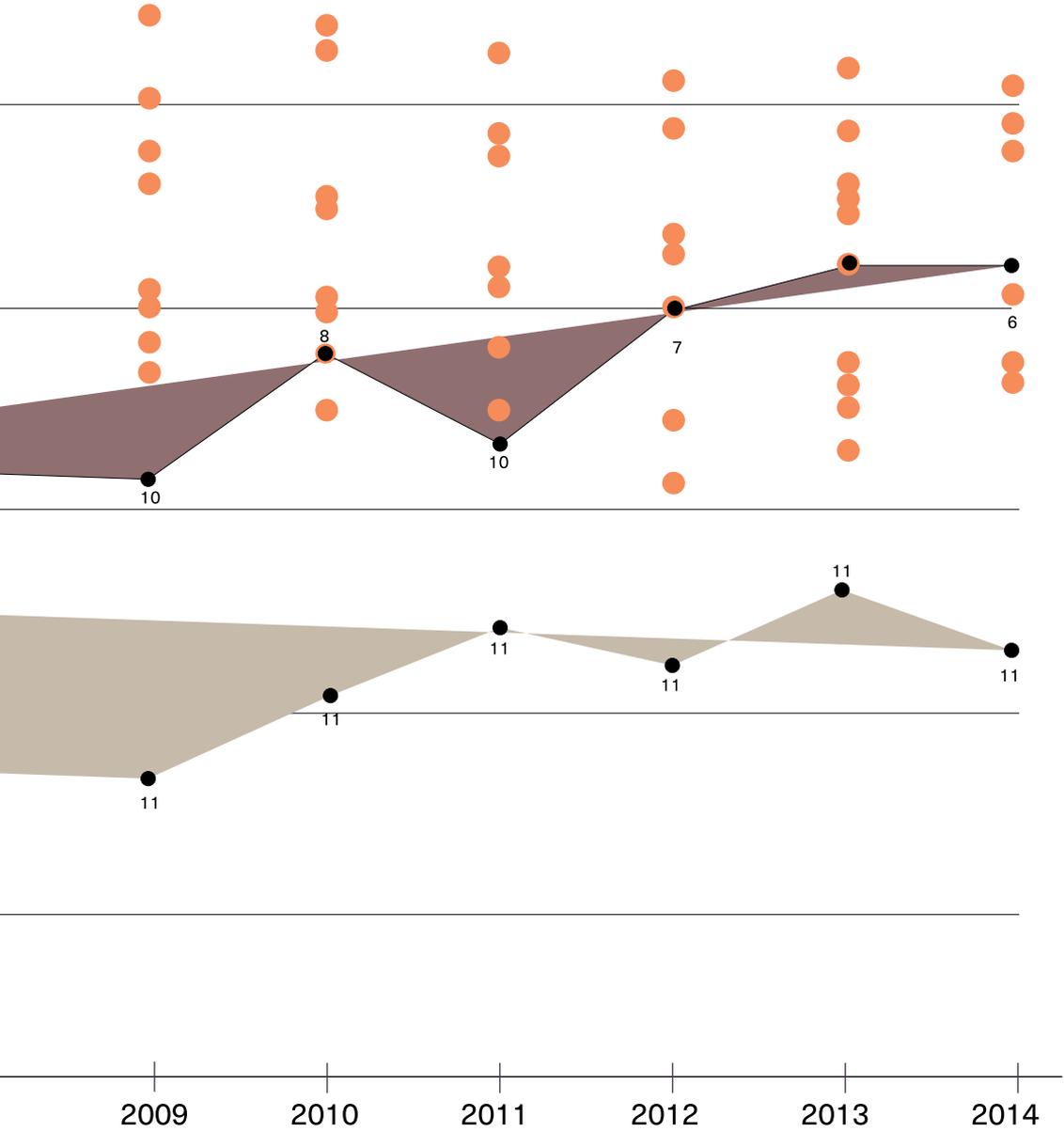
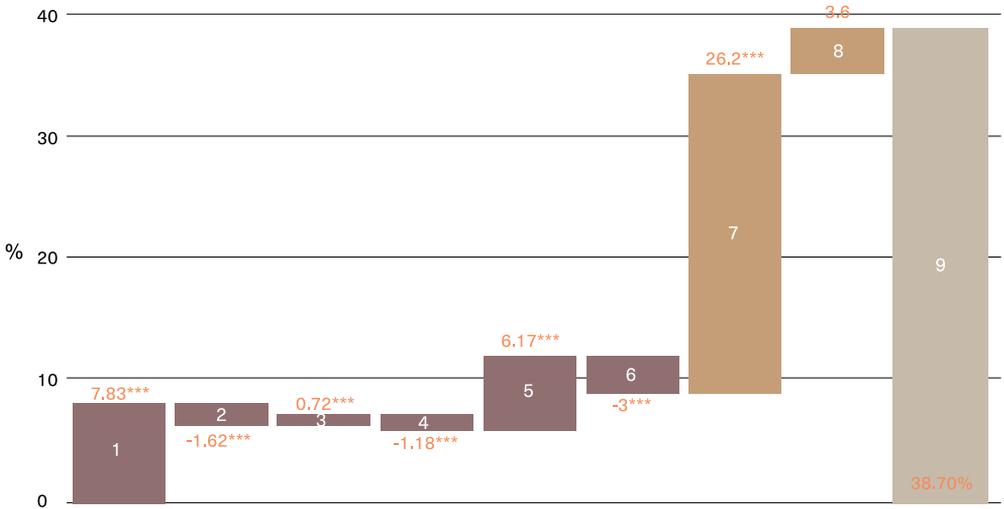


FIGURE 3. Evolution of Economic Complexity Index (2004-2014) Hermosillo, Aguascalientes, and comparison municipalities. CREDITS: Own calculations based on the Atlas of Economic Complexity.





- Explained
- Unexplained
- Total

1. Education
2. Male
3. Indigenous Language
4. Experience
5. Occupation
6. PCI
7. Constant
8. Rest Non-Observables
9. Gap

FIGURE 4. Blinder-Oaxaca decomposition of employee wage gap in export sector (2015), Hermosillo vs. all other municipalities in Mexico. CREDITS: Own calculations based on the 2015 Intercensal Survey and the Atlas of Economic Complexity.

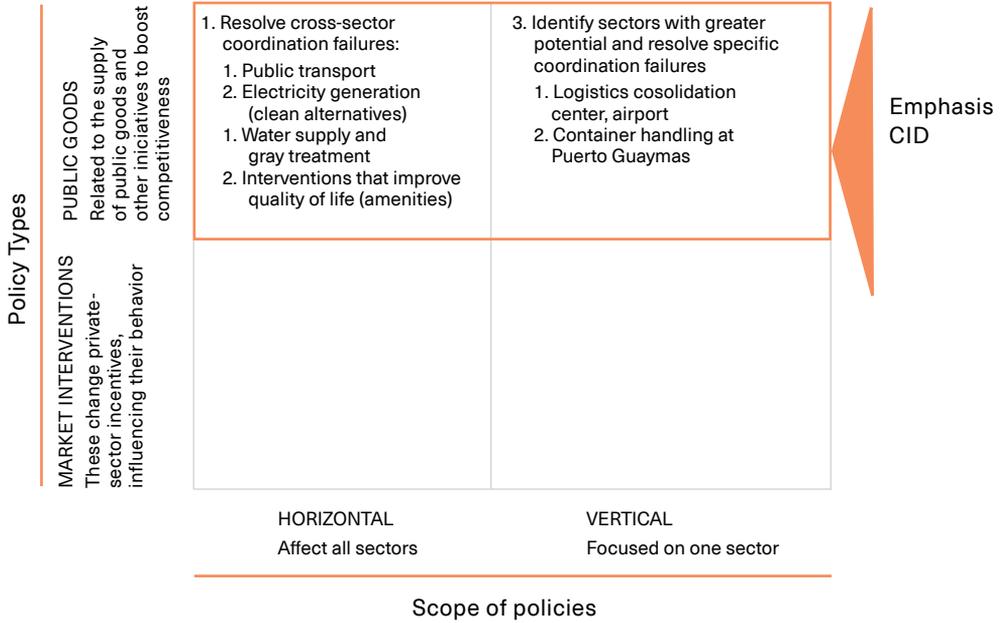
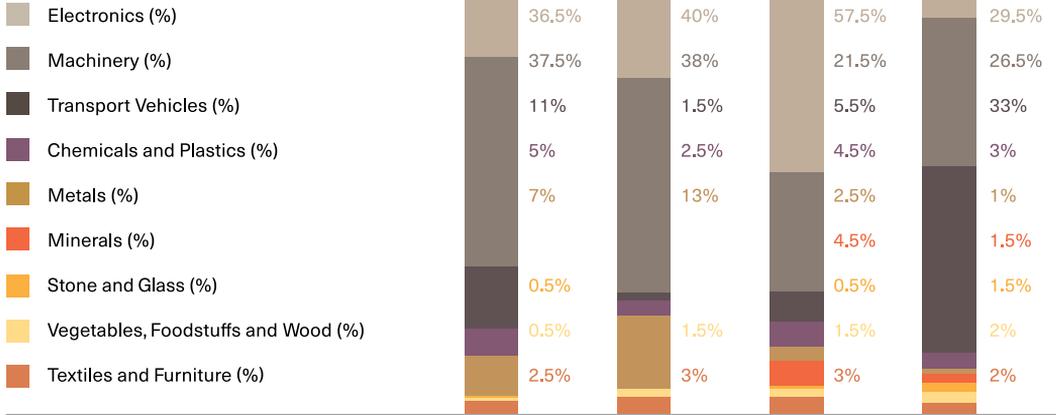
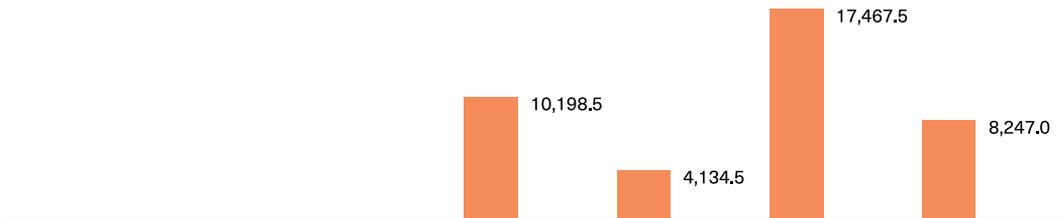


FIGURE 5. Productive development policies (PDP) in Hermosillo. CREDITS: Adapted from Campante and Solé (CID, 2015), based on Crespi, Fernández-Arias, and Stein (2014).

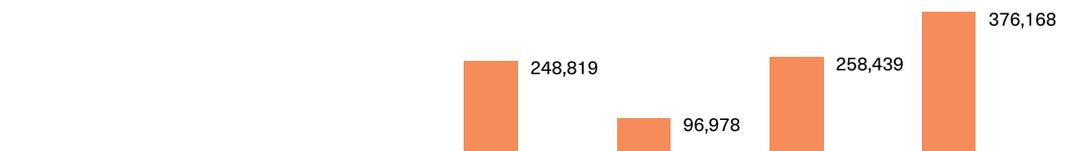
EXPORTS COMPOSITION BY PRODUCT CATEGORY (2010–2014)



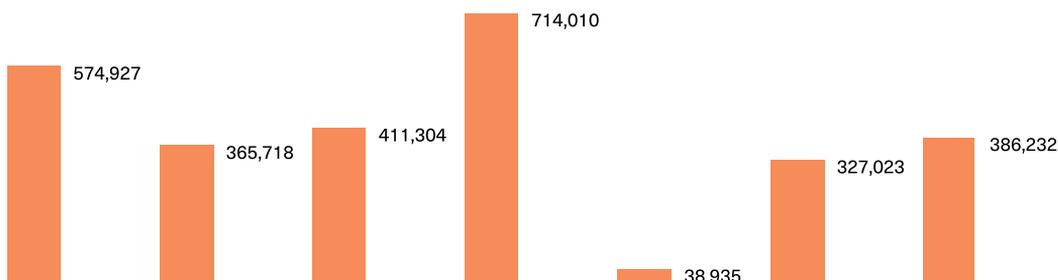
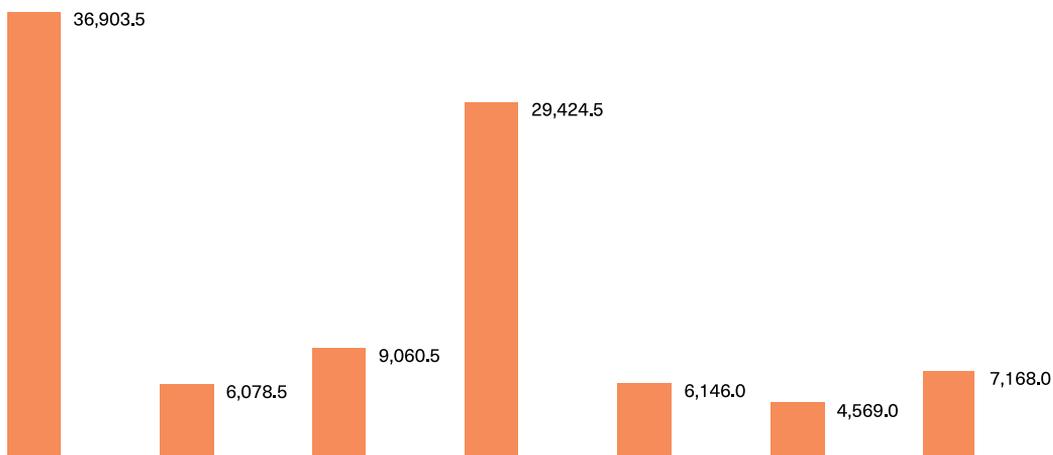
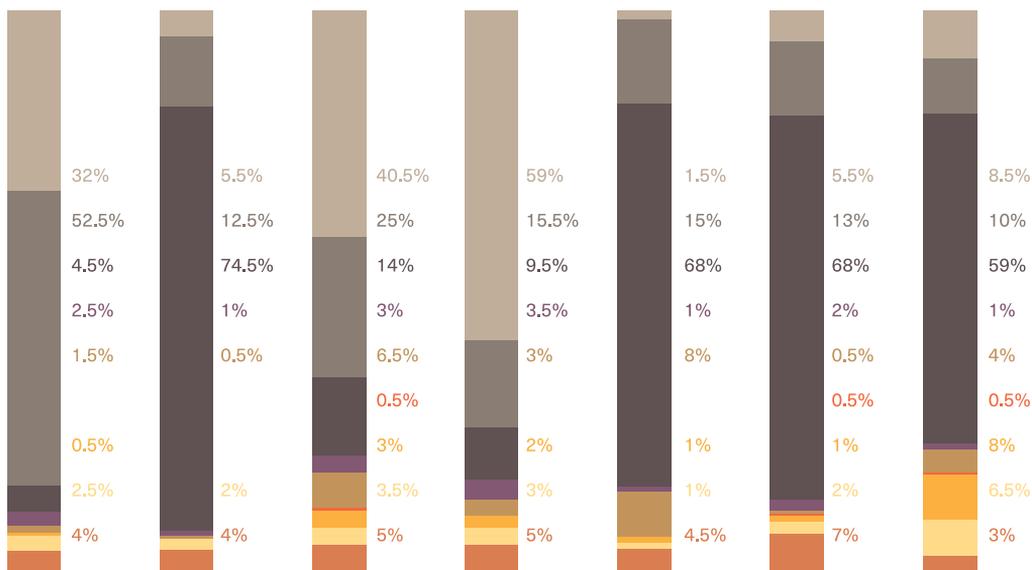
ANNUAL EXPORTS (2010–2014, millions USD)



SIZE OF THE LABOR FORCE (2015)



STATE	NUEVO LEÓN	SONORA	TAMAULPAS	CHIHUAHUA
Municipality	Apodaca	Nogales	Reynosa	Chihuahua



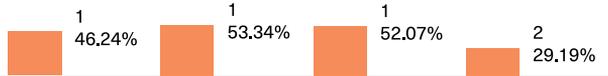
CHIHUAHUA	AGUAS-CALIENTES	BAJA CALIFORNIA	BAJA CALIFORNIA	COAHUILA	COAHUILA	SONORA
Juárez	Aguascalientes	Mexicali	Tijuana	Ramos Arizpe	Saltillo	Hermosillo

MOST PROMINENT PRODUCTS AND INDUSTRIES

EMPLOYMENT (Industry, 2014)

1. Manufacturing

2. Business & Related Services



EXPORTS (Products, 2014)

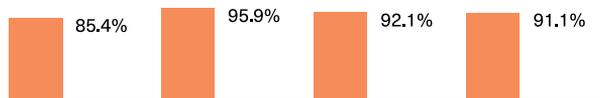
■ Electronics (%)

■ Machinery (%)

■ Transport Vehicles (%)



EXPORTS TO USA (2014)



ECONOMIC COMPLEXITY INDEX (2014)



STATE

NUEVO LEÓN

SONORA

TAMAULPAS

CHIHUAHUA

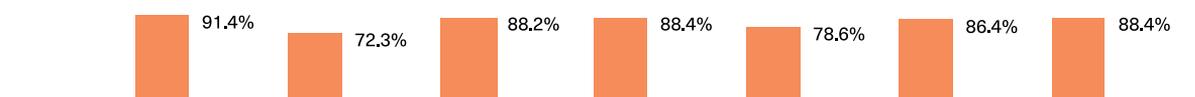
Municipality

Apodaca

Nogales

Reynosa

Chihuahua



CHIHUAHUA

Juárez

AGUAS-
CALIENTES

Aguascalientes

BAJA
CALIFORNIA

Mexicali

BAJA
CALIFORNIA

Tijuana

COAHUILA

Ramos Arizpe

COAHUILA

Saltillo

SONORA

Hermosillo

The constraints preventing Hermosillo from diversifying into more complex products become even more relevant when we consider the situation of its automobile industry. The city's share of total vehicle imports from the United States went from 5.5% in 2006 to 3.7% in 2014. In June 2017, Ford canceled its plans to invest in a new assembly line at its plant in Hermosillo and switched production of the new Focus model to China. There are talks of a potential renegotiation of the North American Free Trade Agreement (NAFTA) that might weaken the relative advantages that have been driving investment into the city's auto plants. All of these factors should trigger a sense of urgency and summon the city's authorities to reconsider how they might imbue the economy with the dynamism it once had before the automobile industry declines at a faster clip.

What can be done to accelerate productive diversification? To answer this question, we must first understand why Hermosillo has not been able to leverage its productive capabilities and know-how since the 1980s to diversify into more complex products.

— Three Hypotheses to Explain Productive Lethargy

Our work in Hermosillo signals three complementary hypotheses. First, there are coordination failures preventing an adequate supply of enabling factors that might accelerate the development of new industries. The city lacks the full array of institutional mechanisms required to identify missing productive capabilities required by potential sectors. Those inputs are typically revealed in the dynamic and iterative process of a productive dialogue that is led, coordinated, and facilitated by local authorities and incorporating representatives from both the private sector and academia. Within the context of this dialogue, parties can also evaluate alternatives to provide missing inputs and explore the different mechanisms available to finance their provision. While this dialogue gets organized in Hermosillo, our Growth Diagnosis offers a starting point by identifying three deficiencies in the provision of public goods that might be impeding the appearance of

new industries: cost-effective electricity supply, adequate long-term water supply, and logistics infrastructure.

Second, relatively high levels of public employment may be causing wage distortions in Hermosillo. Mean wages in the city are 35.7% higher than in the rest of Mexico, and 16.7% higher than the average wage of our comparison group. These differences cannot be explained by any of the factors associated with individual workers (education, experience, gender, indigenous origin), nor by the sophistication or complexity of the productive structure (which is lower in Hermosillo).

One possible hypothesis is that employment in the public sector, where salary grades are primarily determined by level of education and experience rather than productivity, could be pushing equilibrium wages upward. This is based on the fact that the public sector in Hermosillo is the fifth largest employer and the proportion of public employment is 1.8 times greater than the average for the comparison group. Between 2012 and 2017, Hermosillo was the only municipality in the comparison group where both wages and employment in the government sector grew (1.5% and 3.8% as portrayed in Figure 1 above); the trend in the rest of Mexico registered a combination of wage increases and lower number of employees. While it is true that this sector is key to the promotion of well-being and that having well-remunerated public servants improves recruiting and reduces incentives for corruption, these dynamics may be driving higher equilibrium wages, making the required occupational vectors of potential sectors more expensive than in other comparable cities.

The final hypothesis is that Hermosillo lacks innovation catalysts. Cities and regions learn to do new things through various mechanisms. Two of the most important are attracting new firms and individuals that have the necessary know-how, namely, foreign direct investment (FDI) and immigration. Hermosillo does not stand out in either of these. Based on the FDI Markets database, between 2003 and 2016 Hermosillo received approximately \$3.2 billion US dollars in FDI. No less than 91% of that figure was accounted for by a single company: Ford. The large concentration of FDI in one firm is noteworthy, but so too is the fact that most

of the investment was devoted to expand pre-existing activities. Automobile assembly can be a decisive contributor to growth—Hermosillo is a good example—but it has a much lower potential of creating and diffusing know-how than more knowledge-intensive activities, such as design, testing, research, or development. According to this same database, Hermosillo has not received any investment since 2003 in these activities, which represent 3% of investment in the rest of Mexico and 2% in the comparison municipalities. In terms of immigration, the figures are not encouraging either. In 2005, only 0.6% of workers in Hermosillo were foreign immigrants, one third of the average of the comparison group. The internal (within-Mexico) immigration rate is more aligned with comparable cities, but in Hermosillo it is mostly (62%) composed of migrants coming from other municipalities within the Sonora State. Low scores on these two key transmission channels may be preventing the arrival of the new know-how that Hermosillo needs to diversify its productive structure.

Public Policies to Facilitate Productive Diversification

What can be done to reverse this situation? In this section, we include a packet of inputs for designing policies aimed at imbuing more dynamism into the economy of Hermosillo and diversifying its productive structure. We have grouped our policy recommendations in three areas: providing a roadmap of potential sectors, mechanisms to resolve coordination problems, and urban planning.

The complexity profile for Hermosillo has enabled us to identify sectors and products with high potential that require know-how and productive capabilities that are relatively similar to those already in place. Additionally, we have designed a preliminary sorting mechanism that weighs other conditions affecting the profitability of those sectors, including external factors (evolution of product demand on world market, strength of product in Mexico, and labor impacts) and internal factors (dependence on electricity, water, and logistics). The resulting list is essentially comprised of products that are somehow associated with the automobile

ecosystem and the aerospace sector, such as machinery (parts for spark-ignition engines, drive shafts, pumps, compressors, and fans; thermometers and other gauges; liquid pumps), and electronics (for example, automobile lighting and electric ignition devices). Other products with potential in Hermosillo are electrical transformers, electrical control, or distribution panels, chemicals, and plastics (for example, vulcanized rubber tubes and downstream manufacturing). The fact that a large proportion of these products exhibit on average a dependency on electricity, water, and logistic infrastructure that is greater than sectors already in Hermosillo, indicates that a) supply deficiencies will have to be resolved to maximize the likelihood that new sectors appear, and b) those less intensive in the use of these factors may be prioritized. As stressed before, the list of sectors and products should be considered merely as a road map to spark an iterative, dynamic process of public-private dialogue aimed at solving the coordination problems that have inhibited the appearance of these sectors and hampered structural transformation.

Ultimately, Hermosillo's success in attracting investment and increasing the complexity of its economy critically depends on urban planning.

Our second recommendation is thereby to set up an institutional mechanism that would allow the city to gather information on the potential sectors in terms of missing inputs or capabilities, evaluate policies and mechanisms to remove binding constraints, and learn from its own successes and failures. In our experience, the success of institutional productive-dialogue depends on five fundamental functional elements. First, it must have active participa-



CREDITS: Inter-American Development Bank (2016–2018)

tion from the private sector, whose role must go beyond generating requests to ideally taking part in the design, co-financing, and implementation of solutions. Second, the dialogue should collect information and understand the perspective of potential investors; beyond promoting the city, it must be aimed at understanding what productive capabilities are missing by interacting with stakeholders that are not present. Third, the institutional mechanism must be technically well-endowed, able to validate the results of the public-private dialogue in terms of potential sectors and major restrictions, as well as to propose and implement solutions. Fourth, the dialogue should help the city to understand its own productive potential. Finally, it should make use of instruments other than those focused on improving profitability (i.e. tax exemptions) and focus on those that enable higher productivity (i.e. required public goods). While some of these elements affect all sectors alike (horizontal), others focus on solving constraints to the entrance of specific sectors (vertical) (Figure 5).

Ultimately, Hermosillo's success in attracting investment and increasing the complexity of its economy critically depends on urban planning. The decision to settle in an area—either at a corporate or individual level—is made not only taking into account geographic location, market potential, and institutional capability, but also quality of life. The variety of restaurants, cultural spaces, shopping centers, public spaces, parks, historic center, pedestrian zones, availability of high-quality public and private services (education, health, and safety), and ease to get around and connect with work hubs, are thus factors.

The situation of Hermosillo today is much better than the one that prevailed 30 years ago, when Ford first decided to set foot in the city. The city boasts relatively high income levels, as well as low poverty and informality rates, and is one of the areas with the most competitive potential in Mexico. However, it cannot rest on its laurels. Income per capita is higher than what we would expect given its economic structure, a feature that tends to foreshadow lower growth rates. The economic slowdown of the past few years is an alarm bell that should encourage authorities to rethink their growth strategy. The city needs a new approach built on a foundation that takes into account how similar places succeeded in attracting new business models and investment in more complex industries. Doing so will require leveraging the city's know-how to diversify productive structure and instrumenting effective public-private dialogues to overcome the most binding constraints. In a way, the key to a prosperous future in Hermosillo depends in being able to reproduce—within a different context—the feats of its past.

Notes/References

1 – GDP at a municipal level was estimated by assigning the contributions made by each municipality to the state's GDP. To approximate these contributions, we tested the fit of different methods and ended up leveraging a non-parametric approximation that assigned a share of the state's output in a given economic sector to each municipality based on the number of employees working in that sector that were hosted by the municipality. More detail of the methodology used can be found in an upcoming working paper to be featured in the Harvard CID Working Paper Series.

2 – The Economic Complexity Index of a certain product or industry reflects the amount and variety of knowledge required to manufacture it. Hausmann, Hwang, and Rodrik (2007) have documented that richer countries benefit from a large agglomeration of knowledge that allows them to produce more diverse goods, that on average fewer countries are able to make.

3 – Relative comparative advantage is defined in Balassa (1964) as when exports of a certain product represent a larger share of the place's export basket than the same product represents to world trade.

4 – The range of possible cities was also constrained by certain geographical parameters. More detail on the methodology used to select peer groups can be found on an upcoming working paper to be featured in the Harvard CID Working Paper Series.

5 – Featured in the ENOE survey.

6 – For Direct Foreign Investment statistics, we used FDI Markets, which reflects investment announcements taken from the media. This database shows a bias toward large projects with greater visibility, so it is not exhaustive. Also, the database does not follow up to confirm whether these investments were in fact made according to the preliminary announcement.

7 – <http://imco.org.mx/competitividad/indice-de-competitividad-urbana-2016/>

8 – See Hausmann, Hidalgo, et al (2011).



CREDITS: Inter-American Development Bank (2016–2018) (left and right).



A quick glance at the contemporary urban landscape of the city of Hermosillo does not suggest the presence of any urgent problems. On the contrary, the city appears organized, prominent, and growing, with no visible signs of chaos; it presents an infrastructure system that seems to be working fairly well, with new housing developments spreading across the desert, a thriving automobile industry, and new shopping malls and golf courses served by a car-oriented grid that arranges the vapid atmosphere into an illusion of order.

Juan Santamaría
Rubén Segovia
Jorge Silva
Claudia Tomateo

Searching for a New Urban Paradigm

— Rethinking
Hermosillo

Hidden under this illusion lies a complex and unsustainable reality, defined by a forgotten identity, an unfeasible growth pattern, and a deeply-rooted system of social and urban injustice. These issues may not yet be evident in the city, but if no action is taken, the long-term consequences will be severe. While for some Hermosillo is a success and serves as an example for urban and economic development in Mexico (and even the region), we believe that the current scenario needs to be critically readapted to future challenges. Hermosillo's geographic proximity and intrinsic socioeconomic relationship with the United States border likely generated this urban scenario, and many parallels can be drawn with cities such as Phoenix or Tucson. Nevertheless, the challenge is to understand Hermosillo's singular identity—apart from the United States—by constructing a new paradigm, and then to build a future based on that.

In the summer of 2017 we were commissioned by the Harvard Graduate School of Design (GSD) and the Inter-American Development Bank (IDB) to apply our training as urban planners and designers, and our experience in Latin America, to craft a new paradigm for this emerging Mexican city. Our expected contribution to Hermosillo would not be to design beautiful buildings and parks, but rather to make sense of the city's assets and then envision the future of Hermosillo through that same lens.

Our first contact with the city was through research conducted on Hermosillo, particularly the work of IDOM, an international urban consulting firm that has collaborated extensively with the IDB. Using these references as a base, we compiled a set of recommendations and solutions that provide an innovative—yet grounded—point of view and can pave the way for the IDB's Action Plan for Hermosillo. Our research seeks to provide policymakers, citizens, and other students with a platform to rethink Hermosillo's future and address its most pressing economic, social, and environmental challenges.

Using maps, diagrams, and compiled written data, we developed a system to cross-reference background information with other types of data, including historical information, contemporary projects on the city, and IMPLAN's (Municipal Institute of

Planning) reports. Through this method, we managed to produce “Rethinking Hermosillo,” a comprehensive report that collects a variety of aspirations and urban development efforts.

Hermosillo feels and looks like a perfectly functional city under an ‘illusion of order’ but hides a series of structural problems entrenched in an unresolved identity.

An important guideline for our mapping and cross-referential analysis was an initial study completed by the IDB’s Emerging and Sustainable Cities Program (ESC). The ESC identifies priority areas for development using a variety of indicators. As researchers, we acknowledge the perils of using a strict methodology for such a complex landscape, and we believe that successful visions and projects must cut across several urban layers. In that sense, rather than using the ‘priority areas’ pre-established by the bank as starting points—identified as Urban Form, Mobility, Landscape, and Public Space, and Economic Development—we reframed these in our proposal as layers that are intrinsically related.

To compile these different sources of information, we traveled to Hermosillo in May 2017. The trip permitted us the opportunity to meet with a broad range of stakeholders: from government officials and public institutions in charge of shaping the city, to small business owners and activists. This provided a first-hand experience of the city and the beautiful landscapes surrounding it, its sinuous geography and extreme weather. Most importantly, it

allowed us to engage in conversation with *Hermosillenses* about the problems they face and concerns they have about their city. With this information in hand, we were able to confirm our suspicion: Hermosillo feels and looks like a perfectly functional city under an ‘illusion of order’ but hides a series of structural problems entrenched in an unresolved identity.

The use of cars continues to shape the city’s grid and fosters its expansion. This, accompanied by low land values in the periphery and the lack of land use regulations, has caused public institutions to engage in a series of actions that seek to build more car-oriented infrastructure. As a result of these trends and urban policies, Hermosillo went from 7,238 hectares to 15,525 hectares over the last 30 years, expanding its urban footprint by more than 200%. The city has tried to control this sprawl, mostly to the northwest, by instituting ‘Growth Boundaries.’ However, the tendency of the real estate market over the last 20 years has been difficult to halt without a stronger reformulation of the existing policies. Consequently, with 48 people per hectare, Hermosillo has very low population density (Figure 1). Along with sprawl, this condition poses a challenge in terms of sustainability and urban equity, as public transportation, the provision of public space, and urban rehabilitation projects become less feasible. Changing these dynamics requires not only modifying regulations, but also a creating a cultural shift in the way the city is inhabited.

Parallel to these problems, we uncovered a set of other issues that are also important to any discussion about Hermosillo’s future. Rather than being integrated into a system of green areas and public spaces, we found public amenities to be disconnected and struggling to survive under current conditions. The city also demonstrates high economic dependency on the automotive industry. If this pattern doesn’t change, this fading development model may have severe environmental and social implications and could impose additional costs for the provision of basic services in the future.

Although there have been many programs and policies implemented to work on these issues—in many cases with successful results—the city hasn’t been able to create a cohesive

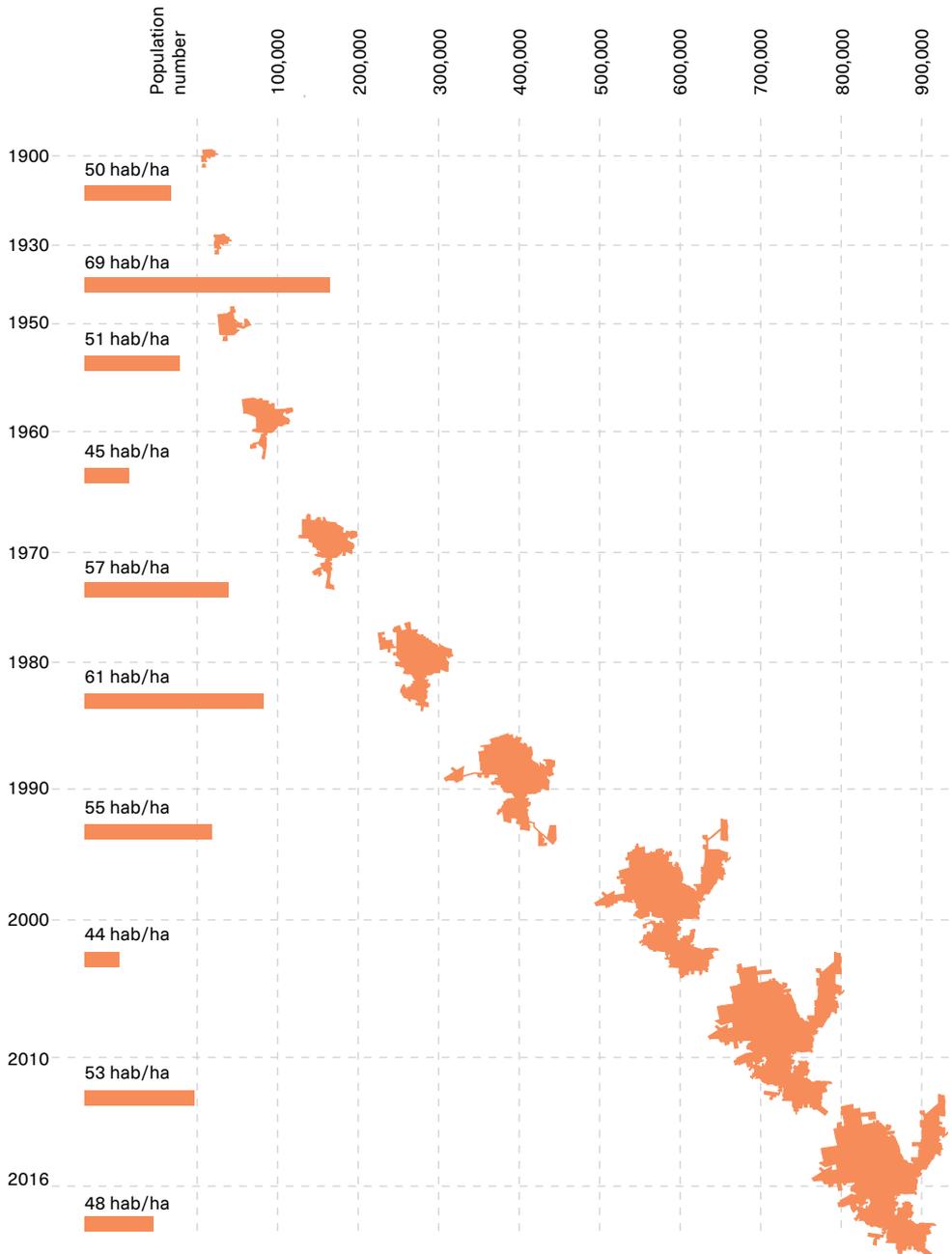


FIGURE 1. Population growth of Hermosillo from 1900-2016, with respective housing density data. / Hermosillo presents a pattern of growth that has created a medium to low density city. At different points in its history, the city's population and physical growth rate have not coincided, causing the city to have periods when it was much denser. CREDITS: Based on authors' own diagram.

narrative that could be sustained over time. Good practices are not enough if they are not supported with an explicit challenge to the current paradigm. Public and private stakeholders must work towards a shared urban ideal that transcends political change over time. To do so would require a new mindset where amenities, such as quality open spaces and public transportation, inform community aspirations.

Is there an alternative paradigm for Hermosillo? How can the city rediscover its own meaning and identity? What are the critical conditions in place that need to be reestablished or challenged? These questions were central to rethinking the city's existing model of development and they informed our new, grounded vision for its future, which we have titled: "Hermosillo: a creative, inclusive, and ecological city" (Figure 2).

We propose that these ideas act as a conceptual framework for future development. Most importantly, they have the capacity to transcend political and personal agendas, giving Hermosillo a series of values that are grounded in its true spirit:

- Creative. New economies that take advantage of existing capabilities and potential. In order to mitigate the effects of high dependency on the automotive industry, we propose that the city government explore the rich creativity of its citizens and diversify its economic sector.
- Inclusive. Equal access to goods, services, and resources that encourage new ways to live, work, and enjoy Hermosillo. To overcome urban inequality, we propose that the city government rethink its planning strategies and generate mixed-use and mixed-income urban scenarios.
- Ecological. Improve quality of life by recognizing the natural assets of the desert and protecting and valuing these elements for future generations. The current system of open spaces is failing to fulfill its social and ecological purpose. We propose that the city take advantage of the incredible potential of its landscape, particularly for performative use.

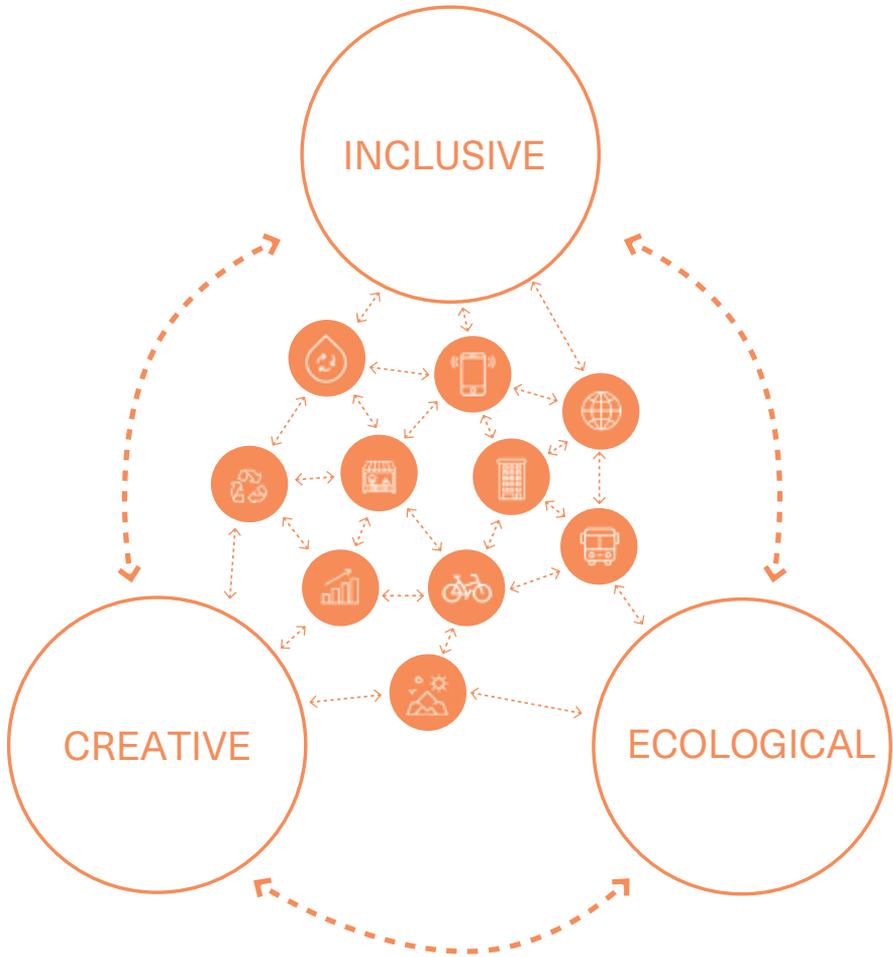


FIGURE 2. A new vision for the city, rooted in its own history, its own geography, and its own people.
 / Hermosillo has the opportunity to capitalize on its strengths and face new challenges with creativity. Actions taken today regarding growth patterns and their relationship to local geography will define the future of the city and the lives of its citizens.
 CREDITS: Authors' own diagram.

