COLIMA
RESILIENTE
RESILIENCE
STRATEGY

Colima
GOBIERNO MUNICIPAL

COLIMA

RESILIENTE

Photo: Adrián F. Labastida Salgado

PALACIO MUNICIPAL

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Photo: Carlos Enrique Tirado Rascón

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- **Introduction**

Photo: César Aceves Alfaro

LEONCIO A. MORÁN SÁNCHEZ

The current municipal administration has from the beginning been committed to guiding our public policies to create conditions that will allow our city to have the best quality of life in the country. This is the future that we have imagined and are determined to make a reality with the support of the citizens of our city. The Colima Resilience Strategy is an important instrument that will guide both the capacity-building actions of the municipal administration and the efforts of various local actors. The Resilience Strategy will help us address all the challenges that prevent our citizens from living fulfilling lives and being prepared for all types of future events that could adversely affect both them and the city.

In this singular process of building a resilient future for our city, our task has been to complete the work already planned and to start the implementation phase, which extends to 2030. This is, of course, a great responsibility, but we assume it enthusiastically and we are committed to work to achieve the goals of the Resilience Strategy initiatives during our tenure, as established in the Municipal Development Plan 2018-2021. Succeeding administrations will update this agenda and continue to ensure its evolution and benefits.

On behalf of Colima Municipality, I thank all the citizens who have participated in the development of this program to benefit our city.

"The current municipal administration has from the beginning been committed to guiding our public policies to create conditions that will allow our city to have the best quality of life in the country."

MICHAEL BERKOWITZ

On behalf of 100 Resilient Cities, I want to congratulate the city of Colima, Mayor Leoncio Morán Sánchez, and Chief Resilience Officer Jorge Ortiz Moreno for the launch of the Colima Resilience Strategy, an important milestone for the city and for our joint collaboration.

The city of Colima is in the western region of Mexico, surrounded by volcanoes and rivers and strategically located 76 kilometers from Manzanillo, the most important port in Mexico. This city has built its resilience thanks to an active community and its capacity to learn and take advantage of new opportunities. The Colima Resilience Strategy reflects this capacity and establishes the vision of the city through an integrated, inclusive lens of urban resilience that identifies the impacts of existing and future efforts to help to achieve a stronger and more dynamic Colima.

The Colima Resilience Strategy recognizes the city's vulnerabilities and proposes initiatives to address them. The Strategy leverages the social capital of the region by identifying opportunities for innovation and engagement with a population that is more than 50% under the age of 30 and by learning from other cities about the challenges of urban expansion, connectivity, and sustainable development.

This Strategy strengthens the capacity of Colima's institutions to address the impacts of natural disasters and build resilient communities, and works with the municipal planning institute on metropolitan integration strategies for connectivity and management of the city's water resources.

The Strategy also aims to work with the community to build safe public spaces and promote projects to reduce inequality and violence. Lastly, the Strategy incorporates strong partnerships with the private sector and academia in the search for solutions to maintain and improve the quality of life for which this city is known.

With the release of this Strategy, Colima has the opportunity to become a model of urban resilience worldwide. We look forward to partnering with Colima in the months and years to come as the Municipality executes the actions and initiatives outlined in the Strategy, which will have a positive impact on it inhabitants. The team of 100 Resilient Cities could not be happier to be an ally in these efforts. Congratulations to the city of Colima!

Letter from the Director of the Planning Institute for Colima Municipality (IPCO)

J. JESÚS RÍOS AGUILAR

Colima is a medium-sized city in an area that, while rich in environmental resources, constantly faces challenges from natural and man-made disasters. Although the city has been impacted by these events, in most cases it has recovered and its operations have been restored to some extent but this type of recovery is not certain in the long-term. Such disasters are complex and learning from these experiences has not been easy or systematic. Consequently, we must change our response paradigm, use the processes that are already in place to satisfy current requirements. and look for new solutions to the issues that arise from the shocks and stresses of natural and man-made disasters. The 100 Resilient Cities (100RC) program presents an opportunity for Colima to better understand its challenges and establish its own plans and strategies for a systematic response to and recovery from disasters.

Since 2006, the Planning Institute for Colima Municipality (IPCO), a decentralized agency that promotes long-term planning, supports the continuity of projects, and recognizes the importance of international cooperation, has been an advantage to Colima. Through the participation of experts and interested local citizens, new and better ways to run the city have been introduced, which have shortened the learning curve, and the city has shared its successful local practices with other cities. From The Rockefeller Foundation's first call for participation in its 100RC program, IPCO pushed for the inclusion of Colima, which was finally selected in the third call. From this moment onwards, IPCO has contributed to the institutionalization of resilience as a recognized responsibility of the municipal administration. IPCO has also participated in the development of the Resilience Strategy, a long-term planning instrument that will be a starting point in the building of a Resilient Colima.

I would like to thank all the neighbors, civil society organizations, academics, local and international experts, public servants, the IPCO team, the 100RC program, and The Rockefeller Foundation for making Colima's Resilience Strategy possible.

"...IPCO pushed for the inclusion of Colima, which was finally selected in the third call. "

Carta del director de resiliencia de Colima

JORGE A. ORTIZ MORENO

The Resilience Strategy is an integrated, workable plan to make Colima a prosperous, sustainable, and resilient city by 2030. This planning instrument brings together a number of perspectives, visions, and solutions to combat the kinds of acute shocks and chronic stresses that the city has experienced in the past and faces in the present, and some of the future shocks and stresses it is likely to face, such as those stemming from the effects of climate change.

The foundational work for the Resilience Strategy began in 2016, 10 years after the creation of the Planning Institute for Colima Municipality (IPCO). Thus the Resilience Strategy benefitted from a decade of social learning and experience in urban development and planning for the capital city of Colima. The development of this resilience instrument is the result of a process of strategic thinking and participatory planning that will serve both Western Mexico and other medium-sized cities in other regions as a exemplary reference model for resilience-building processes. This project was led locally by the Resilience Office and IPCO. It built upon the collective intelligence and knowledge of citizens and institutions that were involved from the beginning in 2016 and are still involved today. Development of the Resilience Strategy, however, would not have been possible without the support of the 100 Resilient Cities program and the contributions of its many international experts. It is a product of the great teamwork of local and international partners.

"The Resilience Strategy represents a legacy for the future that will facilitate building the necessary capacities to maintain and ensure the quality of life in Colima in spite of the complex socioeconomic, environmental, and urban challenges of the 21st century."

ACRONYMS AND ABBREVIATIONS

100RC
100 Resilient Cities

3D
Distant, Dispersed, and Disconnected

ACICOL
Association of Consultants and Instructors

AIETIC
Colima State Association of Electronic Industry and Information Technology

AIMSI
International Association of Software and the Internet

AMINEC
Intermunicipal Metropolitan Association of North Colima

AMMEEC
Mexican Association of Women Entrepreneurs of the State of Colima

AMPI
Mexican Association of Real Estate Professionals

CANACINTRA
National Chamber of Transformation Industry

CANACO SERVYTUR
National Chamber of Commerce, Services, and Tourism

CANADEVI
National Chamber of Development and Promotion of the Housing Industry

CANIRAC
National Chamber of Restaurants and Seasoned Food Industry

CAPSUS
Sustainable Capital

CEUGEA
University Center of Environmental Management

CBTIS
Technological, Industrial, and Services Baccalaureate Center

CECyTCOL
Colima State Council on Science and Technology

CFE
Federal Electricity Commission

CIAPACOV
Water Supply and Sewerage Intermunicipal Commission of Colima and Villa de Álvarez

CMIC
Mexican Chamber of Construction Industry

CMPSP
Municipal Council of Social Participation for Planning

CONACULTA
National Council for Culture and the Arts

CONAFOR
National Forestry Commission

CONAGUA
National Water Commission

CONAPO
National Population Council

CONAVI
National Housing Commission

CONEVAL
National Council for Evaluation of Social Development Policy

COPARMEX
Mexican Employers' Confederation

CRF
City Resilience Framework

CRO
Chief Resilience Officer

CURB
Climate Action for Urban Sustainability

DIF
Integral Development of the Family

ECLAC
Economic Commission for Latin America and the Caribbean

EY
Ernst & Young

GHG
Greenhouse gas

GERIEM
Specialized Group for Immediate Response in Major Emergencies

ICSIC
Colima Institute of the Information and Knowledge Society

IMADES
Colima State Institute for the Environment and Sustainable Development

INAH
National Institute of Anthropology and History

INEGI
National Institute of Statistics and Geography

INFONAVIT
Institute of National Housing Fund for Workers

INSUVI
Colima State Institute of Land, Urbanization, and Housing

IPCO
Planning Institute for Colima Municipality

JCDR
Joint Centre for Disaster Research

MABIO
Manantlán Foundation for the Biodiversity of the Western Region

OMECOL
Colima Metropolitan Observatory

PDU
Urban Development Program

PET
Polyethylene Terephthalate

PMDUOET
Municipal Program of Urban Development and Ecological Territorial Management