IDEA FOR THE CITY

INFILL

STRATEGY

MAIN STRATEGIES

BACKBONE INFILL

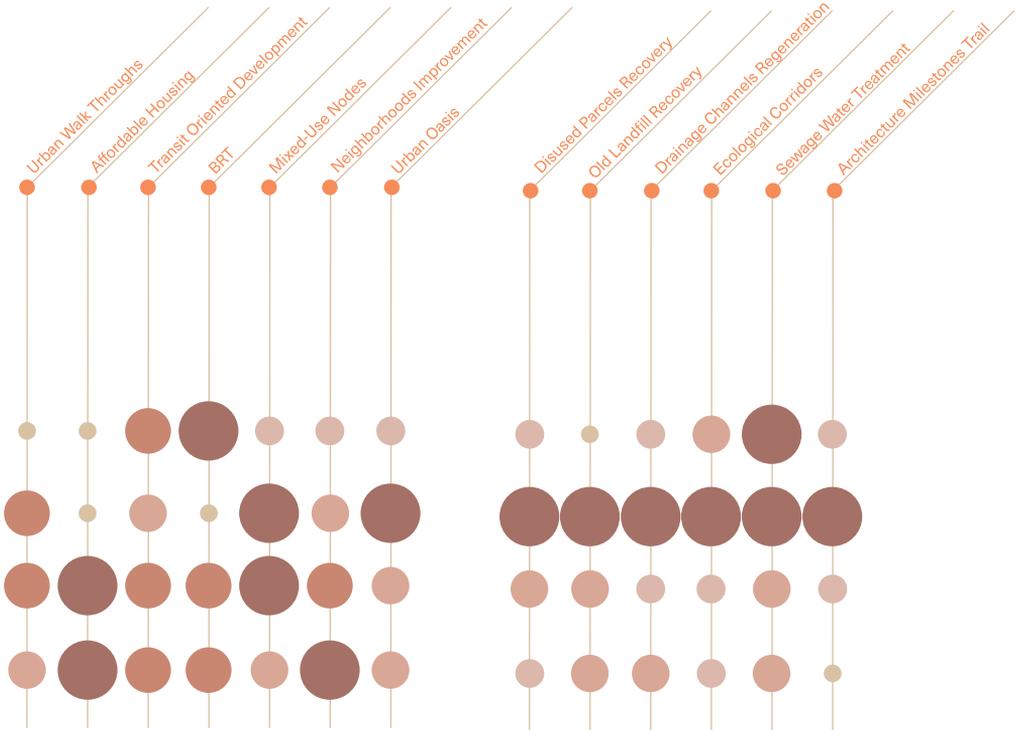


FIGURE 3: Projects matrix. Conceptual structure and pilot projects recommended for the city. CREDITS: Authors' own image.

HMO Y CREATIVE T INCLUSIVE C ECOLOGICAL

URBAN FABRIC INFILL

ECOLOGICAL INFILL



To successfully implement these values, we propose a redevelopment and reuse process for underutilized land that we call ‘the infill.’ The infill acts at a metropolitan scale and is organized around three levels of tactical interventions, defined as main strategies:

- 1 Backbone Infill
- 2 Urban Fabric Infill
- 3 Ecological Infill

Each of these strategies involves a series of separate—but interrelated—projects.

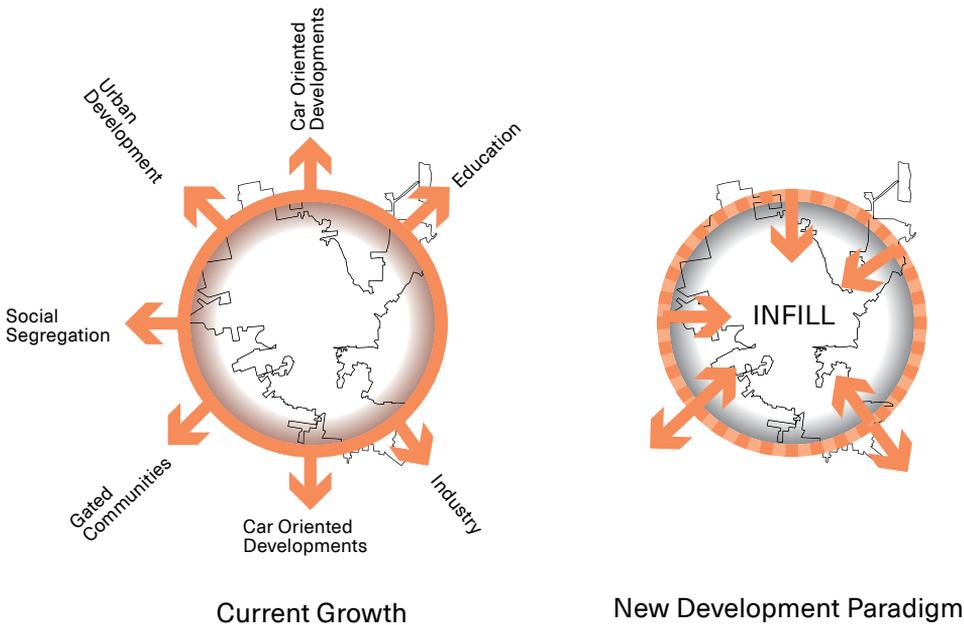
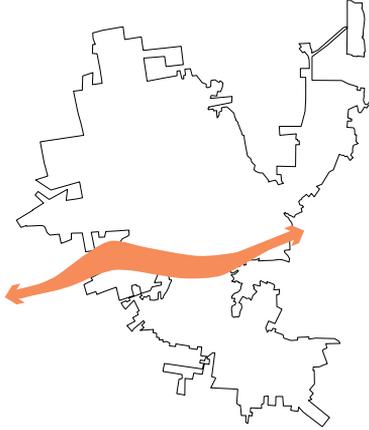
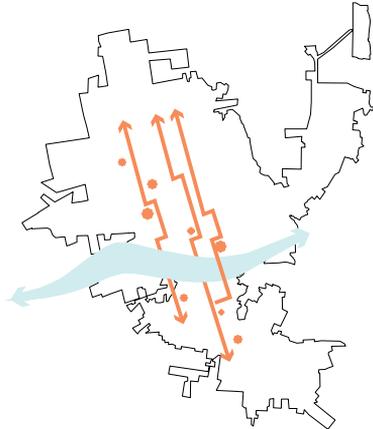


FIGURE 4. Strategy in space (left and right).
CREDITS: Authors' own image.

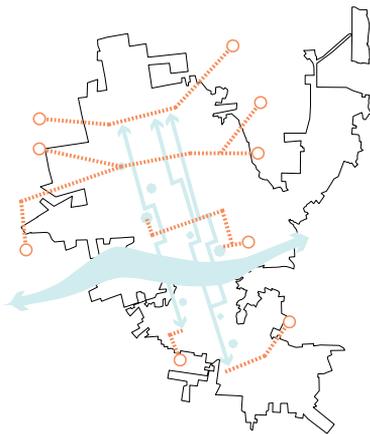
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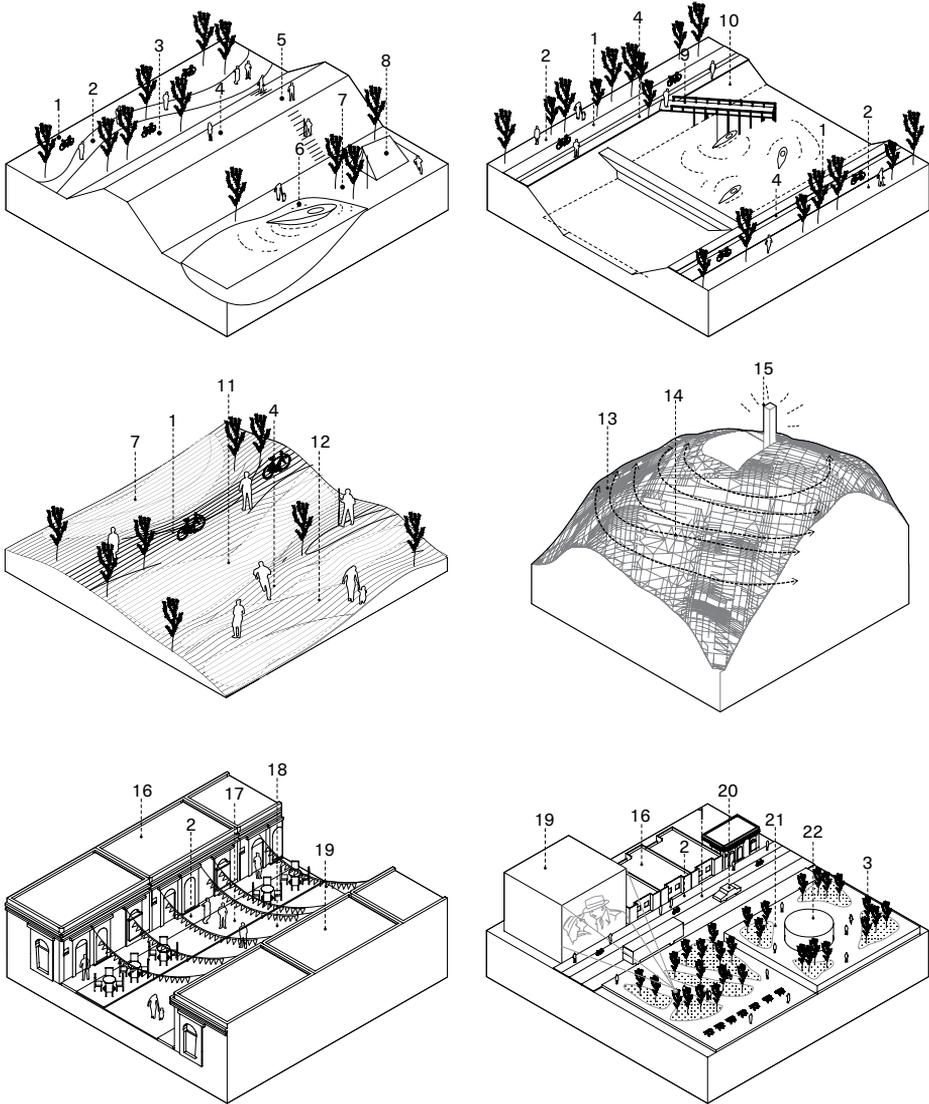
3



1

The Backbone Infill

The objective of this strategy is to create inclusive interventions that foster innovative and productive activities by recovering the city's abandoned spaces and underutilized infrastructures. It highlights the potential of the city's central areas, particularly its historic center and the Sonora river, to connect different urban realities. Through these interventions (Figure 5), the city will be able to change its perspective and rediscover its foundational elements. Such transformations can act as attractors for a new paradigm of development. Within these projects, we propose tax and construction incentives for the creation of entrepreneurial, educational, and cultural districts with mixed-income housing typologies. Other projects propose public competitions for urban design and landscape architecture that will recover the Sonora river basin (a large piece of infrastructure that is currently underutilized) or the *Cerro de la Campana* and its surroundings. The project search will generate a series of tactical actions that turn these natural elements into points of reference along the hills of Hermosillo.



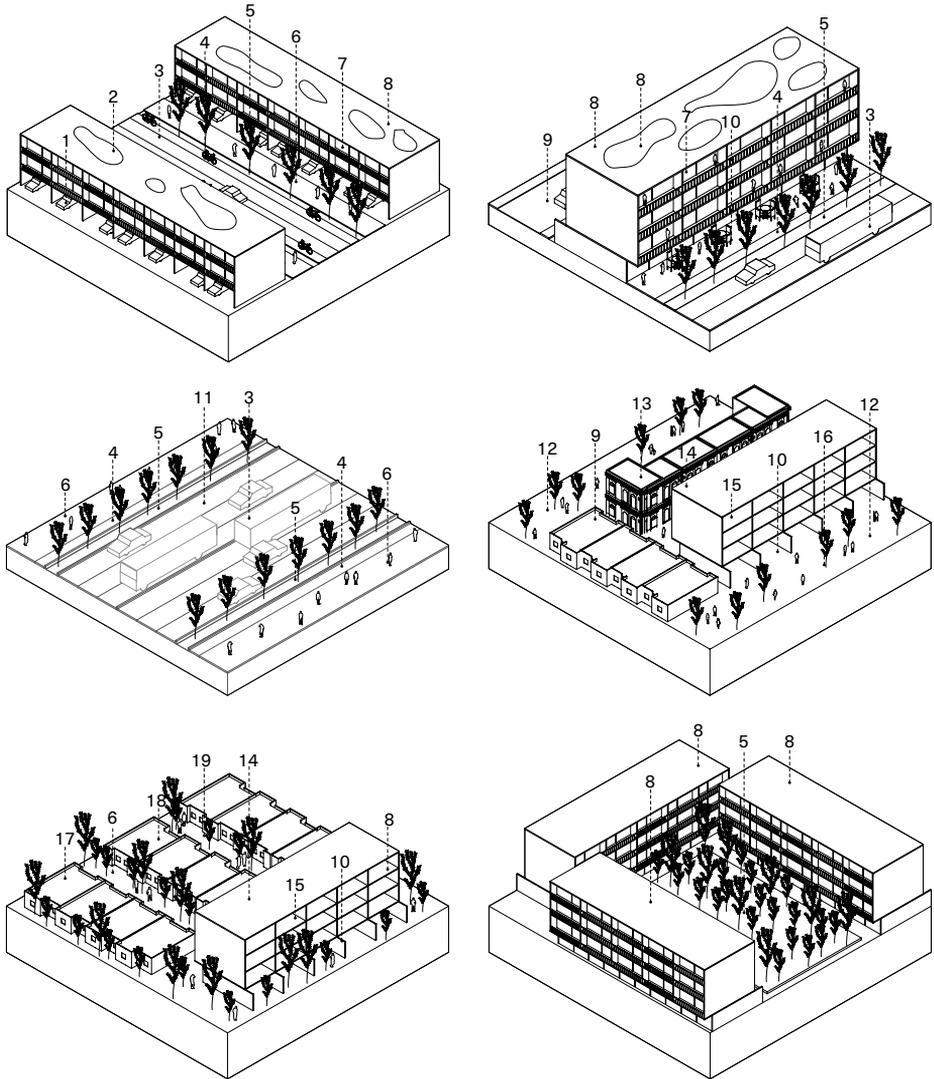
- | | | |
|-----------------------|---------------------------------|-----------------------|
| 1. Bike Lane | 9. Lookout | 17. Commerce |
| 2. Sidewalk | 10. Water Channel | 18. Shared Road |
| 3. Green Space | 11. Natural Flow | 19. Reuse |
| 4. Lineal Park | 12. Topography | 20. Transport |
| 5. Crossing | 13. Neighborhood Revitalization | 21. Plaza Activation |
| 6. Aquatic Activities | 14. Paths Activation | 22. Identity Elements |
| 7. Absorption | 15. Competition | |
| 8. Recreational | 16. Revitalization | |

FIGURE 5. Inclusive interventions that foster innovative and productive activities by recovering abandoned spaces and underutilized infrastructures in the city. CREDITS: Authors' own diagram.

2

— The Urban Fabric Infill

The Urban Fabric Infill centers on the revitalization of three north-south corridors with the objective of gradually densifying areas where public infrastructure and programs are already in place. By identifying development opportunities that relate to public transportation along these corridors, this strategy (Figure 6) aims to generate higher density and promote the use and appropriation of public spaces. One of the main components is the strategic reuse of existing, underutilized buildings to generate new programmed public spaces and reinforce the identity of each neighborhood. Proposed projects include the densification of several urban areas (La Reforma, San Francisco Monteverde, Dr Domingo Olivares, and Lopez del Castillo), creating incentives for medium-density affordable housing projects, and redesigning the corridors to incorporate complementary public transportation systems such as Bus Rapid Transit (BRT).



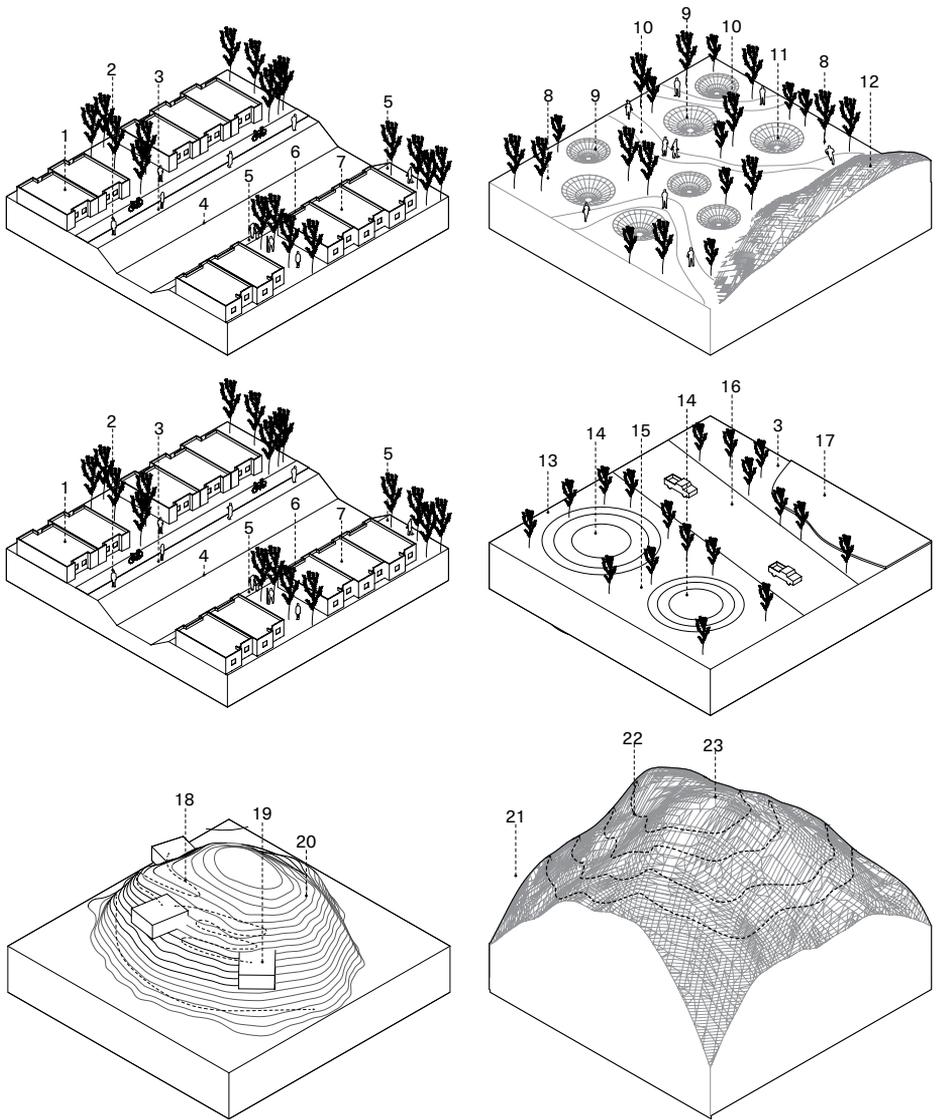
- | | | |
|----------------|--------------------|-----------------|
| 1. Parking | 9. Service Road | 17. Renewal |
| 2. Green Roof | 10. Commerce | 18. Reuse |
| 3. Transport | 11. Car Lane | 19. Linear Park |
| 4. Bike Lane | 12. Park | |
| 5. Green Space | 13. Revitalization | |
| 6. Sidewalk | 14. Roof Terrace | |
| 7. Views | 15. Flexible | |
| 8. Housing | 16. Common | |

FIGURE 6. Revitalization of three north-south corridors with the objective of gradually densifying areas where public infrastructure and programs are already in place. CREDITS: Authors' own diagram.

3

— The Ecological Infill

This strategy seeks to connect the city with its surrounding geography by designing strategic paths and revitalizing certain streets for greater activation and accessibility. At a programmatic level, the strategy (Figure 7) proposes the implementation of water management infrastructure and tactical interventions to incorporate small scale public spaces into the network. These strategies seek to promote Hermosillo's identity by using the desert as an asset for landscape interventions. Ecological infill projects are varied: one recovers an old landfill through a sanitation process; another provides a performative landscape that is capable of holding methane gas and water management programs; a third creates ecological corridors that connect the hills that surround the city of Hermosillo through a pedestrian pathway.



- 1. Revitalization
- 2. Bike Lane
- 3. Linear Park
- 4. Water Duct
- 5. Pocket Park
- 6. Reuse
- 7. Improve
- 8. Green Space

- 9. Absortion Well
- 10. Paths
- 11. Filtering
- 12. Landfill
- 13. Park
- 14. Water Treatment
- 15. Absortion
- 16. Water Transport

- 17. Replenished Park
- 18. Topographic Paths
- 19. Landmarks
- 20. Landscape Features
- 21. Neighborhood Revitalization
- 22. Paths Activation
- 23. Competition

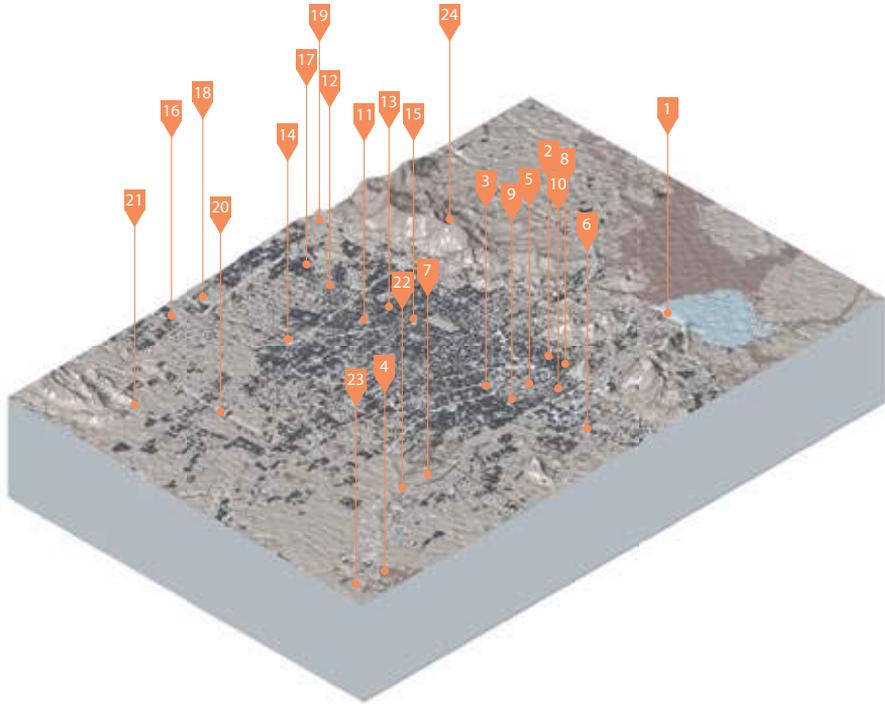
FIGURE 7. Strategies to connect the city and its surrounding geography by designing strategic paths and revitalizing certain streets for greater activation and accessibility. CREDITS: Authors' own diagram.

— Hermosillo's New Paradigm: Vision and Challenges

Our proposal aims to articulate the priority areas in Hermosillo established by the ESC methodology (Urban Form, Mobility, Landscape & Public Space, and Economic Development) through three strategies of 'Infilling.' A key aspect to defining conceptual ideas and projects for the city was to set a holistic and transversal approach in dealing with these four areas. As a result, the projects operate at different scales (Figure 8), tackle several issues at different angles, and build upon various layers of the same narrative in order to define a new paradigm—a creative, inclusive, and ecological city.

While some aspects of Hermosillo, like its cultural history and gastronomy, are already well-anchored in citizens' imagination, the city is still defining its urban identity and negotiating its own narrative. Our proposal rethinks Hermosillo not only as a place of production, but also as an inclusive and dynamic urban environment that leverages its existing natural and social components. The proposed projects deal with infrastructure issues while also tackling more complex social dynamics, such as inequality and the right to the city. By developing strategies that enhance the built environment while considering preexisting social dynamics, we hope that our set of interventions will jumpstart participatory processes and complement the IDB's vision for the city.

Project implementation will represent a key challenge. Having identified and mapped the diverse stakeholders (Figure 9) and institutions involved, we are now able to provide a platform for future technical refinement, encourage citizen participation in the process, and jumpstart the involvement of public and private agencies. The IDB's methodology allowed us to understand Hermosillo as a case study that needs to be explored on-site. We believe that our exercise complements IDB's findings in a way that anchors innovative but abstract ideas into the specificity of the Sonoran context. Both studies are complementary and necessary, but understanding Hermosillo as a tangible urban phenomenon is only possible—as is the case for many Latin American cities—by sharing and receiving knowledge from the local actors that shape its urban future day to day.



- | | | |
|--------------------------------------------------------|-------------------------------------|------------------------------------|
| 1. La Saucedá Park and Abelardo Rodríguez Dam Recovery | 9. Disused Buildings Rehabilitation | 18. Urban Oasis |
| 2. Entrepreneurship District | 10. Shared Streets | 19. Disused Parcels Recovery |
| 3. Educational District | 11. Public Bicycles | 20. Old Landfill Recovery |
| 4. Metropolitan Park project | 12. Urban Walk Throughs | 21. Drainage Channels Regeneration |
| 5. <i>Cerro de la Campana</i> Recovery | 13. Affordable Housing | 22. Ecological Corridors |
| 6. Historical Center Rehabilitation | 14. Transit Oriented Development | 23. Sewage Water Treatment |
| 7. Cultural District | 15. BRT | 24. Architecture Milestones Trail |
| 8. Sonora Riverbed Recovery | 16. Mixed-Use Nodes | |
| | 17. Neighborhoods Improvement | |

FIGURE 8. Pilot projects index and their location in the Hermosillo Metropolitan Area. CREDITS: Authors' own diagram.

— Lessons Learned

After working in Hermosillo for three months, we recognize that creating a new narrative for the city was a fundamental step before diving into more specific projects. By studying the history of the city, we discovered that a main problem was that the city had no central narrative that could align and drive citizen aspirations. As a result, imported development models—such as those from American cities—were implemented, overshadowing the city’s cultural identity and its assets.

The paradigm we propose moves from a sectoral vision of city problem-solving to an integrated and more complex approach that allows planners to foresee the consequences of development projects, particularly in terms of social inclusion sustainability and economic development. Though we were not able to arrive at a deeper level of definition, our work and methodological framework form the basis for initiatives that followed—such as the Fall 2017 course at the Graduate School of Design and this publication—which dove into more practical and concrete strategies. If we had more time, we would have tried to engage further with a broader spectrum of stakeholders in Hermosillo. We understood the relationships and dynamics from a public-sector perspective, but we lacked knowledge of the private sector and advocacy and citizen-oriented groups. These stakeholders have a key role in defining the city’s new narrative, and their input would be fundamental to generating proposals that transcend political agendas. We also found the vision from new generations of entrepreneurs in Hermosillo to be particularly interesting. These entrepreneurs have a renewed perspective on the city’s uniqueness, something that previous generations lacked in their efforts to bring development to the city.

As Latin American architects and urban designers, we were surprised to find a city in northern Mexico with such unique characteristics. We traveled to Hermosillo expecting to find similar issues to other intermediate Latin American cities. Instead, we found that Hermosillo’s identity and complexity goes beyond any preconceived model, and thus, the solutions and strategies

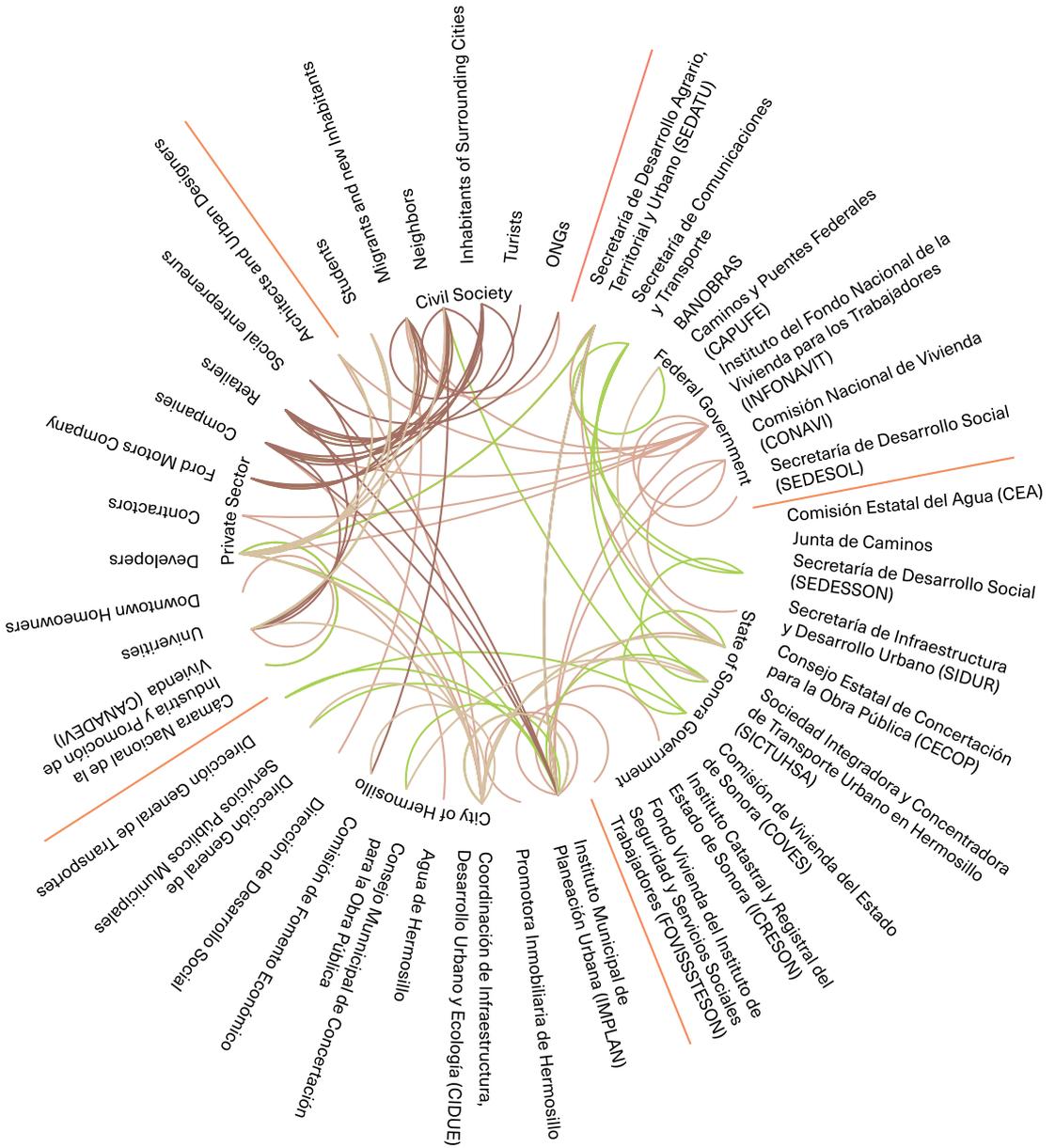


FIGURE 9. Hermosillo stakeholders diagram / Different colored lines represent the four axes of the ESC methodology: Mobility (green), Economic Development (dark brown), Urban Growth (medium brown), and Public Space (light brown). CREDITS: Authors' own diagram.

for its problems must be addressed by looking closely at its real identity and by avoiding imported models as magic solutions. Although we recognize the importance of looking at other cities' strategies and incorporating good practices and placemaking examples from around the world, the projects and initiatives required to make Hermosillo a creative, inclusive, and ecological city must be grounded in the city's existing assets and prioritize local culture above all else.

We hope that our contribution to rethinking Hermosillo from a more experimental and theoretical approach serves as a starting point to encourage more concrete visions for the city. Hermosillo needs to change its patterns of urban development, and we recognize that important efforts have already been made in this direction. The leadership and vision of institutions like IMPLAN over the last several years give us hope about the future of Hermosillo. As we mentioned earlier, special attention should be granted to the new generations of *Hermosillenses* who share these values and wish to put them to work in the near future.

Notes/References

- 1 – IDOM [Ingeniería y Dirección de Obras y Montaje] (2017). Baseline studies: Climate Change, Natural Risk and Urban Growth for the city of Hermosillo, Sonora.
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CREDITS: Inter-American Development Bank (2016-2018).



CREDITS: Inter-American Development Bank (2016–2018)



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FOR
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Diane E. Davis
Felipe Vera

From Unrealized to Realized Potential

— Design, Planning,
and Policy
Visions for the City of
Hermosillo, Mexico

In 2017, Harvard University and the Inter-American Development Bank (IDB) initiated a collaboration to identify promising policy actions and new urban design and planning strategies that could help the city of Hermosillo, Mexico achieve what many considered to be its 'unrealized potential.' This collaboration paved the way for an experimental project-based course titled "Emergent Urbanism: Planning and Design Visions for the city of Hermosillo" that we co-taught in the Fall of 2017; the class gathered 12 students from 10 countries and six different programs at the Harvard Graduate School of Design (GSD).

This course was intended to unfold as a purposeful collaboration between university, a multilateral agency, and a city. This meant that the course instructors, visiting lecturers, and students were expected to take into consideration the priorities and concerns emanating from all three realms. In preparation, students were provided background materials on IDB's priorities in Latin America and supplementary reports on Hermosillo (included in the second section of this publication). Students were thus exposed to multiple points of view from actors and institutions involved in academia, the development policy world, and the city of Hermosillo.

This class began as a purposeful collaboration between three realms: a university, a multilateral agency, and a city.

In terms of framing the larger task at hand, the class instructors emphasized multi-scalar, collaborative, and holistic approaches to the city and its urban planning and design challenges, drawing equally from urban ecology, landscape architecture, public policy, economics, and politics. Yet students also were expected to rely on knowledge produced by development economists,



CREDITS: Andreina Seijas

historians of science and technology, and experts in the social sciences. Over the course of the semester, students sought to translate these various disciplinary frameworks and multiple stakeholder concerns into a final proposal for the city. It is our aim in this introduction to give you a sense of the pedagogic process through which each particular student project came to be, and to show how students' classroom and fieldwork experiences led to the overarching design visions and policy recommendations presented in this volume.

— Grasping Hermosillo's Unrealized Potential in a Classroom Setting

Much of the creative process was guided by the class assignments and expectations about intermediate and final deliverables given to students at the outset of class. In addition to es-

tablishing the expectations that students would be required to propose projects that could lay the groundwork for creating a more livable, economically vibrant, socially-inclusive, and sustainable future for the city of Hermosillo, we asked each of them to conduct original research and explore advocacy strategies, participatory exercises, as well as other forms of social and spatial practice in their efforts to produce alternative, speculative, and creative solutions for the city. To get all of this started, the first assignment in the class required students to familiarize themselves with the socio-economic and environmental history of Hermosillo and its regional surrounds. This involved recognizing the city's location near the U.S.-Mexican border and its evolution from an agriculture-based to a manufacturing economy.

From early on, we asked students to select one of the following domains for strategic intervention—city form, environment, mobility, or economic growth—and to show some understanding of how challenges in these domains had been successfully addressed in another urban context. Students also were expected to work on these ideas in the context of ongoing discussion about the multicollinearity of urban, social, economic, and environmental sustainability. In short, we wanted them to remain aware that sectoral problems are often correlated, even if one is prioritized for action. For example, students were asked to consider if and how mobility and urban form are deeply connected; or, similarly, how environmental threats and economic growth might be intertwined. To support the multi-sectoral nature of the class, we invited different experts, who collectively were able to cover a broad range of issues related to these four domains of interest.

After laying out these expectations and asking students to undertake initial background preparation for several sessions, we traveled to Hermosillo for a week. Seeing the city with their own eyes encouraged students to confront the distinction between abstract academic analysis and grounded, empirical research. Upon arrival, the first takeaway was the realization that many of the problems that may have been highlighted in general background reading about urbanization in Latin America did not seem to be very relevant for this particular city. Superficially at least, Hermosillo did not appear to present many of the standard

urban problems common in other major cities of Mexico or in the emerging economies of the Latin American region, such as high degrees of housing and commercial informality or even extreme social and income inequality. As a consequence, students began to think more deliberately about which problems and which populations their proposals would or should be serving. Likewise, two of the issues that were identified in pre-visit preliminary briefings by experts and by the IDB—particularly the problems of transport as well as questions of water—did not seem to be high on the agenda of all the stakeholders that students met in Hermosillo, although local urban planning officials were indeed cognizant of these concerns.

Seeing the city with their own eyes encouraged students to confront the distinction between abstract academic analysis and grounded, empirical research.

During their time in Hermosillo, students met with representatives from private, public, and civil society organizations who had different ways of identifying priorities and problems in the city. These meetings included those with former Mayor Manuel 'Maloro' Acosta and representatives from Hermosillo's Municipal Planning Institute (MPLAN), the Infrastructure and Urban Development Secretariat, the Housing Commission of the State of Sonora (COVES), the National Housing Fund (INFONAVIT), the Social Development Secretariat of Sonora (SEDESON), the city's Tourism Department, Water of Hermosillo, the Chamber of Commerce, Sonora Lab, *Centro Capital*, *Hermosillo Cómo*

Vamos, Hermosillo 2015, *Patronato del Centro Histórico*, *Colegio de Arquitectos*, students from Universidad de Sonora and the Monterrey Institute of Technology, the founder of *Parque La Ruina*, cyclist groups, and real estate developers, among others.

Many of the problems that may have been highlighted in general background reading about urbanization in Latin America did not seem to be very relevant for this particular city.

The interactions with all these stakeholders led to the second takeaway from the trip: the fact that there were many different views about what was of high priority for the city. This knowledge informed subsequent project development by forcing the students to think more critically about what proposals they should produce, and why. Indeed, the opportunity to meet with so many different residents and public officials impressed upon students the fact that there was no single view of the city, and that any new ideas that they might generate could potentially alienate or engender enthusiasm from any given stakeholder, depending on their particular framing of the city's main problems, or even where they lived in the city. This realization thus motivated students to think strategically about how to maximize public and private sector support for any particular idea they sought to propose, independent of their own views of what might help the city realize its potential.



Views from the top of the *Cerro de la Campana*.
CREDITS: Theodore Kofman.

While in Hermosillo students also concluded that there seemed to be a surprising degree of stakeholder convergence on the importance of revitalizing downtown areas. This had not been evident in the pre-trip briefings. Though some of the initial briefing materials and expert lectures highlighted tourism potential and manufacturing competitiveness, the more macroeconomic issues did not emerge substantially in the stakeholder meetings—despite being key concerns for economists whose main priority was employment and/or long-term economic growth. To be sure, students were aware that any effort to revitalize downtown could also have a bearing on tourism and a start-up economy in manufacturing. It also could easily involve a transportation program, another key challenge identified in the pre-trip briefings. Yet as with manufacturing competitiveness, mobility was not necessarily the primary concern of those advocating for downtown renewal.

In the process of seeing a disconnect between the downtown priorities of many of Hermosillo stakeholders and the other issues highlighted by invited experts back in Cambridge, students began to think that conceptual or programmatic linkages between downtown development, transport, economic competitiveness, and other urban and built environmental concerns had not really been sufficiently developed in preliminary background documents. They were thus inspired to make some headway in these regards: i.e. to piece together the different priorities of various stakeholders in novel ways in the subsequent development of their projects.

A final takeaway from the field trip was a deeper understanding of the city's problematic spatial organization. Specifically, when traveling through the city students found Hermosillo to be insufficiently dense and overly sprawling, not an uncommon problem in Latin American cities. But in Hermosillo, students began to speculate that the city's form and recent land use patterns were the product of an unusual combination of factors related not merely to the city's desert location and infrastructural connections to the northern border and the western coast, but also to recent, perhaps misguided, urban policy decisions.

In addition to the extremely low population and building density as well as an under-utilization of properties in historic downtown areas, of particular concern was a proliferation of INFONAVIT housing in previously undeveloped areas to the north, a product of decisions made between private social housing developers and federal authorities that contributed both to transportation problems and urban sprawl. Likewise, students identified a range of current and projected real estate developments that threatened to generate urbanization on the city's eastern end, away from the city's main sources of employment.

Students further noted the existence of a very poor and spatially-isolated large informal settlement—Miguel Alemán—nestled along a westward-oriented corridor cutting through agricultural lands and leading to the coast. These patterns raised questions about who was prioritizing the development of the city's distinct peripheries and motivated students to ask whether, if left unchecked, such patterns might increase spatial inequality with poor populations isolated in the West, wealthier residents moving to the East, and modest middle-class residents moving to the North. When combined with a lack of attention to the historic center, these urbanization tendencies held the potential to produce even greater socioeconomic fragmentation. If such issues were not addressed, students reasoned, progress would be limited, and Hermosillo's potential would remain unrealized.

Armed with this new knowledge, during their fieldwork students began discussing among themselves what might constitute a well-planned and more strategic metropolitan vision capable of



The students, Diane E. Davis, and Felipe Vera during a visit to the Sonoran Desert. CREDITS: Andreina Seijas.

generating new synergies both across different activities and between the many unconnected city spaces noted above. It was while visiting Hermosillo that students made the decision to form into teams that would give equal attention to each of these three distinctive territorial spaces: 1) the city center or core; 2) the periphery, or the land use interface between urban and agricultural activities; and 3) the so-called semi-periphery, or the spaces and activities somewhat distant from the city center but still squarely located within the existent urban footprint. By selecting territorial space as their initial entry point students did not avoid thinking about sectoral activities. Rather, while their initial logic was spatial they were also interested in shifting the built environmental character of the city and its constituent activities so

that the urban whole and the distinctive territorial parts would interact in new more productive ways. Overall, students sought to determine what types of activities would thrive in which physical spaces, and how they together could produce a more vibrant, equitable, and well-connected metropolitan area.

Upon returning to Cambridge, students pursued projects for these different parts of the city in tandem with further readings and with a focus on implementation. Among their concerns were: how to foster collaboration in complex projects; how to make a distinction between a project and a plan; and how to assess the impacts of power structures on urban policymaking? Ultimately, their final projects embodied these semester-long efforts to identify and craft new visionary ideas for this emerging Mexican city.

In what follows, we present three distinct projects (“Rural Intensification,” “El Hit”, and “Revive el Centro”), each of which summarizes students’ visions and proposals for the city of Hermosillo, crafted in the context of the class. As noted above, they have been organized by the scale of their sites—from the periphery to the center—and contain background, rationales, and recommendations for implementation.

Notes/References

1 – The Action Plan is a technical document developed by IDB specialists and external consultants that includes a city’s vision, an evaluation of its multi-sectoral sustainability, and proposed projects for improving its performance (Inter-American Development Bank, 2016).



CREDITS: Theodore Kofman.



CREDITS: Andreina Seijas.



CREDITS: Inter-American Development Bank (2016–2018) (left and right).



Hermosillo is located in the southern end of Mexico's Sonora desert. As an emerging city in a rapidly developing country, Hermosillo faces a series of pressing challenges, driven in large part by the particular mode of economic and spatial development unfolding there. First and of primary concern is an over-reliance of the economy and the industrial sector on the Ford-owned automobile assembly plant in the city. A stagnation of the automobile industry or Ford's departure from the city could mean severe economic losses, including job loss for the 21% of the workforce employed in the industrial sector (INEGI, 2014).

Cesar Castro
Neha B. Joseph
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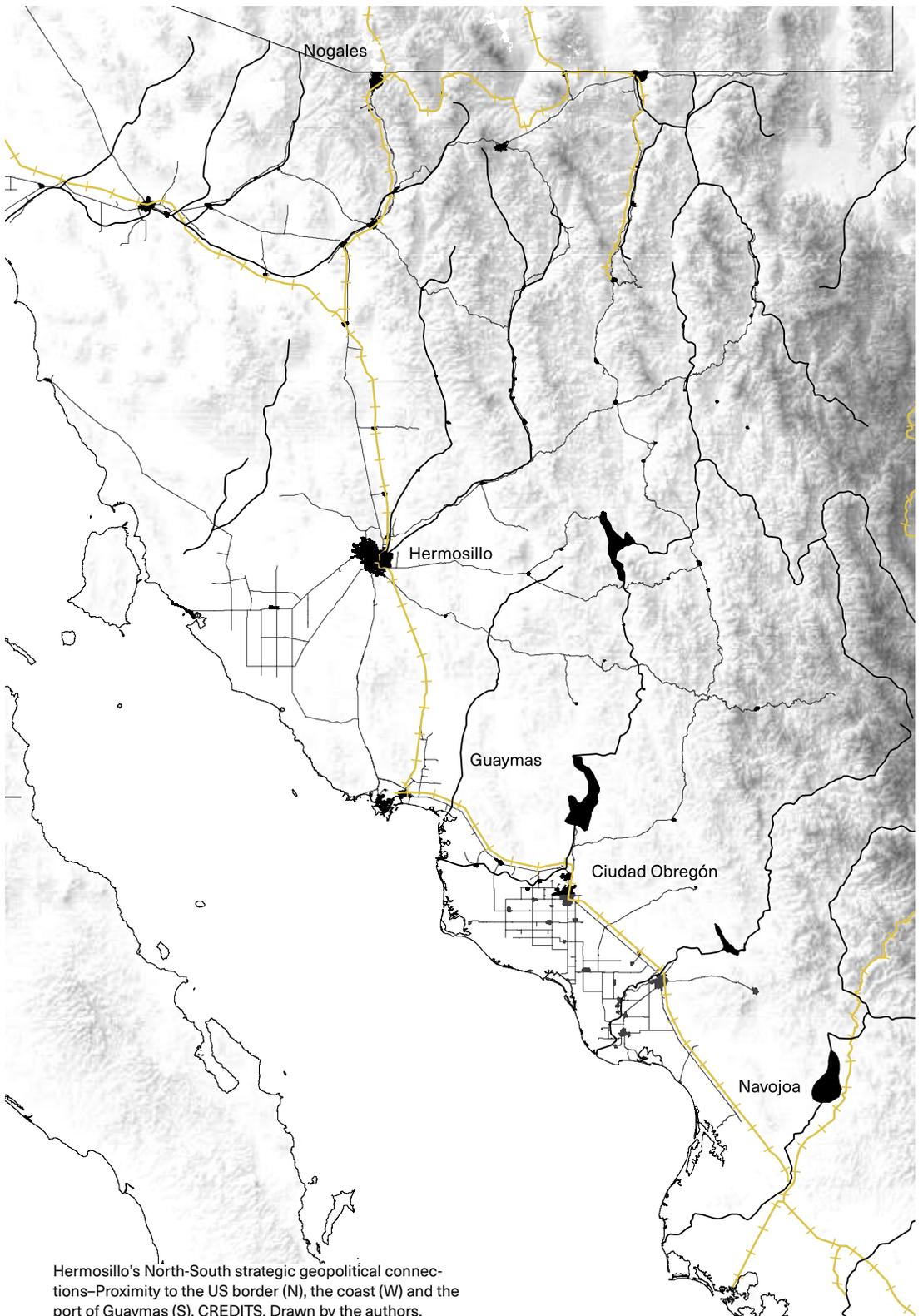
Rural Intensification

— A New Model
of Urbanization
Leveraging Heritage
and Innovation in Hermosillo

Another important contributor to local GDP is construction activity driven by a robust real estate sector. Much of the city's real estate activity is concentrated in the peripheral area surrounding the urban core, which, if left unchecked, holds the potential to exacerbate Hermosillo's proclivity to sprawl and low-density development. Additionally, there is immense unrealized potential in Hermosillo's place-based assets and little effort to mobilize these assets to serve local economic development. These assets include the large swathes of vacant and unused pastoral land in the rural periphery, the region's geographical location in a sun belt, and the municipality's proximity to the coast and the United States border. The city is also witnessing considerable brain drain, driven in large part by recent engineering graduates of Sonoran universities going elsewhere for work.

Our project aims at alleviating these specific and immediate challenges. We focus on the urban edges of Hermosillo and look inwards for a new model of growth and development. At the site level of the project, we propose that a publicly-owned, unused pastoral parcel along the border of the city proper be converted into an agricultural solar park. Our larger vision is to trigger economic development through the establishment of solar agricultural units in unused pastoral lands in the area lying between Hermosillo city and the town of Miguel Alemán, a low-income community of approximately 30,000 inhabitants located in the outskirts of Hermosillo. We envision that a transformation of unused and underused rural land into revenue generating opportunities will have significant economic benefits as well as co-benefits for other sectors.

In this project, we think of Hermosillo as comprising not just the city proper and urban core, but the entire municipality that stretches at the western end towards the coast and at the northern end towards the United States border. Importantly, this will mean that the town of Miguel Alemán and its largely lower-income farmer population will be central to our strategy.



Hermosillo's North-South strategic geopolitical connections—Proximity to the US border (N), the coast (W) and the port of Guaymas (S). CREDITS. Drawn by the authors.



Abelardo L. Rodríguez Dam. CREDITS: Image collected from google Earth (top).



Sonora River. CREDITS: Image collected from google Earth (top), Inter-American Development Bank (bottom).



There is immense unrealized potential in Hermosillo's place-based assets and little effort to mobilize these assets to serve local economic development.



Underutilized Pastoral Land. CREDITS: Image collected from google Earth (top).

Bahía de Kino. CREDITS: Image collected from google Earth (top), Inter-American Development Bank (bottom).

Employment by Sector



- Agriculture
- Construction
- Manufacturing Industries
- Wholesale Trade
- Retail Trade
- Shipping and Storage
- Other Sectors

Contribution to GDP by sector



- Agriculture
- Mining
- Generation, Transmission, Distribution of Electricity
- Construction
- Industries
- Commerce
- Other Sectors

Why the proposal focuses on economic development. The different sectors' current contribution to Hermosillo's GDP and employment. CREDITS: Analysis and data visualization made by the authors.

— Our Vision

Our vision for Hermosillo is two-fold and stems from the challenges described above. First, we aim to stimulate economic development in the city in a manner that is sustainable and that capitalizes on the unrealized potential of its place-based assets such as vacant and unused pastoral land. Integral to this vision is a diversification of the economy and a reduction of economic overreliance on the Ford-owned automobile assembly plant. Also vital is the creation of economic opportunities that meet the demands of the highly-skilled graduates of Hermosillo's universities and higher educational institutions. The second aspect of our vision—facilitating the emergence of Hermosillo as a sustainability leader—is closely related to the ideas of economic diversification and seeks to take advantage of the city's location in a green belt.

Based on this vision, we propose a three-pronged strategy to promote an economically vibrant and sustainable Hermosillo: developing a technology-oriented and infrastructure-intense agricultural sector, developing a solar energy sector, and activating the entire territory of Hermosillo and its people.

STEP 1: DEVELOPING A TECHNOLOGY-ORIENTED AND INFRASTRUCTURE-INTENSE AGRICULTURAL SECTOR

Being the capital of the state in which the first experiments that sparked the Green Revolution were conducted, Hermosillo has a long tradition in agriculture. The agricultural sector has played a pivotal role in the course of Sonoran history and legacy around the world. However, what was once critical to the creation and growth of Hermosillo, has, with the water crises of the early 2000s, ceased to be a profitable, feasible economic activity. Testaments to the decline of this industry are the large swathes of fallow agricultural land, amounting to 2.3% of surface area of the municipality and dotting the periphery of the city. Our goal with this project is to mobilize this important place-based asset and rebuild the legacy of the region of Sonora as a hub of agricultural innovation.

There are two reasons why a revival of the agricultural industry assumes importance. First, agriculture presents an opportunity for history-based identity building. Second, and more importantly, agricultural activity in the periphery emerges as the most financially-profitable method to utilize peripheral fallow land in a manner that is sustainable and that acknowledges the water and infrastructure-related constraints that the city faces. For example, utilizing the periphery for real estate activity or other industrial and development-related activities would only serve to exacerbate existing water risks.

In order to reduce current and future vulnerabilities to water scarcity and address an issue that has long hindered the growth of the agricultural industry, we propose two interventions. First, we advocate for moving away from surface water and making treated wastewater the basis for irrigation. As the first phase of our project, we propose capitalizing on the already existing wastewater treatment plant located along the Hermosillo-Bahía de Kino highway and using water treated at this plant to irrigate the site. This wastewater treatment plant has an installed capacity to treat 57 MDG of wastewater and is equipped—at least for the next few years—to treat 100% of the wastewater generated in the city, which in 2011 stood at 51.32 MDG. Wastewater treated at this plant is used for agricultural purposes, aquifer recharge, and urban uses.

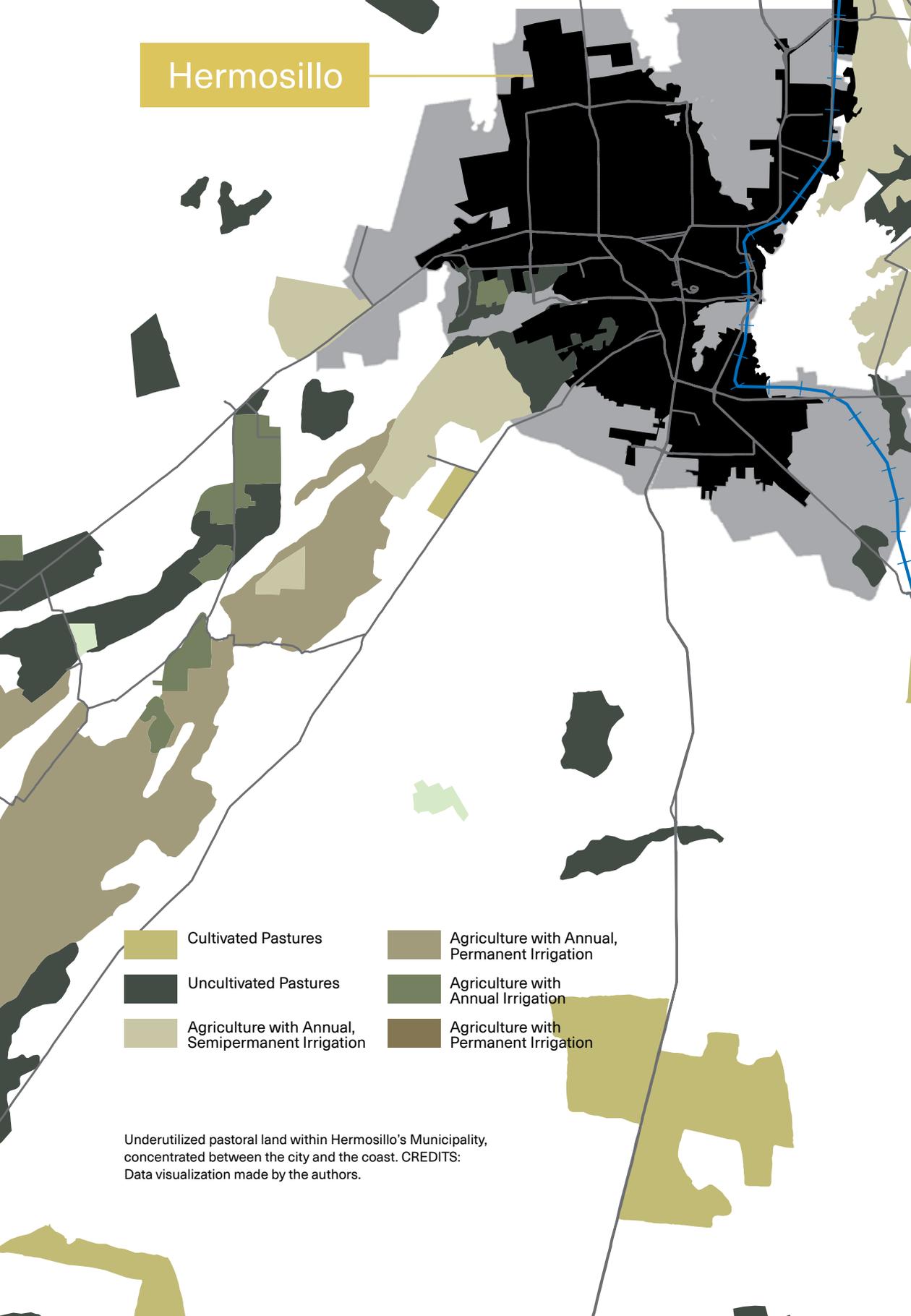
In the second phase of the project, when wastewater generated within the city has exceeded the installed capacity of the treatment plan, and pursuant to the construction of piped infrastructure, we propose on-site solar powered treatment of wastewater. Additionally, we advocate for the cultivation of less water-intensive crops like grapes, tomatoes, potatoes, and apples to replace more water-intensive crops that currently form the bulk of agricultural activity in Hermosillo. With these innovations, we are attempting to develop a cutting edge, technology-intensive agricultural industry, while simultaneously ensuring that the industry remains relatively unharmed in the face of increasing water scarcity.

A revival of the agricultural industry could render many benefits for the city. First, it would help rebuild the identity and legacy



Miguel Alemán

Hermosillo



- | | |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|  Cultivated Pastures |  Agriculture with Annual, Permanent Irrigation |
|  Uncultivated Pastures |  Agriculture with Annual Irrigation |
|  Agriculture with Annual, Semipermanent Irrigation |  Agriculture with Permanent Irrigation |

Underutilized pastoral land within Hermosillo's Municipality, concentrated between the city and the coast. CREDITS: Data visualization made by the authors.

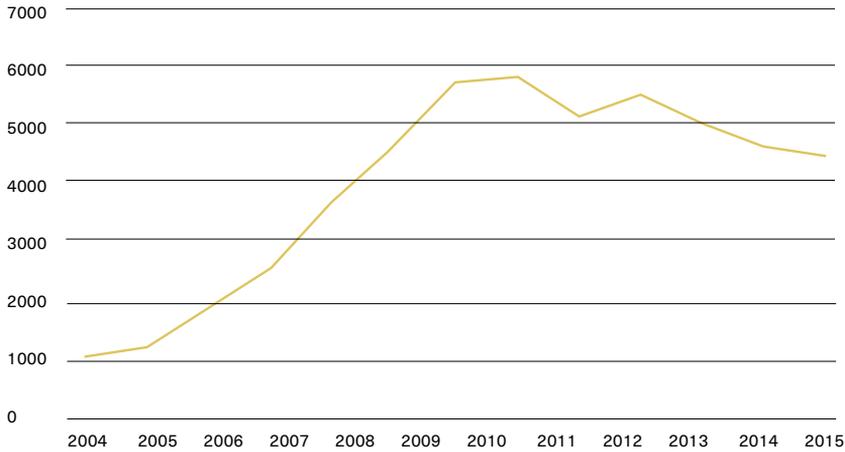
of Hermosillo as a hub of agricultural innovation. We expect the project to render significant synergies for economic development and create job opportunities in the agricultural sector. Farmers will be able to sell and export not only agricultural produce but also solar power and treated wastewater. Many of these job opportunities will be in the fields of environmental engineering and will provide a means to absorb the large numbers of engineers that graduate every year from Hermosillo's universities.

The project also promises significant benefits to other sectors of the economy. On the urban development front, our proposal will engender a mode of ecological urbanism. First, utilizing peripheral land for agricultural purposes will result in the creation of a green belt around the southern portion of the city, which can provide significant ecological benefits, including serving as a carbon sink. Second, the green buffer will contain city expansion and ensure that cheaply available land in the periphery is not diverted to more financially beneficial—at least in the short run—uses like real estate development. Third, it will mean that any expansion or growth in the city is met by densification of existing urban areas rather than boundary expansion.

We also see this as a potential catalyst in order to strengthen Hermosillo's connection to the U.S. border, as well as to foster the future role of Hermosillo as a regional hub of goods and services. In transport, it is likely to facilitate expansion and extension of infrastructure to not only Miguel Alemán, but also to the port and the U.S. border, as well as to facilitate better connectivity with the industrial and downtown areas of the city. Finally, we envision an expansion of water pipeline infrastructure and recognition of the role wastewater can play in a desert economy.

STEP 2: DEVELOPING A SOLAR ENERGY SECTOR

By some estimates, Sonora as a region could easily become one of the top five largest producers of solar energy in the world. However, current solar energy production in the state, and in



Contribution of Agriculture to Hermosillo's GDP (2003-2015).
 CREDITS: Authors' own diagram.

Hermosillo in particular, does not come close to such bright potential, even when taking into account other approved solar farm projects in the pipeline.

Our project seeks to embolden a vision of Hermosillo as a sustainable and viable city, through the development and deployment of new sources of energy. By tapping into Hermosillo's place-based advantage through solar energy, we can help spur the beginnings of a new economic sector and engine of growth for the city. However, in order to ensure that past mistakes such as jumping from agriculture to auto assembly are not repeated, our strategy combines the advantages of solar energy with the heritage and tradition of agriculture in the region, pushing the city towards a more holistic and encompassing future. While our strategy only scratches the surface of the possible production of solar energy, other ways to expand the sector, such as the manufacturing of solar panels and the leveraging of a robust local engineering curriculum and entrepreneurship, are still waiting to be further explored.

STEP 3: ACTIVATING THE ENTIRE TERRITORY OF HERMOSILLO AND ITS PEOPLE

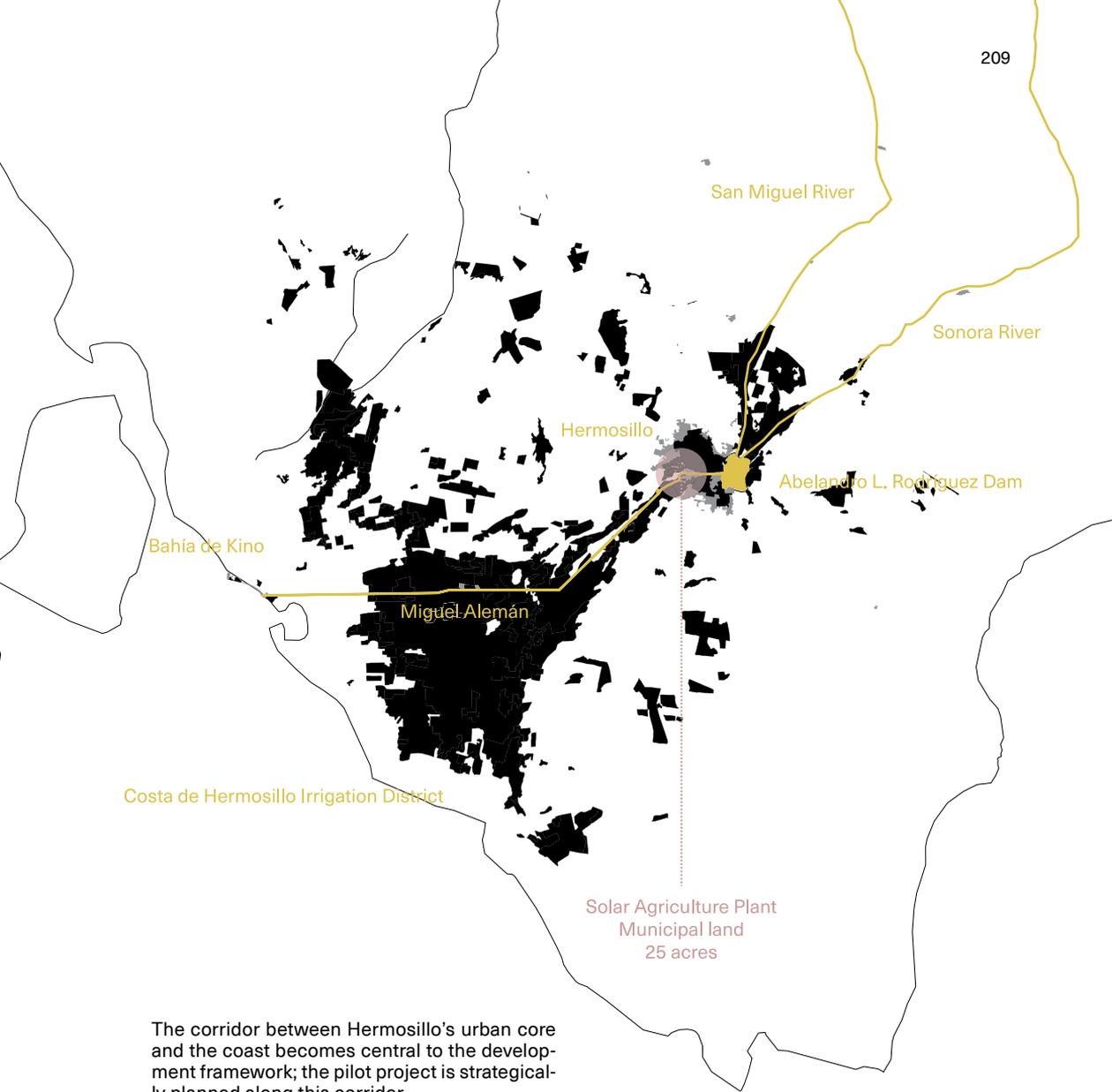
In addition to reviving the agricultural sector and developing solar energy as a new engine of innovation and economic diversification, the long-term strategy of our project would be to activate



CREDITS: Inter-American Development Bank (2016-2018).

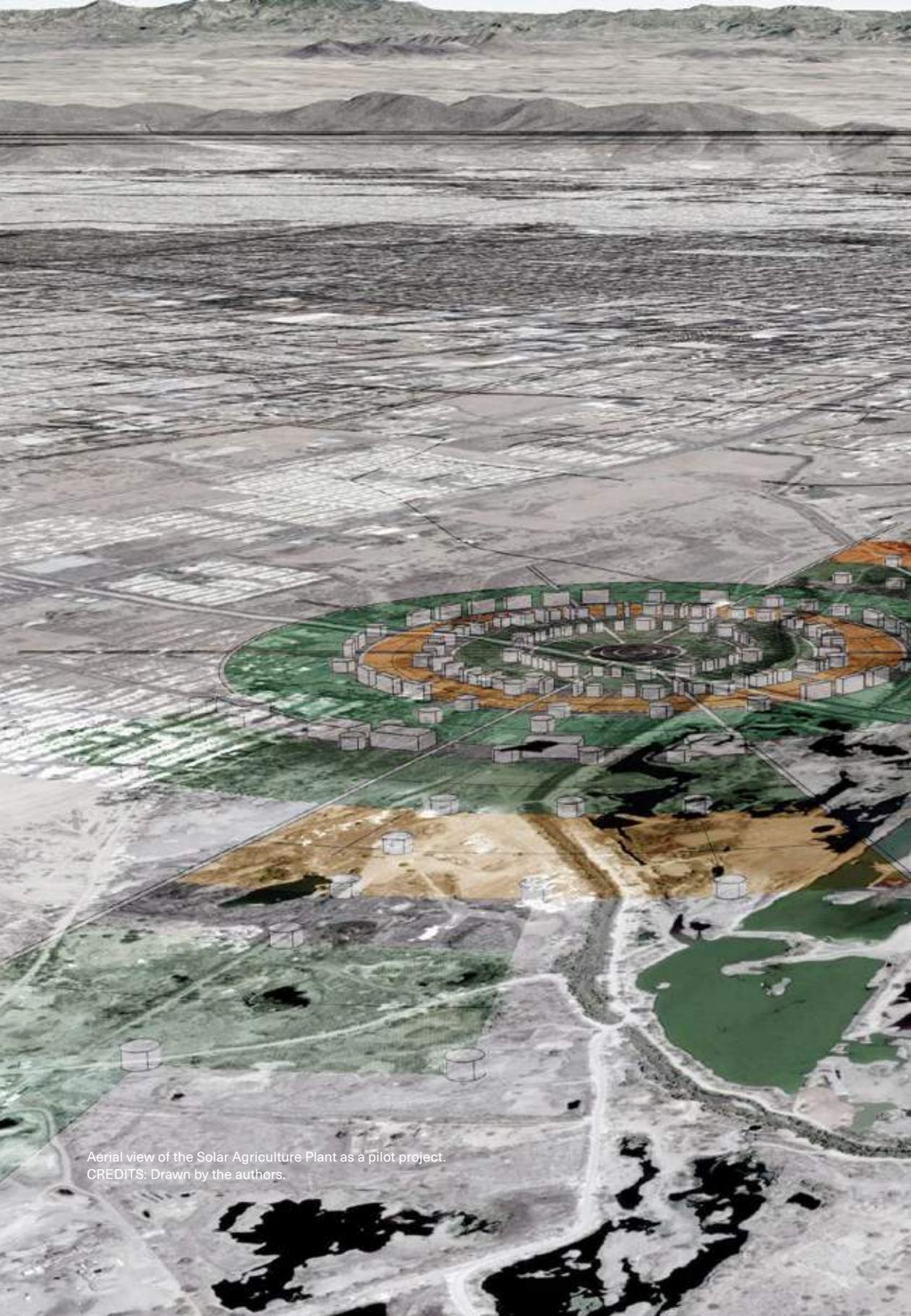
the entire territory of Hermosillo and, more importantly, its residents and heritage. Our proposal will do so by incentivizing the role of Miguel Alemán and Hermosillo's coast as new hubs for innovation and growth through the creation of a new overlay district that encourages solar energy, sustainable agriculture, and other green economies of scale. From a cultural perspective, it is also critical for Hermosillo to celebrate its indigenous communities and rich past. At multiple levels, the inclusion of indigenous communities, from small farmers to large communal lands, into the production, distribution, and replication of solar-powered sustainable agriculture would not only be a win for those communities, but also for Hermosillo.

The public sector can contribute to such potential by investing in new infrastructure for water and solar energy distribution of this system. By improving rural roads, adding pipelines, and subsidizing solar panels and sustainable agricultural practices and innovations, Hermosillo can embrace a new model of urban development that takes advantage of its place-based assets. Whether as a port city or a border-crossing logistics hub, Hermosillo has a regional role to play. Our strategies and goals at three different spatial and temporal scales will help the city get started on that vision for the near and long-term future.

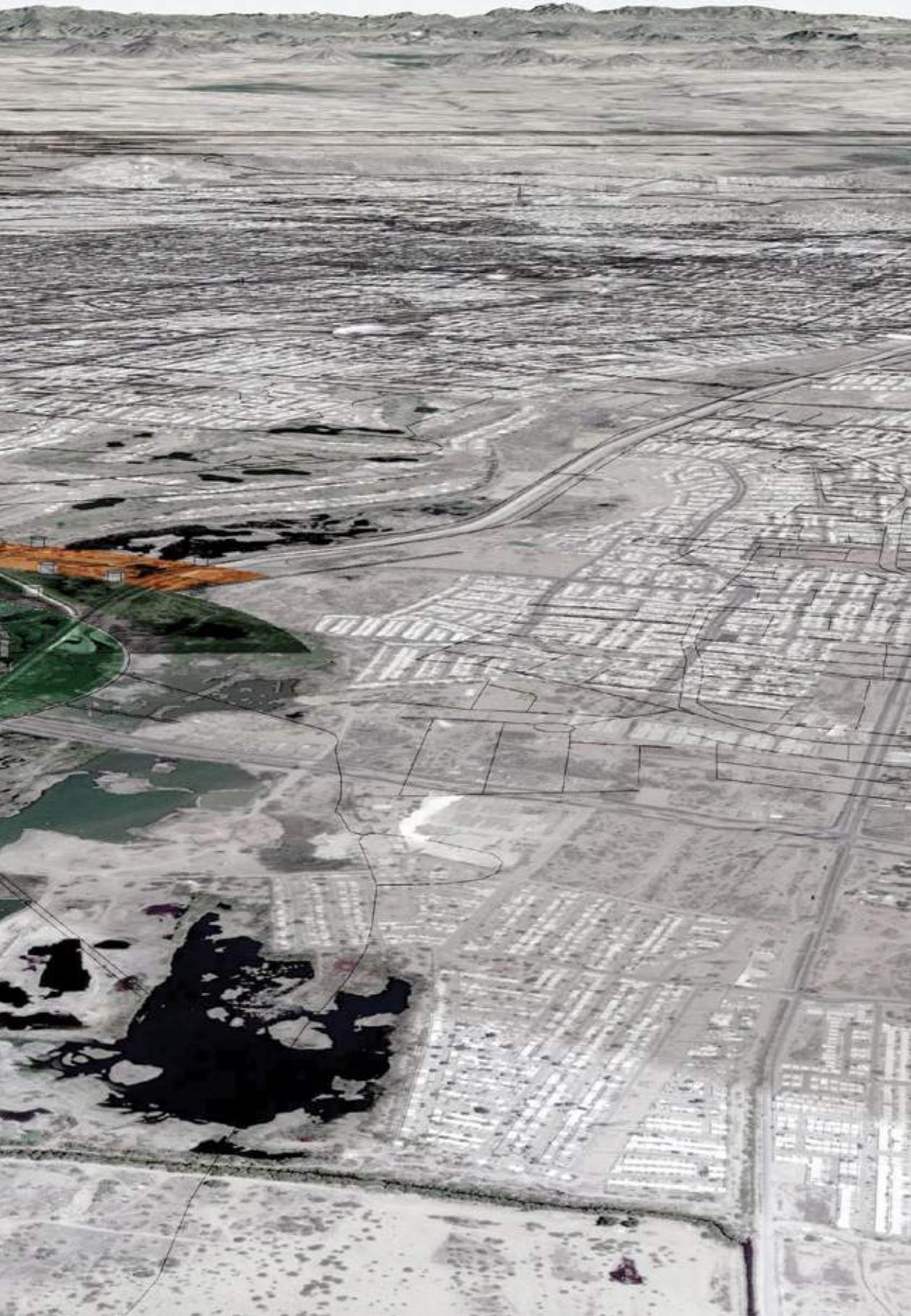


The corridor between Hermosillo's urban core and the coast becomes central to the development framework; the pilot project is strategically planned along this corridor.
CREDITS: Drawn by the authors.

A revival of the agricultural industry could render many benefits for the city.

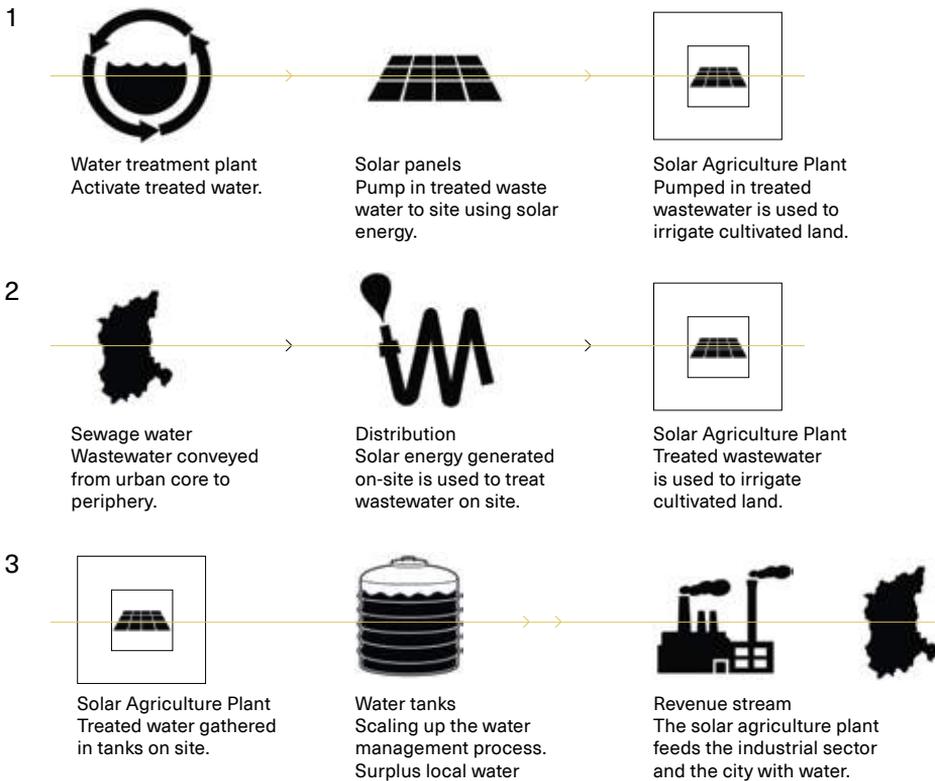


Aerial view of the Solar Agriculture Plant as a pilot project.
CREDITS: Drawn by the authors.



— Scales of Intervention

Our proposal envisions two scales of intervention: the larger Hermosillo region and the individual pilot project on the selected site. From a regional perspective, we envision that the project is replicated and expanded for implementation in the publicly-owned, unused pastoral lands dotting the peripheral region, lying towards the south-west of the city of Hermosillo and extending towards the coast—Bahía de Kino—through Miguel Alemán. Our ultimate goal is to gradually transform the area lying between the city and the Sonoran coast by building a sustainability corridor that will serve as the backbone for our proposed model of urbanization.



Proposed mechanics of operation for the pilot project—phasing. CREDITS: Drawn by the authors.

The site chosen for our proposed intervention spans 25 acres and is located next to the proposed new metropolitan park, in the corridor of the Sonora River channel. It is currently owned by the City of Hermosillo. Its proximity to the wastewater treatment plant and the agricultural corridor allows us to test our proposed synergies and create a reciprocal model for the project.