PPMU
Partial Program for Urban Improvement

RITS
Regional Integrated Transportation System

SCT
Secretariat of Communications and Transport

SDGs
United Nations' Sustainable Development Goals

SEDATU
Secretariat for Agrarian, Territorial, and Urban Development

SEDER
Colima State Secretariat of Rural Development

SEDESCOL
Colima State Secretariat of Social Development

SEIDUR
Colima State Secretariat of Infrastructure and Urban Development

SEMARNAT
Secretariat of the Environment and Natural Resources

SEMOV
Colima State Secretariat of Mobility

TOD
Transit-Oriented Development

ZMCVA
Colima-Villa de Álvarez Metropolitan Area

EXECUTIVE SUMMARY

In 2016, Colima was selected from among thousands of cities around the world to become part of the 100 Resilient Cities Network (100RC). From this moment, the municipal government began the task of preparing an agenda for urban resilience with the help of international specialists, citizens, and organizations representing different sectors of society. The current Colima Resilience Strategy, which resulted from this initiative, is a planning instrument aimed at building a resilient city by 2030.
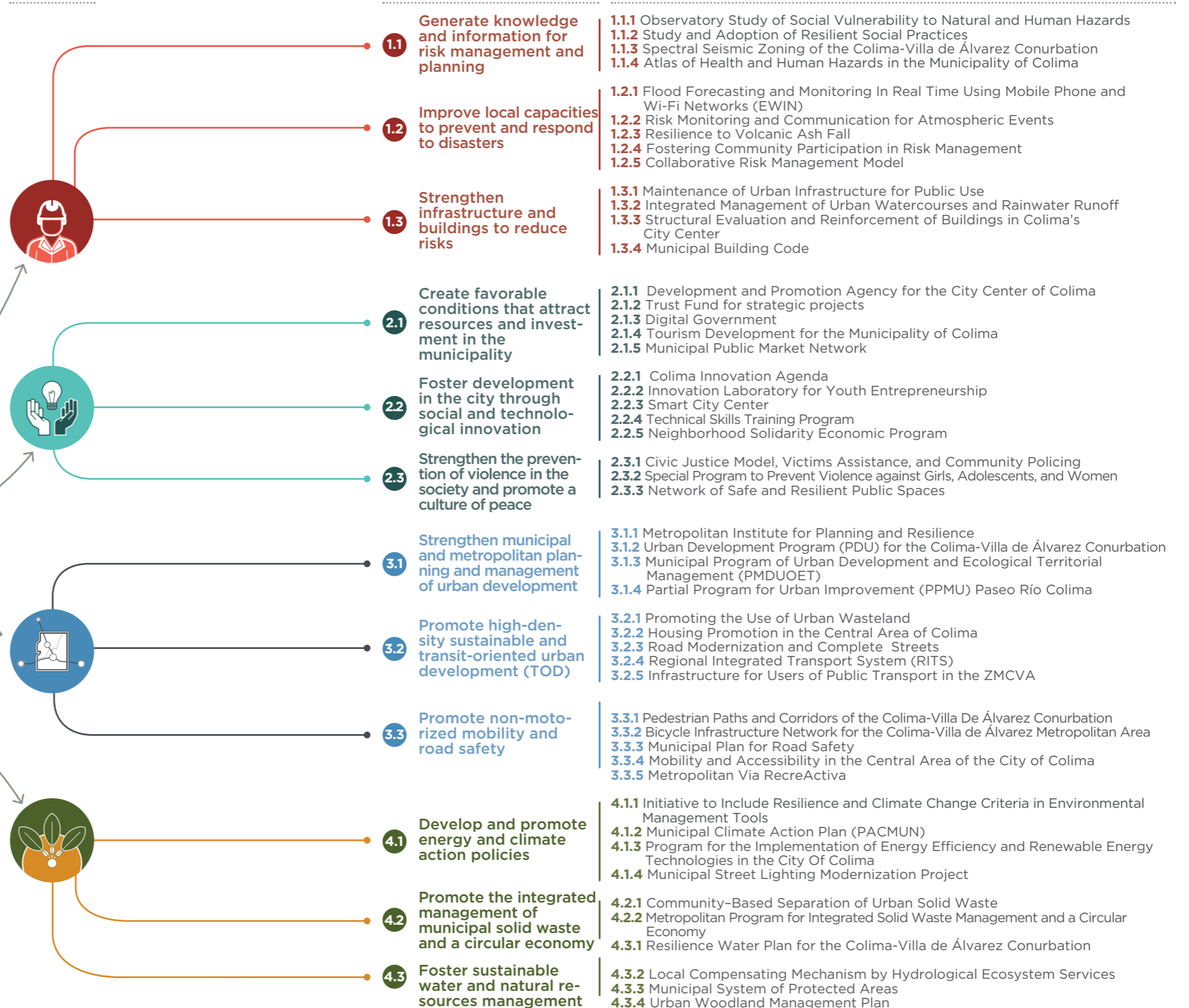
The first phase of preparing the Resilience Strategy involved identifying the city's main resilience-related challenges and promoted the involvement of a wide range of important local stakeholders. The second phase entailed deepening our understanding of some of these challenges so that potential initiatives could be defined and developed to improve the resilience capacity of the city. The result is a strategic agenda of 50 initiatives supporting 12 goals and the following 4 pillars—all aimed at building:

- A Colima that is **prepared** for potential natural and man-made risks;

- A socially and economically **prosperous** Colima

- An **integrated** urban Colima

- An environmentally **sustainable** Colima

The Strategy is divided into three sections. The first section is a brief description of the city of Colima, its context and main resilience challenges. The second explains the Strategy's development process and the most relevant results of that process; and the third section, which focuses on the vision of a Resilient Colima, presents the resilience agenda in terms of pillars, goals, and initiatives.

VISIÓN: Colima is a city that builds its quality of life through innovation and the participation of its citizens. It is open to the world, resilient, and prepared to face threats, thrive inclusively, develop sustainably, and grow in a close, connected, and cohesive manner.

PILLARS

GOALS

1.1 Generate knowledge and information for risk management and planning

1.2 Improve local capacities to prevent and respond to disasters

1.3 Strengthen infrastructure and buildings to reduce risks

2.1 Create favorable conditions that attract resources and investment in the municipality

2.2 Foster development in the city through social and technological innovation

2.3 Strengthen the prevention of violence in the society and promote a culture of peace

3.1 Strengthen municipal and metropolitan planning and management of urban development

3.2 Promote high-density sustainable and transit-oriented urban development (TOD)

3.3 Promote non-motorized mobility and road safety

4.1 Develop and promote energy and climate action policies

4.2 Promote the integrated management of municipal solid waste and a circular economy

4.3 Foster sustainable water and natural resources management

INITIATIVES

1.1.1 Observatory Study of Social Vulnerability to Natural and Human Hazards
1.1.2 Study and Adoption of Resilient Social Practices
1.1.3 Spectral Seismic Zoning of the Colima-Villa de Álvarez Conurbation
1.1.4 Atlas of Health and Human Hazards in the Municipality of Colima

1.2.1 Flood Forecasting and Monitoring In Real Time Using Mobile Phone and Wi-Fi Networks (EWIN)
1.2.2 Risk Monitoring and Communication for Atmospheric Events
1.2.3 Resilience to Volcanic Ash Fall
1.2.4 Fostering Community Participation in Risk Management
1.2.5 Collaborative Risk Management Model

1.3.1 Maintenance of Urban Infrastructure for Public Use
1.3.2 Integrated Management of Urban Watercourses and Rainwater Runoff
1.3.3 Structural Evaluation and Reinforcement of Buildings in Colima's City Center
1.3.4 Municipal Building Code

2.1.1 Development and Promotion Agency for the City Center of Colima
2.1.2 Trust Fund for strategic projects
2.1.3 Digital Government
2.1.4 Tourism Development for the Municipality of Colima
2.1.5 Municipal Public Market Network

2.2.1 Colima Innovation Agenda
2.2.2 Innovation Laboratory for Youth Entrepreneurship
2.2.3 Smart City Center
2.2.4 Technical Skills Training Program
2.2.5 Neighborhood Solidarity Economic Program

2.3.1 Civic Justice Model, Victims Assistance, and Community Policing
2.3.2 Special Program to Prevent Violence against Girls, Adolescents, and Women
2.3.3 Network of Safe and Resilient Public Spaces

3.1.1 Metropolitan Institute for Planning and Resilience
3.1.2 Urban Development Program (PDU) for the Colima-Villa de Álvarez Conurbation
3.1.3 Municipal Program of Urban Development and Ecological Territorial Management (PMDUOET)
3.1.4 Partial Program for Urban Improvement (PPMU) Paseo Río Colima

3.2.1 Promoting the Use of Urban Wasteland
3.2.2 Housing Promotion in the Central Area of Colima
3.2.3 Road Modernization and Complete Streets
3.2.4 Regional Integrated Transport System (RITS)
3.2.5 Infrastructure for Users of Public Transport in the ZMCVA

3.3.1 Pedestrian Paths and Corridors of the Colima-Villa De Álvarez Conurbation
3.3.2 Bicycle Infrastructure Network for the Colima-Villa de Álvarez Metropolitan Area
3.3.3 Municipal Plan for Road Safety
3.3.4 Mobility and Accessibility in the Central Area of the City of Colima
3.3.5 Metropolitan Via RecreActiva

4.1.1 Initiative to Include Resilience and Climate Change Criteria in Environmental Management Tools
4.1.2 Municipal Climate Action Plan (PACMUN)
4.1.3 Program for the Implementation of Energy Efficiency and Renewable Energy Technologies in the City Of Colima
4.1.4 Municipal Street Lighting Modernization Project

4.2.1 Community–Based Separation of Urban Solid Waste
4.2.2 Metropolitan Program for Integrated Solid Waste Management and a Circular Economy
4.3.1 Resilience Water Plan for the Colima-Villa de Álvarez Conurbation

4.3.2 Local Compensating Mechanism by Hydrological Ecosystem Services
4.3.3 Municipal System of Protected Areas
4.3.4 Urban Woodland Management Plan

INTRODUCTION

Throughout its almost 500-year history, the capacity of the city of Colima and its citizens to survive, adapt, and move forward—its resilience in the face of various threats since its pre-Columbian origins—has been put to the test. Today, the city of Colima has grown to be a metropolis with urban, administrative, environmental, and socioeconomic challenges. Among the resilience challenges facing the city are acute shocks, such as earthquakes, severe storms, and volcanic eruptions, as well as chronic stresses, such as high levels of violence, uncontrolled urban expansion, and the effects of climate change.

Given this context, the future quality of life in the city will depend on the actions and measures the city takes today. For this reason, Colima's municipal government has led the building of a resilience agenda for the long term in collaboration with citizens and key local actors and with the support of 100 Resilient Cities. To implement this agenda for building a resilient future for the city, the Resilience Strategy provides an integrated plan that includes 4 pillars, 12 goals, and 50 initiatives.

The Strategy is the product of a long technical analysis and a citizen participation process involving more than 600 representatives from different sectors of society. Each initiative was developed through studies, workshops, and recommendations from subject matter experts and city key partners. Likewise, in keeping with the Municipal Development Plan 2018-2021 and with the Sustainable Development Objectives (SDGs) of the United Nations, the Resilience Strategy's planning horizon is the year 2030.

Photo: Alicia Salazar Urzúa

100 Resilient Cities Program

Founded on The Rockefeller Foundation's centennial anniversary in 2013, the 100RC program was created to support the world's cities to build the resilience needed to face the economic, social, and physical challenges of the 21st century.

More than 1,100 cities from all continents responded to The Rockefeller Foundation's three global calls in 2013, 2014, and 2015 for applicants to the 100RC program, a network of cities working together and learning from each other to build a more equitable and resilient future. Colima responded to all three global calls and the city was finally selected in the third call, joining the network in 2016.

In joining the 100RC program, the municipality of Colima received four essential benefits:

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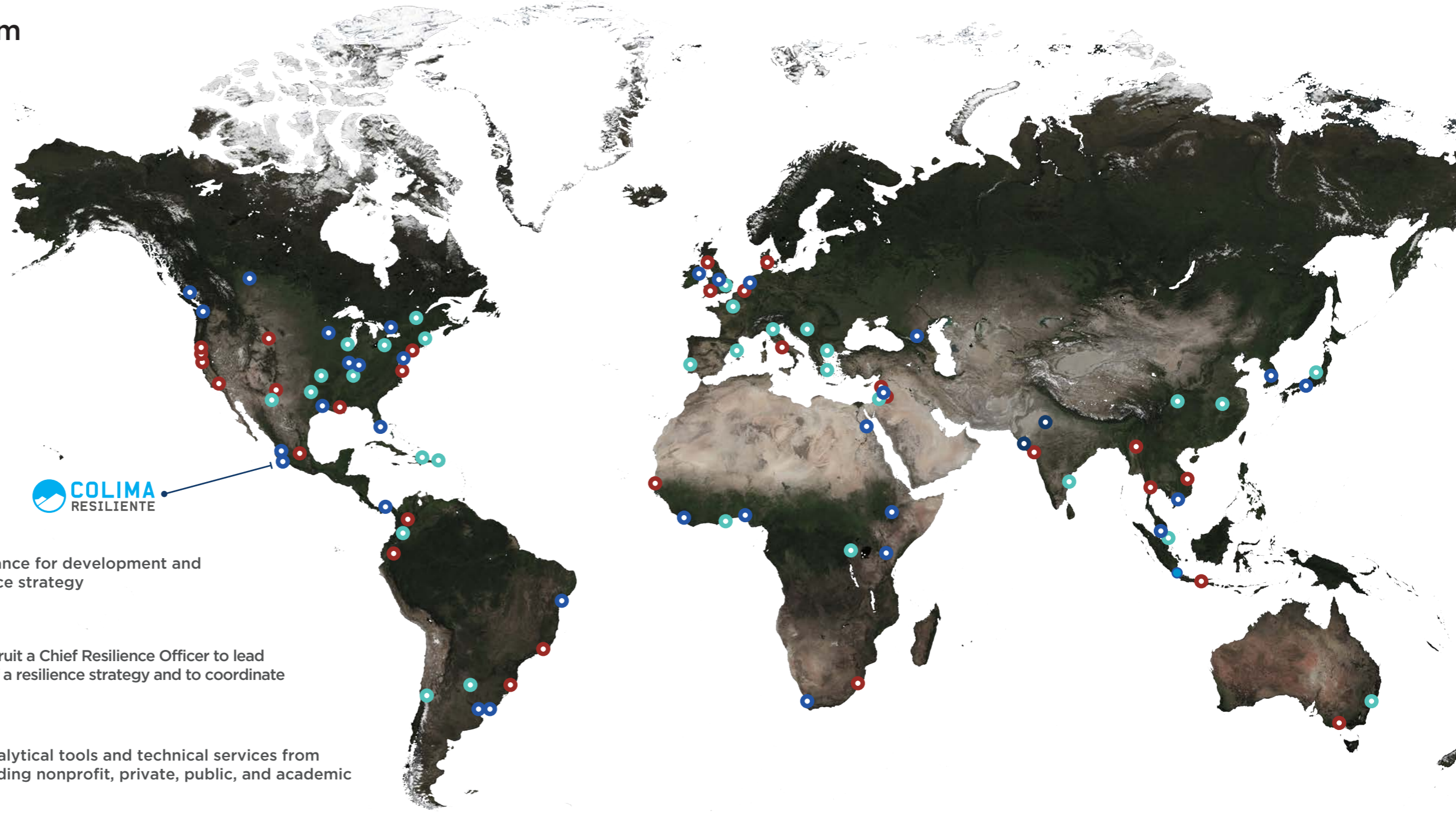
1 Advice and technical assistance for development and implementation of a reslience strategy

2 Financing for two years to recruit a Chief Resilience Officer to lead the city in the development of a resilience strategy and to coordinate its priority initiatives

3 Access to a catalogue of analytical tools and technical services from international partners, including nonprofit, private, public, and academic organizations

4 Access to a catalogue of analytical tools and technical services from international partners, including nonprofit, private, public, and academic organizations

○ FIRST ROUND CITIES
○ SECOND ROUND CITIES
○ THIRD ROUND CITIES

Urban Resilience

Disciplines such as ecology, engineering, and psychology incorporate the concept of resilience but may define it differently. Resilience for some is the ability of a system to respond, adapt and recover from a disaster. This definition has been extended to the fields of disaster risk reduction and sustainability. In these disciplines, resilience also means the ability of a system to recover and maintain a state of balance after a natural or man-made disaster.

The 100RC program defines urban resilience as the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and prosper despite the challenges they experience. These challenges include acute shocks, such as earthquakes, floods, or outbreaks of diseases, and chronic stresses that can weaken the fabric of a city on a day-to-day or cyclical basis. Stresses on a city include high unemployment, social inequality, air pollution, water and other resource shortages, and increasing violence.

The Colima Resilience Strategy was built upon the City Resilience Framework (CRF), a methodological framework developed by international consulting firm Arup and The Rockefeller Foundation. The CRF is a holistic, integrated approach to analyzing the urban resilience of the cities in the 100RC program in a standardized way. The CRF is divided into 4 pillars, 12 drivers, and 52 indicators. According to the CRF, resilient cities demonstrate seven qualities; they are reflective, resourceful, robust, redundant, flexible, inclusive, and integrated.

Qualities of resilient cities:

Reflective:
Using past experience to inform future decisions.

Resourceful:
Recognizing alternative ways to use resources.

Robust:
Well-conceived, constructed and managed systems.

Flexible:
Willingness and ability to adopt alternative strategies in response to changing circumstances.

Redundant:
Spare capacity purposively created to accommodate disruption.

Inclusive:
Prioritizing broad consultation to create shared ownership in decision-making.

Integrated:
Bringing together a range of distinct systems and institutions.
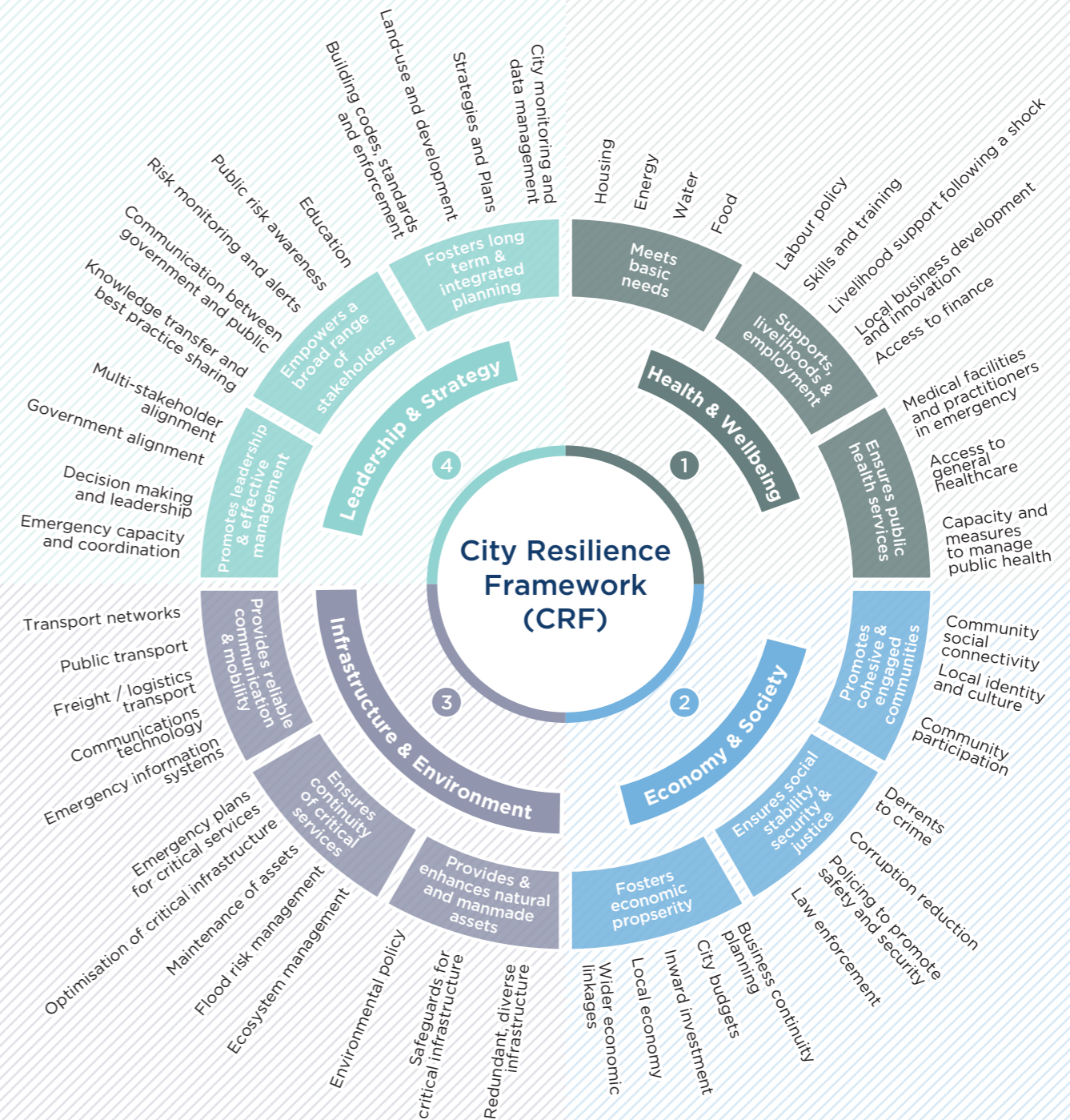
2

CITY OF COLIMA

- Historical Context
- Regional and Metropolitan Context
- Colima Statistics
- Shocks and Stresses in Colima
- Colima's Resilience Challenge

Photo: Adrián F. Labastida Salgado

HISTORICAL CONTEXT[1]

When the indigenous inhabitants of Colima were conquered by the Spanish conquistadors in 1523, the village of Colima was built near the Pacific Ocean on top of the old Caxitlan village. However, in 1527 weather conditions forced its founders to move the village near Colima River, where it is located today.

The first homes in the city were constructed around the boundaries of Royal Plaza (now called Freedom Garden), which later extended to the west across the Colima River and to the east to Arroyo Manrique. The initial urban layout remained until the 18th century. During the first half of the 19th century, Colima became a city and the state capital, and by the end of the century, the city remained as a small settlement surrounded by exuberant gardens and relatively far away from its old haciendas.

During the first half of 20th century the conurbation of Colima and Villa de Álvarez began to develop and in 1940 the first regulatory plan for both areas was created. However, its implementation was rejected after an earthquake on April 15, 1941, when a different urban layout was adopted that included important road works, roundabouts, forest ridges, schools, and the University of Colima. In 1960, the first ring road became operational, which encompasses the city center, and many peripheral settlements began to appear on land that previously had been orchards.

Since 1990, the conurbation limits were redefined, and the territory consisting of the interdependent municipalities of Colima, Villa de Álvarez, Comala, Cuauhtémoc, and Coquimatlán became a flourishing metropolitan area. Finally, at the beginning of the 20th century, the city center of Colima started to decline, and this situation worsened after the major earthquake on January 21, 2003.

Photo: Edgar Alejandro Preciado Victorino

REGIONAL AND METROPOLITAN CONTEXT

Colima city is both the main town of Colima Municipality as well as the capital of the same-name Mexican State. As such, it occupies a strategic position in Western Mexico. The city is located along the highway linking Manzanillo Port, the main entry for container ships to Mexico, with the Guadalajara Metropolitan Area, which is the second largest metropolitan area in Mexico.

Currently, the conurbation of Colima and Villa de Álvarez is the center of the Colima-Villa de Álvarez Metropolitan Area (ZMCVA), which is home to 359,392 inhabitants, who make up 50% of the population of the State of Colima[2].