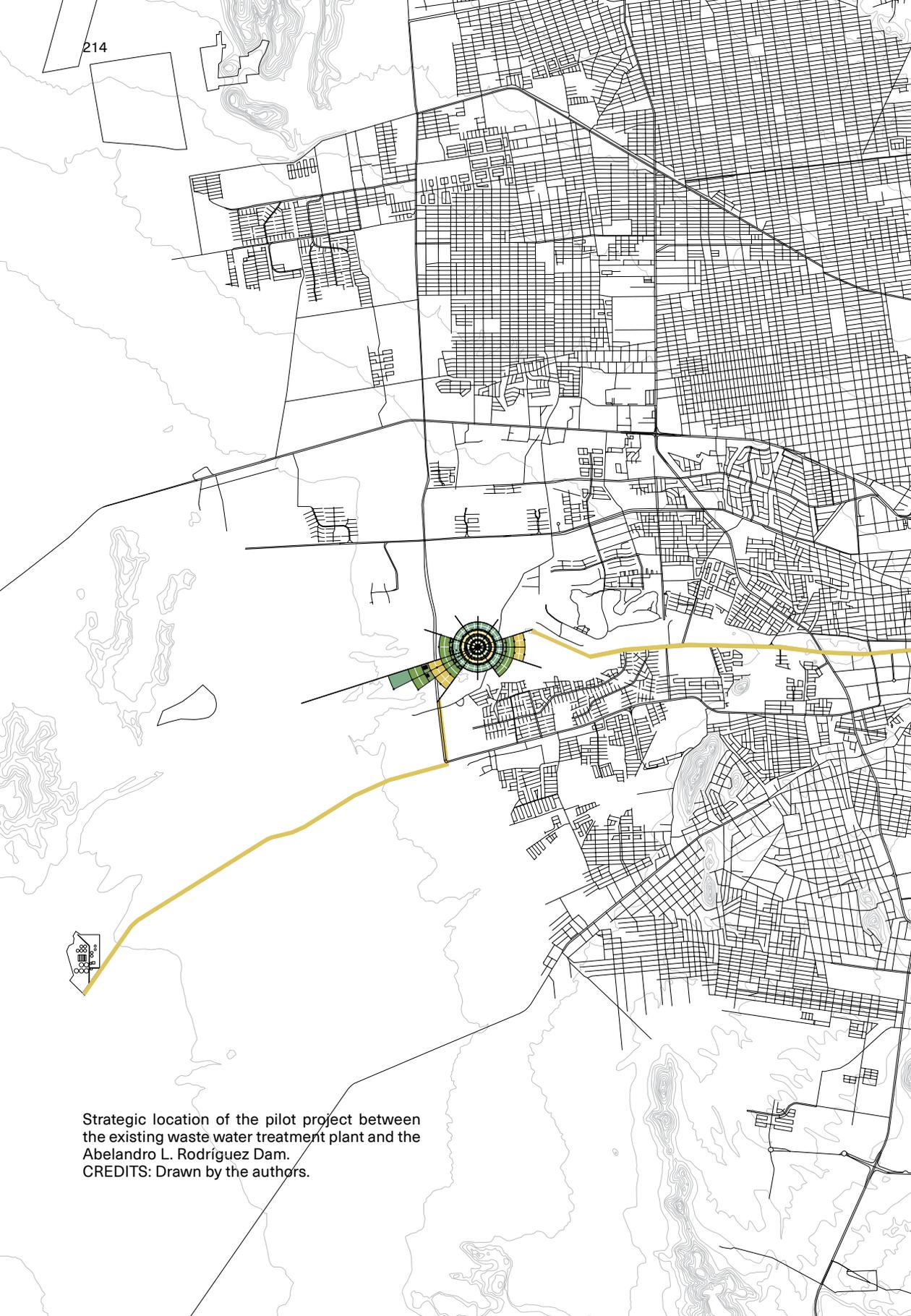
— Phases and Mechanic of Operation

In the first phase of operation, we leverage the existence of the Hermosillo wastewater treatment plant. Solar energy generated from solar panels located on site will be used to pump in treated wastewater from the treatment plant, and pumped-in water will be used to irrigate the cultivated portions of the site. In the second phase of the project, we propose that solar energy be used to treat wastewater generated within the city, and treated wastewater will be used to irrigate the surrounding cultivated land. In the third phase, surplus treated water will be sold to the city or the private sector for use in industrial processes.

— Pilot Project and Design Development at Site-Scale

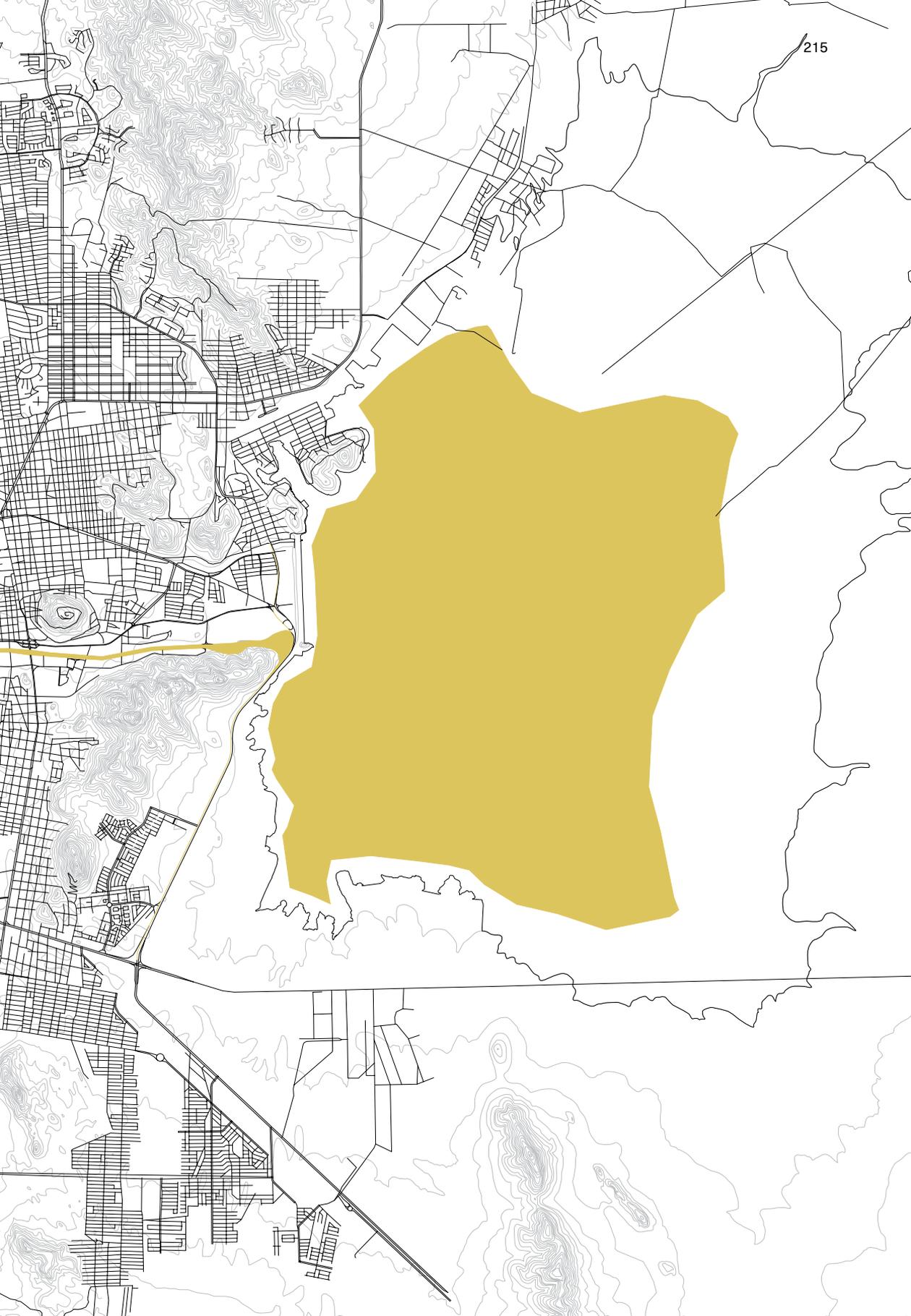
The pilot project consists of a Solar Agriculture Plant located at the edge of the consolidated urban core of Hermosillo, along the Sonora River channel. The location of the pilot project was chosen strategically for water management purposes. It will benefit from the close proximity to the Abelandro L. Rodríguez Dam, the existing water treatment plant, as well as a recent project to build a metropolitan park, which will all coexist along the same irrigation channel.

The overall proposed layout is that of a concentric system that demonstrates flexibility and adaptability to future needs for expansion. The starting point and driving force of the whole project



Strategic location of the pilot project between the existing waste water treatment plant and the Abelandro L. Rodríguez Dam.

CREDITS: Drawn by the authors.

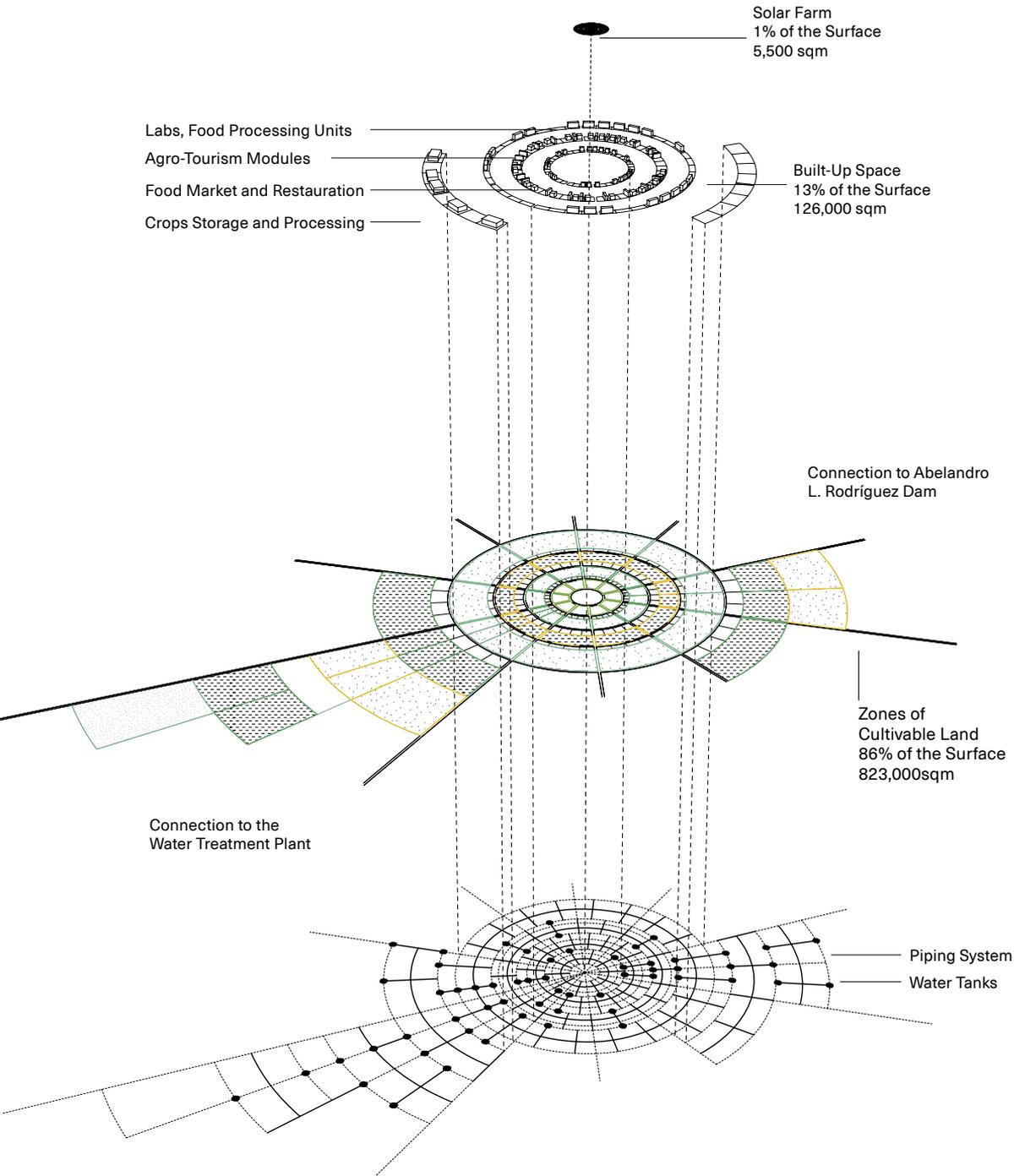


is the solar farm located at the center of the system. We expect that the project will gradually grow in concentric zones around the solar farm and will incrementally accommodate a plurality of uses. The development of the site is therefore proposed to happen in several investment phases. In the first phase, investment should be directed into the installment of a solar farm at the heart of the site. The need for solar panels for the proposed plant corresponds to only 1% of the total surface of the site. Along with the solar panels, investment should be directed towards the enhancement of the existing water infrastructure and specifically into the expansion and installment of a piping system on site. Once this is accomplished, the zones of cultivable land will be defined concentrically around the solar farm, while following the piping system structure. The cultivable land will occupy 86% of the total surface of the project. The first labs and food processing units will then be developed on site and the solar agriculture plant will be able to initiate operations. The zones assigned to the development of built-up space account for the 13% of the total surface of the project.

In the second phase of the project, and once the plant has stabilized its operations, investment should be directed towards the installment of several water tanks. As water begins to be treated locally, the goal is to scale up the process and start storing it on site. In the meantime, additional and outer zones of cultivable land will continue to be defined; parallel, social productive uses will start appearing in support of on-site programs. An example of a social, productive, on-site program is a food market that would promote the exports of the agriculture produce. In the final phase, the project aspires to accommodate the component of Research & Development related to solar agriculture, as well as a certain number of agro-tourism units.

Regional and Corridor Development

Moving beyond the scale of the pilot solar agriculture plant, we propose actions that encompass the regional metropolitan scale

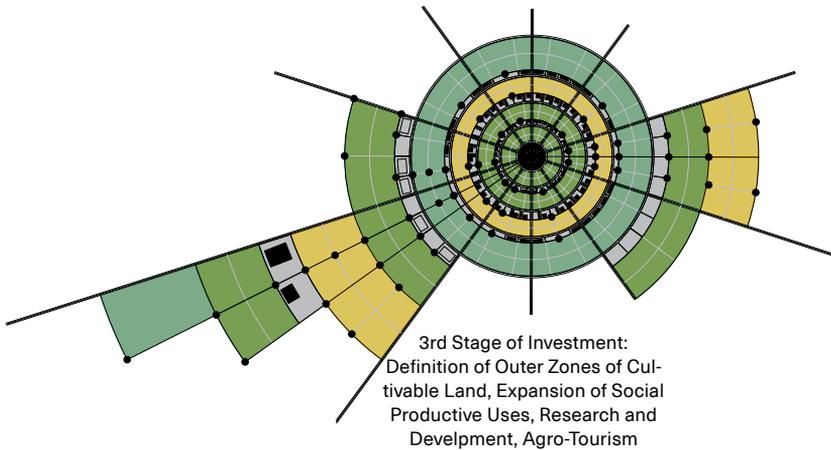
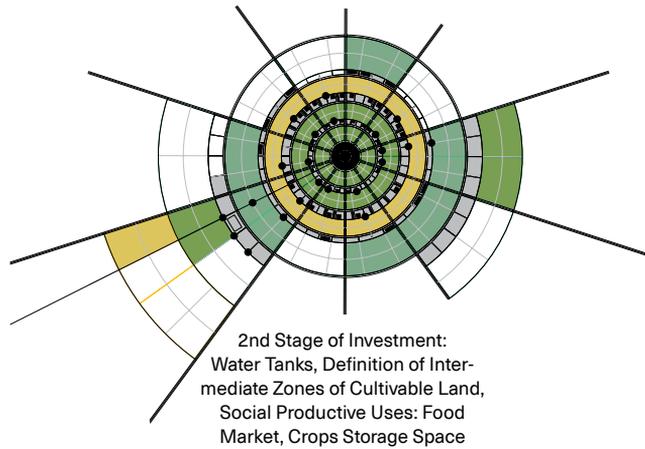
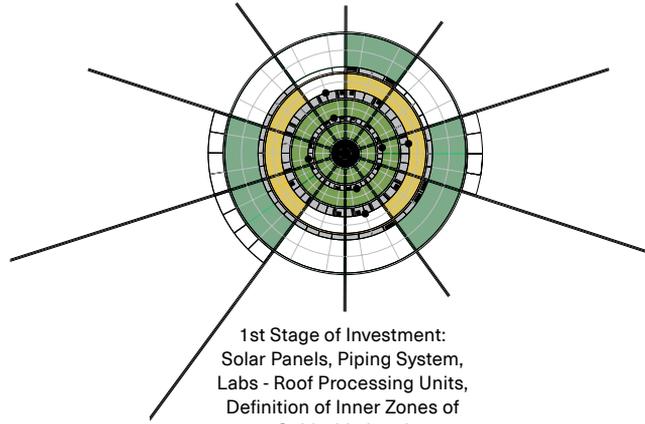


The pilot project's infrastructure layers—an incremental design process. CREDITS: Drawn by the authors.

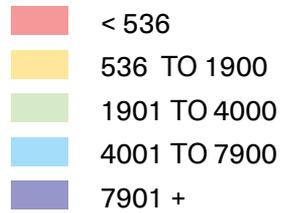
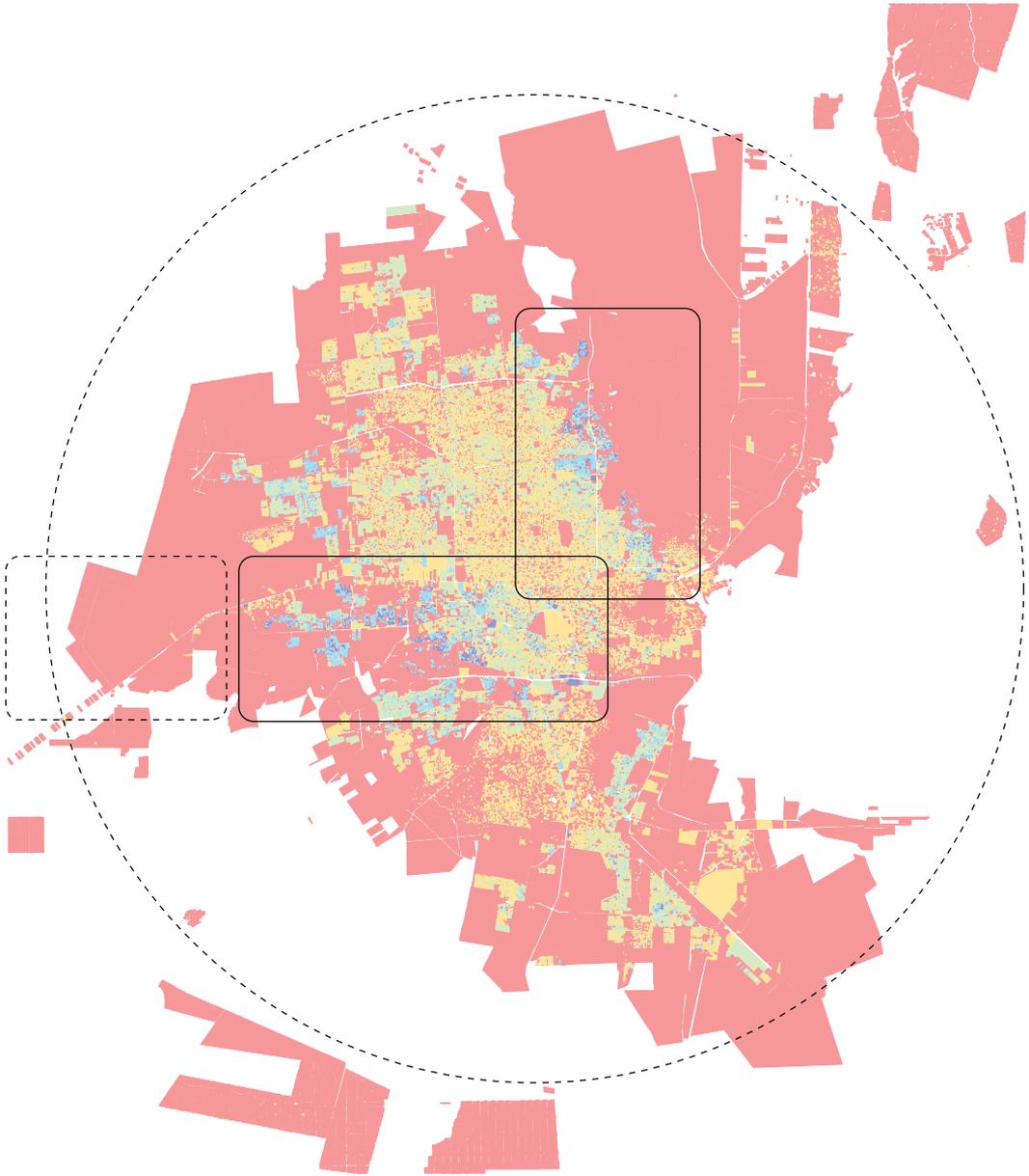
of Hermosillo. Such strategies include a mixture of policy, planning, and spatial interventions that, in combination, may help spur vision and goals of the pilot project. For instance, the creation of a planning overlay district between the airport and Miguel Alemán that encourages green infrastructure and the mixture of industrial, agricultural, and institutional uses through updated form-based zoning ordinances and a streamlined permitting process.

To incentivize the adoption of solar-based agriculture by local farmers, our project also proposes transferring development rights in the overlay district. This will allow agricultural landowners to transfer or sell their rights to developers seeking higher densities within the core urban area of Hermosillo. The current density limits within Hermosillo dictate that the height of a building may not be greater than the width of its adjacent street. However, through this proposal, developers will be able to go beyond such limits. The benefits of this action would be twofold: for one, it will provide a new revenue stream for agricultural land owners to capitalize on and use to invest in a solar-powered agricultural

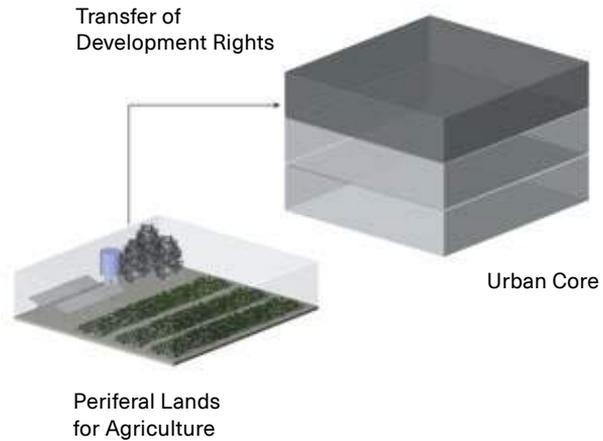
Hermosillo's periphery provides the ideal opportunity not only to expand the city's interstate connections and its allure as a regional and global hub of agro-development, but also to make gradual and secure steps towards a more complex economy.



Proposed investment on the pilot project in three distinct stages. CREDITS: Drawn by the authors.



Hermosillo's land value.
CREDITS: Drawn by the authors.



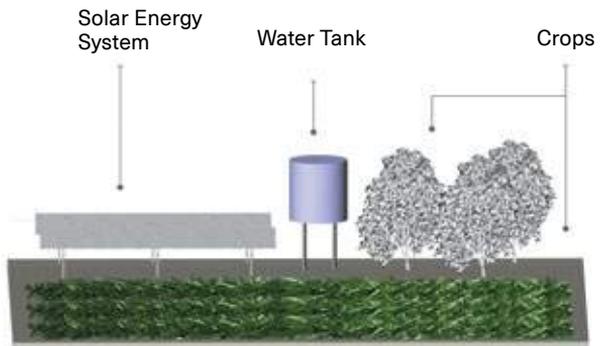
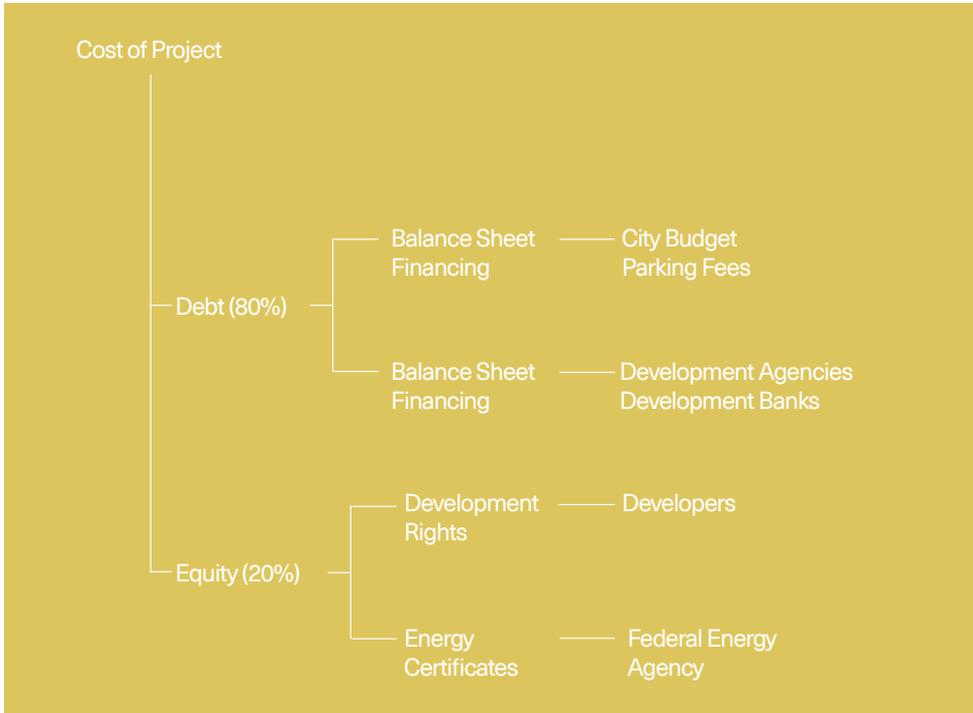
model; and second, it will encourage infill development and deter further urban sprawl in Hermosillo.

In addition to such regional proposals, the city and financial-backers such as the Inter-American Development Bank may also contribute to the regional growth of a new agricultural model of production by providing grants and financial assistance to farmers hoping to purchase solar panels, water storage systems, and a new batch of water-resilient crops. This assistance may begin in Miguel Alemán and in the indigenous communities neighboring the city as a way to further community development in those areas and provide the economic backbone to promote their cultural and historical heritage within Hermosillo.

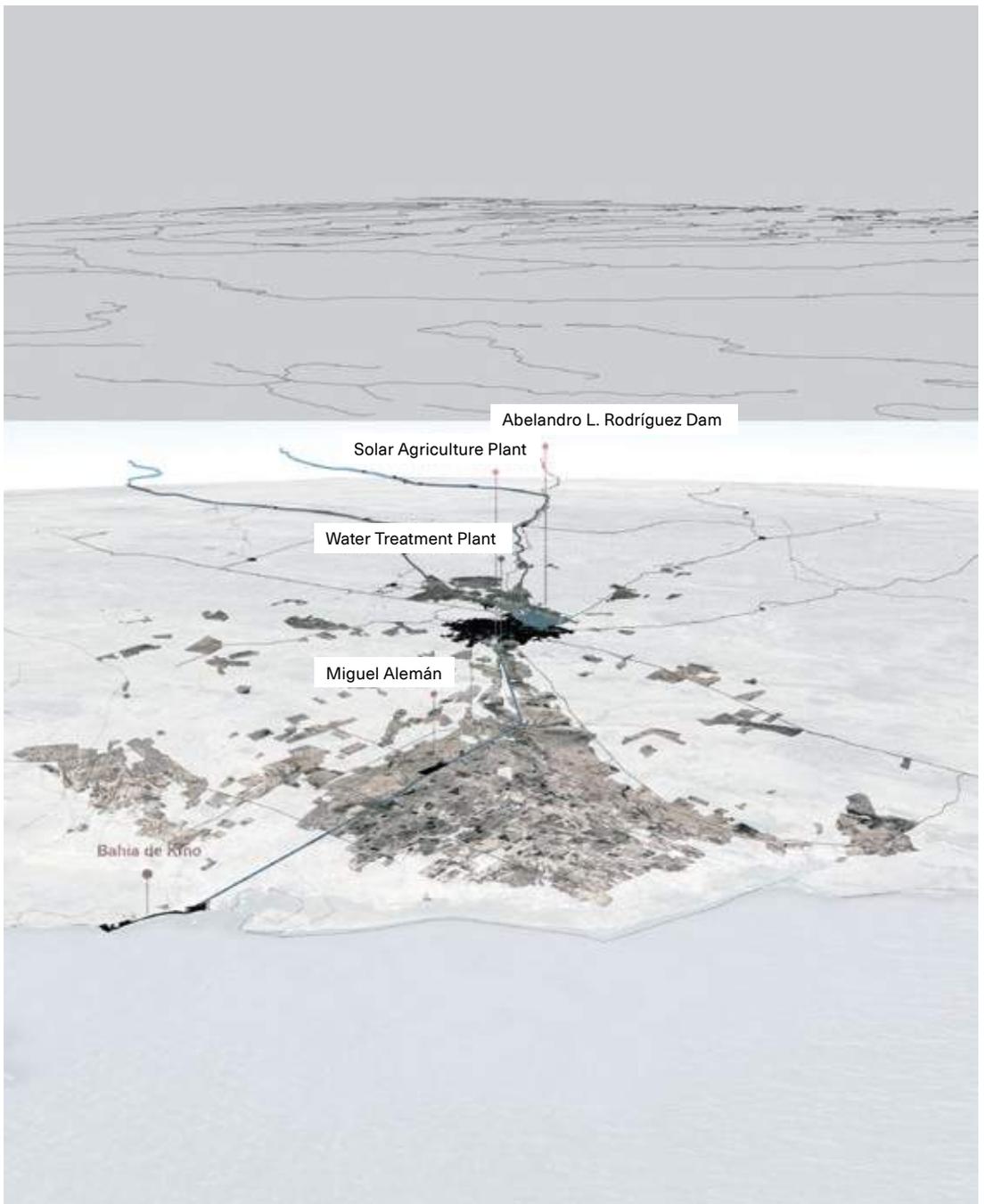
In summary, Hermosillo's periphery provides the ideal opportunity not only to expand the city's interstate connections and its allure as a regional and global hub of agro-development, but also to make gradual and secure steps towards a more complex economy. Such a principle not only takes into account a sustainable, adaptable, and ecological approach to growth, but also situates development in the context of Hermosillo's history and heritage. While jumping from cotton and wheat to automobiles and airplanes has taken the city in leaps and bounds so far, Hermosillo must find ways to reinvigorate its rural edges and look towards the sea for a new horizon of potential opportunities.

Notes/References

1 – Hermosillo-Parque Metropolitano (2018). Available online at <https://www.hermosillo.gob.mx/parque-metropolitano/>



A combination of grants and loans will allow private farmers to transition and convert parcels to new model. CREDITS: Authors' own image.



Looking to Hermosillo's urban center from its coast. A vision that capitalizes on the potential of Hermosillo's peripheral land in order to foster the city's economic development.
CREDITS: Drawn by the authors.

Hermosillo's sustained spatial growth over the past 50 years has resulted in an extended periphery of poorly-connected, low-density blocks and neighborhoods. These conditions have exhausted the city's natural resources and the municipal government's ability to distribute them efficiently. Our vision for Hermosillo is that of a city that provides families with a high-quality, affordable life within the urban core; it creates a living environment that is well connected to services, amenities, employment, and recreation. This vision calls for strategies to reverse urban sprawl, articulate mobility needs, and stimulate the city's economic performance in a way that includes all sectors of the population, while also ensuring the sustainability of the environment.

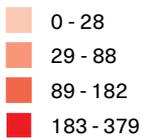
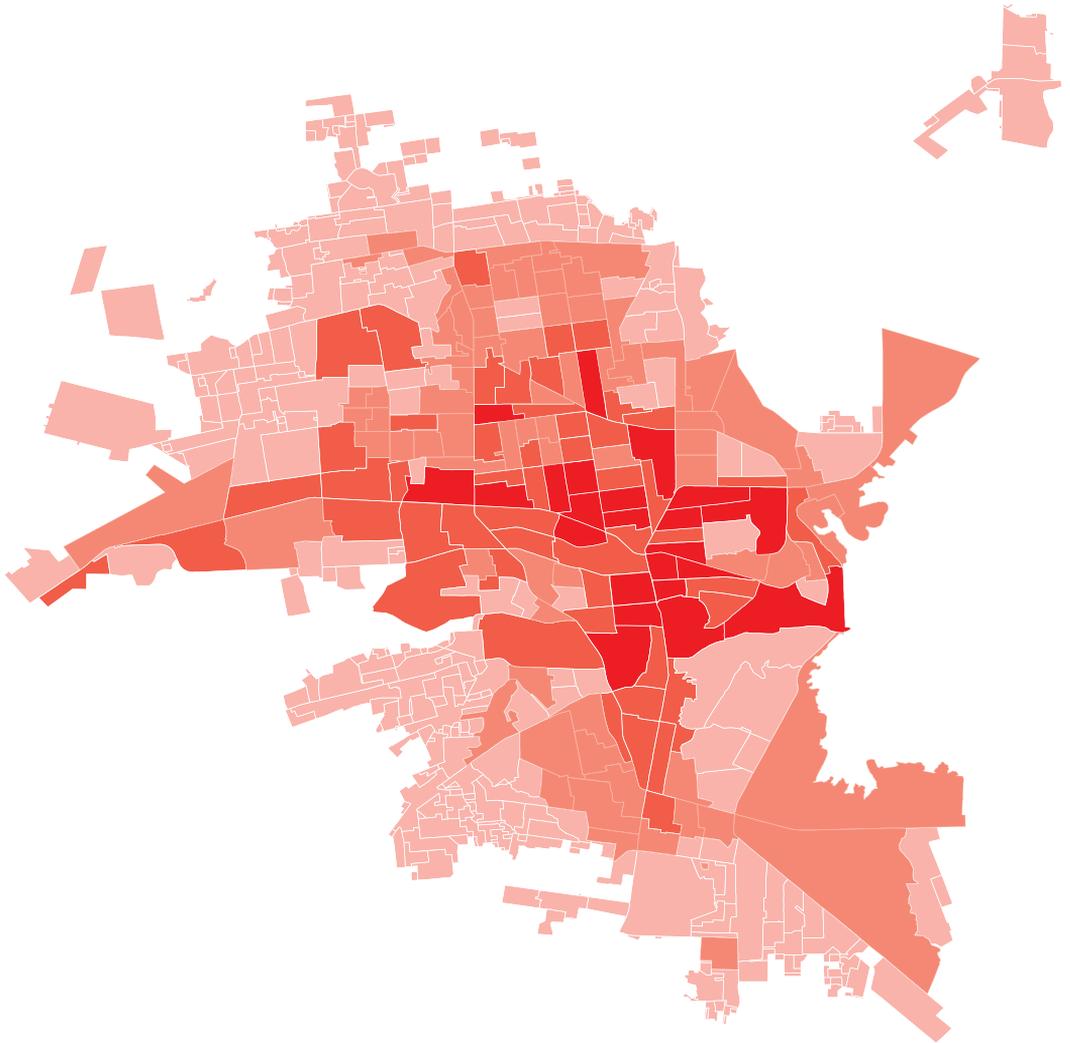
Patricia Alvarez
Theodore Kofman
Samuel Matthew
Aaron Ramirez

El Hit

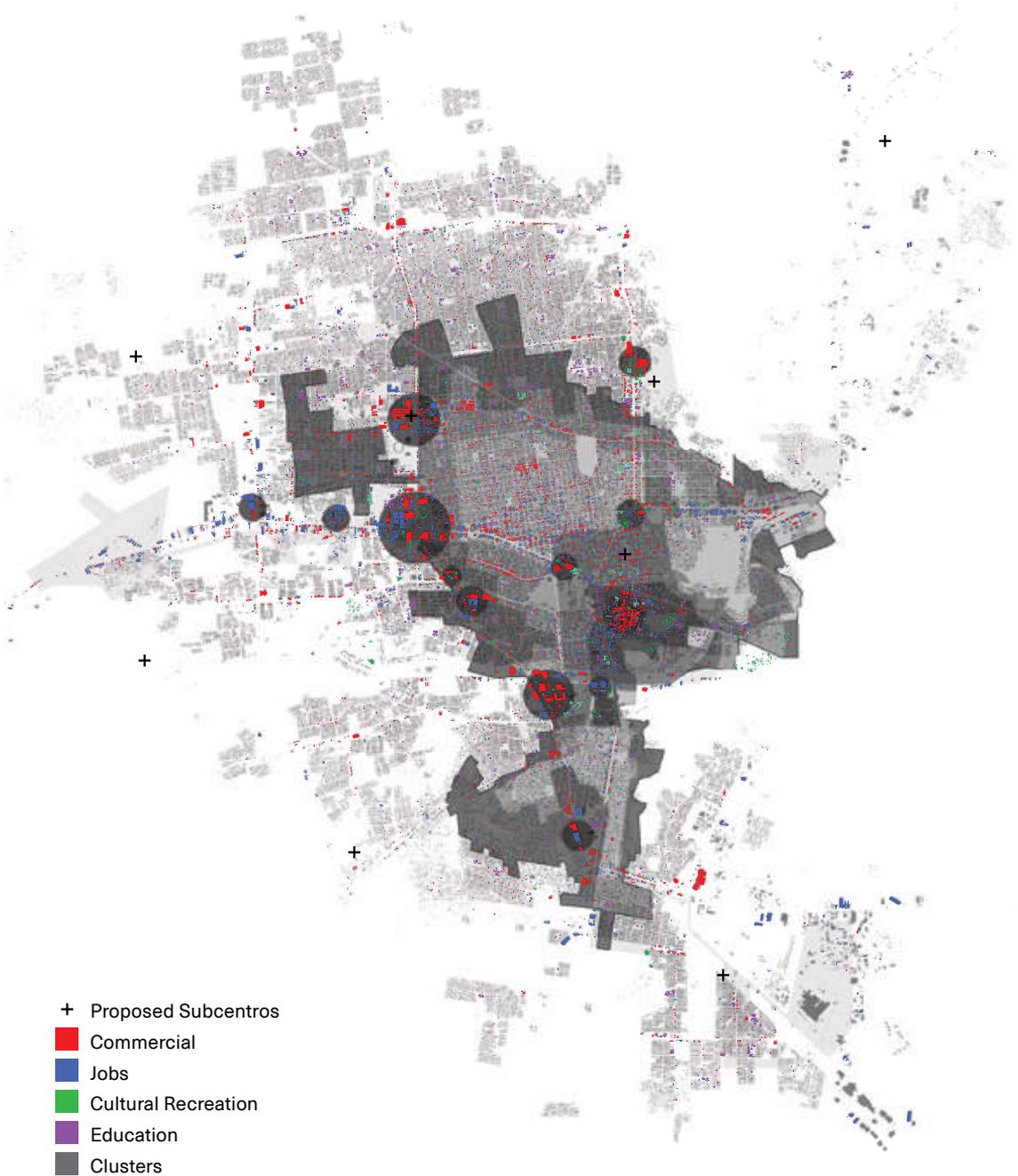
— The Family's
Right to the City

The need to infill and densify is clearly understood when we look at the city's job density map. Most employment opportunities are located in Hermosillo's center; however, the majority of newly-approved residential projects are located in the city's outskirts. Our project provides a sustainable model of development which could generate an alternative to the city's existing model of expansion, segregation, and disconnection. It encourages development in existing and underutilized urban centers within the existing urban fabric, and looks to reverse the trend of sprawl by using a three-pronged approach that incorporates urban design interventions, housing development, and commercial development. Our aim is to increase housing and population density and, thus, the capacity of Hermosillo's city government to provide services that benefit the majority of its citizens while conserving its resources.

When looking for a site to put these ideas into practice, we mapped existing jobs and services in the city, searching for the densest, most diverse, and best-connected areas. We decided to focus on the most central node in our analysis: an abandoned baseball stadium—*Estadio Hector Espino*—that is located at a critical junction that facilitates daily commutes from residential neighborhoods in the north to education, commercial, and recreation centers throughout the city. The stadium is located between Hermosillo's historic center and General Ignacio Pesqueira García International Airport—approximately five kilometers from either landmark; seven of 18 city bus routes pass by the landmark, making it an important juncture for public transportation. The site consists of 105,625 square meters of abandoned infrastructure, including a parking lot, a stadium, and a recreation center with tennis and football pitches. Despite its proximity to commercial, educational, and recreational amenities—a 10-minute walk, approximately—these services are only accessible using private cars. However, the stadium continues to be a relevant community space with a strong cultural history; it was home to the *Naranjeros de Hermosillo* since 1972.