Despite the fact that its urban centers are physically and/or functionally connected, the ZMCVA is quite complex in terms of its political structure and governing bodies (which include five municipal governments, state, and federal entities). Efforts to encourage collaboration among the municipalities of the metropolitan area, such as the creation of the Intermunicipal Metropolitan Association of North Colima (AMINEC) and the Colima Metropolitan Observatory (OMECOL), have made relatively little impact on ZMCVA decision-making and governance

Colima municipality and state location

Jalisco

Minatitlán
Comala
Cuauhtémoc
Villa de Álvarez
Coquimatlán
Manzanillo
Colima
Armería
Ixtlahuacán
Tecomán
Michoacán de Ocampo
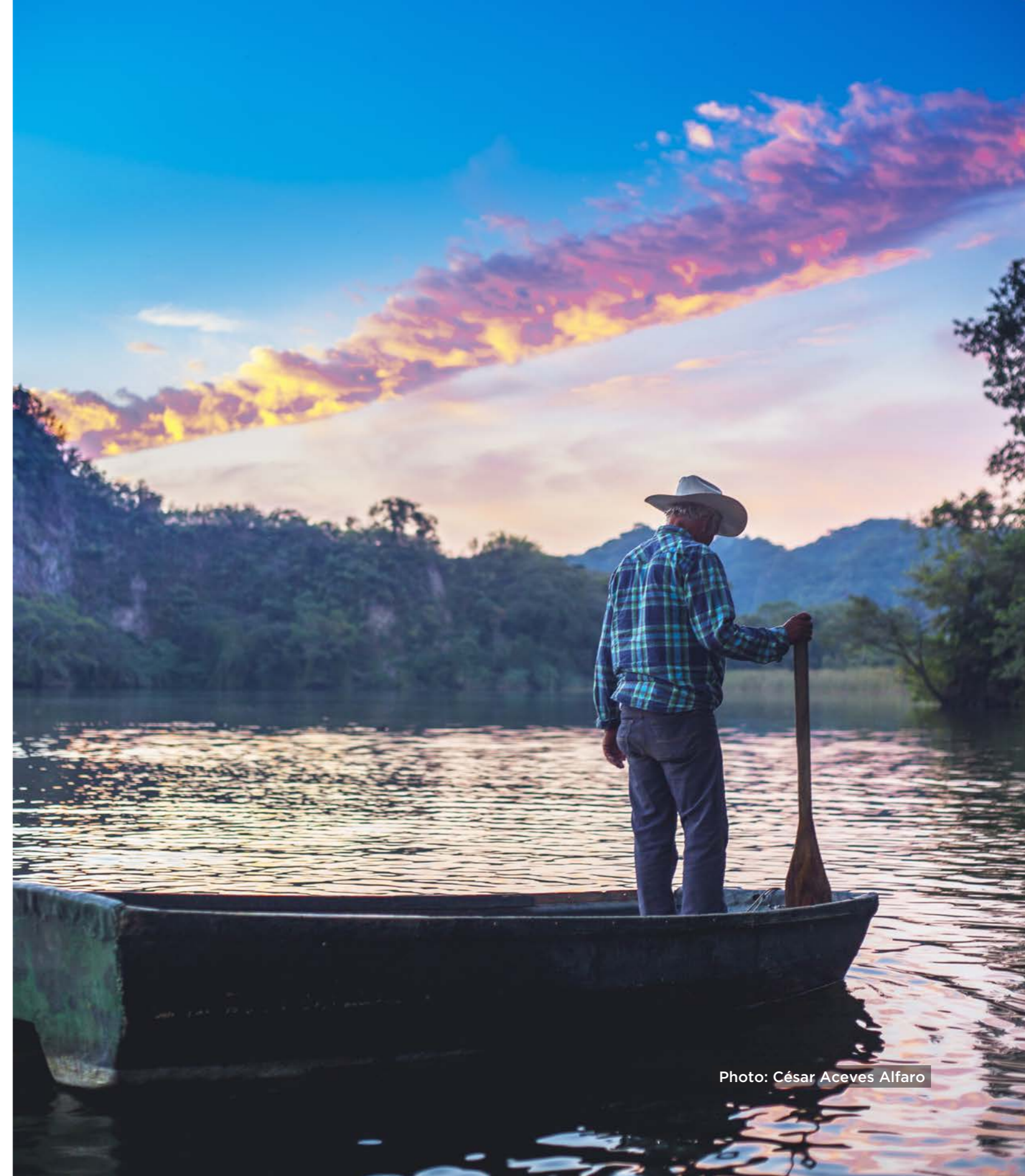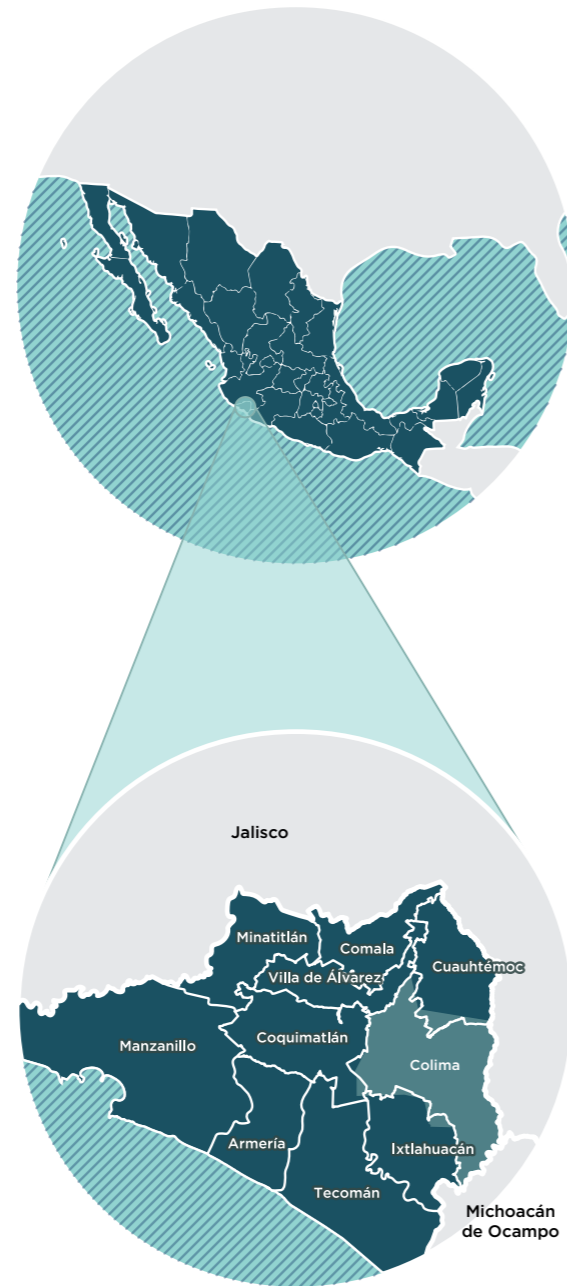
Photo: César Aceves Alfaro

TERRITORIAL STRUCTURE OF COLIMA-VILLA DE ÁLVAREZ METROPOLITAN AREA (ZMCVA)

Jalisco

Comala

Cuauhtémoc

Villa de Álvarez

Coquimatlán

Colima

Colima

Michoacán de Ocampo

Official Municipal Boundary
Metropolitan Core Boundary
Municipal Boundaries INEGI
State Boundaries
Urban Settlements

0   0.75   1.5   3   4.5   6 Km
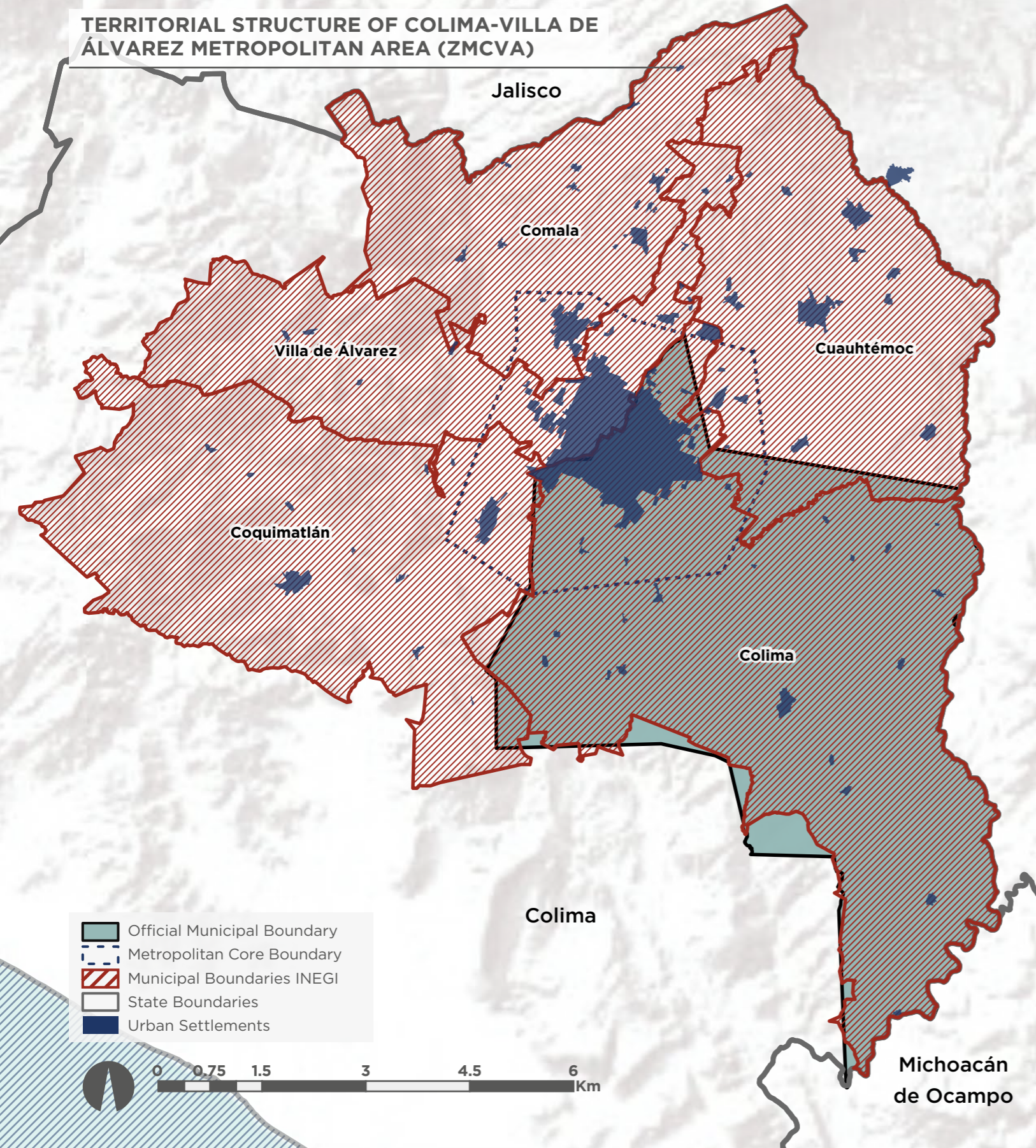
COLIMA STATISTICS

Land area[3]

ZMCVA - 233,151.39 hectares (ha)
1 - Colima - 79,849.32 ha
2 - Cuauhtémoc - 40,984.24 ha
3 - Comala - 31,270.45 ha
4 - Villa de Álvarez - 28,623.53 ha
5 - Coquimatlán - 52,423.85 ha
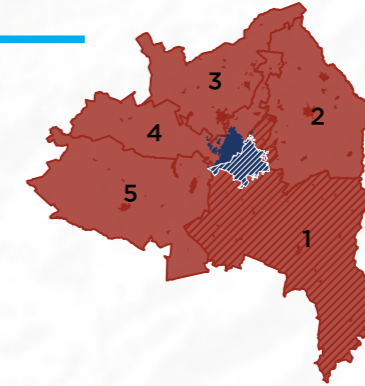
Total Population (2015)[4]

City of Colima - 140,909 inh.
Colima Municipality - 150,673 inh.
Conurbation Colima-Villa de Álvarez - 275,742 inh.
+ ZMCVA - 359,392 inh.