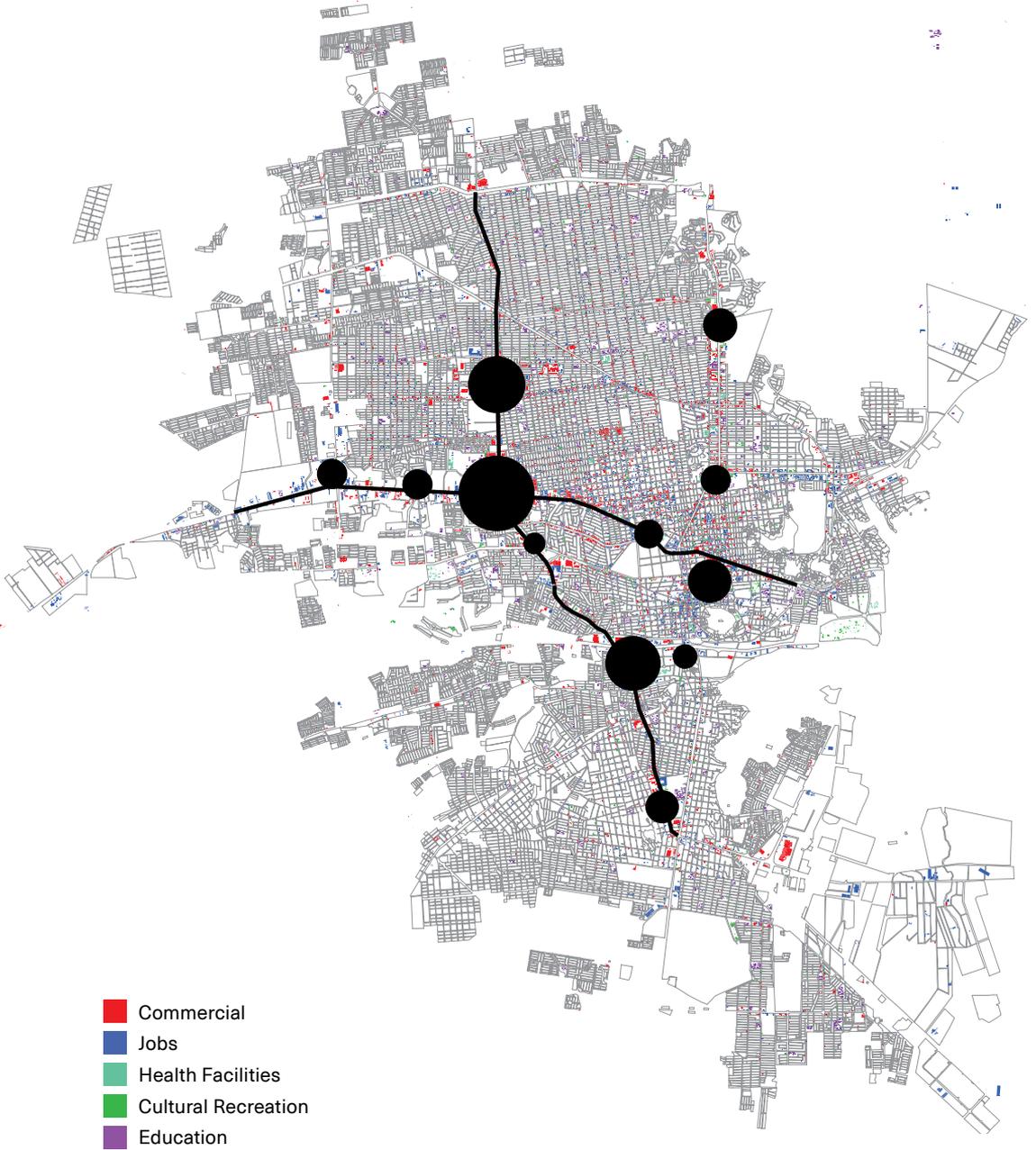


Density of businesses and job sources in central arteries. CREDITS: Authors' own diagram.



- + Proposed Subcentros
- Commercial
- Jobs
- Cultural Recreation
- Education
- Clusters

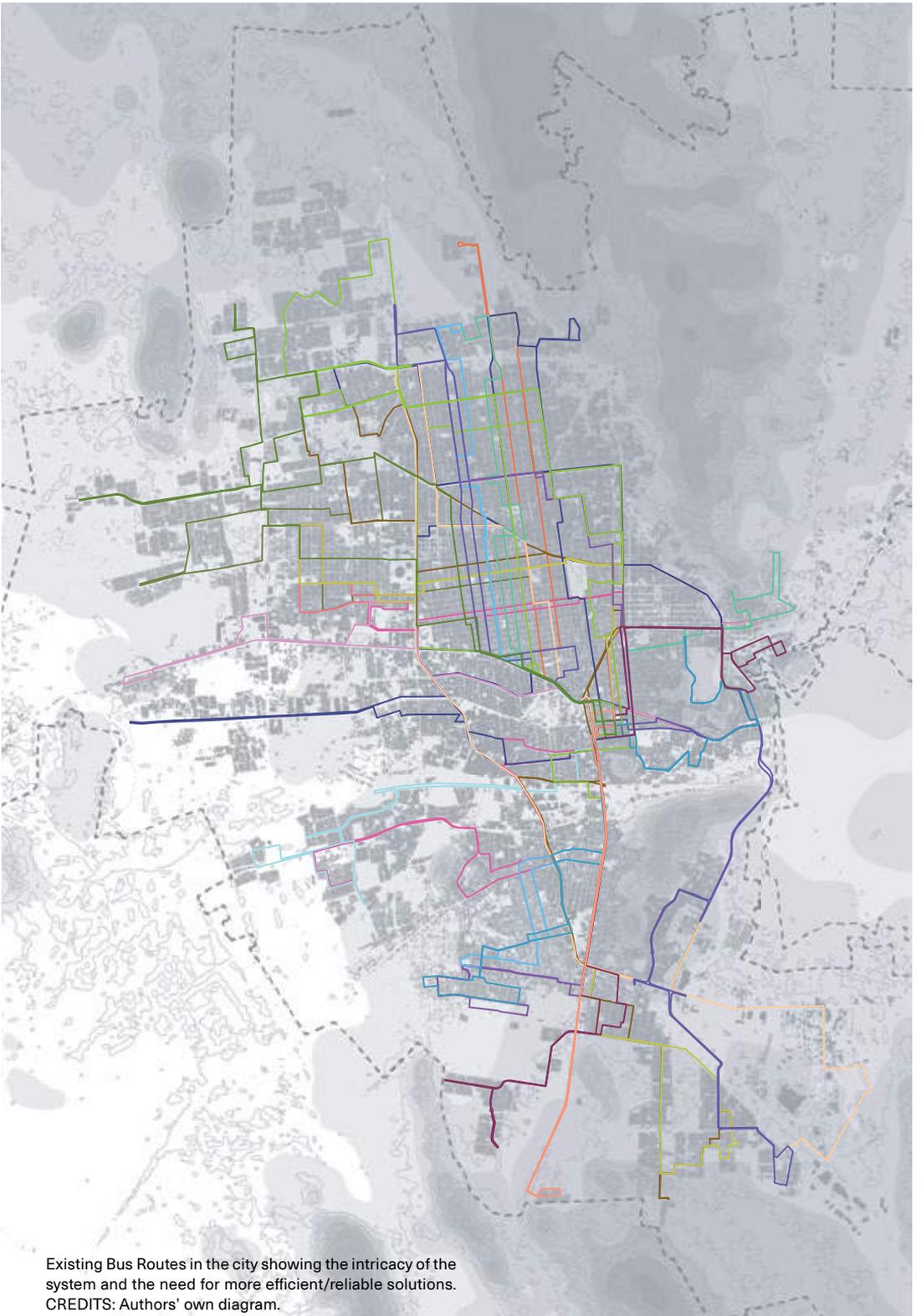
Identified Urban Nodes through GIS data.
CREDITS: Authors' own diagram.



Selected nodes to connect with BRT.
CREDITS: Authors' own diagram.



Photographs of the surroundings.
CREDITS: Authors' own images.



Existing Bus Routes in the city showing the intricacy of the system and the need for more efficient/reliable solutions. CREDITS: Authors' own diagram.



Location of the site, relative to airport and historic city center. CREDITS: Authors' own image.

The stadium continues to be a relevant community space with a strong cultural history; it was home to the *Naranjeros de Hermosillo* since 1972.



Site dimensions and the portion of the stadium to be preserved and repurposed. CREDITS: Authors' own image.

— Our proposal

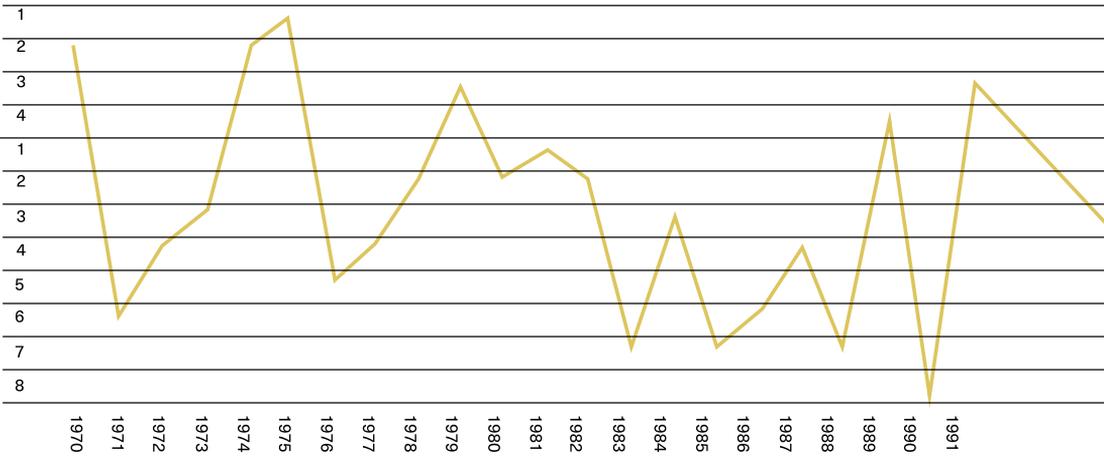
To stem current and future urban sprawl, our project focuses on connecting this sports complex to the residential areas to the north and to the historic center to the southeast by creating a shuttle system that incorporates designated stops, segregated lanes, and smaller vehicles. Our goal is to illustrate how a high-capacity and cost-effective investment can detract usage of energy-intensive modes of transportation, like private automobiles. At the same time, by encouraging activity in such well-connected nodes, we seek to incentivize denser modes of living that counteract the tendency to sprawl to poorly connected, cheaper, single-family housing in the periphery.

Learning from other Bus Rapid Transit (BRT) case studies, the successful implementation of this transportation system depends on ensuring that the segregated lane is used properly. Our intention is for existing public transportation providers to be able to join this system as long as they adhere to the designated areas for stopping, a fixed schedule, and higher levels of service. Over the long run, incorporating existing providers can reduce

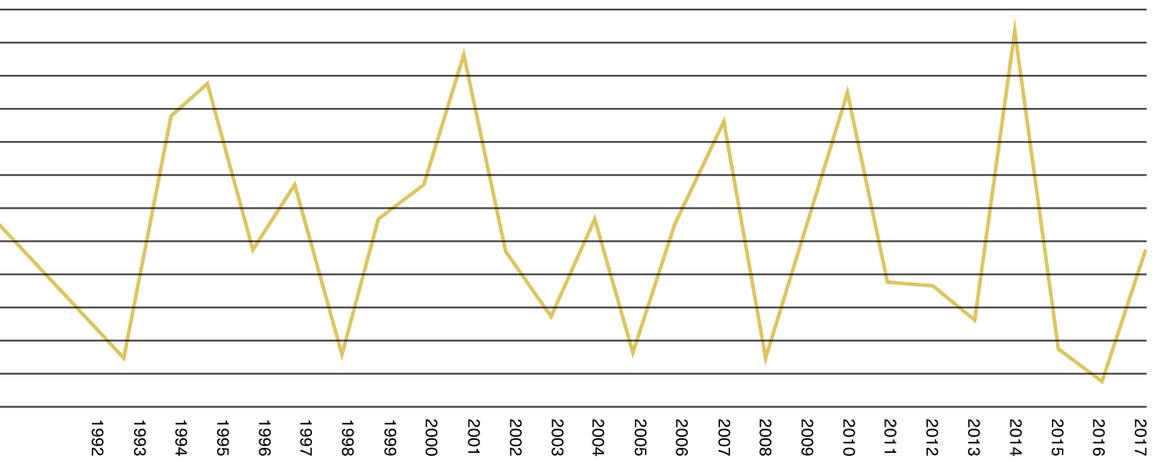


Carribean Series Ranking

Mexican Pacific League Ranking



Historic timeline of the site. CREDITS: Authors' own diagram.



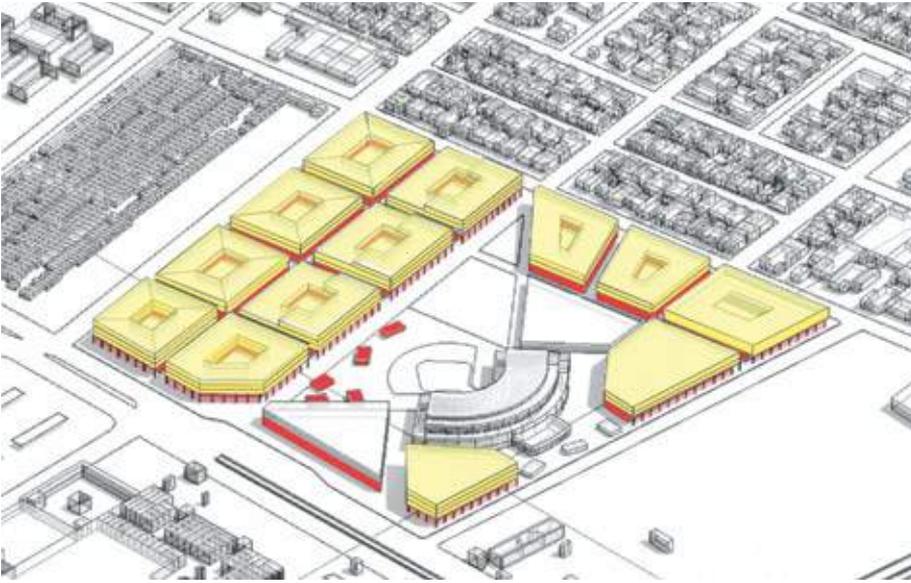


Activity generated in the porticos. CREDITS: Authors' own image.

costs while at the same time gaining buy-ins from end users for future capital-intensive investments. Investments may include the purchase of new, fuel efficient high-capacity vehicles, extending the segregated lane shuttle service, or implementing a traditional BRT system. The long-term goal is to allow reliable concessionaries to take over the private-provision of the shuttle service (in case no BRT is implemented).

A key component of our project is generating a critical mass for this new transportation system while providing a denser residential alternative to stem sprawl. To achieve this objective, several residential typologies are proposed that aim to serve diverse population groups within a variety of tenure structures. As things are now, residents choosing to live on the periphery of the city are attracted to single-family developments that are affordable with INFONAVIT credits—Mexico's federal affordable housing system. Such developments target households with a 2.5 to 5.5 minimum wage income (\$6,750 to \$14,850 Mexican pesos per month), for the purchase of a 60 square meter house (on average) using a 30-year loan. Developments are sold at an average price of \$400,000 Mexican pesos, with average monthly credit payments of \$4,200 Mexican pesos at 12% interest. Occupants must add transportation costs to their expenses, whether they use public transportation (about \$25 Mexican pesos per round trip per person per day), or a private vehicle (including the cost of the vehicle, fuel, and maintenance).

Our project builds on these numbers to provide residential alternatives for the middle-income population, with property prices from \$392,000 up to \$1,800,000 Mexican pesos, depending on the size of the unit and the modality for its use or acquisition. It will also provide rental alternatives, through the traditional model (owned by a private owner) or through innovative, subsidized models. The project explores four subsidized housing schemes:



Massing of the commercial (red) and residential (yellow) uses. CREDITS: Authors' own diagram.

1. **Temporary Rentals:** intended for new couples, young professionals, single parents, and migrants, the unit will be available for rent for a limited amount of time (two to five years) at a subsidized cost. The period is intended to allow the user time to save for a down-payment for another property. These units will have relatively high turnover, maximizing the benefits for the population in need.
2. **Rent-to-Own Models:** during the pre-screening process, a buyer can explore the possibility of alternative financing models; potential buyers can begin renting a unit that they intend to buy until a down payment has been made. This proposal seeks to incentivize a rental culture and also provide alternatives for families to become property holders in denser areas.
3. **Student Housing:** major educational institutions such as Sonora's Institute of Technology (ITSON) and other philanthropic entities already provide student housing at a subsidized cost (or at no cost). However, these properties are not successfully integrated to the city. By including them in our proposal, we are promoting the integration of the educational sector with other demographic groups.
4. **Senior Living:** by including a senior living component—ideally publicly-sponsored—a marginalized sector of the population



Ibasho Cafe



Business Education Center

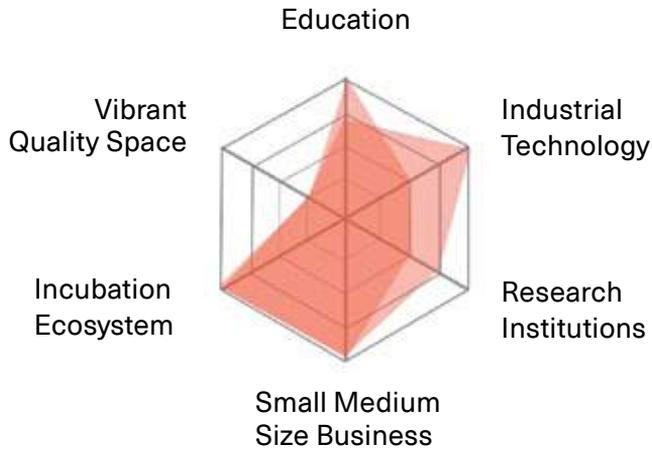
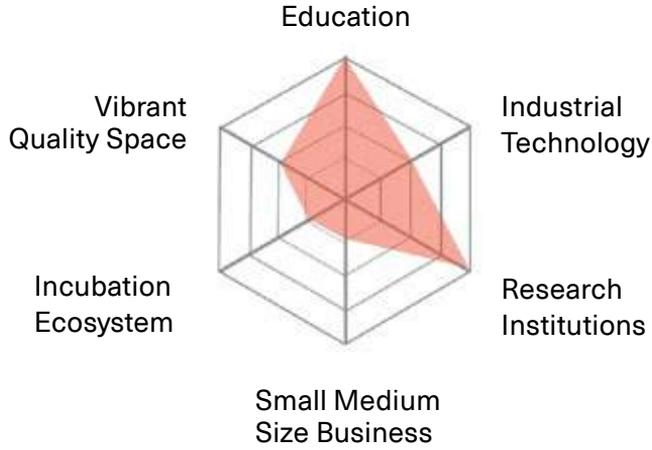


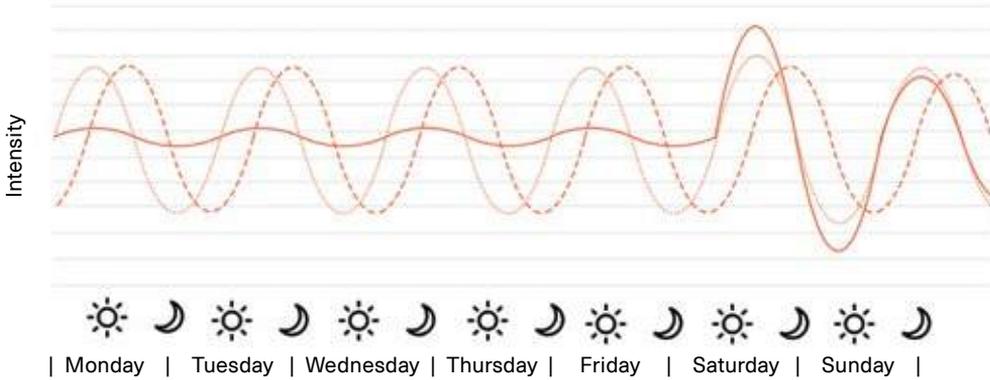
Research Space



Incubation Space

Multigenerational Education Center.
CREDITS: Authors' own images (left and right).





may not only be served more efficiently, but would also become better integrated into the community by participating in cultural and economic activities. Commercial offerings will also be relevant for this sector, promoting a richer quality of life and possibilities to interact with younger people, families, and professionals.

Aside from housing and transportation, our project looks to diversify the site's commercial offerings in order to generate activity at the ground level, create amenities for residential offerings, and attract non-residents. These offerings will take up 22% of the GLA (Gross Leasable Area) and include food and beverage, retail, local producers, artisans, office space, a research and development center, and a community space.

— From Sports Complex to a New Community Space

At the heart of this vision for a more public-oriented, healthy, and inclusive site is the creation of a new public space for families: a multigenerational education center which will be integrated into the community and activated throughout the week. A playground and a shaded open space will create a family-friendly area where people can relax during the day. At night, it would become an events space that echoes the spirit of the stadium.

The stadium's southern stands will be converted into the Hector Espino Library and Makers Center. The new library will be a modern, digital, and socially and geographically central institution. It will serve the site as well as the surrounding city, which does



Plaza Hector Espino. CREDITS: Authors' own images (left and right).



Market Space



Playground and Shaded Open Space



Auditorium and Event Space

not offer sufficient access to public libraries beyond the historic center. The library will also provide a work area for students and residents. It will be paired with an Innovation and Makerspace, a practical solution to Hermosillo's absence of flexible work spaces for start-ups and innovators and a potential symbol of Hermosillo's growing digital economy. Following the Ibasho elder care model, this building will also house a café, a senior care center, and a daycare for children.

Finally, the baseball diamond will be preserved as a public space; it will be surrounded by rising steps that are original to the stadium. The space will be flexible for use and can be converted for nighttime concerts, rallies, and performances, seating up to 900 people. This structure will address the city's need for large venues following the closure of many of its theaters after a fire in a daycare center in 2009. The neighboring plaza will be a second flexible space that can be used for seating, eating, and for hosting temporary markets and events.

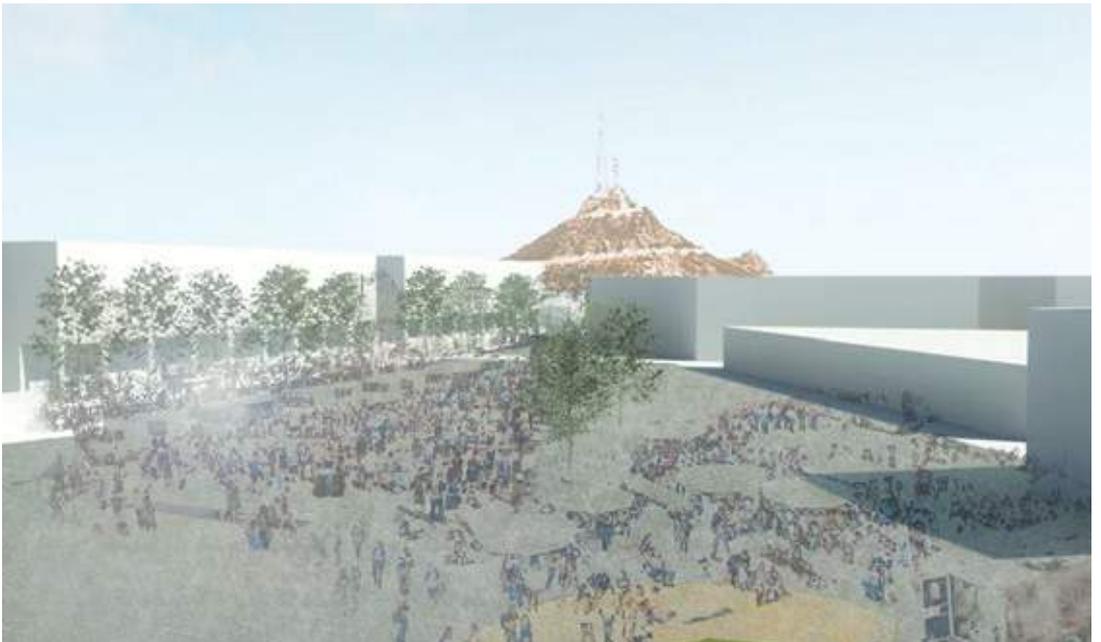
— Implementation

Our project seeks to balance the financial performance of all of the space's components to allow for an optimal mix of users, with varied demographics, preferences, schedules, and priorities, ultimately generating a node of activity that makes denser living more attractive. The library, the senior center and the day-care are crucial amenities for the populations that will reside in the development—mostly young families, and workers in neighboring offices—and will be integrated into the flagship building so they form the heart of the site. Together they will create a flexible, pedestrianized, and democratic place, knitted into the fabric of the city, and used by a wide range of ages and demographics, day and night. Each piece of the development will require independent financial feasibility and return targets to allow for the synergies intended.

An independent entity—a Special Purpose Vehicle (private model), a State-Owned-Entity (public model), or a CKD (Development Capital Certificate to raise funds in the public markets)—will be created to guarantee the completion of the project and enable independent and transparent management, reinforced by contractual arrangement and incentive structures. The assessed value of the land will be assigned upfront to a single purpose entity (such as a state-owned enterprise) that will design, finance, operate, and own the project. Using INFONAVIT loans, investors will combine market rate and subsidized units—and their supporting commercial and cultural uses—while cross-subsidizing investment in infrastructure. Key components, such as the transit node and the cultural center, may be developed upon long-term commitments from accredited entities or institutions such as the Mexican Secretariat of Agrarian, Land and Urban Development (SEDATU), and the National Council for Arts and Culture (CONACULTA). In other words, the project will be developed with the participation of the government, both state and local, public institutions, multilateral agencies, private sector, and the broader community.



View of the plaza. CREDITS: Authors' own image.



Transit Oriented Mixed-Used Development of Hector Espino Stadium. CREDITS: Authors' own image.

— Conclusion

Our project builds on the unrealized potential of the future of Hermosillo by bringing together a new consortium of major stakeholders. For the state, it presents an opportunity to leverage unused land that is not generating income as a way to incentivize the local economy. For investors, it offers an opportunity to participate in urban core development at subsidized prices as there is no need to pay for the land upfront. And, most importantly, the community will benefit from a new mixed-use development with improved transport connectivity, affordable housing for middle-class families, and a vibrant public space that respects the legacy of the stadium and helps shape a new identity for the city.

Notes/References

1 – The Ibasho Model. Ibasho is a non-profit organization that promotes the value of socially integrating elders, and demonstrates the multi-generational social, economic, and environmental benefits of such communities in both developed and developing countries.



CREDITS: Inter-American Development Bank (2016 - 2018).



CREDITS: Inter-American Development Bank (2016 - 2018).

Hermosillo, the capital of Sonora, is a city marked by rapid growth and industrial activity. Since its founding in the seventeenth century, Hermosillo has undergone cycles of growth and decline. These cycles have left the downtown in its current state of untapped potential. Despite its spatial primacy and its connectivity with the rest of the city, downtown Hermosillo's existing urban conditions prevent it from becoming a lively, dynamic, and multidimensional place. Expansive tracts of vacant land and abandoned historic buildings are reminders of past industry and activity, while major highway thoroughfares cut through neighborhoods. Segregated land uses keep entire blocks of the downtown completely unoccupied during evening hours and weekends, and existing points for recreation and entertainment are totally disconnected from one another.

Andreina Seijas
Jorge Silva
Claire Summers
Kate Wolf
Diana Zwetlich

Revive el Centro

— Connecting
Hermosillo's
Past and Future

While these challenges are of no small significance, downtown Hermosillo has great potential to add dimension to its current land uses and activities. It is the city's main commercial center, employing thousands in finance, services, and in the public sector. It is also rich with cultural and historic assets including the University of Sonora, the Cathedral and its surrounding historic district, the Municipal Market and the *Cerro de la Campana*. The primary audience engaging with the downtown is comprised of government workers, students attending the University of Sonora, and older adults who make up the majority of its residents. These actors and assets are key stakeholders in the area's success and present opportunities for future development. In this context, we selected downtown Hermosillo as the site for an intervention that would help create a more livable, economically vibrant, and sustainable future for this Mexican city.

The rise of technology and the creative class has led to a shift in the economic rationale of cities. Cities are moving from physical to cultural production, which requires an enabling built environment in which talent and creativity can flourish. Hermosillo and the Sonora region feature many strong cultural assets, including unique gastronomy, a high-quality agave-derived beverage—the *Bacanora*—and a striking landscape given its proximity to the Sonoran desert. Hermosillo also has a large student population: more than 50 thousand young men and women attend the city's more than 30 universities and technical institutes. However, former Mayor Manuel 'Maloro' Acosta suggests that the city has failed to build on its college town vocation: younger generations are not conscious of its cultural identity (former Mayor Manuel 'Maloro' Acosta, personal communication, September 29, 2017). According to the Education and Culture Secretariat of Sonora, the state has 5,000 students specializing in the creative industries, including art, graphic design, and marketing. However, nine out of 10 students leave the state because they claim they cannot find relevant work (Aviña, 2017).

Over the past decade, Hermosillo has witnessed the arrival of an emerging creative class. By promoting urban art interventions and opening restaurants and cafes in historic buildings, these new residents are helping to reimagine the use of streets and

public spaces downtown. How can Hermosillo build on these interventions and create an inviting environment that enables innovation, retains talent, and spurs new opportunities for social and economic development?

Despite its spatial primacy and its connectivity with the rest of the city, downtown Hermosillo's existing urban conditions prevent it from becoming a lively, dynamic, and multidimensional place.

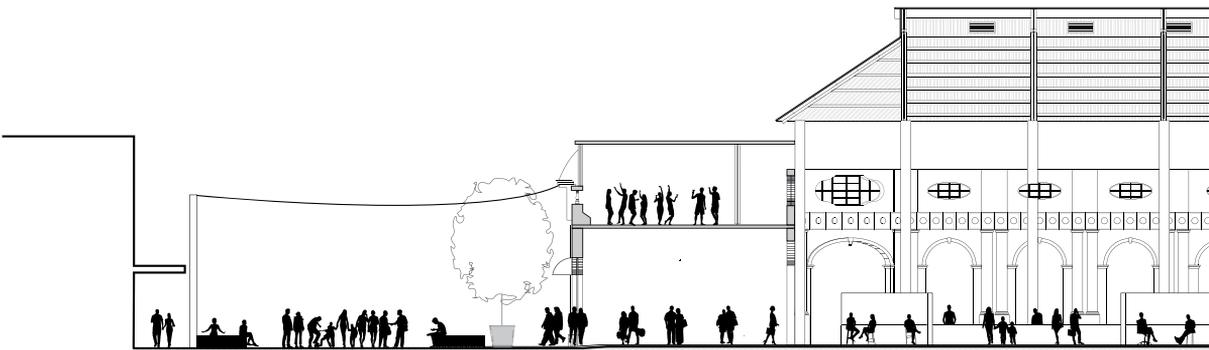
— Revitalizing Downtown Hermosillo: A New Urban Model

There have been several attempts to revitalize downtown Hermosillo over the past decade. The most successful so far has been *Vía Activa*, a program launched by the city's tourism department in August 2016 with the goal of recovering downtown's public spaces. The program consists in the temporary closure and pedestrianization of a 3.4 kilometers of streets and public spaces every Sunday from 5:00 pm to 10:00 pm, connecting historic sites such as the Plaza Zaragoza, the Cathedral, the Municipal and Government Palace, and the Plaza Bicentenario. This creates a temporary cultural corridor where *Hemosillenses* can participate in concerts, their children can play, and visitors can attend *lucha libre* matches. By activating the area, the pro-

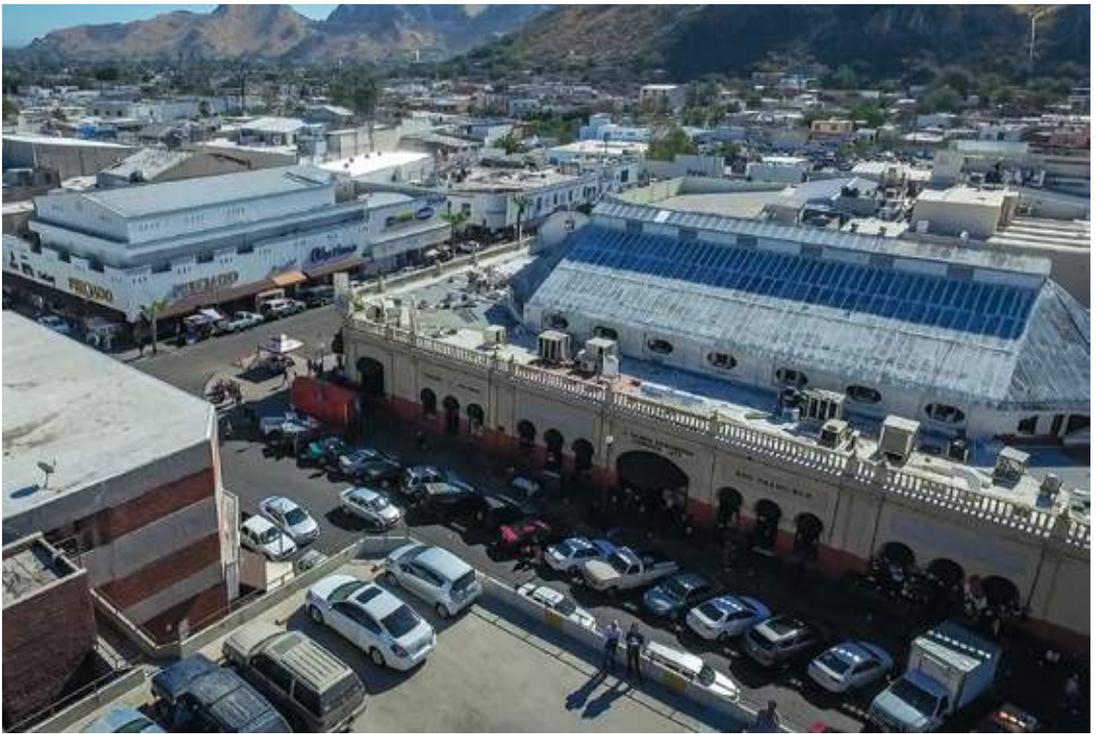
gram generates approximately 120 new jobs and also benefits local businesses, such as restaurants and bars located nearby.

The Macroplaza Cultural project is an initiative developed by IMPLAN which could have an enormous impact on the urban configuration of the city's core. It consists in building an underpass bridge in *Avenida Rosales*, between *Bulevar Luis Encinas* and *Avenida Oaxaca*, to create a large public space that will connect the Museum and Library of the University of Sonora and the Plaza Emiliana de Zubeldía. The project seeks to improve pedestrian accessibility between the university and downtown, generating a safe area for pedestrians who move between the different buildings of the University of Sonora and streamlining the flow of cars in *Avenida Rosales* (IMPLAN, 2016).

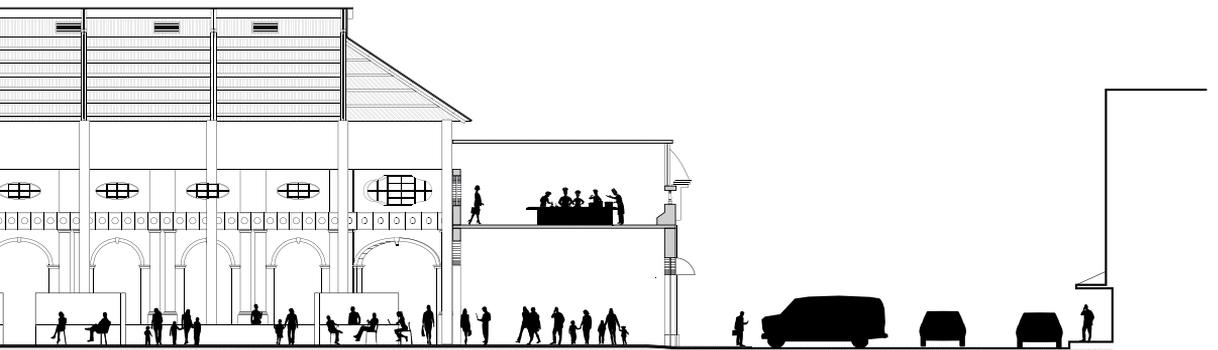
More recently, the Inter-American Development Bank and Spanish architecture firm Ecosistema Urbano have embarked in a project called Banco de Ideas (Idea Bank) which consists in repurposing a large building located in *Avenida No Reelección* and transforming it into a catalyst for the area's revitalization (see the chapter titled "Banco de Ideas"). The project focuses on six main areas: gastronomy, culture, entrepreneurship, education, sports, and new technologies. It seeks to transform the building and its parking lot into flexible, multi-functional spaces that spur new economic activities and showcase local culture (Ecosistema Urbano, 2017).



CREDITS: Authors' own diagram



Hermosillo's Municipal Market. CREDITS:
Inter-American Development Bank (2016-2018).





CREDITS: Authors' own diagram

Although it is located outside of the city's downtown, there is another relevant precedent of urban revitalization that has greatly impacted the way citizens—particularly young generations—use public spaces in Hermosillo. *Parque La Ruina* is a food truck park founded in 2016 that has recovered use of an abandoned lot. The brainchild of two 30-year-old entrepreneurs, this innovative venue seeks to serve as a new space that functions as an incubator for local talent and creativity as well as a gathering place where citizens can socialize. The park is open everyday from 6:00 pm until 2:00 am, generating more than 50 permanent jobs and attracting hundreds of visitors every week.

Efforts to revitalize downtown Hermosillo should build on the strengths of these existing projects and generate synergies that would lead to a broader transformation of this area. However, they must also be based on a new model of urbanization that invites current and potential residents, as well as visitors, to begin reimagining downtown not only as the central business district, but as a neighborhood.

As the site to test such model, we propose that a way to begin the reactivation of the downtown area's assets is by recovering its heart: The Municipal Market José María Pino Suárez, a timeless institution, touristic landmark, meeting place, and corner-



Proposed reactivation of Hermosillo's historic center by recovering its Municipal Market . CREDITS: Authors' own image.

stone of Hermosillo's history. The history of the Market resembles that of the city. In 1879, Hermosillo was established as the capital of the State of Sonora. Over the following decades, the city experienced a period of sustained economic growth, based on agricultural production and the livestock industry. This led to the construction of the Municipal Market, which opened its doors in 1902 to showcase and commercialize these products. It quickly became a symbol of the city's progress, wealth, and identity. By the time the market had its first restoration in 1985, Hermosillo was making a fundamental transition into the manufacturing world, with the establishment of the Ford Stamping and Assembly Plant at the southern end of the city.

Today, the market continues to be a key component of the downtown's vitality, sustaining more than 100 jobs. It opens seven days a week, and caters to a predominantly older population that gathers inside the building or enjoys the shade that the existing arbor provides. However, its conditions cannot accommodate the needs of the city's youngest population, in search for new spaces to meet and create. The building is surrounded by a vibrant commercial area mostly occupied by retail and service outlets. However, these businesses are very small: 73% of them employ less than five people. The site's greatest missed opportunity is at night: the market is disconnected from existing points of recreation and



The interior of Hermosillo's Municipal Market. CREDITS:
Inter-American Development Bank (2016-2018) (left and right).



entertainment such as bars and restaurants located around the Cathedral and *Avenida No Reelección*. Most businesses in the area remain open until 8:00 pm, but the market closes its doors at 6:00 pm. In other words, the strategically-located building remains empty for more than 10 hours a day, creating an opportunity to transform the market into a hub and an anchor of night-time activity in downtown Hermosillo.

This is why we believe that downtown, and specifically the market, should be the site to lead Hermosillo into a new and more sustainable model of urbanization that will spur the city's growth for the years to come. Rather than continuing the trajectory of development that follows foreign models—a pattern that developed as a result of proximity to the United States border—this model of urbanization should involve development that is based on an Hermosillo/Sonora-specific identity. An example of this kind of development would be emphasizing Hermosillo's climate through xeriscaping that uses native Sonoran species, a pattern already happening in Hermosillo. Other examples include moving from a single use, nine-to-five downtown to a multi-use 24/7 downtown, hosting indoor-focused activities within mall developments, generating activities that encourage more connection between outdoor and indoor uses, and catering to both select audiences and a wide variety of audiences. Finally, rather than tolerating empty lots and abandoned buildings, a new model of urbanization in Hermosillo will effectively use its existing infrastructure through adaptive reuse.