Green Area per Capita in the city of Colima[5]

11.6 m2/inh. (2018)

Gross Domestic Product (GDP)[6]
GDP in 2015 (million pesos in 2008)

43,545.17 ZMCVA

29,648.38 Municipio de Colima

Consumption of Resources and Waste Generation in Colima Municipality

Colima and Villa de Álvarez Municipalities

493.1 m3/day (2018)

Colima Municipality

5.11 kWh/day (2018)

1.18 kg/day (2017)

Average water consumption per household[7]
Average electricity consumption per household[8]
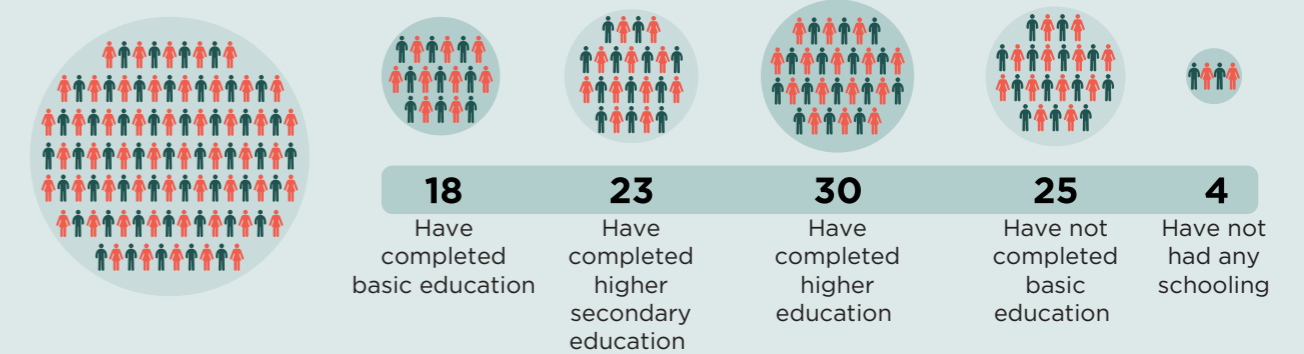Average generation of urban solid waste per person[9]
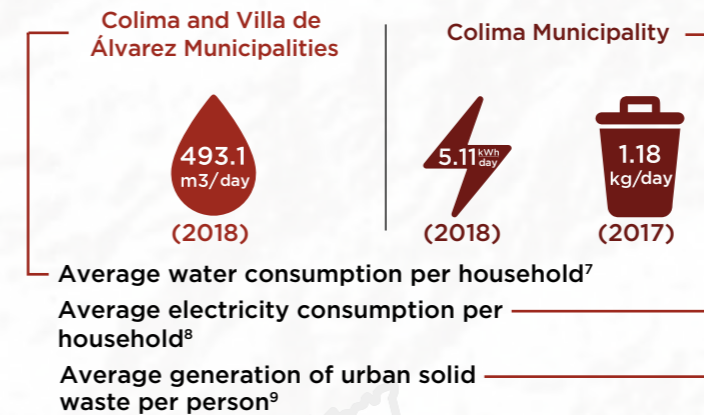
Transport Modes in the city of Colima (2011)[10]

46.7%
33.8%
10.5%
1.6%
7.4%
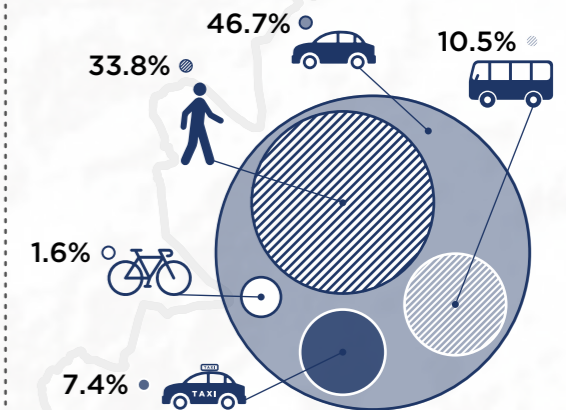
Multidimensional Poverty (2015)[11]

	Colima Municipality	ZMCVA
Population living in poverty	27.6%	35.4%
Population living in housing without access to basic services	4.2%	12.5%
Population without quality housing and space	4.5%	7.1%
Population lagging behind in education	14.1%	16.9%
Population with limited access to food	16.8%	17.8%
Population with limited access to health services	16%	12.1%
Population with limited access to social security	48.2%	55.5%

In the municipality of Colima, for every 100 citizens (2015)

48 are men

52 are women

For 2030 will be:

28 More people

90% Are literate

23 are children (0 a 14 años)

41 are adults (30 a 64 años)

10 are elderly (más de 65 años)

26 youngsters (15 a 29 años)
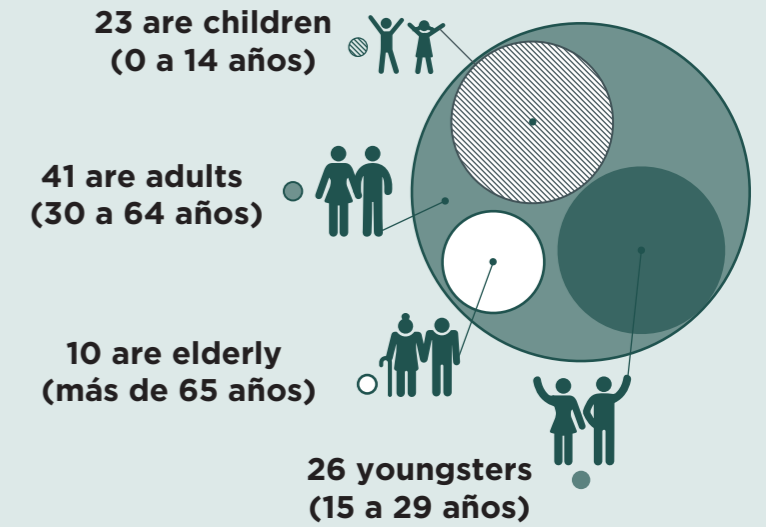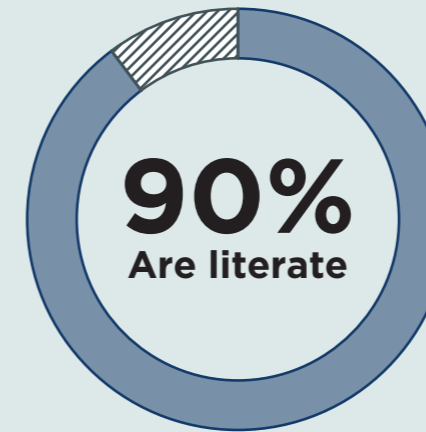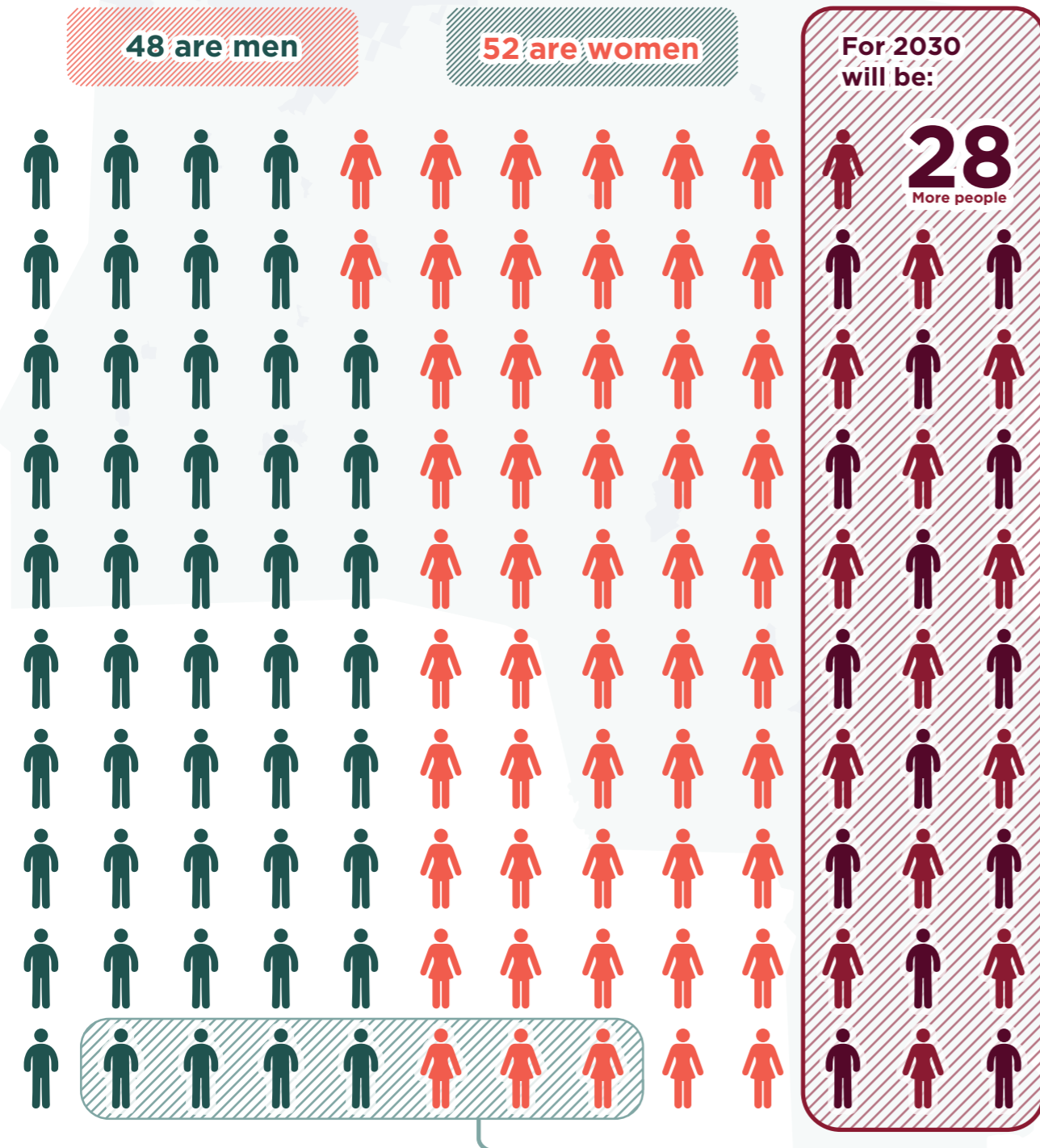
For every 100 people over 15 years old

18	23	30	25	4
Have completed basic education	Have completed higher secondary education	Have completed higher education	Have not completed basic education	Have not had any schooling

1 live in extreme poverty

31 are neither poor nor vulnerable to social deprivation

36 are vulnerable to some social deprivation

5 are vulnerable due to their income

27 live in moderate poverty

93 Live in urban areas

7 Live in rural areas

SHOCKS AND STRESSES IN COLIMA

Strengthening Colima's urban resilience requires building collective capacities to combat the various shocks and stresses that jeopardize its citizens' well-being and quality of life. After formulating the Colima Resilience Strategy (described in the following chapter), it was possible to identify the city's vulnerabilities to potential shocks as well as existing and future stresses.