Revive el Centro

In order to promote this new urban model, we proposed Revive el Centro, a two-phased program that seeks to revamp the city's Municipal Market to showcase Hermosillo's rich gastronomy, transforming the downtown into a springboard for the entire city's development. Today, many young *Hermosillenses* are not familiar with this part of their city and therefore seek entertainment and socialization options in other centralities and commercial corridors. This makes downtown a missed opportunity for local tourism and economic development.



Retail and public spaces surrounding Hermosillo's Municipal Market. CREDITS: Inter-American Development Bank (2016-2018).

In this context, the first phase of Revive el Centro focuses on physical enhancements and temporary efforts to change the negative perception of the area and invite a younger audience to return to the area. The goal is to use programming as a means to spark curiosity and encourage citizens to consider downtown as an alternative area where they can spend time. This activation would take place in the area immediately surrounding the Municipal Market—on the plaza adjacent to the market—and would extend south along *Calle Guerrero* for three blocks, to *Avenida No Reelección*. This axis would connect the Market with an existing project, the Banco de Ideas, and with the *Cerro de la Campana*. This first phase also includes physical interventions, such as removing the arbor shading structure covering the plaza adjacent to the market and replacing it with lighter, more aesthetic shading infrastructure as well as trees. This shading would create a cohesive streetscape environment that is more friendly to pedestrians walking in the hot Sonoran sun.

Existing murals and urban art would also be given center stage in this phase in order to promote culture and identity and to enhance street life. In line with muralism's history and significance in Mexican culture, and building on a 2016 initiative titled "From the Galleries to the Street" that placed over 25 murals downtown, we propose a nighttime urban art gallery through illumination. Illumination would allow murals to gain life after dark and become a night-time tourist attraction for locals and visitors. Lights could use solar energy, harnessing one of Sonora's strongest resources.

Cities are moving from physical to cultural production, which requires an enabling built environment in which talent and creativity can flourish.

Programming interventions would take place on this same axis. A series of recurring events would create activity in this area as often as possible, including weekly street food fairs during the summer months and monthly free cultural events. These fairs would partner with local restaurants and attract food truck vendors—a popular model in Hermosillo as demonstrated at *Parque La Ruina*—and would hinge on the presence of local Hermosillo products like breweries and *Bacanora* distilleries.

Though it is anticipated that there will be some initial resistance from market vendors and local businesses to having new kinds of uses in the area around the market, these activations look to support the new uses by increasing foot traffic and sales, which would in turn open the door for a gradual expansion of hours of operation and the generation of more nighttime activity. These activities will also dramatically change the perception of safety

in the area at night, as it is proven that vibrant streets are perceived as being much safer than empty streets. This phase is intended to last one year, and to pave the way for additional initiatives. Once the first phase has been implemented, we propose an upgrade and expansion of the building that houses the Municipal Market in order to add a second level and a rooftop to accommodate new dining and entertainment uses that will expand the market's timeline and activity throughout the night.

— Program Implementation

In order to ensure the execution and maintenance of our vision, we propose the creation of a Tax Increment Finance (TIF) district to cover the market and its surrounding blocks, extending to *Avenida No Reelección* and the *Cerro de la Campana*. We believe that Hermosillo's downtown is well-suited for this kind of financing structure as it will allow the municipality to capture increases in property taxes resulting from investment in the area and then use that money for reinvestment in the market itself, as well as in future projects.

In this regard, revitalizing the Municipal Market will not only increase activity and make for a more vibrant downtown, but also will have a significant monetary impact on surrounding property values. With rising property values comes rising property taxes. By establishing a TIF, the city of Hermosillo would assign any increase in property taxes to a dedicated reserve fund to be used for future investments to the Municipal Market or to lend against for its expansion. In the first year that the TIF is created, taxes for properties within the TIF boundary would essentially 'freeze' at their existing level. As time goes on, any increases in property value, and subsequent increases to a property owner's annual tax payment, would be assigned to the reserve fund.

While an increase in property values can have many positive benefits, it can also make rental space less affordable. However, we have found that because there are so few people living in the core of the downtown, residential displacement is less of a critical issue. Our focus is on local businesses, particularly on the ecosystem of

A photograph of a wall covered in vertical stripes of blue, yellow, and red paint. The paint is applied in thick, dripping strokes, creating a vibrant, textured effect. The wall itself appears to be made of stone or brick, with some areas showing signs of wear and peeling paint. In the lower right portion of the image, a quote is written in red, cursive script.

Siempre hay Flores
el que desea verlas
(H. Maties)



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creatively-oriented small businesses that we see downtown: local food producers, restaurants, art galleries, music venues, cafes, and design firms. Supporting these small businesses goes hand in glove with the Municipal Market project, as their success both complements and provides a partner in building the brand of cultural gastronomy that is uniquely *Hermosillense*. Small business owners play a major role in rehabilitating historic homes for their businesses and need to be regarded as important figures in the revitalization of downtown Hermosillo.

Efforts to revitalize downtown Hermosillo should build on the strengths of these existing projects and generate synergies that would lead to a broader transformation of this area.

We also propose that the city engages with foundations and capital-raising intermediaries to build a social impact fund to offer financing to these small businesses. Social impact investing provides an opportunity to tap into more risky investments, such as early state businesses, while also supporting those who are established to scale up, renovate, and grow their businesses. In this context, groups like Adobe Capital, the Inter-American Development Bank's Multilateral Investment Fund, and other social impact investors in Mexico could offer rich opportunities for partnership.

Each of these activities—the launch of the TIF, as well as the social impact fund—could occur alongside the programmatic

activation of the market. In doing so, partnership with local initiatives like *Vía Activa*, Banco de Ideas, and local entrepreneurs will be crucial in organizing these events. To introduce more food vendors, we suggest that the city expedites the licensing process for food truck vendors interested in participating in these events. While ambulant vendors have been a source of tension in Hermosillo in the past, we feel our programming recommendations could serve as an excellent opportunity to demonstrate successful deployment of food truck vendors as a means of enhancing the public realm.

In our second phase, the Municipal Market expansion, we see this as an opportunity for the city to engage in a public-private partnership with a real estate developer to design and manage the project. As construction commences, it is important that the city be vigilant when property is being bought and sold downtown. As new capital projects like the Municipal Market expansion take off, it will be important that any new developments taking place in the area are done in accordance with local zoning and the Mayor's vision. As the TIF starts to mature, the city can begin to access funds for future projects like improved connectivity between the downtown and the *Cerro de la Campana*, as well as improved infrastructure along *Avenida No Reelección*.

Conclusion

In the context of Hermosillo's transition from physical to cultural production, we hope that these interventions will aid movement from a mono-industrial tradition to expanding its creative industries. If successful, these interventions will lead towards building a new gastronomic economy in Hermosillo that will start in the downtown and later expand to the rest of the city. The goal is to see a significant growth in the city's number of restaurants and bars, an increase in the sales of *Bacanora*, and the positioning of this product in other Mexican cities and abroad.

These interventions could also lead towards an expansion in the hours of operation of the businesses located downtown, stimulating greater pedestrian traffic and use of public transportation

at night. The initiative could also increase the number of people—locals as well as tourists—who visit the city center every year, making it a key tourist destination in Hermosillo. Finally, these interventions could promote a greater number and diversity of businesses located in the city center, hopefully bringing hotels, more bars and restaurants, gyms, cafes, and other amenities to the area. In short, we believe that by investing in the city center, Hermosillo could find a gateway to reconnect with its past and pave the way for future generations to take advantage of the many assets this city and region have to offer.



Hermosillo's Historic Center at night. CREDITS:
Andreina Seijas.

Notes/References

- 1 - Information provided by IMPLAN, from the records of the *Secretaría de Educación y Cultura (SEC) del Estado de Sonora*.
- 2 - The source to determine this figure was the North American Industrial Classification System (2013).



Hermosillo's Historic Center at night. CREDITS:
Andreina Seijas.





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CREDITS: Inter-American Development Bank (2016-2018)





CREDITS: Inter-American Development Bank (2016-2010)



Syllabus

EMERGENT URBANISM:
Planning and Design Visions for
the city of Hermosillo, Mexico

Fall 2017
Graduate School of Design,
Harvard University

Instructors: Diane E. Davis, Felipe Vera
Teaching Assistant: Andreina Seijas

Course Description

This course asked students to develop a multidisciplinary sensibility in the resolution of contemporary urban problems. The class emphasized multi-scalar, collaborative, and holistic approaches to urban planning and design, drawing from urban ecology, landscape architecture, public policy, economics, and politics, simultaneously. Students' final objective was to propose a project, or set of projects, that would lay the groundwork for creating a more livable, economically vibrant, socially inclusive, and sustainable future for the city of Hermosillo. Students used research findings, advocacy strategies, participatory exercises, as well as other forms of social and spatial practice to produce alternative, speculative, and creative solutions for the city.

With this in mind, the class was structured around several deliverables related to research, documentation, analysis, and projection. In the first several weeks of the course, students were exposed to conditions in Hermosillo as well as in Latin American cities more generally. Such materials were intended to offer a deep dive into the geographical, political, economic, and social context of urbanization in Latin America. In the first weeks of class, and as a framing for the final deliverable, we discussed the Inter-American Development Bank's (IDB) Emerging and Sustainable Cities Program (ESC), their research methodology, and how that methodology brought them to focus on Hermosillo.

Within the first few weeks of class we also traveled to the city of Hermosillo where we met with public and private actors involved in the city's urban development.

Upon the return to Cambridge, students provided a written assessment of what they considered to be the most urgent but potentially solvable problem affecting Hermosillo, and began thinking about making a case for addressing this issue in their final project. Although the course focused on four main themes (city form, environment, mobility, economic growth), it was up to students to identify which of these four domains should be targeted for intervention, how and why. Moreover, students should be able to articulate the particular sub-concern that frames their interest in one of these domains. For example, the lack of public space or fear of crime may be the reason to focus on city form, or vice-versa. Likewise, mobility is a key domain of interest because current transport services (or their lack thereof) may limit economic opportunities or produce environmental degradation.

For the first major deliverable (Presentation #1), students were asked to examine precedents from other Latin American cities and consider how they are helpful in promoting new ways of addressing the problem or urban domain they have identified as the most critical for Hermosillo. That is, in the first deliverable, we wanted to know why the student had selected a particular problem or domain for intervention and have some understanding of how this type of issue was successfully addressed in another urban context. Another way to think about this is with respect to process and not merely outcome: i.e. what actors, institutions, structures, and processes helped advance this particular policy solution, and how and why did this happen.

After identifying their preferred domain for intervention, students continued to work on their ideas in the context of continued discussion of the multicollinearity of urban, social, economic, and environmental sustainability—i.e. the fact that sectoral problems are often correlated. For example, mobility, and urban form are deeply connected, just as are environment and economic growth. In recognition of this, throughout the class we continued to hear from experts on a range of issues related to our four

domains of interest, working under the assumption that the projects being pursued by students should make sense in the context of more than one domain of special interest. In the second deliverable (Presentation #2) students showed how and why the proposed intervention or domain of action might constructively lay the groundwork for problem solving in another domain. Near the end of the course, lectures and materials focused more on barriers and enablers to policy or project implementation in the context of Hermosillo.

For this reason, we focused on governance and participatory structures, as well as the array of programs, resources, and institutions at the local, state, and federal level in Mexico that could be leveraged to advance urban policy aims. To insure students were thinking programmatically, as a third deliverable, students provided a diagram and deeper institutional assessment of the main actors, institutions, and programs that must be part of the conversation if the proposed project is to be successful. Final projects were presented in a full-day session on December 11th, with input from IDB specialists and other guests.

Whenever possible, the class was structured in a lecture + workshop format, where students engaged in conversation with a lecturer on a research topic covered in the class. Formats and topics will be explained in greater detail further in the syllabus. Each week, students were required to read 2-3 articles in order to engage in conversation with the guest lecturer. Additional articles on related topics were available to students in the form of suggested readings.

Learning Objectives

After completing the course, students should now be able to:

1. Demonstrate a clear understanding of the challenges facing Latin American cities as they seek to address urban growth in a context of scarce resources, environmental vulnerability, and high degrees of social and economic marginality.



Former mayor of Hermosillo, Manuel 'Maloro' Acosta met in Hermosillo with IMPLAN, IDB and GSD students led by professor Diane E. Davis. September 2017. CREDITS: Andreina Seijas.

2. Be able to identify a range of social, spatial, political, and economic strategies that will be necessary to advance the sustainable urban development of a medium-sized Latin American city.
3. Be able to strategically assess the likelihood that a given urban sustainability strategy will be adopted by planners, public officials, and or the private sector in a given city.
4. Understand how to develop and respond to existent or proposed urban development scenarios with feasible design or planning strategies that address current social, political, environmental and economic issues.
5. Have the skills and capacity to work on an interdisciplinary team and come to a consensus on a proposed project.



CREDITS: Inter-American Development Bank (2016-2018).



— Calendar

CLASS 01 / SEPTEMBER 05

DIANE E. DAVIS, FELIPE VERA

INTRODUCTORY CLASS

Guest Speakers:

Juan Santa María, Rubén Segovia, Claudia Tomateo, Jorge Silva
- GSD Research Team

1st module: Class Info and Introduction

2nd module: Presentation “Rethinking Hermosillo”

The first class was an introduction to the class and to the Inter-American Development Bank’s Emerging and Sustainable Cities Program (ESC). We looked at the state of Sonora, Mexico and the reasons why the IDB had selected the city of Hermosillo to implement the program. We explored what the Bank’s expectations are in developing the program in Hermosillo, and how the city projects itself into the future. Also, the GSD Research team responsible for the “Rethinking Hermosillo” Report, presented their findings. We also went through the course’s objectives and practical information for the rest of the semester.

CLASS 02 / SEPTEMBER 12

DIANE E. DAVIS

CURRENT CHALLENGES FOR THE CITY OF HERMOSILLO;

ESTABLISHING THE TERRITORIAL CONTEXT

Guest Speakers:

Gabriela Soto Laveaga – Department of the History of Science, Harvard University / Ramón Sánchez – Center for Health and the Global Environment, Harvard University.

1st module: Lecture

2nd module: Student Presentation and Discussion

This week the class heard more about the political, social, and territorial history of Sonora, placing Hermosillo’s development as the capital city in the context of the key role that Sonora (and



Presentation of the "Rethinking Hermosillo" report in class. September 2017. CREDITS: Andreina Seijas.

the northern territories) played in the Mexican Revolution and in twentieth century agricultural and regional development. Students were also expected to familiarize themselves with general patterns of urbanization in Mexico and elsewhere in the late industrializing world, and to understand how recent trends such as economic liberalization, globalization, transnational trade, and decentralization have affected Hermosillo and Sonora.

CLASS 03 / SEPTEMBER 19
DIANE E. DAVIS, FELIPE VERA
URBAN GROWTH AND CITY FORM IN LATIN
AMERICAN CITIES: DRIVING FORCES
Guest Speakers:
Enrique Silva – Lincoln Institute of Land Policy

1st module: Lecture
2nd module: Discussion and Group Work

This class focused on urban growth and urban form, understanding both general patterns across Latin America and the particularities of urbanization in Mexico. Special emphasis was paid to housing and land use, particularly the main actors and developmental dynamics responsible for sprawl. Other issues addressed included industrial location and firm behavior as well as relationships between the city and its hinterland. Students were expected to understand the dynamics from the lens of key stakeholders, including citizens, local authorities, and the private sector.

TRIP TO HERMOSILLO, MEXICO / SEPTEMBER 23-30
DIANE E. DAVIS, FELIPE VERA

We visited Hermosillo for a week, where we met with government officials and different actors from the city. We had on-site lectures and visits to different areas with the intention of immersing students in the different problematics of Hermosillo.

On-site lectures:

- Socio-Environmental Risks (and Resilience strategies) in Mexican Cities, by Adriana Chávez
- Landscape Urbanism in the Sonora Desert, by Gabriel Díaz Montemayor

CLASS 04 / OCTOBER 03

DIANE E. DAVIS

URBAN INFRASTRUCTURAL CHALLENGES IN MEXICO:
CONNECTING SECTORIAL DOMAINS

Guest Speakers:

Chris Zegras – MIT-DUSP

1st module: Lecture

2nd module: Discussion and Work Group

This week we addressed the possibilities of implementing Transit Oriented Development in Mexican cities, framing our understanding of how infrastructural interventions can advance densification.



Professors Ricardo Hausmann and Miguel Ángel Santos from the Center for International Development participated in a class at the GSD to discuss Hermosillo's economic complexity. November 2017.
CREDITS: Andreina Seijas.

The focus on transportation is only one lens for discussing the challenges of enabling compactness, employment access, and equity through infrastructure. Students were also encouraged to think about new urban patterns for Hermosillo in the context of resource constraints (i.e. limited public funds) that must be factored into decisions about infrastructural services.

CLASS 05 / OCTOBER 10
DIANE E. DAVIS, FELIPE VERA
PRESENTATION #1

Guest critics:

Enrique Silva – Lincoln Institute of Land Policy / Shaney Peñagomez – Loeb Fellow

Students were expected to present precedents from other Latin American cities and show how those precedents are helpful in promoting new ways of addressing the problem or urban domain they have identified as most critical for Hermosillo.



Parque La Ruina, Hermosillo. September 2017.
CREDITS: Andreina Seijas.

CLASS 06 / OCTOBER 17

DIANE E. DAVIS

MULTISECTORAL PROJECTS AND COLLABORATION IN
EMERGENT CITIES OF LATIN AMERICA

Guest Speakers:

Tatiana Gallego-Lizón – Inter-American Development Bank

1st module: Lecture

2nd module: Workshop

Guest lecturers from the Inter-American Development Bank talked in-depth about the challenges of carrying out projects of great complexity in terms of collaboration, resources, and time, in the different political scenarios that exist in Latin American cities today.

CLASS 07 / OCTOBER 24

DIANE E. DAVIS

POLITICS OF URBAN POLICY: CITIZEN VS. STATE PRIORITIES

Guest Speakers:

Verónica Herrera – University of Connecticut and visiting fellow,
DRCLAS

1st module: Lecture

2nd module: Workshop

This week we examined the political, social, and bureaucratic barriers and enablers to better public policy. Our work focused on the ways in which coalitions and collaboration can both advance and stall urban policy reform, conceiving of politics and governance as unfolding within both the state and civil society. It also raised questions about the extent to which traditional structures of urban policy formation serve residents.

CLASS 08 / OCTOBER 31

DIANE E. DAVIS

FINANCING URBAN DEVELOPMENT THROUGH LAND VALUE
CAPTURE

Guest Speakers:

Belinda Tato – GSD / Calixto Mateos - NADBank

1st module: Lecture

2nd module: Workshop

This week focused on how to finance urban projects and urban policies. One of the common strategies used to generate public revenues to undertake infrastructural and urban development investments is land value capture. Other strategies include selling air rights, imposing user fees and taxes, and engaging in public-private partnerships.

CLASS 09 / NOVEMBER 07

DIANE E. DAVIS

PRESENTATION # 2

Guest Critics:

Surella Segu – Loeb Fellow / Nora Libertun - Inter-American Development Bank

Students had their second pin-up, which showed how and why the proposed intervention or domain of action might constructively lay the groundwork for problem solving in another domain.

CLASS 10 / NOVEMBER 14

DIANE E. DAVIS, FELIPE VERA

NEW STRATEGIES FOR MONO-PRODUCTIVE CITIES

Guest Speaker: Ricardo Hausmann, Miguel Ángel Santos,
Douglas Barrios – Center for International Development

1st module: Lecture

2nd module: Discussion

Students were exposed to new ways of thinking about economic development. With a focus on such concepts as economic complexity and product space, we found ways of understanding and addressing the challenges of economic development in Hermosillo, particularly in the context of its current highly-concentrated and undiversified economy. During the second module of the class, students discussed how the concern with economic competitiveness in Sonora enables or constrains urban development priorities.

CLASS 11 / NOVEMBER 21

DIANE E. DAVIS

TOPIC: RISK AND RESILIENCE (THIS LECTURE WAS CANCELLED)

Guest Speaker:

Anjuli Fahlberg – Northeastern University

1st module: Lecture

2nd module: Workshop

In this class we were going to address the multiple vulnerabilities that residents of Latin American cities face in the arenas of vio-

lence and climate change, among other contextual conditions. Particular attention was going to be paid to the role of spatial interventions in generating resilience and helping communities push back against risk.

CLASS 12 / NOVEMBER 28

FELIPE VERA

INFORMALITY AND URBAN GROWTH

Guest Speaker: Rahul Mehrotra – Harvard GSD

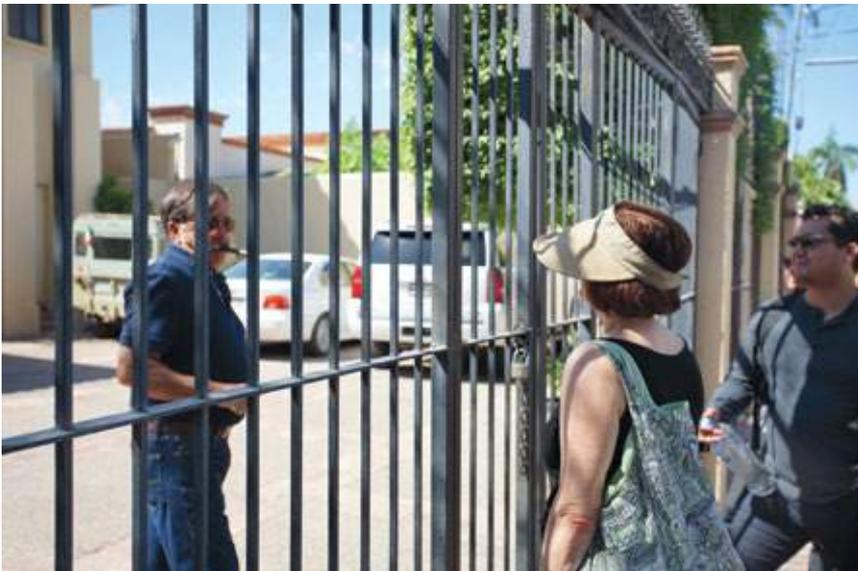
1st module: Workshop

2nd module: Workshop

We used both modules of the class as a workshop to prepare the final presentations.

FINAL PRESENTATION / DECEMBER 05

DIANE E. DAVIS, FELIPE VERA



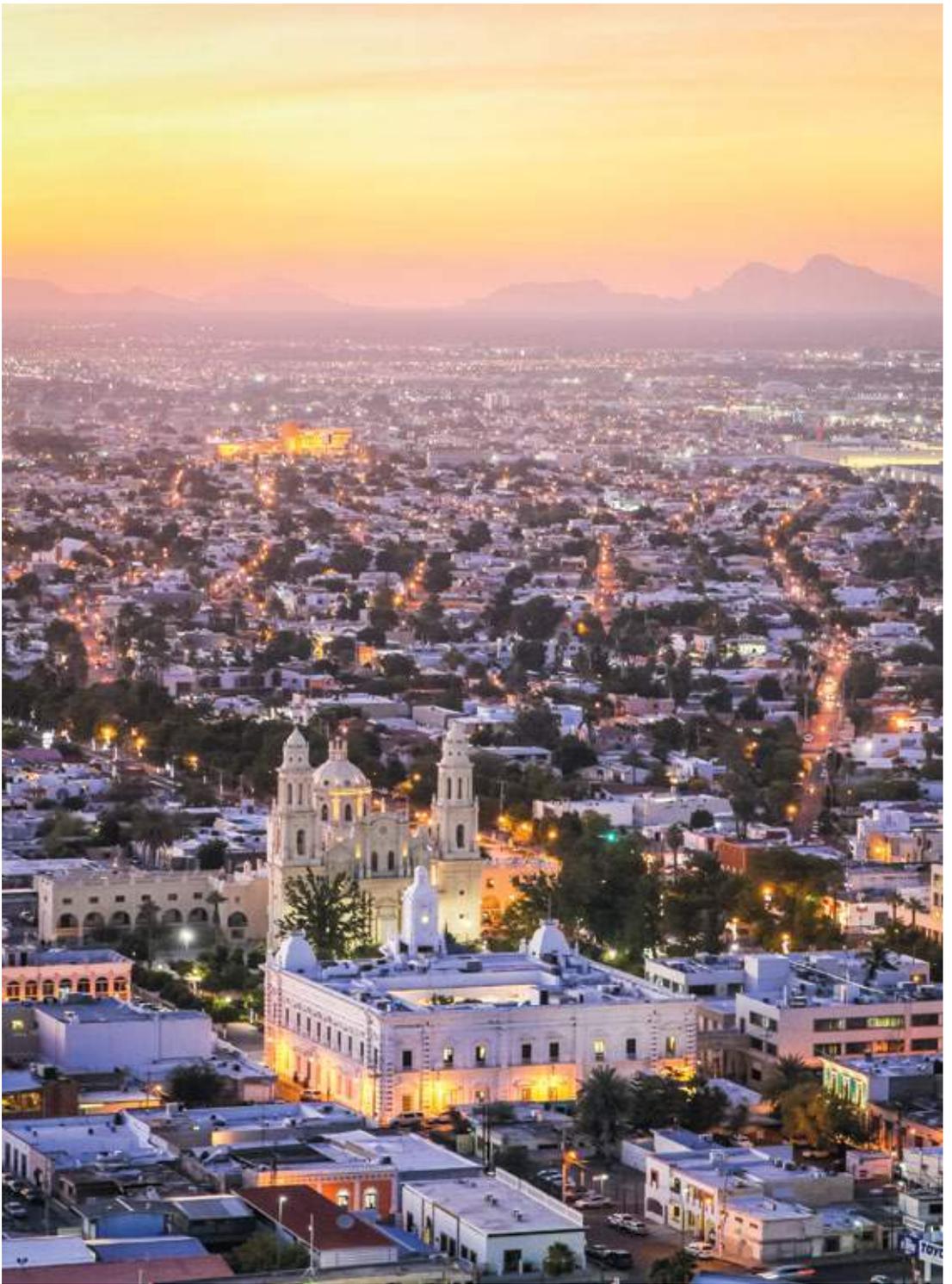
CREDITS: Theodore Kofman.



Professors Felipe Vera and Diane E. Davis introduce the Final Review session. December 2017.
CREDITS: Andreina Seijas



Diane Davis and students contemplate the view from Cerro de la Campana. September 2017.
CREDITS: Theodore Kofman.



CREDITS: Inter-American Development Bank (2016–2018).

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An integrated Approach to Promote Sustainable Urban Development / Diego Arcia

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Banco de Ideas: The Keystone of the Revitalization of Hermosillo's Historic Center / Belinda Tato, Jorge Toledo, José Luis Vallejo

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Hermosillo on a Human Scale: A Diversified, Innovative, and Sustainable City / Diego Arcia, Adriana Chávez, Daniel Stagno

CONNECTING THE DOTS

— A Blueprint for
Collaborative Innovation

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Diego Arcia

An Integrated
Approach
to Promote
Sustainable
Urban
Development

One of the primary goals of the Housing and Development Division (HUD) of the Inter-American Development Bank (IDB) is to extend the full benefits of sustainable and productive urbanization to all residents of Latin American and Caribbean cities. Over the past eight years and through the Emerging and Sustainable Cities (ESC) program, our team has assisted over 80 emerging cities in the region to rethink strategies around growth and development and move towards a more sustainable agenda. Our approach is, in essence, multi-sectoral, and provides comprehensive solutions that involve a myriad of actors and resources to ensure long-term ownership of urban transformations.

From this perspective, our work in Hermosillo is both an example and an exception of our contributions to the region. On the one hand, it exemplifies the collaborative way in which IDB specialists and consultants work with local governments to gather data on the cities' most pressing issues, prioritize courses for action, and devise joint solutions. On the other hand, it is the first time that we have been able to put one city under the magnifying glass and incorporate so many perspectives and innovative ideas to its Action Plan—a diagnosis and a blueprint for its sustainable development in the years to come.

The previous sections in this book provided a set of background documents and foundational materials that are key to understanding the history of Hermosillo, its current situation and its future development challenges (see section 2 “Preparing for Action in Emerging Cities”). For instance, the chapter titled “Searching for a New Urban Paradigm: Rethinking Hermosillo” developed in collaboration with a group of recent graduates from the Harvard Graduate School of Design (GSD) and the IDB, served as a springboard for the course taught in the Fall of 2017 at the GSD.

One of the key sources of information that informed the works included in this volume is the unique baseline data that was gathered in the context of the ESC program: 130 indicators covering 30 topics ranging from water and sanitation, to public spaces, education, competitiveness, and fiscal sustainability. The program also financed a set of baseline studies on urban and territorial dynamics, including reports on GHG emissions and

climate change, environmental risks, urban growth patterns, urban mobility and transport, and an in-depth analysis of the potential for economic diversification conducted by the Center for International Development (see the chapter in Section 2 titled “Is there life after Ford? Structural transformation and inclusive growth in Hermosillo, Sonora”). All these inputs paved the way for a multi-sectoral analysis of Hermosillo’s past, present, and future.

Against this backdrop, the third part of the book provided the proposals and design visions that three teams of GSD students put together for the city in the context of the Fall 2017 class (see Section 3 “Planning and Design Visions for Hermosillo”). The implementation of the ESC program in Hermosillo greatly benefited from this knowledge, which later also informed the design of the projects and interventions that are presented in the following pages and were later incorporated as part of the Action Plan for the city of Hermosillo.

The first chapter of this section, titled *Banco de Ideas*, presents the rationale and implementation of a multi-disciplinary project commissioned by the IDB in 2017 to ignite the transformation of the city’s historic center. The project outlines the conversion of an old warehouse—known as the *Banco de Ropa* or Clothes Bank—into a meeting place and community center with the potential of activating new land uses and promoting a greater cultural appreciation for downtown Hermosillo.

This project is part of a larger urban revitalization plan for the area spearheaded by Spanish architecture and urban design firm *Ecosistema Urbano* and called “*Idea Hermosillo*.” The plan aims to reactivate the city’s creative economy, incentivize local entrepreneurship, and strengthen its identity through its cultural, historical, and natural attributes. Through physical and digital platforms, “*Idea Hermosillo*” hopes to transform the city’s downtown into an inhabited, active, connected, green, innovative and collaborative historic center.

The last chapter of this section, titled, “*Hermosillo on a Human Scale*” is the sum of all the parts presented in the previous pages of this publication. By providing a summary of Hermosillo’s Action

Plan, devised jointly by the IDB and city officials, this chapter integrates the collective insights drawn from the Harvard-IDB collaboration. It also outlines a set of strategic interventions proposed to tackle the city's most pressing issues, while maximizing social returns and building credibility and social support for the Action Plan. These is the case of the "Idea Hermosillo" and the Banco de Ideas projects, which aim to encourage entrepreneurship and job creation while recovering traditional areas for leisure, promoting 'citizens' right to the city' and strengthening social capital.

In essence, this final section of the book serves as a statement of the positive transformations Hermosillo could undergo in the upcoming years and a blueprint for how to achieve them. It helps crystallize the lessons learned from the collaboration between the government of Hermosillo, the government of Sonora, the IDB, the North American Development Bank (NADBANK), and the students and researchers from Harvard University. It therefore hopes to build on current policies and initiatives and leverage innovative methodologies to design feasible solutions for the challenges currently constraining the sustainable development of Hermosillo.

Notes/References

- 1 – Juan, E. et al. (2016) "Urban Development and Housing Sector Framework Document." Housing and Urban Development Division. Inter-American Development Bank. Available online at: <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=40768953>
- 2 – The Action Plan is a technical document developed by IDB specialists and external consultants that includes a city's vision, an evaluation of its multi-sectoral sustainability, and proposed projects for improving its performance (Inter-American Development Bank, 2016).
- 3 – Data from these indicators was collected by El Colegio de la Frontera Norte (COLEF).
- 4 – IDOM [Ingeniería y Dirección de Obras y Montaje] (2017). Baseline studies: Climate Change, Natural Risk, and Urban Growth for the city of Hermosillo, Sonora.
- 5 – Navarro, U. (2017) Mobility and urban transport study for Hermosillo. Inter-American Development Bank: Emerging and Sustainable Cities Program.



CREDITS: Inter-American Development Bank (2016–2018).

In 2017, we took the challenge of developing a revitalization plan for Hermosillo's historic center. The plan was framed under the IDB's Emerging and Sustainable Cities Program (ESC), which helps local governments develop integrated solutions towards urban sustainable development in Latin American and Caribbean cities.

Belinda Tato
Jorge Toledo
José Luis Vallejo

Banco de Ideas

— The Keystone of
the Revitalization of
Hermosillo's
Historic Center

One common issue in Latin American cities is the decline of city centers. The downtown of Hermosillo features significant historic value and a balanced mix of heritage, centrality, connectivity, access to public spaces and services, and other aspects that contribute to a general attractiveness of the area. However, the extensive, low-density urban development model adopted by Hermosillo during the past decades has caused a decline in the social, cultural, and economic activity in this area, and a progressive displacement of its residents towards the periphery. This is a situation that now has to be reverted.

With this goal in mind, Ecosistema Urbano conceived a plan to revitalize a critical area of the city center (Figure 1) by putting together a participatory process to incorporate the views of different stakeholders, and developing a vision that would provide both a long-term agenda and a short-term action plan for downtown.

This new vision is summarized in the “Idea Hermosillo” revitalization plan, which includes six main strategies or goals: attracting more inhabitants to the city center, promoting the diversification and activation of uses, increasing accessibility and mobility, improving the climatic comfort and presence of nature in public spaces, supporting innovative initiatives, and building more collaborative and transparent relationships between local stakeholders. In order to translate these general goals into site-specific interventions, these strategies were complemented with 27 pilot projects that vary in scope, budget, and implementation. One of them, the “Banco de Ideas,” was proposed as a flagship intervention and the main driver to activate this area of Hermosillo.

— The Process

At Ecosistema Urbano, we often approach urban projects as two interlaced parallel processes: a technical one, usually identified with the work of a planner, architect, or urban designer; and a social one, in the form of a participatory process (Figure 2).

This approach implies that technical tasks (i.e. analyzing urban data) and social mapping (i.e. a workshop) can happen at the

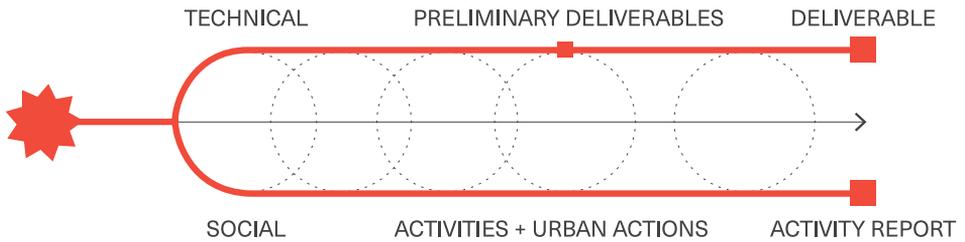


FIGURE 2. Combined technical-social process.
CREDITS: Ecosistema Urbano.

same time. Certain actions can also serve both ‘sides’ of the project, for instance, by conducting an on-site survey or urban mapping process with citizens during a workshop. Under this scheme, the technical process supports and informs the social one, and the social process feeds and enriches the technical one. This is usually made possible by a multidisciplinary—or rather, transdisciplinary—team working tightly together and constantly transferring insights from one ‘side’ to the other.

In order to illustrate how this technical-social approach translates into a specific project, this chapter will provide a step-by-step explanation of how the “Idea Hermosillo” plan was conceived and developed. However, the reader should keep in mind that some phases were less defined and often overlapped in the real process.

— Getting to Know the Site

Though a full diagnosis was out of the scope of the project, some kind of assessment was needed in order to understand the area’s current situation. For this purpose, we were provided with existing studies and datasets from which we identified and prioritized the aspects that were more relevant for the project’s goal: the revitalization of the city center.

Once we narrowed the intervention to a few streets, the city-wide statistics and studies became less precise. There was no detailed information available regarding land uses and the state of conservation of streets, buildings, and lots. In order to overcome this limitation, we used the technical tools at hand and created custom GIS mappings based on satellite imagery and

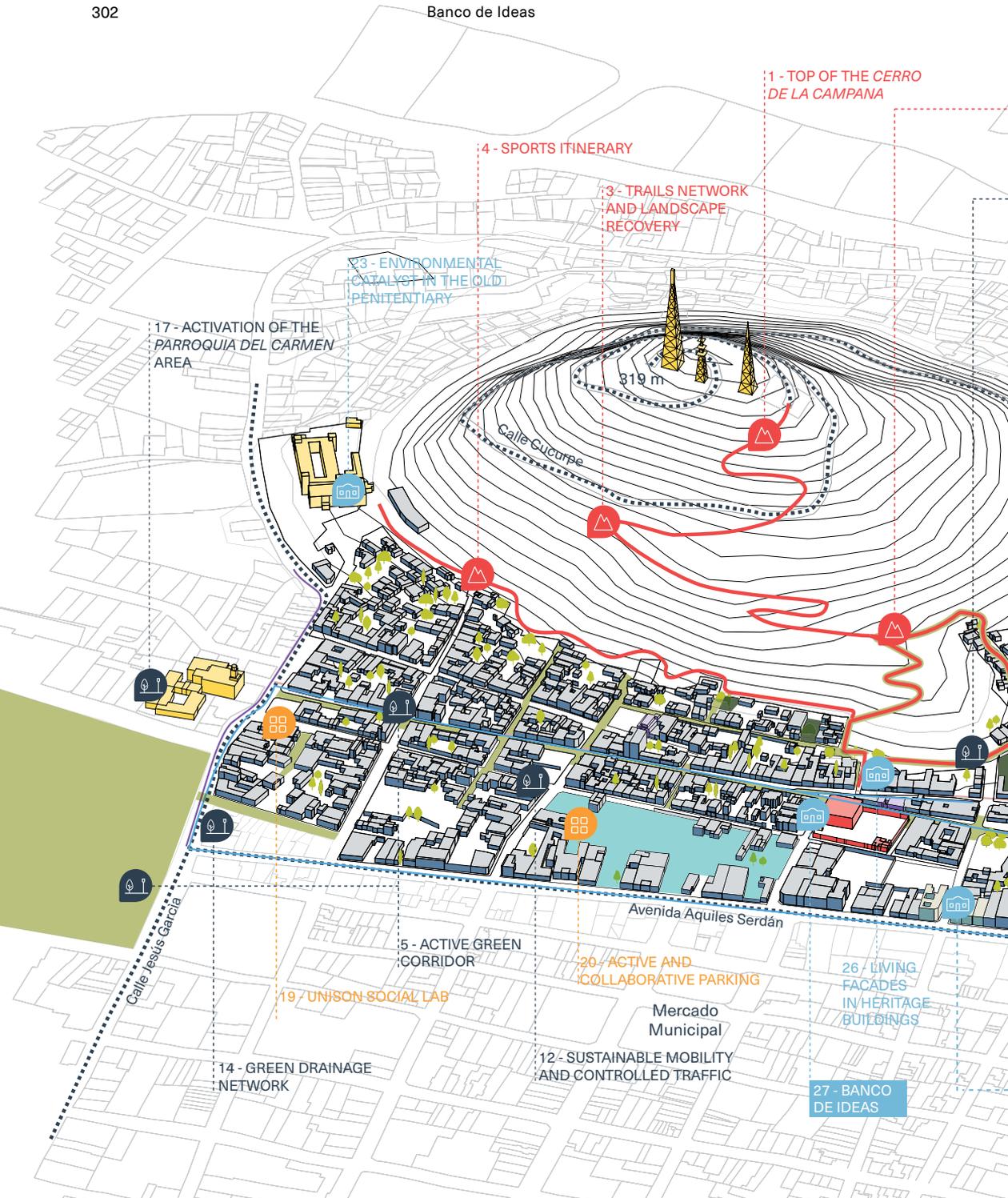
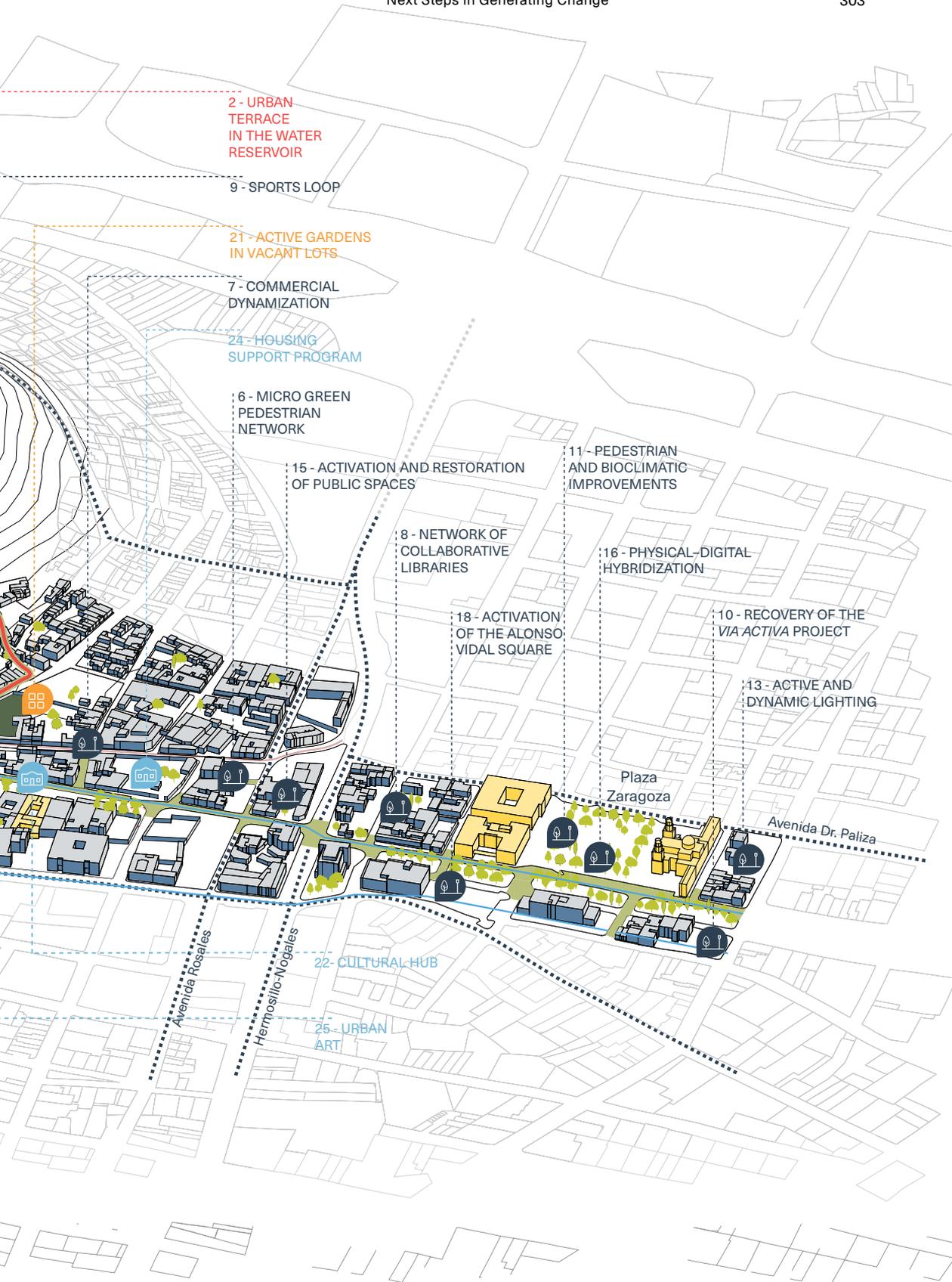


FIGURE 1: Isometric representation of the area of intervention and the location of the pilot projects, including the "Banco de Ideas." CREDITS: Ecosistema Urbano.



2 - URBAN
TERRACE
IN THE WATER
RESERVOIR

9 - SPORTS LOOP

21 - ACTIVE GARDENS
IN VACANT LOTS

7 - COMMERCIAL
DYNAMIZATION

24 - HOUSING
SUPPORT PROGRAM

6 - MICRO GREEN
PEDESTRIAN
NETWORK

15 - ACTIVATION AND RESTORATION
OF PUBLIC SPACES

8 - NETWORK OF
COLLABORATIVE
LIBRARIES

18 - ACTIVATION
OF THE ALONSO
VIDAL SQUARE

11 - PEDESTRIAN
AND BIOCLIMATIC
IMPROVEMENTS

16 - PHYSICAL-DIGITAL
HYBRIDIZATION

10 - RECOVERY OF THE
VIA ACTIVA PROJECT

13 - ACTIVE AND
DYNAMIC LIGHTING

Plaza
Zaragoza

Avenida Dr. Paliza

Avenida Rosales

Hermosillo Nogales

22 - CULTURAL HUB

25 - URBAN
ART

street-level photographs. We were also able to complement the diagnosis with a more 'social' approach: involving local citizens and organizations in the process of generating new and more detailed datasets. These kind of mapping activities have an important educational value for participants and provide a valuable system to review existing information. The value of resulting partnerships and collaborations goes beyond the plan itself, raising awareness and creating new dynamics and synergies within local communities.

Implementing this project was proposed as the first step towards the revitalization of the historic city center of Hermosillo.

A key partner to the project was Monterrey's Institute of Technology and Higher Education—also known as the TEC. A specific toolkit was designed for TEC students to actively engage in the mapping process. The toolkit enabled them—and us—to work from a different perspective by mapping templates, digital tools, and surveys. It required students to ask about and experience the neighborhood, and to reach out to residents to try to understand their physical reality, as well as their dreams and expectations. As part of this toolbox, an online mapping platform was created using "Local_in," an open source mapping software developed by Ecosistema Urbano and previously used in other cities, worldwide. This tool was used as a platform for students' direct observation of the area of interventions. Additionally, it helped create a new channel for citizens to participate and continue the conversation individually, beyond the scope of this particular project.



FIGURE 4. Pictures from the different activities.
CREDITS: Tania Molina and Gustavo Colin (IMPLAN, Hermosillo) and Ecosistema Urbano.

This preparatory research gave us a deeper understanding of the area of intervention. The survey provided data on the perception and habits of the inhabitants of Hermosillo, specifically on topics such as mobility, urban activities, places of interest, and the main urban issues identified by them. In parallel, the physical urban mapping enabled the team to locate businesses, facilities, public transport lines, and urban uses in general, as well as quantifying the existence of parking spaces, empty lots, or abandoned buildings. These activities provided insight into the city center's main challenges and allowed us to draft six strategies aimed at making the area more densely-inhabited, as well as more active, connected, green, innovative, and collaborative.

Urban studies and data were not the only sources of information and inspiration. Our experience in similar situations worldwide and in the Latin American context contributed to the strategies we proposed, and these were carefully complemented with the views of local people and organizations. Meetings were held in which different stakeholders—neighbors, academics, entrepreneurs, public workers, and representatives from local organizations—were invited to discuss their experiences, views, and ideas about the city center and its potential for future development. 'Thematic meetings' centered the discussion on a specific topic or aspect of the city through the views of different stakeholders, and 'institutional meetings' were designed to establish a direct conversation with civil servants and officials.



FIGURE 3. Mapping of opportunities in one of the sectors in the city center (left), and two screenshots of the online mapping tool (right). CREDITS: Ecosistema Urbano.

These meetings complemented our understanding of the area and guided our recommendations about the best way to spark its revitalization. The visualization of the ideas that arose during these meetings was also made using the online mapping tool.

These participatory activities also informed our search for specific opportunities for intervention. Meetings were useful to map interesting or sensitive locations, and mapping activities allowed us to accurately identify vacant lots and buildings as opportunities for reactivation.

A university workshop with students from the University of Sonora, the Durango Santander University, the State University of Sonora, the UVM, and the TEC of Monterrey also took place in the area of intervention. The activity had an educational approach but also an activation and communication role. It challenged participants to detect and develop relevant situations for the revitalization of the city center and to propose creative interventions. The most visible result was the production of 10 'urban actions' or mock ups of the students' proposals in real life, by means of a collective performance. These were recorded and the video was later used to disseminate the initiative.

Both the meetings and the workshop helped Ecosistema Urbano's team identify many of the final pilot projects, which were checked against the general strategies and developed into a coherent set of short-term activation proposals.

— Choosing a Starting Point: Banco de Ideas

One of the locations that stood out during the mapping, meetings, and workshops was the *Banco de Ropa* (Clothes Bank): a two-story warehouse used by the local NGO *Banco de Ropa de Hermosillo* to receive, store, and distribute used clothing. Several aspects that are usually linked to a successful urban activation project are particularly present at the *Banco de Ropa*:

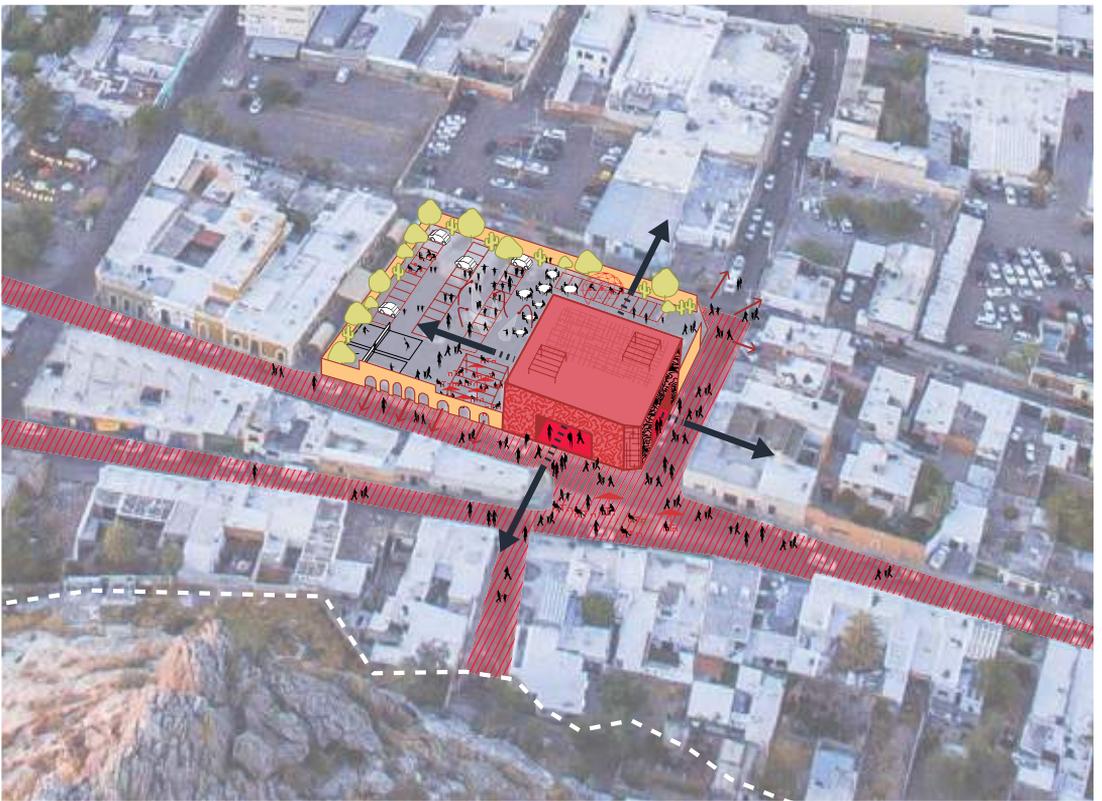


FIGURE 5. General view of the Banco de Ideas and its surroundings. CREDITS: Ecosistema Urbano.

- It has a strategic location in the center of the area of intervention, on the main street, near a crossing, and with direct views upon the *Cerro de la Campana* (Figure 1). This location gives it an excellent level of visibility and maximizes its potential impact over the city center.
- Though its constructive quality and materiality is not exceptional, the building has the potential to accommodate different activities. Its combination of indoor and outdoor spaces makes it an ideal setting for experimenting with indoor/outdoor urban interventions as well as day/nighttime events.
- The size of the building—about 18,300 square feet—and the spaces surrounding it are within the ideal range. This keeps the intervention manageable and affordable, but still has a significant impact in the area.

- The building is the only public property in the area, enabling a series of possibilities that would be limited on a privately-owned lot. Transferring the existing use of the building as a ‘clothing bank’ to a different location was also feasible.
- During the workshops and meetings, several stakeholders showed interest in taking part of the activation of this site from the business side—by investing in it through a private business— or the sociocultural side—by programming activities in it. It was seen as a potential hub for entrepreneurship, gastronomy, and technology with an educational component.

All these factors, combined, give this location a key role as a ‘catalyst’ of the social, cultural, and economic activation of the area. This is why it was chosen as the flagship intervention of the Idea Hermosillo plan, and proposals around its rehabilitation and activation led to what was finally presented as the Banco de Ideas pilot project.

The name and identity of the project tried to establish a link between the current character of the building as a ‘clothes bank’ and its future use as a cultural, social, and economic incubator. Implementing this project was proposed as the first step towards the revitalization of the historic city center of Hermosillo.

Following the identification of the Banco de Ideas as a pilot project, we organized a kick-off event and temporary intervention in the open spaces beside it. On one evening, the parking lot surrounding the building was transformed into a privileged outdoor stage for a series of short presentations about Hermosillo, its city center, and its future. This was an opportunity to show the potential of temporally activating a place and generating a tangible and impactful experience without the need of a permanent intervention. This 1:1 scale intervention proved to be an interesting catalytic activity that gathered more than 200 people from different areas in the city, some of them unfamiliar with this building, with the neighborhood, and even with the historic center in general.

The main proposals for the activation of this building are the creation of multi-functional spaces, the connection of indoor

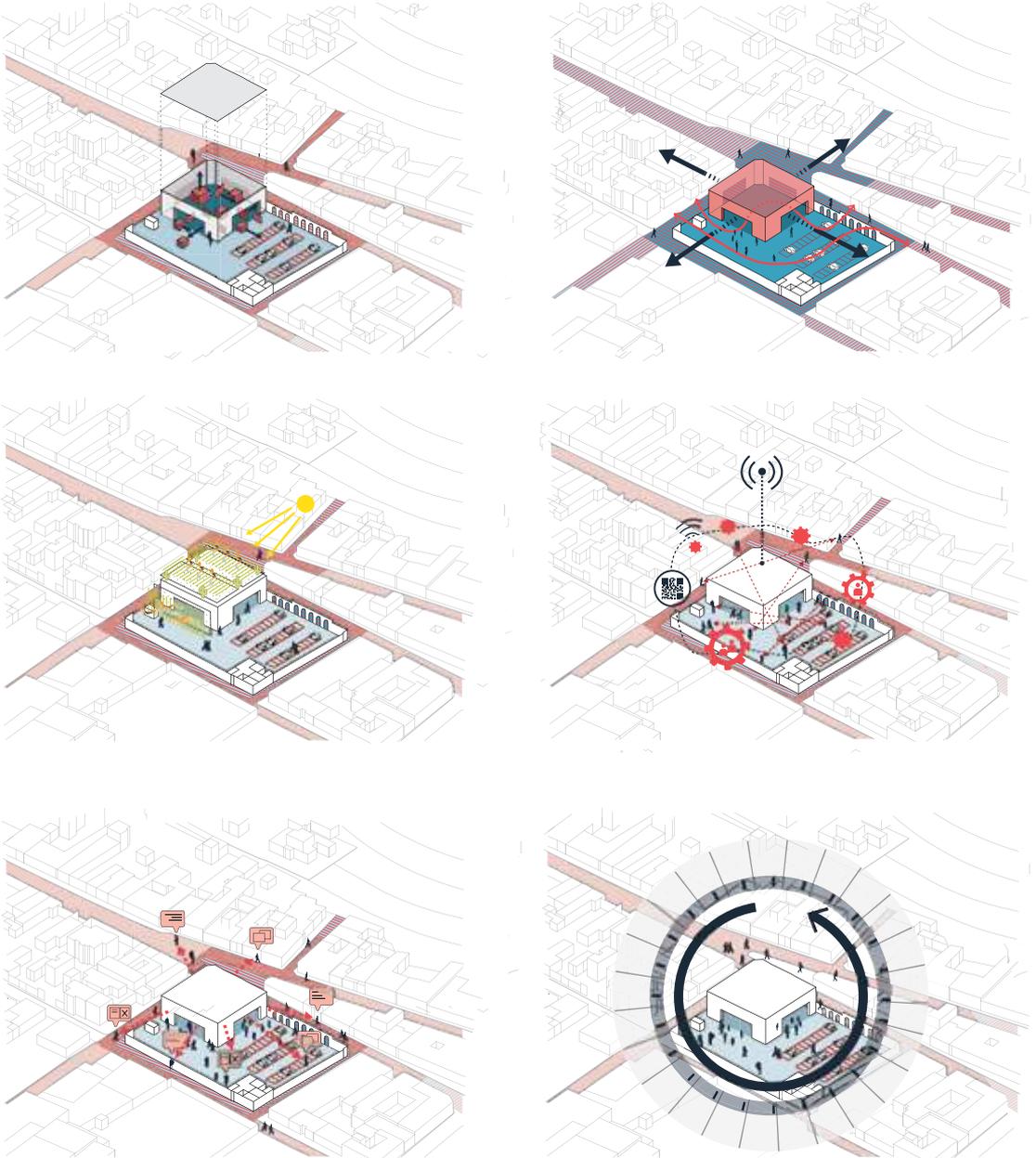


FIGURE 6. Diagrams explaining the main concepts behind the design. CREDITS: Ecosistema Urbano.



FIGURE 7. Recreation of the proposal and the activated public spaces around it. CREDITS: Ecosistema Urbano.

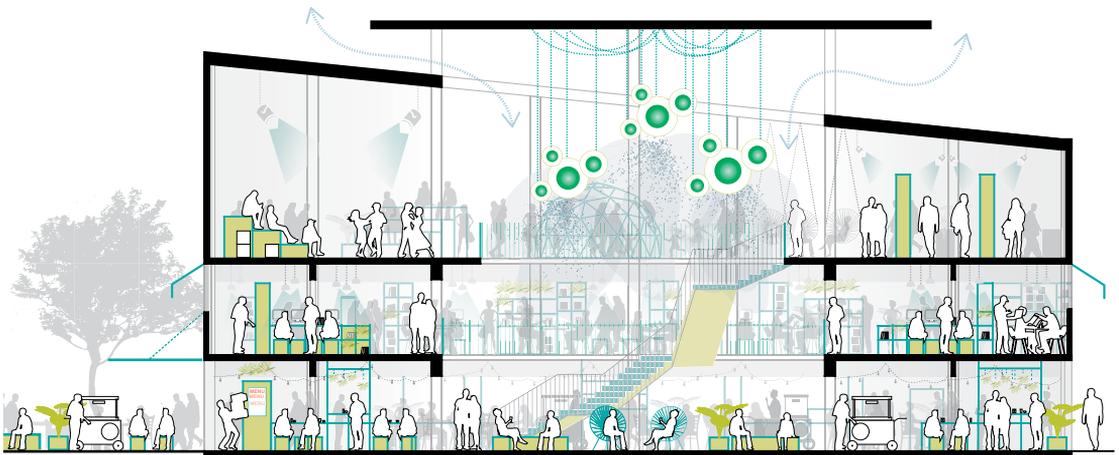


FIGURE 8. Section and recreation of the interior. CREDITS: Ecosistema Urbano.

spaces with the surrounding open spaces, the improvement of its climatic comfort via bioclimatic design, the integration of new technologies and utilities to prepare for innovative uses, the creation of an open and inclusive management system, and the extension of the opening hours to create an almost 24/7 facility.

— A New Approach to Revitalization: Strategies and Tactics

One way of understanding and explaining this project is by looking at it as a strategic intervention. 'Strategy' and 'tactic' are two terms that can very well describe the contemporary vision of urban development that underlies the project. While urban planning requires a long-term strategic vision, our approach to urban activation or revitalization also takes the more agile or tactical route, delivering the proposals in a way that makes them capable of being implemented and tested as soon as possible. This approach focuses on 'bootstrapping' urban activation by implementing several site-specific low-cost actions.

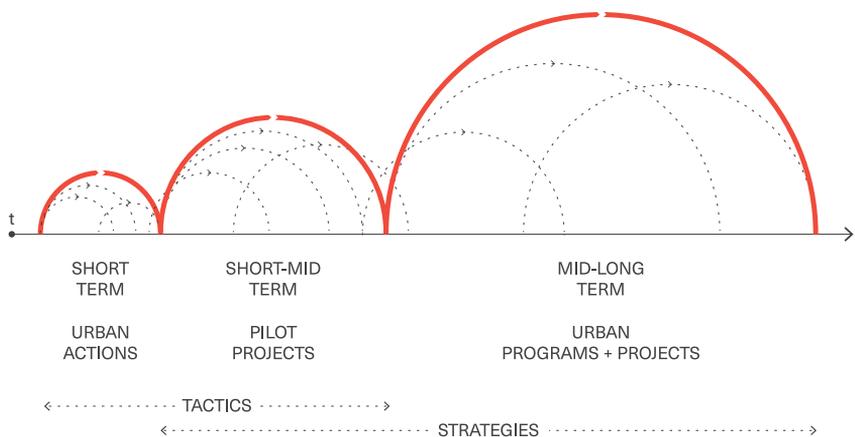


FIGURE 9. From tactics to strategies: urban actions, pilot projects, and long-term programs.
CREDITS: Ecosistema Urbano.

INCO DE ROPA



MACONGU



CREDITS: Inter-American Development Bank (2016-2018).

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ESTÁS
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#CocaMural

In the case of the “Idea Hermosillo” plan, the chronological process could be explained as a series of temporary arcs extending over different time spans (Figure 2).

The concept of early activation was applied from the preliminary design and study process (which lead to the “Idea Hermosillo” plan) to the actual urban development process afterwards. Pure tactical interventions in the form of ‘urban actions’ were implemented during the actual design/participation process, probing locations, and concepts. And tactical interventions were turned into strategically-grounded pilot projects, which can then be extended into long-term urban design processes where the strategic vision will—finally—be fully embodied.

The Banco de Ideas became the first example of this approach: a pilot project framed in a long-term strategic vision but conceived and activated in the short term through participatory activities and temporary actions. A tactical intervention—repurposing and refurbishing a building—became proof of concept for a strategic goal: regenerating a neighborhood.

Aside from generating positive impact from the beginning, the main advantage of this methodology is that short-term tactics can actually help improve long-term strategies. Proposals can be tested in a quick and resource-efficient way, leading to high returns in terms of direct experience, project communication, civic engagement, and technical feasibility. Data can be generated and evaluated, and based on these conclusions, certain aspects of the overarching strategies can be adapted for the better.

— The Challenges Ahead

By combining the technical and the social sides of urban development, we believe the plan we developed is deeply rooted in the local conditions and has all the main ingredients for the successful revitalization of the city center. The biggest challenge now, by far, is to make it a reality.

Our approach to urban activation or revitalization takes the more agile or tactical route, delivering the proposals in a way that makes them possible to be implemented and tested as soon as possible.

Proposing several pilot projects already simplifies the question of 'what to do next' by suggesting manageable and actionable development 'packages' that follow long-term strategies. This array of possible interventions will enable the city of Hermosillo to work at different paces, scales, and budgets in the coming years. Partners and funding have to be identified, permissions are to be granted, and several other boxes checked in order to implement each of these projects. However, the plan can start from specific interventions that will pave the way for larger investments.

While pilot projects can help translate general guidelines into specific actions, the long-term strategies proposed in the plan still have to be turned into urban programs, local laws, or other actionable items of urban development. Hermosillo has the opportunity to transform the city center into a much more attractive and livable place. "Idea Hermosillo" is not a fixed scheme that will force urban development like a corset: the tactical-strategical approach will allow the city to reconsider and improve the proposed solutions in order to better adapt to an ever-evolving urban area.



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MEXICO

CREDITS: Inter-American Development Bank (2016-2018).



#CasaMadrid
Mural #14
Kika
C. Duarte



CREDITS: Inter-American Development Bank (2016–2018) (left and right).





CREDITS: Inte – American Development Bank (2016-2018)



Dynamic, innovative, and productive, Hermosillo is one of the most prosperous cities in Mexico thanks to the hard work of its people and the strategic vision of its government. With a population of 850,000 and a median age of 27.9 years, it is a predominantly young city that is proud of its culture, its rich agricultural tradition, and its modern industrial sector. For more than two centuries, the city has leveraged its strategic location as a gateway to the United States to propel its economy and the welfare of its inhabitants forward. After little more than three decades of unprecedented economic growth, Hermosillo stands today as one of the 5% most prosperous municipalities in Mexico (Center for International Development, 2017) and has been able to consistently reduce social exclusion and poverty since 1990 (SEDESOL, 2017).

Diego Arcia
Adriana Chávez
Daniel Stagno

Hermosillo on a Human Scale

— A Diversified,
Innovative, and
Sustainable City

Yet, the economy of Hermosillo has lost its dynamism over the last five years. Its manufacturing sector, responsible for the industrialization and subsequent economic take-off of the municipality during the period of 1980-2010, has played a prominent role in the city's current economic slowdown (Center for International Development, 2017). If this trend continues, Hermosillo risks losing some of the advances in social welfare achieved during its boom years. From a spatial perspective, the urban form of Hermosillo has responded to the rapid industrialization through a horizontal, mono-functional, and low-density expansion (IDOM, 2017). This development pattern directly impacts urban inequality and generates upward pressure on government expenditure, as it increases the costs of providing infrastructure and basic services. In this sense, low-density urban sprawl threatens the future growth and sustainability of this Mexican city.

Hermosillo's development pattern has made for greater distances between citizens, their workplaces, and service centers. Consequently, this dynamic has increased congestion, affecting the productivity of labor and impacting welfare levels in the city. The automobile stands today as the main mode of transportation in the city, responsible for 48% of trips. Long commuting times make public transport unattractive for citizens with access to automobiles (Navarro, 2017), while some bus lines have overlapping routes and their frequencies are usually low. Mobility problems may further restrict the competitiveness and development of new industries in Hermosillo if innovative solutions are not implemented to improve public transport in the city.

Another critical factor for the sustainability of the Sonoran capital is the availability of water; the overexploitation of this resource has rapidly reduced the city's reserves. An insufficient water supply could limit Hermosillo's growth and make it more vulnerable to climate change. Moreover, it could also restrict the possibilities of economic diversification by imposing prohibitive costs on water-intensive production processes.



CREDITS: Inter-American Development Bank (2016-2018).

— ESC Program for Hermosillo: Analysis and Diagnostics

The Action Plan for Hermosillo began with a strategic diagnosis based on the 30 topics covered by the Inter-American Development Bank (IDB) Emerging and Sustainable Cities (ESC) Methodology. The Methodology proposes two fundamental tools for this purpose: the Multisectoral Diagnosis and the Base Studies. Both tools were complemented with the perceptions of the citizens of Hermosillo, which were collected through a Public Opinion Survey.

The IDB, the municipality of Hermosillo, state and federal governments, and the organized civil society, participated in the process of assessing the current situation of the city and formulating the Action Plan. Three dimensions were evaluated in this process:

1. Environmental sustainability and climate change;
2. Urban sustainability;
3. Fiscal sustainability.

This exercise involved the collection, refinement, and verification of local data into 132 indicators, which were then contrasted with regional and national parameters, and subsequently evaluated according to their level of importance.

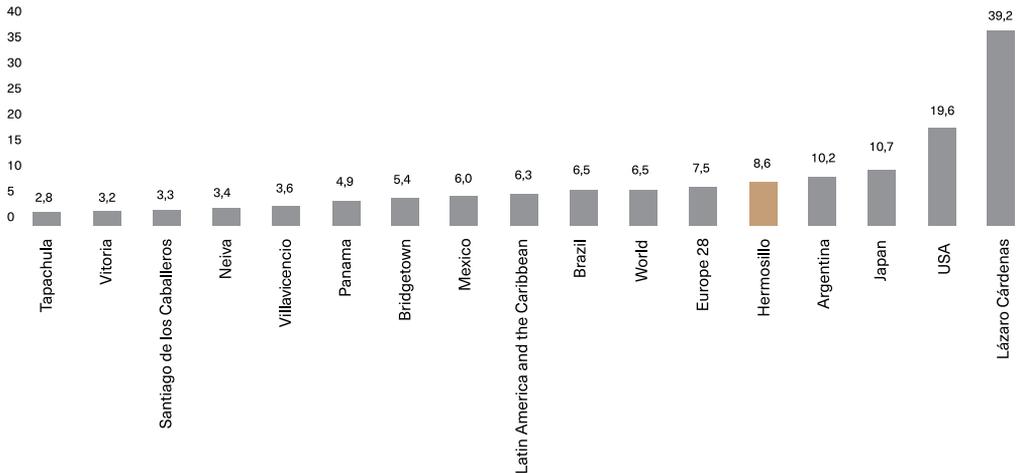
From an environmental sustainability and climate change perspective, the ESC methodology identified challenges in the efficient supply of drinking water, treatment of wastewater and solid waste, energy coverage and efficiency, and the use of alternative and renewable energy. From an urban sustainability perspective, the ESC methodology identified the need to control the city's growth, promote the densification of central areas, improve public transport, and provide infrastructure for pedestrians. Finally, the fiscal sustainability dimension identified a need to design and put in place systems for more efficient public management, as well as plans to reduce municipal public debt.

Aside from these three dimensions, three base studies were carried out to complement the ESC diagnosis with an in-depth analysis of territorial dynamics. These studies evaluated the main problems and opportunities of the territory regarding the mitigation of the effects of climate change, risk reduction in natural disaster scenarios, and urban growth scenarios for 2030 and 2050.

- The study on climate change measured and evaluated the balance of per capita Greenhouse Gas (GHG) emissions for the municipality of Hermosillo, highlighting the risk that a model of urban development based on automobiles represents for the city's sustainability.

- The study on vulnerability to natural disasters focused on threats due to drought, river floods, and rain floods, including analyses of water deficits and potential losses due to floods, in return periods of 50 and 100 years.

- The urban growth study evaluated the city's historic patterns, highlighting two dynamics: an acceleration of population



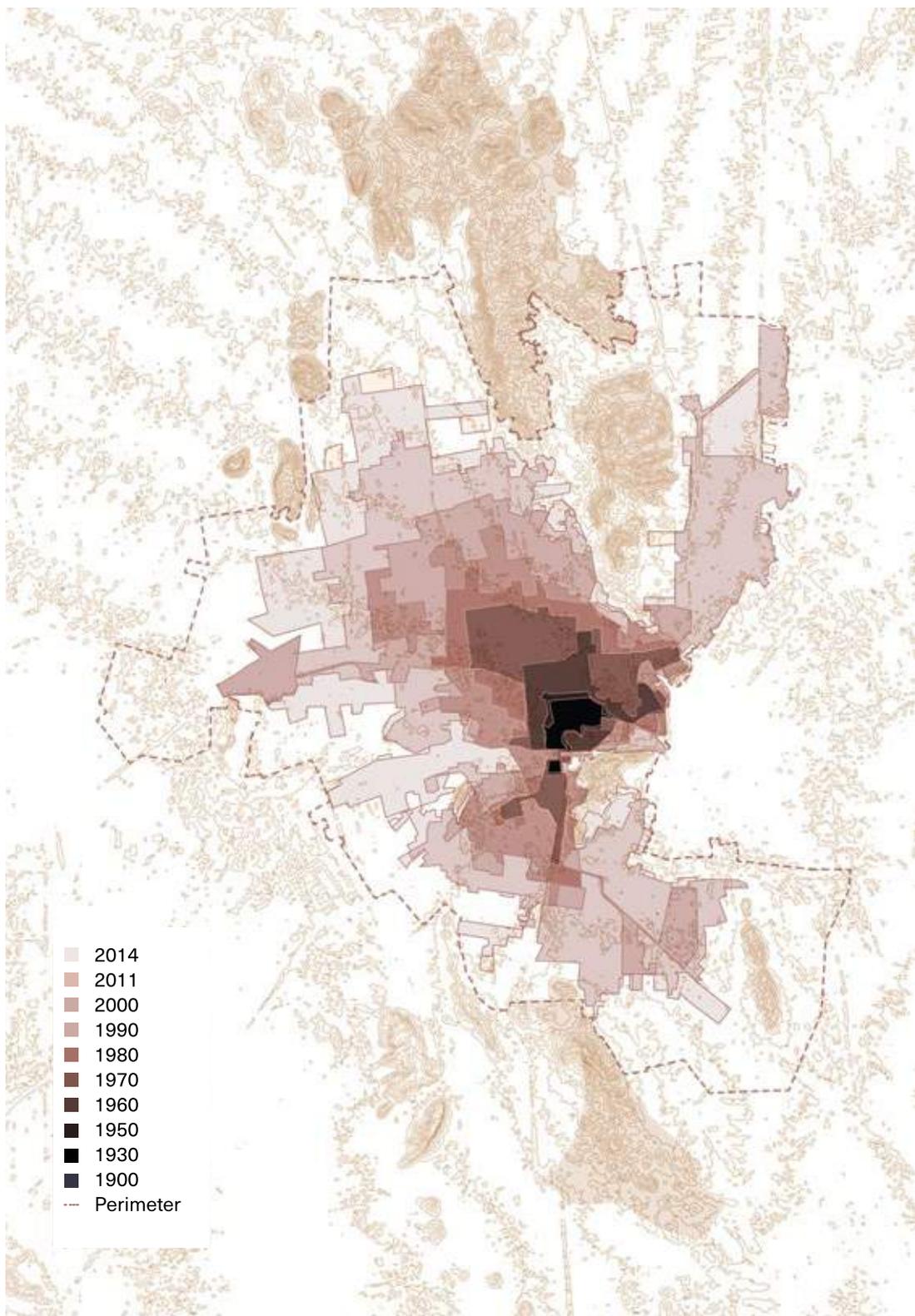
Comparison of per capita emissions balances (T CO₂/HAB). CREDITS: CAIT Climate Data Explorer for Countries / IDB for Cities.

growth between 1930 and 1950—possibly due to the Green Revolution—and a constant deceleration starting in 2005 (close to 2.4% in the last intercensal period) that could be associated to the apparent exhaustion of the city’s economic model.

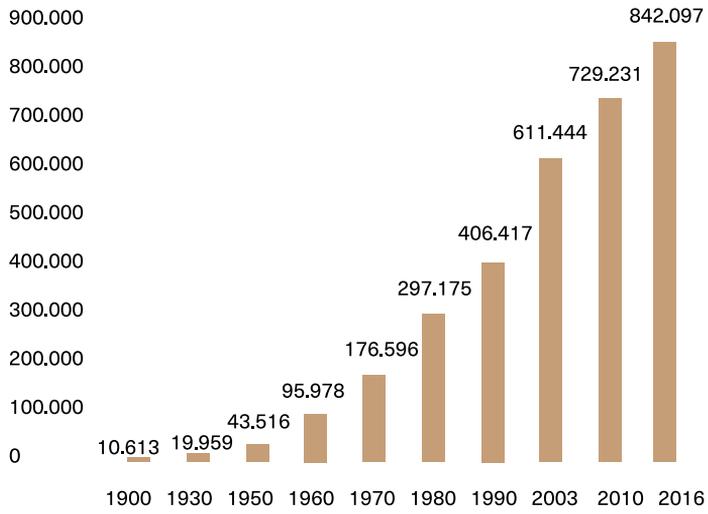
A prospective analysis on urban growth enabled a visualization of the city in 2030 and 2050. Three scenarios were built:

1. A trends scenario, based on assumptions of the current model of urban development;
2. The optimum scenario, which incorporates desired planning elements to amend deficiencies in the system;
3. The intermediate scenario, which considers financial limitations to ideal planning.

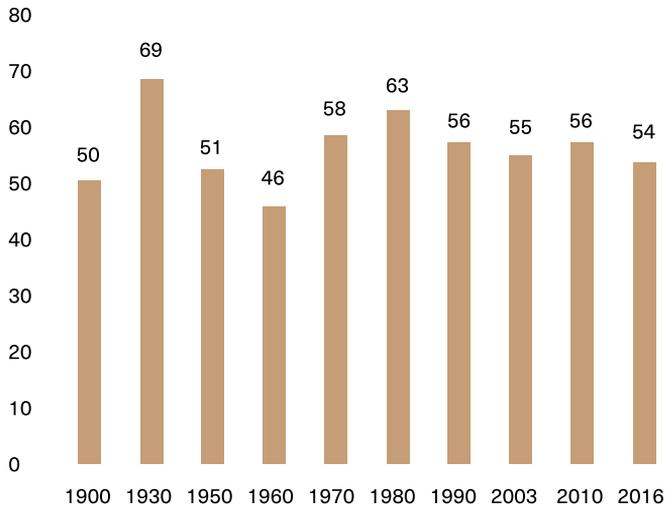
The intermediate scenario—a realistic scenario with limited resources and institutional capabilities that aims to achieve a more sustainable growth pattern for Hermosillo—aspires to consolidate and densify 23,122 hectares of the city, which would include 130,000 new households by 2050. In this scenario, the urban footprint would grow 41% (7,422 hectares) since 2016; the gross urban density would decrease from 47 to 44 inhabitants per hectare, and the built urban density would increase from 17 to 18 inhabitants per hectare. The intermediate scenario requires infrastructure investments of approximately 8,500 million dollars (61% of the investment that will be required if the current growth trends continue unchecked).



POPULATION

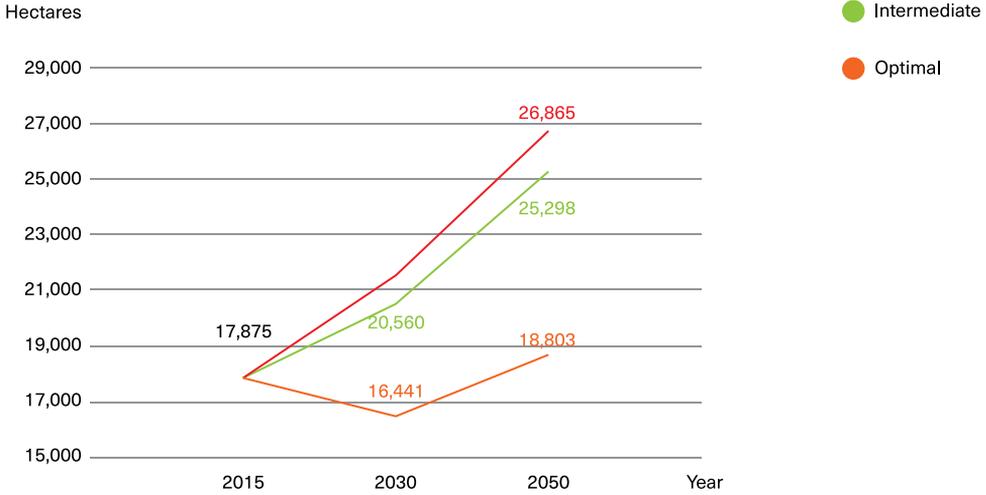


DENSITY

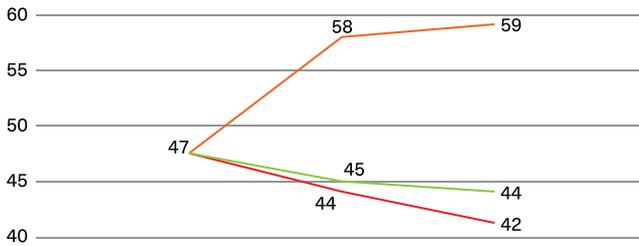


Urban Footprint Growth 1900-2016.
CREDITS: IDOM Hermosillo Baseline Study 2017.