Shocks

- Earthquakes
- Volcanic activity
- Cyclones
- Severe storms and mesoscale convective systems
- Rainfall flooding
- Drinking water crises and shortages
- Accidents and hazards involving dangerous substances
- Disease outbreaks

Stresses

- Environmental degradation
- Climate change
- Water insecurity
- Undiversified economy
- Weak municipal finances
- Poverty and marginalization
- Crime and violence
- Uncontrolled urban expansion
- Poor urban mobility
- Poor infrastructure
- Urban decay

Photo: Carlos Enrique Tirado Rascón

COLIMA'S
RESILIENCE CHALLENGE

The city of Colima today is the result of almost 500 years of continuous occupation, and its resilience depends on a number of ecological, political, social, economic, cultural, and urbanistic factors. Based on the shocks and stresses identified and the analysis undertaken in developing the Colima Resilience Strategy, Colima's primary resilience challenges can be grouped into four major areas, and these are described below.

Risk **management**

Social and economic development

Urban development

Environmental sustainability

Photo: César Aceves Alfaro

Risk Management

Colima is exposed not only to risks from natural hazards but also to risks associated with human activities in the municipality and its surroundings.

The city of Colima is situated within the the most dangerous earthquake-prone area in Mexico.[12] More than 40 local earthquakes have been recorded since the city was founded.[13] The most recent, which occurred on January 21, 2003, killed 21 people throughout the state and destroyed 5,874 houses (17.5% of the total number of houses) and 96 schools in the municipality.[14]

Volcanic activity is another common threat because of the city's proximity to the most active volcano in Mexico, Volcán de Fuego de Colima. Although approximately 32 kilometers lie between the city and the volcano, ash has fallen in various occasions and there is a slight possibility of volcanic debris that could harm the city.[15]

Colima's proximity to the Pacific Ocean exposes the city to the effects of tropical cyclones in the rainy season (from May to October). Although the risk is considered low,[17] recently Hurricane Jova (a Category 2 hurricane) caused rivers to overflow, flooding, and damage to urban bridges. Extreme storms have also occurred due to the hydrometeorological phenomena known as mesoscale convective systems. These systems pose a unique threat that is rarely monitored, although they have repeatedly caused damage.[18]

As for risks resulting from human activities, 13 companies in the city of Colima are known to use hazardous substances. In addition, heavy vehicles use the city's roads to transport hazardous substances from the Port of Manzanillo (which is projected to triple its capacity by 2032[19]) and the Peña Colorada mine, located in Minatitlan (which produces 30% of Mexico's iron ore [20]). At present, the city has no plans or mechanisms in place to address these risks.
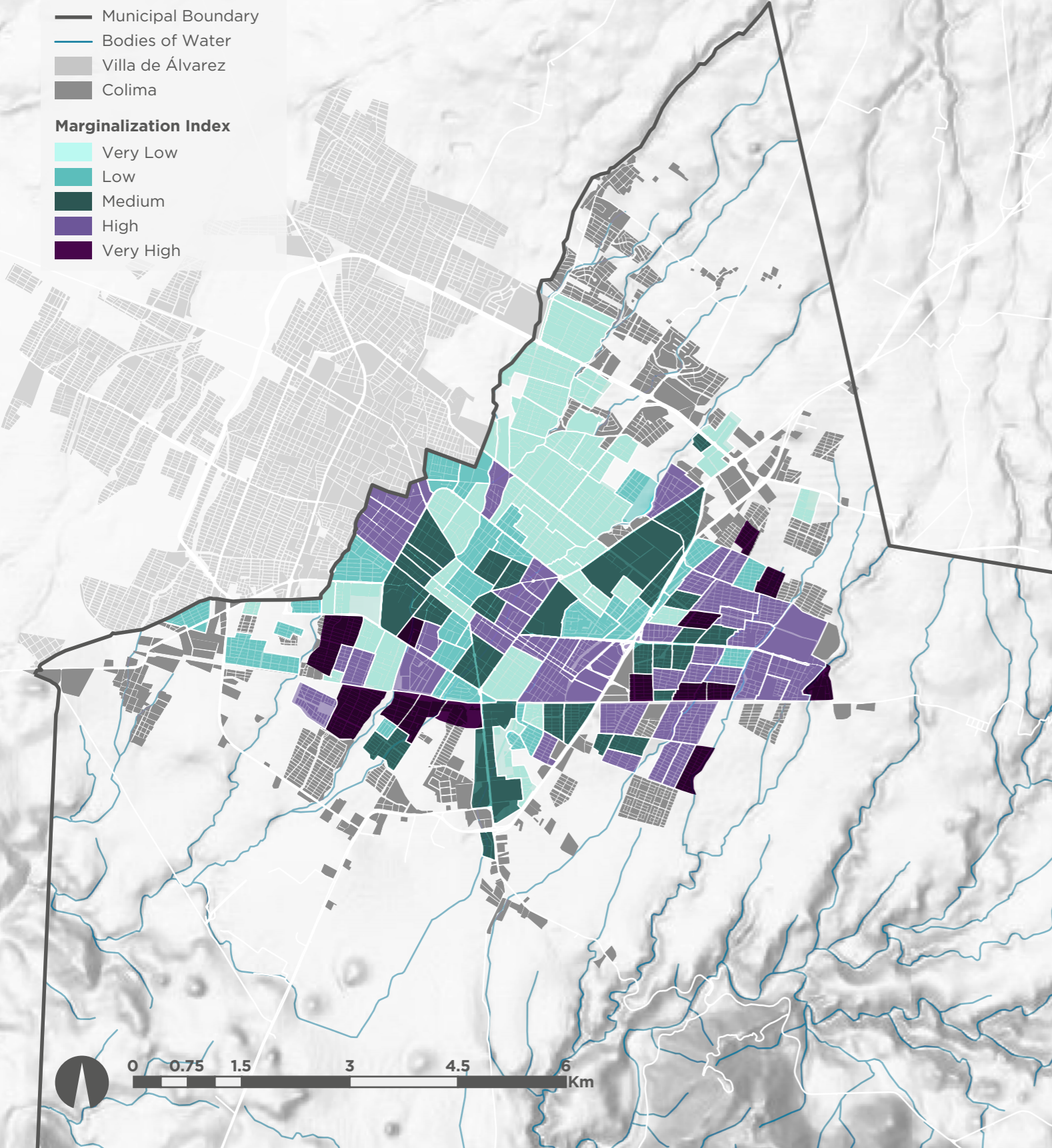
Legend:
- Municipal Boundary
- City of Villa de Álvarez
- City of Colima
- Pyroclastic Flows
- Lava Flows
- Lahars
- Debris Avalanche

0   2.25   4.5   9   13.5   18 Km
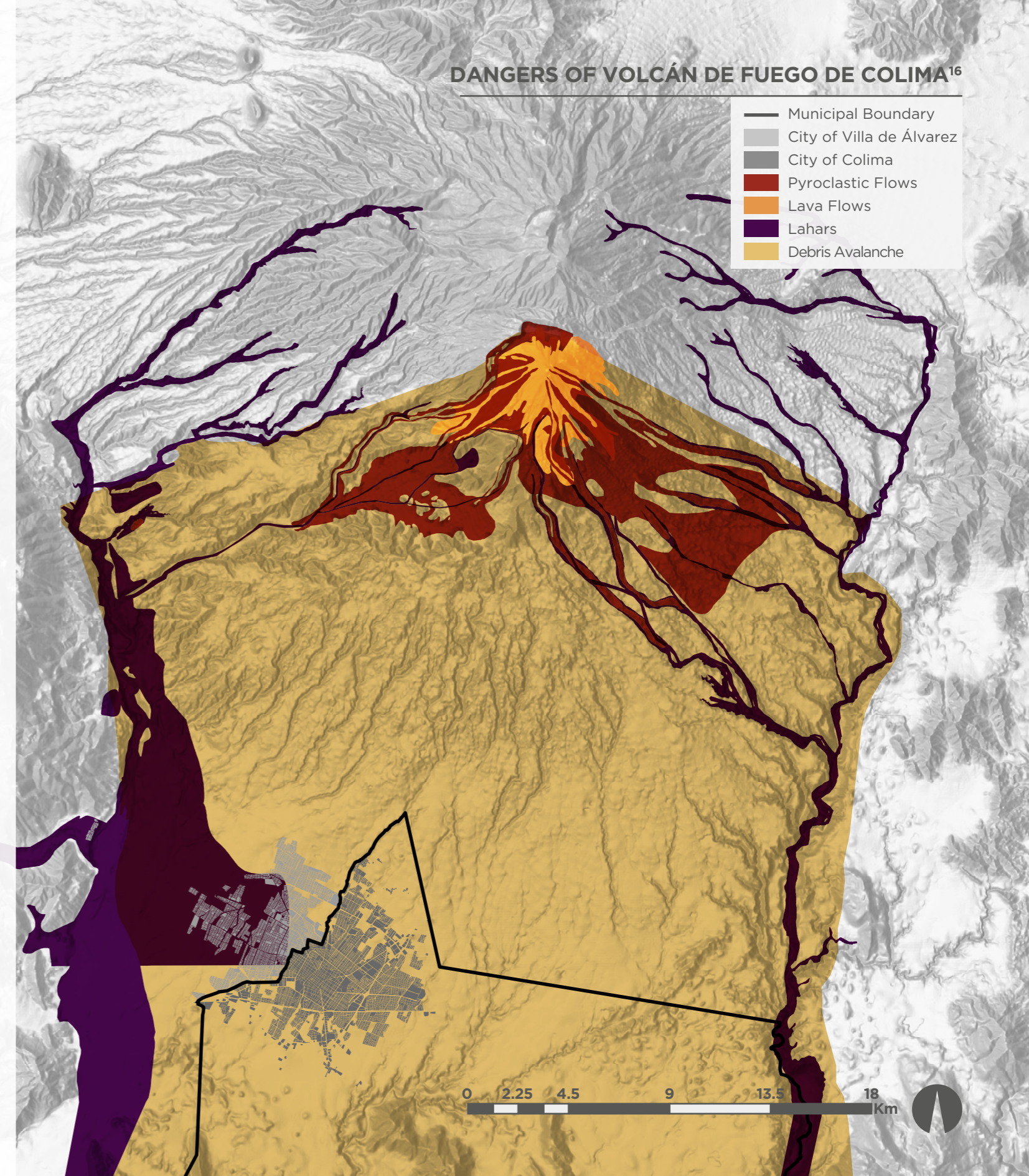
MARGINALIZATION INDEX BY NEIGHBORHOOD IN THE CITY OF COLIMA[25]

Legend:
- Municipal Boundary
- Bodies of Water
- Villa de Álvarez
- Colima

Marginalization Index
- Very Low
- Low
- Medium
- High
- Very High

Scale: 0 — 0.75 — 1.5 — 3 — 4.5 — 6 Km

Social and economic development

Stresses and events at the regional and national level have resulted in problems at the local level and challenges with respect to equitable and inclusive economic development. Thus, it is extremely important that a Resilient Colima stop and reverse the trends and activities that can harm the social and economic well-being of its people.

Colima is moving toward demographic stabilization. Currently, 67% of the population is of working age (15 to 64 years old).[21] This is an economic opportunity that can be leveraged locally; however, it is also a challenge at both the local and national level now and in the future. The population is also aging,[22] and the percentage of people of working age will not remain as high as it is today. An aging society can become more economically dependent. Although the ZMCVA has been one of the country's urban areas with a significant decrease in the socially deprived population, approximately 30% of the city's inhabitants are living in poverty[23] and 46.7% live in marginal conditions.[24] The low-income population is confined largely to large housing developments in the southern and eastern sections of the city. These areas face serious challenges, including overcrowding, low levels of schooling, and limited employment opportunities or jobs with a living wage.

Diversifying the local economy and increasing the city's productivity are among the most important structural challenges. Currently, most jobs are in the trade and service sectors, which largely add little economic value. Services that could generate high profits for companies, and therefore high salaries for workers, are limited.[26] Moreover, the City of Colima's ability to foster development is a challenge, as it relies on money transferred from the federation for 70%[27] of the municipal budget and has debt that restricts the municipality's capacity to finance high-impact projects.[28]

Finally, the rise in violence is probably the most critical and damaging development in this century. In a period of less than 15 years, quality of life in the State of Colima, which used to have a low crime rate, has deteriorated. In 2017, the state had the highest homicide rate in the country (106 out of every 100,000 inhabitants),[29] economic losses of $95,486 (MXN) per capita,[30] and increasing gender violence in the municipality of Colima and other four entities. Although these issues have been attributed to fighting among organized crime groups for territorial control (specifically, the area surrounding the Port of Manzanillo), other factors (such as lack of economic opportunities for youth, weak laws, and a dysfunctional criminal justice system) contribute to the deterioration in urban life.

Legend

— Municipal Boundary
— Bodies of Water
▢ Villa de Alvarez
▢ Colima

Growth Years
■ 1527
■ 1789
■ 1859
■ 1887
■ 1913
■ 1938
■ 1960
■ 1979
■ 1993
■ 2000
■ 2011
■ >2011

0   0.75   1.5   3   4.5   6
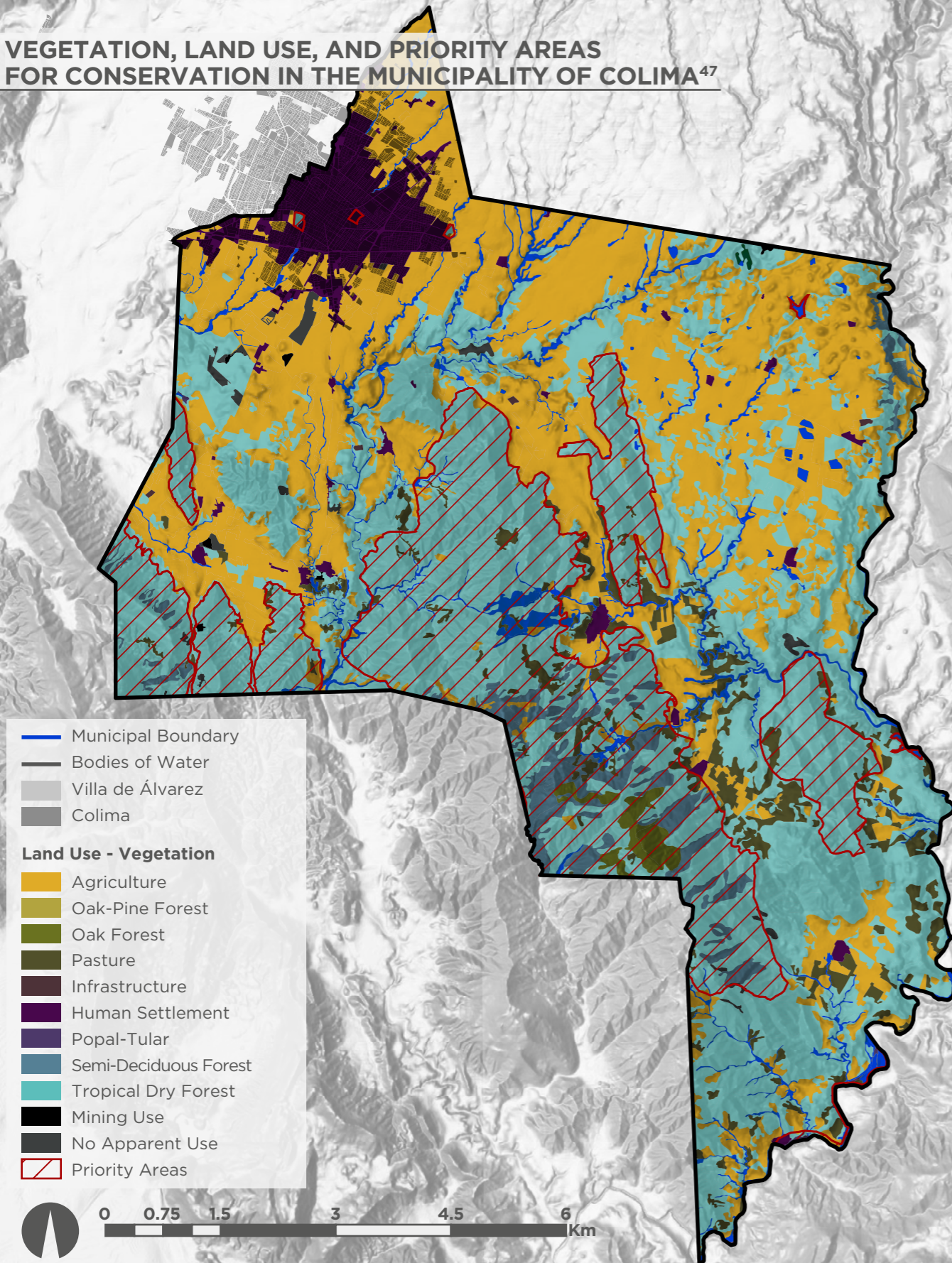Km
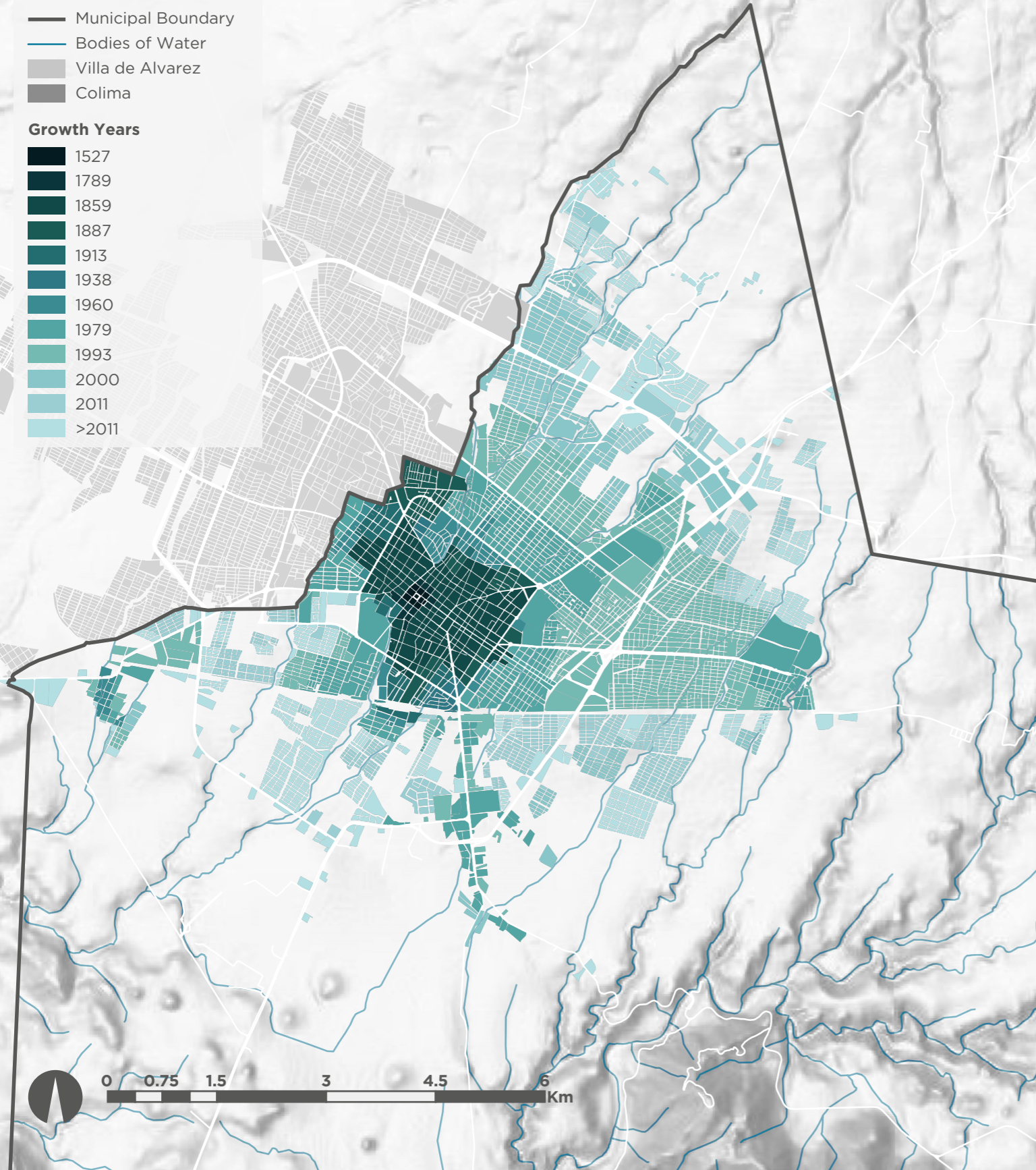
Urban development

Most of the resilience challenges Colima faces with respect to urban development arise from the city's expansion, which began in the 1990s with the urbanization of land that was previously commonly owned (ejidos) and the rise of informal settlements.[31] This urban sprawl intensified in the beginning of the 21st century as a consequence of a territorial policy that promoted expansion and investment in the city's growing areas.[32] Between 2000 and 2015, the urban area increased by 85%[33] (from 2,202 to 4,068 hectares), whereas the population only grew by 18%[34] (from 119,639 to 140,909 inhabitants).