EVOLUTION OF URBAN FOOTPRINT



GROSS DENSITY (Inhabitants per hectare)



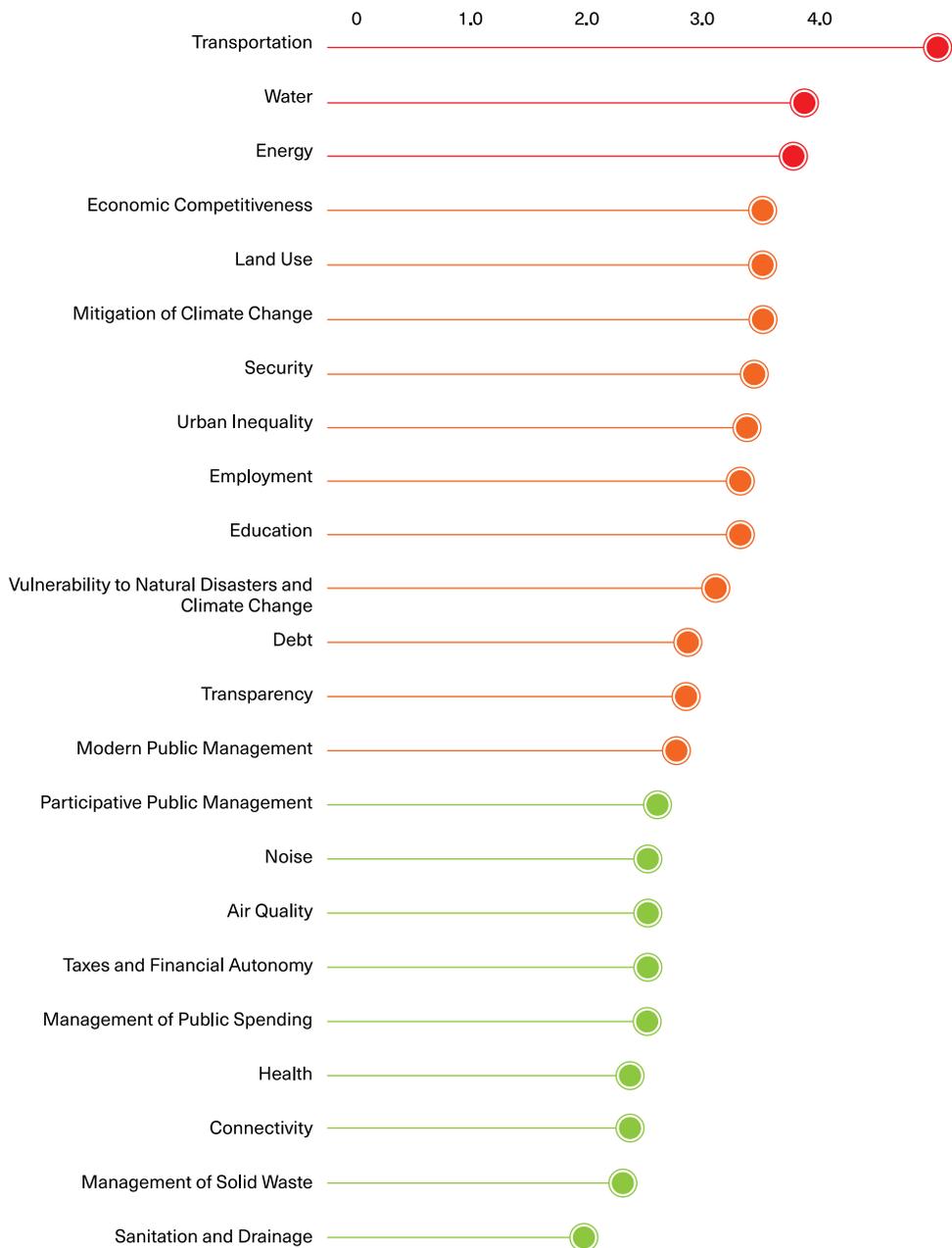
CREDITS: IDOM

— What should Hermosillo's priorities be?

Tackling all the challenges identified in the diagnosis at the same time would be difficult given the budgetary, technical, and time constraints faced by the municipal government. For this reason, the Action Plan prioritizes the issues that could generate greater benefits in overall quality of life without compromising the financial, political, and environmental sustainability of the city and its government. For this purpose, the ESC Methodology applies five filters to help refine the diagnosis: 132 indicators, a public opinion survey, an economic impact analysis, an environmental impact analysis, and a multi-sectoral analysis.

RANKING OF THEMATIC PRIORITIES

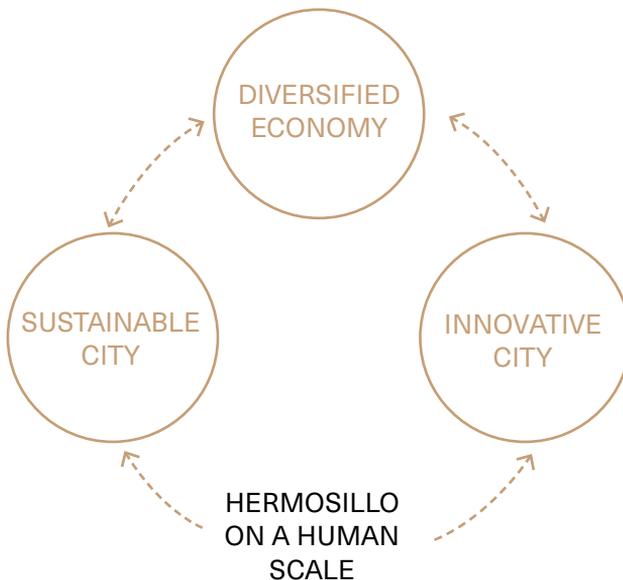
- Highest priority
- Medium priority
- Lowest priority



In the prioritization stage, the ESC identified three priorities for Hermosillo: 1) mobility and transport, 2) water, and 3) energy. After a process of dialogue with the municipal and state government, the private sector and civil society, competitiveness, and land use/management were also prioritized.

— The Action Plan: Hermosillo on a Human Scale

To consolidate a model of sustainable and inclusive development, Hermosillo must face its challenges with a long-term vision that promotes integral solutions in the social, urban, and economic aspects of its development and puts the environment at the center of the agenda. The Sonoran capital must begin a process of productive diversification while reimagining its model of urban development so that citizens come first. This implies nothing less than a paradigm shift: from a Motor City to a Human Scale City.



The ESC Action Plan has been structured upon three strategic lines:

1. Hermosillo diversifies its productive base to promote inclusive and sustainable economic development

Thanks to its rapid industrialization, Hermosillo has reached a level of development that allows it to provide high standards of living to its inhabitants. However, the economy of Hermosillo has lost dynamism in recent years: even in the context of Mexico's low growth from 2005-2015, the rise in Hermosillo's GDP per capita (1.3%) was below the federal average (1.4%) (CID, 2017). Studies carried out in 2017 by Harvard's Center for International Development suggest that Hermosillo's economic slowdown is a consequence of the lag in the diversification and sophistication of the municipality's exports base. While other comparable municipalities in Mexico used their know-how to diversify their economies and move up the value chain, the Sonoran capital has not managed to increase the sophistication of its main exports. Meanwhile, the prospects of the automotive industry as an economic engine for Hermosillo's economy have been deteriorating steadily.

In this context, Hermosillo must leverage the productive capabilities it already possesses while acquiring those it lacks, in order to attract sectors of high potential for future development of the local economy. Economic dynamism will be essential to creating fiscal space to invest in the infrastructure, services, and amenities that will allow Hermosillo to become a city on a human scale.

2. Hermosillo guarantees the sustainability of its resources

Between 2008 and 2015, Hermosillo was classified as one of the municipalities with the highest likelihood of drought occurrence and as one of the municipalities with greater vulnerability to the increase in average temperatures (PRONACOSE, 2015). According to ESC Program base studies (IDOM, 2017), over the next 30

years, average temperatures in Hermosillo will increase by 1°C, the volume of precipitation will decrease by 20% and only 70% of its current water supply will remain. The city's vulnerability to drought has increased due to the uncontrolled urban growth and the wasteful use of water in the city, which has led to the drying up of the Abelardo L. Rodríguez dam, the depletion of surface bodies, and the depletion of groundwater wells (Wilder, Scott, Pineda-Pablos, Varady, Garfin 2012).

In this context, Hermosillo needs to leave behind traditional policies aimed exclusively at increasing water supply through major hydraulic engineering works, and reduce its vulnerability based on land use and smart urban design. Achieving this objective also entails improving the operative and commercial efficiency of its Operating Body, carrying out basin studies with water availability projections, rehabilitating the potable water system, strengthening the commercial management of the Operating Agency, updating and implementing the Urban Drainage Strategic Plan, and developing the Strategic Plan for the Reuse of Residual Water Treatment.

Hermosillo must reimagine its urban design and territorial planning from a perspective of resilience to climate change. This involves creating a Municipal Program of Climate Action that integrates, on the one hand, specific efforts aimed at improving energy efficiency, as well as the management of urban solid waste; and on the other, ensuring sustainability in the management of the municipality's water resources through a circular economic approach.

Hermosillo's development pattern has created greater distances between citizens, their workplaces, and service centers.



Image of densified street proposal in downtown Hermosillo with improved urban amenities.
CREDITS: Santa María et al (2017)

3. Hermosillo reimagines its urban development to sustain and improve its quality of life.

In recent decades, Hermosillo's urban form has reacted to the city's fast industrialization with low-density horizontal expansion and an urban development pattern that affected the quality of life of its citizens and now endangers the sustainability of the city. Changing Hermosillo's urban development pattern is not only important to quality of life in the municipality, but also plays a critical role in the city's desired economic growth. Urban issues—flaws in the public transport system, difficulties in pedestrian mobility, abandoned households, empty lots, deterioration of the historic center—reduce Hermosillo's appeal to private investment and highly qualified human capital, two fundamental elements in reactivating its economic development.

The city presents a low gross density (53 inhabitants per hectare) in an oversized extension: approximately 17,000 hectares. Since 2000, Hermosillo has been expanding into private land located in the periphery where single family homes are settled. This model of expansion has drawn people away from their places of work and distanced them from basic services and public spaces, generating sizeable inner city displacement and impacting the efficiency of the transport system.

In terms of its natural environment, Hermosillo has an enviable urban geography. The hills that run from north to south offer many possibilities to create new spaces for recreation. However, there is no efficient public policy to recover, preserve, and activate natural reserves—this is a missed opportunity in a city where most spaces for social encounters are private areas like commercial spaces, movie theaters, and malls. Despite having 547 green areas and 191 neighborhood parks, Hermosillo only provides 2.14 meters squared of green spaces per inhabitant (one of the lowest rates in Latin America). Moreover, the supply of green areas is largely uneven: among the wealthiest segments of the city, nearly 56% of residents have walking access to green areas but in lower-income neighborhoods only 18% have walking access to green areas.

In this context, the Action Plan proposes a reinvention of the current urban model through a paradigm shift from a motor city to a city on a human scale: a city for people, with amenities and quality urban services. To achieve this, it proposes three complementary lines of action:

- a. Consolidate and improve the efficiency of the public transport system by promoting alternative uses of automobiles through a Route Network Plan for the Hermosillo Integrated Mobility System (SIMHer for its Spanish acronym), designing a project for public transport trunk corridors, changing the bus fleet for SIMHer, drafting a cyclist infrastructure plan, improving the user information system (UNE for its Spanish acronym) and the monitoring system (UBICA for its Spanish acronym), and strengthening municipal and state governance in sustainable mobility.
- b. Redirect growth and urban form through a Transport Oriented Densification Program, develop new centralities and mixed uses, and create a program to upgrade abandoned households.
- c. Recover the city's landscape and public spaces by developing a landscaping masterplan with an emphasis on four projects: recovering value in the hill corridor, the construction of viewpoints, the construction of paths, and the reconversion of canals using green infrastructure.

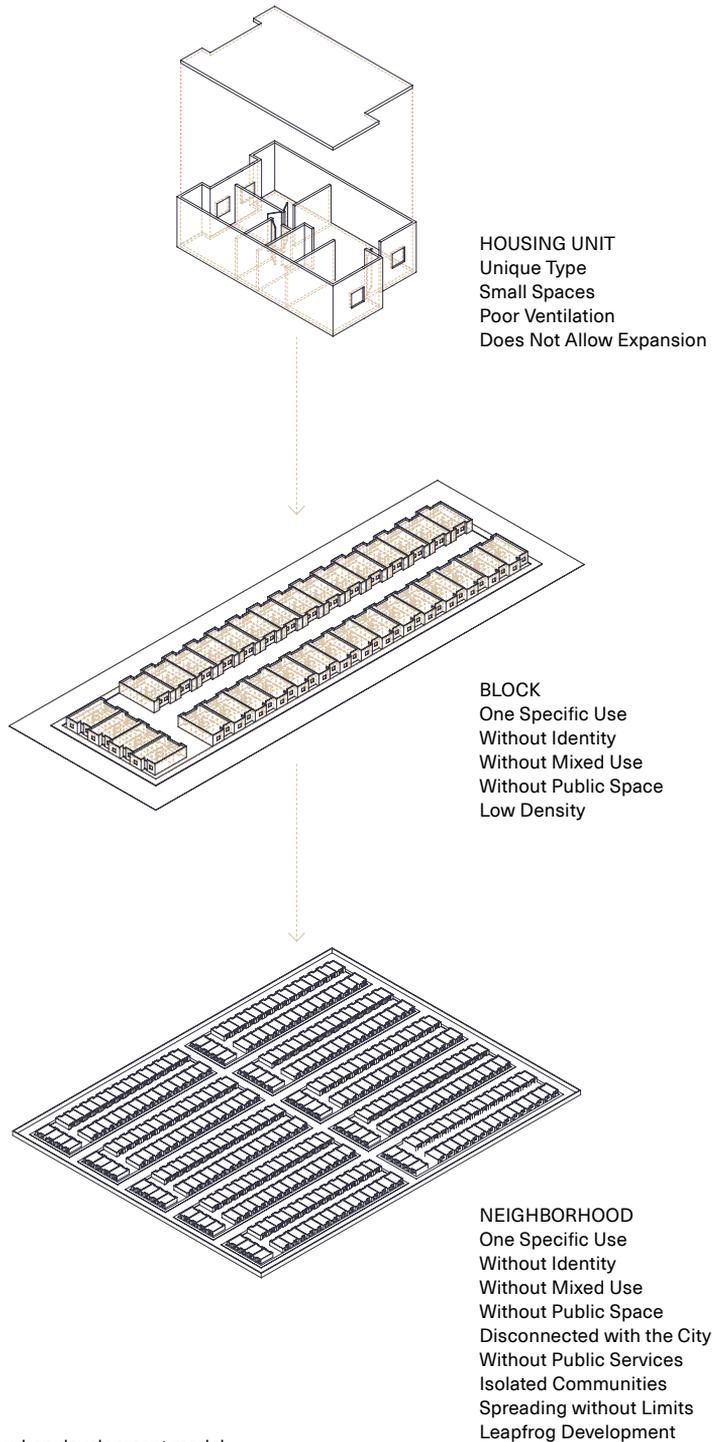
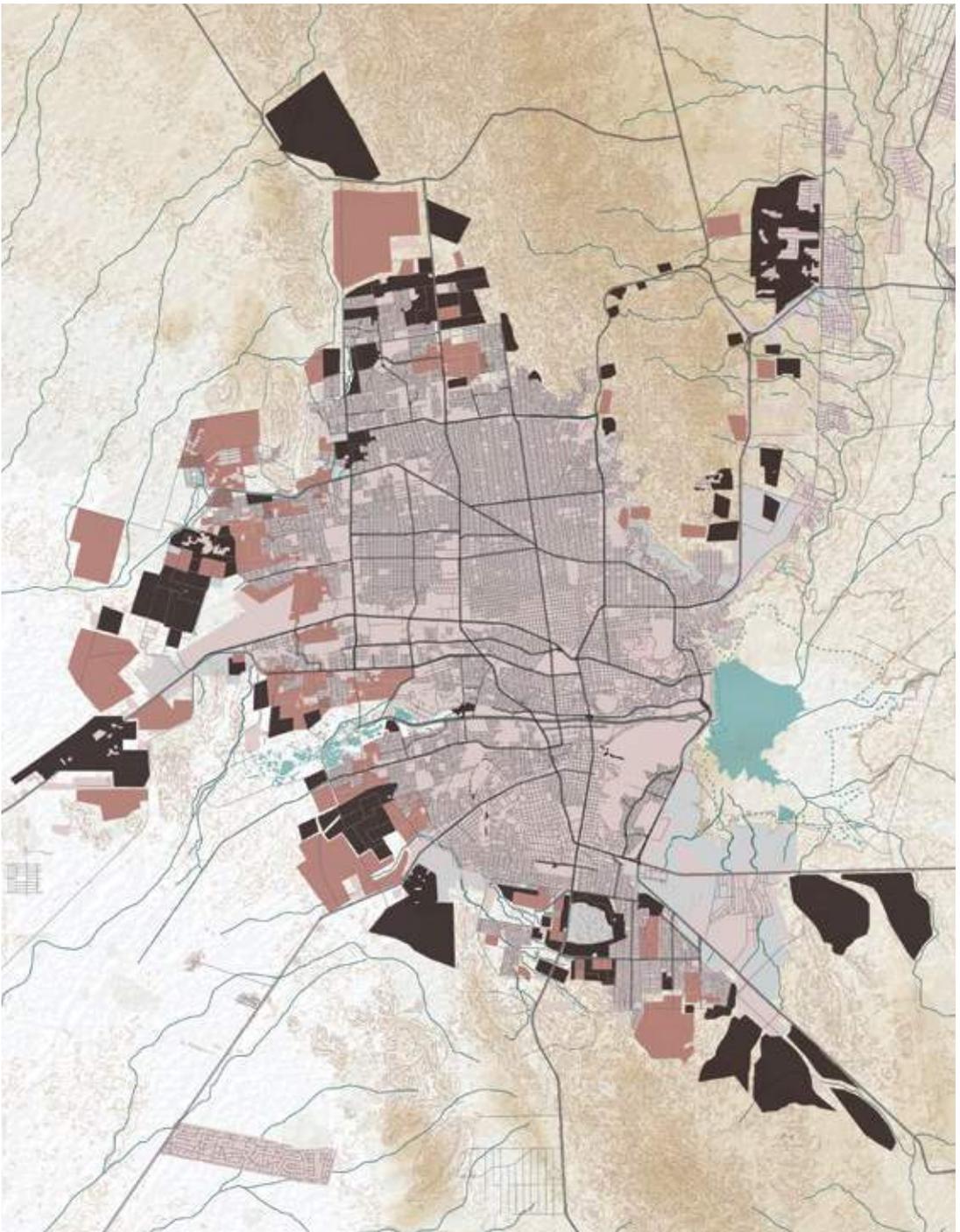


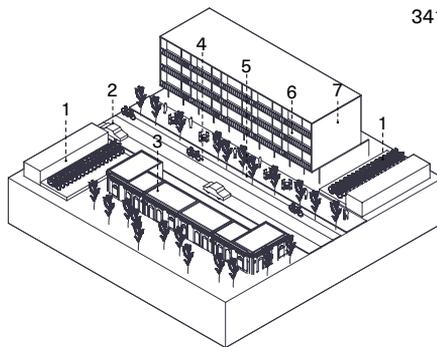
Diagram of the current urban development model through repetition of single family homes
CREDITS: Santa María et al, 2017.



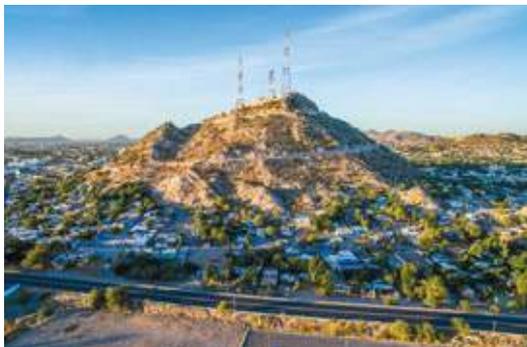
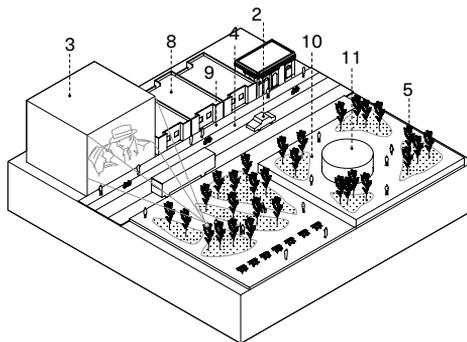
Scenario of total growth until 2050.
CREDITS: Santa María et al, 2017.



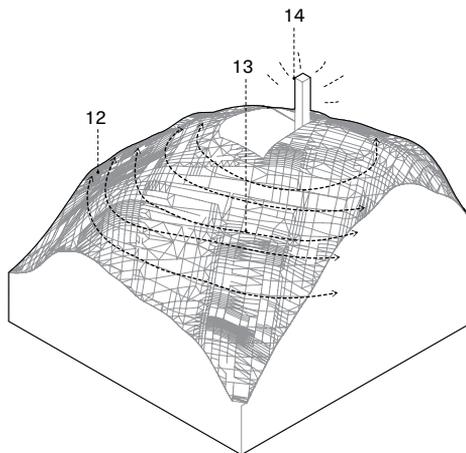
Density increase along structuring roads.
 CREDITS: Santa María et al, 2017.



Upgrade of urban amenities along the transport corridors.
 CREDITS: Santa María et al, 2017.



Cerro de la Campana.
 CREDITS: "Rethinking Hermosillo" GSD.



- 1. Bike Stations
- 2. Transportation
- 3. Reuse
- 4. Cycle Path
- 5. Green Area

- 6. Views
- 7. Dense Housing
- 8. Rehabilitation
- 9. Sidewalks
- 10. Plaza Activation

- 11. Identity Landmarks
- 12. Neighborhood Revitalization
- 13. Walking Trails
- 14. Landmark

Actual

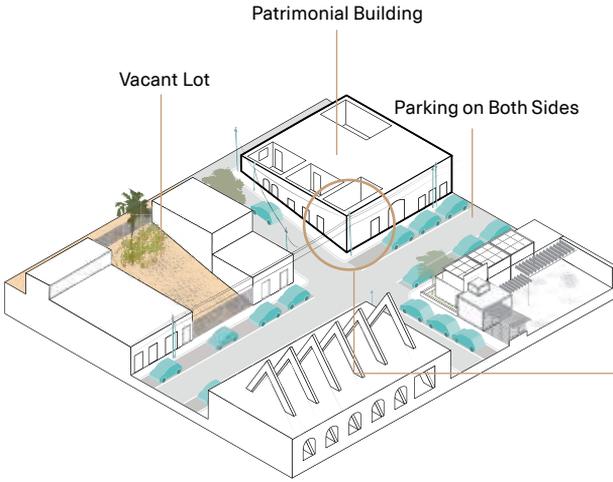
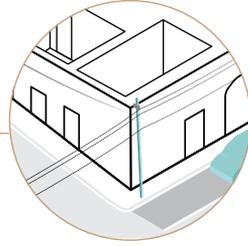
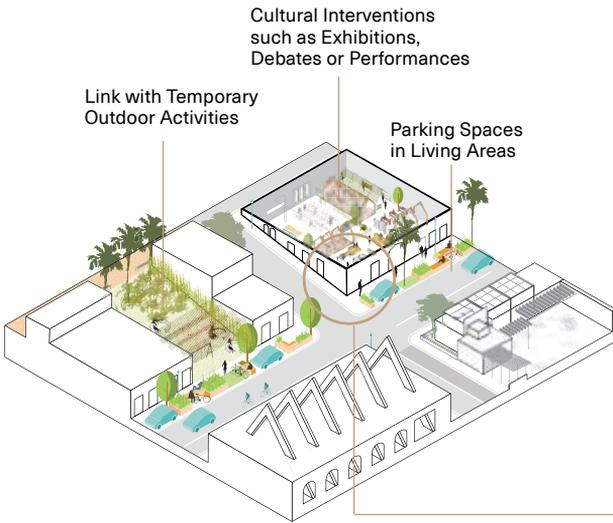


Image of actual state.



Actual Patrimonial Building

Proposal



Red Bull Music Academy (Madrid).



Cultural Hub

Axonometry with actions and interventions in the area of Cerro de la Campana. CREDITS: Ecosistema Urbano.

Actual

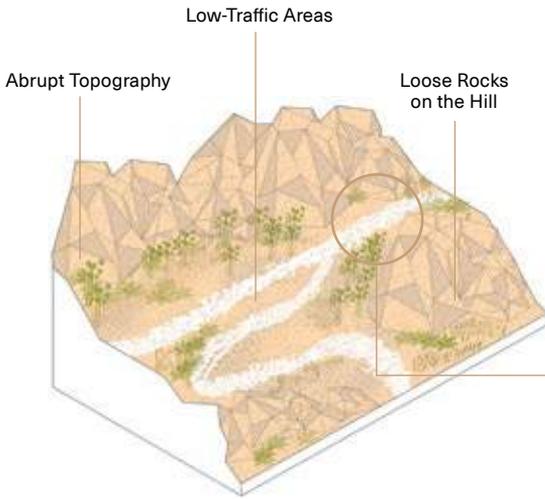
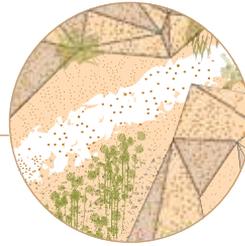
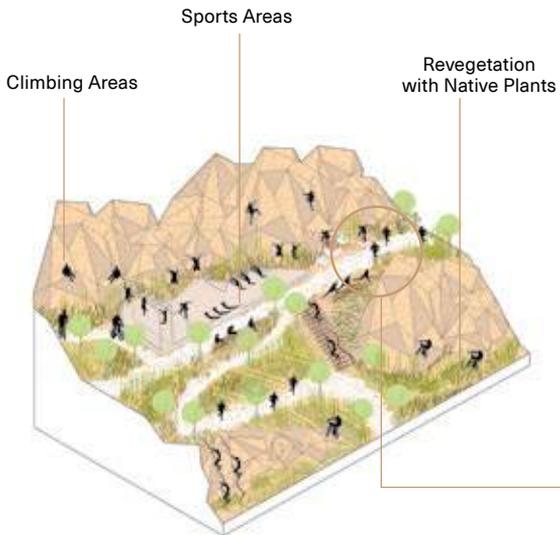


Image of actual state.



Steeper Slopes

Proposal



Park Beringen (Belgium).



Sports Areas

— Integral Project: Revitalization of Hermosillo's Historic Center

The biggest challenge for the ESC program, given the narrow timeline of local administrations, is to build a long-term vision and plan. To solve this issue, the program prioritizes areas that will have greater impact in terms of quality of life and sustainability; it also prioritizes projects that offer clear short-term benefits for quality of life and therefore generate citizen support to continue with other long-term actions in the future. Following this strategic line, the project “Idea Hermosillo: Plan to Revitalize Hermosillo's Historic Center” was conceived as a way to enable collaborative entrepreneurship, generate innovation, and create quality jobs in the traditional center of Hermosillo. The project serves as a means to strengthen social capital and promote local identity.

Urban interventions considered in the Action Plan will be coordinated through Hermosillo's Municipal Planning Institute (IMPLAN for its Spanish acronym). Hermosillo was one of the first 10 municipalities in Mexico to have a local planning institute, and its IMPLAN is considered one of the best performing in the country.

Our recommendations for Hermosillo's IMPLAN include adjusting the Urban Development Program for the Population Center of Hermosillo (PDUCHP for its Spanish acronym) in order to incorporate modifications to the limits of urban growth, the regulation that incentivizes the Development Program for Transportation (TOD), the recovery and revitalization of the Historic Center, and the work in natural reserves and public spaces. The PDUCHP should be in harmony with the Integral Plan of Sustainable Urban Mobility, the Public Spaces Master Plan, and the Hills Recovery Plan, among others.

The Action Plan does not suggest that new regulations be created, but that existing ones be reinforced and used to leverage the initiatives outlined in this document. These initiatives present a multi-disciplinary tool for long-term urban planning as well



Hermosillo on a Human Scale. CREDITS: Inter-American Development Bank (2016–2018).

as a base for innovative public policies. It has the potential to reactivate the city's economic dynamism, promoting a more efficient use of natural resources, and consolidating a new model for the city on a human scale.

Notes/References

1 – The action plan is a technical document that includes the city's vision, an evaluation of its multi-sectoral sustainability, and proposed projects for improving its performance. The Action Plan tells us where we have come from, where we are going, and where we want to go. It reflects the city's vision of its future development, as defined in the technical analysis of the urban situation and the consensus reached by its citizens (Inter-American Development Bank, 2016).

2 – This strategic line was structured from the study, "Yes there is a future after cars: analysis of economic growth in Hermosillo," prepared in 2017 by the Center for International Development (CID) at Harvard University, under the CES Program in Hermosillo.

3 – Hermosillo's share in U.S. vehicle imports has fallen, while the Ford Motor Company (the largest automaker in Hermosillo) canceled its plans to invest in a new production line at its local plant.

4 – The strategic line used input from the study Rethinking Hermosillo and the course "Emergent Urbanism: Planning and Design Visions for the City of Hermosillo, Mexico," both produced in collaboration with the Harvard Graduate School of Design.

5 – For the design of the plan, the IDB hired the firm Ecosistema Urbano, recognized internationally for their experience in the recovery of historic centers.



CREDITS: Inter-American Development Bank (2016-2018).





CREDITS: Inter-American Development Bank
(2016–2018) (left and right).





CREDITS: Inter-American Development Bank (2016–2018) (left and right).



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Felipe Vera

AFTERWORD:

FROM

THEORY

TO

PRACTICE

In 1983, Donald A. Schön published the first edition of “The Reflective Practitioner.” Thirty-five years later, we sense a significant gap between practice and academia, as if thinking and doing were actions from different domains. On the one hand, the realm of reflection is committed to exploring the boundaries of imagination and critical thinking, resisting to accept the normative tendency of reality. On the other, the realm of practice is committed to making things happen, many times hampering reflection in the anxiety of accepting rules and navigating reality.

In his seminal book, Schön (1983) argues that “competent practitioners usually know more than they can say. They exhibit a kind of knowing-in-practice, most of which is tacit.” In a certain way, this phrase summarizes our vision at the Inter-American Development Bank (IDB), and the reason why we approached Diane E. Davis, Chair of the Department of Urban Planning and Design at the Harvard Graduate School of Design (GSD), and invited her to embark on this project.

This project emerged from a strong conviction that the gap between practice and research must be bridged, and that we need to explore

new ways of engaging both with reality and with academia. In this sense, this has been a great opportunity for the IDB's Housing and Urban Development Division (HUD) not only to learn, but also to explore a format for doing things in a more nuanced and provocative manner. The Hermosillo project was, therefore, an experiment concocted out of three main ingredients: a city facing a turning point in its development; an academic with vast knowledge, insights, and energy; and students coming from all over the world with a variety of visions to help us reflect and decide how to best advise Hermosillo.

Advising a mayor is always a very difficult task; it not only requires grounded and realistic thinking, but also imagination. Going from an idea to its materialization is a difficult process that becomes even more difficult given political interests, limited time, and resources. Inviting the GSD to help us put together an Action Plan for Hermosillo was, in a way, an attempt to close the gap between two scopes of action: what we do in the field, in our daily interaction with governments, municipalities, and other international agencies, and the GSD's capacity to test ideas, innovate, create, and imagine that which is still not there. As a result of this

collaboration, we are taking many lessons with us that we believe will help us think about how to better assist other emergent cities in Latin America in the future.

The gap between practice and research must be bridged, and we need to explore new ways of engaging both with reality and with academia.

The first lesson we draw from this experience originates from the opportunity to test the common assumption that smaller cities have smaller potential. As Diane mentions in her introduction to this volume, emerging cities create environments that are often most conducive to innovation, which foster renewed ways of thinking. An emerging city—and one that has grown at an incredibly fast pace—Hermosillo illustrates the challenges and opportunities that rapid growth brings to cities in the region. Gabriela Soto Laveaga's contribution shows us that the economic potential of a city does not always rely on what is evident in the present,

and that digging in its past can shed some light on opportunities to rethink the city's future. In the case of Hermosillo, the key question is: How did wheat come to dominate Sonora and, in particular, how did Mexican wheat seeds come to transform global farming? In her article, we learn that Hermosillo's agricultural tradition and its location in the middle of the Sonora desert placed it almost at the center of the Green Revolution. This legacy laid the groundwork for the city's potential for innovation.

At the dawn of agriculture, the automobile industry became the driver of Hermosillo's economy and prosperity. Automobile production began in 1986 and catalyzed an accelerated process of industrialization. Today, however, this industry has become one of the factors behind Hermosillo's economic slowdown, which has placed it behind comparable cities in the country. This calls for exploring other industries, but which ones? By implementing two methodologies developed by Harvard's Center for International Development (CID)—the Growth Diagnostic and the Economic Complexity Analysis—Barrios and Santos identify a series of factors that constrain Hermosillo's growth, as well as sectors and products with high potential

to overcome these limitations. *Hermosillenses*, they conclude, must leverage their know-how—particularly in the automobile industry—to diversify their productive structure in order to attract new investment towards more complex industries. This is a valuable lesson that also resonates with other intermediate cities in the region whose economy is also dominated by a single industry or company.

Beyond its economic outlook, Hermosillo's growth patterns have played a key role in the development of the city. The same sprawl that we see in many cities of the region has acquired tremendous scale in Hermosillo. In their article, Arcia and Silva unpack the underlying factors that explain urban expansion in Latin America and stress the importance of plans as "an indispensable instrument for the development of an integrated vision of the city and its management." For these authors, fighting sprawl is not just a matter of regulation, but also requires unveiling a set of traditions and local practices that are driving urban patterns of growth. The lessons they draw, once again, are not only pertinent to Hermosillo's future, but also present a blueprint for other Latin American cities that are struggling to

unleash their potential amid rapid population and territorial expansion.

Large-scale urbanization brings a new set of challenges that require factoring innovation into policy design and implementation. For Benton, Blanco, and Razu, however, urban innovation cannot be crafted in a vacuum, but must be conceived with and by city dwellers. The growing presence of urban laboratories such as the IDB's Cities Lab, is an indicator that cities—and their governments—are beginning to listen to citizens' voices when designing solutions to improve their quality of life. What might seem intuitive and logical, is only now beginning to materialize, paving the way for a new era where planning and managing the city becomes a “collective human project.”

Three positive examples of this notion of collective urban thinking can be found in the projects designed by GSD students in the context of the class Diane and I taught together in the fall of 2017. Based on the contributions by IDB specialists and external consultants, and after spending a week in Hermosillo, students divided into three teams and worked on their visions to achieve a sustainable future in Hermosillo.

One of the projects (Castro, Joseph, and Tzemou) looks at the revival of the agricultural industry as a strategy to help the city deal with its water crisis while creating new sources of jobs and income. The second project (Seijas, Silva, Summers, Wolf, and Zwetich) analyzed how downtown Hermosillo's existing urban conditions prevent it from becoming a lively, dynamic, and multidimensional place. The third project (Alvarez, Kofman, Matthew, and Ramirez) proposed a strategy to activate a low-density area of the city with high demand for social and cultural amenities but great access to mobility. These three strategies carefully looked into the factors that currently constrain Hermosillo's growth and innovation, and the sites and actors that must be involved to unlock its unrealized potential. From Schön's perspective, these projects are grounded visions, that—if implemented—will not only transform the city, but also guide political leadership towards deeper and more productive reflection.

In his book, Schön (1983) asks a key question "how is professional knowing like and unlike the kinds of knowledge presented in academic textbooks, scientific papers, and learned journals? In what sense, if any, is there intellectu-

al rigor in professional practice?” Through this Harvard-IDB collaboration, I believe we have started to answer this question by unveiling that the ‘intellectual rigor’ he was seeking is a matter of building the right work environment, finding the right formats to engage multiple actors, and connecting young minds and rigorous researchers to answer practical questions with creative tactics.

These three elements—innovative mindset, multiple stakeholders and actionable research—are at the heart of a successful collaboration between local governments, development agencies, and academia. Hermosillo was the pilot to demonstrate that this model of experimentation is not only possible but successful. As a multilateral organization focused in helping countries to improve quality of life for their people, we at the IDB are grateful for this opportunity to work alongside Harvard University. We are especially thankful to Diane E. Davis and Mohsen Mostafavi for having believed in this project.

Which city will be next to embark on this challenge?



CREDITS: Inter-American Development Bank (2016–2018).





CREDITS: Inter-American Development Bank (2016–2018).





CREDITS: Inter-American Development Bank (2016–2018).



Author Biographies

— **PATRICIA ALVAREZ** is a Mexican architect whose research focuses on financial alternatives to promote mixed-use and infrastructure development in emerging markets as a means to enhance sustainable economies. Patricia worked as a Real Estate Manager for Edyen, a multi-city financial platform to finance educational facilities through private markets in Mexico City, was the project manager for several infrastructure projects including Terminal B of Monterrey International Airport in Nuevo Leon, and was a Senior Associate at VM Transfer / VM Architects, for residential, commercial, interior design and master planning projects. She has a bachelor's degree in Architecture from *Tecnológico de Monterrey* (ITESM), a valuation degree from *Instituto Politécnico Nacional* (IPN) and a Master of Design (MDes) in Real Estate and the Built Environment from the Harvard Graduate School of Design (GSD).

— **DIEGO ARCIA** is an urban development specialist. He was the coordinator of the Emerging and Sustainable Cities Program (ESC) in Mexico. He is a strategic leader and sustainable project development professional with 15 years of experience. He has worked with a number of government agencies—subnational, state level, and national—as well as multilateral development banks and agencies in more than 8 countries and 45 cities in Latin America. He currently works for the Inter-American Development Bank's Housing and Urban Development Division. Prior to joining the IDB, he served as an advisor in the *Financiera de Desarrollo Territorial* (FINDETER) for the Sustainable and Competitive Cities program. For four years, he worked at the IDB in Colombia on urban development and housing issues. Previously he worked as an advisor in the Ministry of Environment, Housing, and Territorial Development of Colombia, in urban development and urban regeneration programs. He was part of the team in the Department of Planning in the Municipality of Medellín in the revision and adjustment of the Plan of Territorial of that city. Diego holds a bachelor's degree in Architecture and a specialization in Urban Design from the National University of Colombia. He is currently a PhD candidate in Sustainability and Urban Regeneration at the *Universidad Politécnica de Madrid*.

— **DOUGLAS BARRIOS** is a Research Fellow at the Center for International Development (CID) at Harvard University. At CID, Douglas has led multidisciplinary teams on research projects aimed at rethinking and improving the development strategies pursued by countries, regions, and cities, and has also worked on designing policies that promote both productive diversification and inclusive growth. Before joining CID, he was a Public Sector Specialist at McKinsey's Bogotá office, where he served public and social sector organizations throughout Latin America and worked on a broad set of topics, ranging from ICT promotion strategies to education policy design. Other previous experience includes serving as an external policy adviser for local governments as well as political campaigns in Venezuela. Douglas holds a master's degree in Public Administration and International Development from the Harvard Kennedy School (MPA-ID 2012) and a bachelor's degree in Economics from the Universidad Metropolitana (Venezuela).

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