As a result, the city of Colima now extends across previous important ecological and agricultural areas. In addition, the urban area is not only underutilized but also has many unoccupied buildings and deteriorating sections. The city center continues to lose occupants and is still suffering from the damaging effects of the 2003 earthquake. Buildings in the city center that have high cultural, historical, and architectural value need to be refurbished or rebuilt.

Like most Mexican cities, Colima's development has followed a distant, dispersed, and disconnected (3D) pattern. This has resulted in inefficiency and a lack of productivity that have deepened inequality and contributed to environmental degradation.[36] This development model is not sustainable because as the city expands, the needs for resources, equipment, and government services also increase. Moreover, unplanned development could aggravate existing risks and stresses. For example, recent land-use changes that reduced the land's water filtration capacity could be related to the growing frequency of floods and other natural disasters stemming from both ordinary rainfall as well as extreme storm events.[37]

An increase in the number of vehicles within a city (like the 0.55 vehicle per person in the municipality of Colima[38]) and a lack of incentives to use public transportation and non-motorized modes of transportation are among the most severe consequences of this type of growth. The huge numbers of vehicles used for transportation combined with the infrastructure to support them are increasing the number of deaths from traffic accidents (pedestrians and cyclists are the most vulnerable to this impact).[39] In addition, locally, road traffic generates the most greenhouse gas (GHG) emissions and produces other air pollutants.[40]

VEGETATION, LAND USE, AND PRIORITY AREAS FOR CONSERVATION IN THE MUNICIPALITY OF COLIMA[47]

Legend:

- Municipal Boundary
- Bodies of Water
- Villa de Álvarez
- Colima

Land Use - Vegetation
- Agriculture
- Oak-Pine Forest
- Oak Forest
- Pasture
- Infrastructure
- Human Settlement
- Popal-Tular
- Semi-Deciduous Forest
- Tropical Dry Forest
- Mining Use
- No Apparent Use
- Priority Areas

0 0.75 1.5 3 4.5 6 Km

Environmental sustainability

The city of Colima's resilience depends to a great extent on environmental quality and the sustainable use of natural resources, as well as on the city's capacity to mitigate and adapt to the effects of climate change.[41] In other words, strengthening the city's environmental sustainability is indispensable to ensuring its resilience.

Currently, Colima faces two sustainability challenges regarding critical services in the city: water and solid waste management. The Colima-Villa de Álvarez conurbation is particularly vulnerable in terms of water management, as about 80% of the water used comes from a single source, the Zacualpan spring,[42] which is in Comala. The spring, which is 30 kilometers from the city of Colima, is replenished by water from the forests of the Sierra de Manantlán Biosphere Reserves. Over the last two years, water demand has risen much faster than the available supply. This gap is exacerbated by urban growth and leaks in the water distribution network (some 35% of the output is lost[43]).

Conversely, the per capita generation of solid waste in both the municipality and the state is high: 1.18 and 1.07 kilograms per day (kg/day),[44] respectively. Both rates are significantly above the national average (0.85 kg/day).[45] Moreover, the landfill that is the final disposal site for the five ZMCVA municipalities has serious operational deficiencies. It is almost at maximum capacity and accepts waste that has not been separated, which causes GHG emissions. Fires have also occurred at the landfill. The most recent, which occurred in April 2018, covered approximately half of the landfill's surface and remained active for more than 20 days.

Finally, the urban portion of Colima is barely 5% of the entire municipal area. The rest of the municipal land is noted for its biodiversity, as it contains 7 of the 14 types of vegetation described in the National Forest Inventory (low deciduous forest, low thorny, savannah, pastures, lowland forest, and to a lesser extent oak forest, gallery forest, and medium subdeciduous forests).[46]

3

STRATEGY DEVELOPMENT PROCESS

- Phase I
- Phase II
- Alliances and participation of stakeholders

Photo: H. Ayuntamiento de Colima

The development of the Colima Resilience Strategy (Strategy) was a participatory and collaborative process. Citizens and academics; representatives from the business sector; officials from the municipal, state and federal governments; residents of the city's most vulnerable areas; and many others contributed their opinions, perspectives, and proposals to the creation of a long-term vision and agenda for building a more resilient future for the city.

The Colima Reslience Strategy consists of three main phases:

Phase I: In this phase, Colima's particular context and the city's main resilience challenges were identified and analyzed. Many local actors were identified and involved in the process, and a Resilience Working Group and a Steering Committee were established. The key product was the Preliminary Resilience Assessment and a set of issues to be studied in greater depth.

Phase II: In this phase, the issues identified by the Resilience Preliminary Assessment were studied in depth, and key opportunities and various initiatives to tackle the city's main resilience challenges were identified. In addition to the various local actors, international partners were engaged to develop certain analyses and conduct specialized studies. Phase II concluded with the writing of the Colima Resilience Strategy and its public release.

Phase III: This phase involves completing the institutionalization of the Resilience Office, managing the implementation of the proposed actions and initiatives, and incorporating a resilience perspective in the operations and programs of the municipal government. This requires project managing all aspects of the Strategy, ensuring sufficient financial resources, building alliances, monitoring completion of the Strategy, and adapting the Strategy going forward so that it can continue to strengthen the city's capacity to face future shocks and stresses.

Resilience Working Group + Resilience Council

Preliminary Resilience Assessment

Stakeholder Commitment

Inventories of:
-Perceptions
-Actions
-Assets
-Stresses
-Shocks

Unique Context of the City

+

Discovery Areas

Scope of Work for phase 2

PHASE 1
- - - - - - - - - - -
PHASE 2

Analysis of Discovery Areas

Opportunities Assessment

Resilience Strategy

COLIMA RESILIENTE

PHASE 3

Institutionalization and Implementation

Photo: H. Ayuntamiento de Colima

MILESTONES IN COLIMA'S RESILIENCE STRATEGY DEVELOPMENT PROCESS

2015

2016

2017

2018

2019

City's application to join 100RC is submitted

Selection of Colima to become a member of 100RC is announced

November

Agenda-Setting Workshop is held

May

December

Colima Chief Resilience Officer is announced

Phase I begins

May

June

Resilience Working Group is created within the municipal government

City's Resilience Steering Committee is installed

January

Preliminary Resilience Assessment is completed

First progress report is made to key local actors in the city

Workshop on community resilience is held, with the support of AECOM

February

Phase II begins

Workshop on economic development is held, with the support of Ernst & Young (EY)

May

Workshop on Urban Growth Scenarios is held, with the support of CAPSUS)

June

Second progress report is made to key actors in the city

October

Colima Resilience Strategy Bootcamp is held

"Resilient Park," is inaugurated, with the support of SEDATU

December

COLIMA RESILIENTE

Colima Resilience Strategy is released

April

COLABORACIONES CON CIUDADES DE LA RED 100RC

JULY
Participates in 100RC global summit in New York

NOVEMBER
Participates in the "Cali Progresa-Living Lab" workshop in Santiago de Cali

DECEMBER
Participates in the architecture contest "Let's make Plaza Juan Gabriel beautiful" and the strategy bootcamp of Ciudad Juárez

MARCH
Participates in "Network Exchange" on seismic resilience in Mexico City

PHASE I

The initial work towards building a Resilient Colima formally started in December 2016 with the Agenda-Setting Workshop, which began the process of identifying the city's main shocks and stresses. After a public search, the Colima Chief Resilience Officer was chosen and development of the Preliminary Resilience Assessment then began.

A comprehensive evaluation was performed to understand the current state of resilience in the city. An extensive document review and five analyses were conducted with the support of key local partners and using the following 100RC tools:

PERCEPTIONS INVENTORY:

Qualitative analysis of the opinions and perspectives of key stakeholders on the main challenges and opportunities for resilience building in Colima.

ACTIONS INVENTORY:

Qualitative analysis of studies, strategies, plans, programs, policies, and existing projects planned or implemented by the city's stakeholders.

ASSETS INVENTORY:

Qualitative analysis of the state of the city's most important infrastructure and urban assets (or features).

STRESSES INVENTORY:

Qualitative analysis of the potential occurrence of various stresses based on environmental and socioeconomic trends and developments.

SHOCKS INVENTORY:

Qualitative analysis of the risks associated with the key shocks to which the city is exposed.

Each inventory analysis was prepared from qualitative information gathered through work sessions, electronic surveys, interviews, and workshops with experts, key stakeholders, and citizens residing in vulnerable areas.

The results of the work completed in Phase I were documented in the Preliminary Resilience Assessment, and four thematic areas, or "Discovery Areas," were identified for further analysis.

Distribution of stakeholders consulted as part of the analysis performed during the Colima Preliminary Resilience Assessment:

3.3% | **26.1%** | **23.3%** | **PRA** | **17.7%** | **29.6%**

11 Representatives from the private sector

88 Public officials from 3 levels of government

100 Community leaders and residents from vulnerable areas

60 Members of civil society organizations

79 Academics and students

338 Total
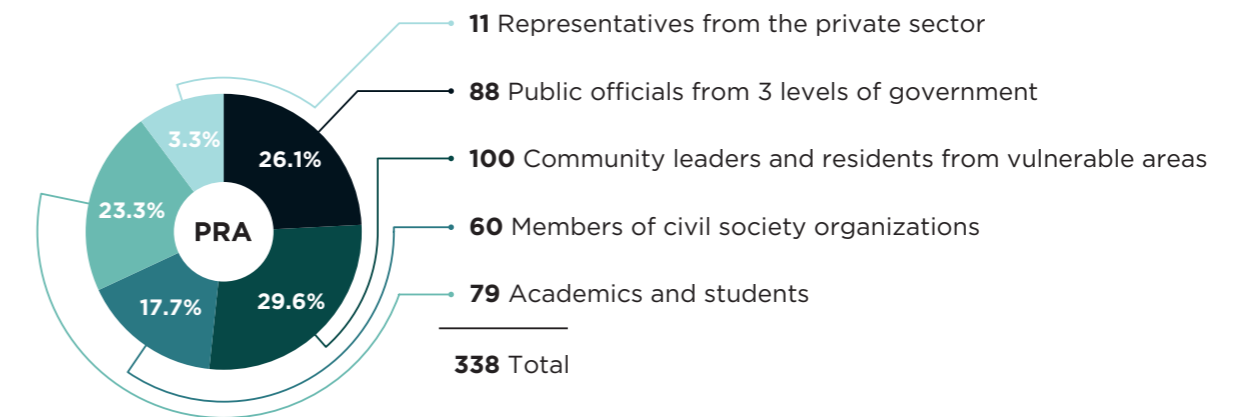
733 Opinions and perspectives were analyzed through the perceptions inventory.

208 Studies, strategies, plans, programs, policies, and projects were analyzed through the actions inventory.

54 Infrastructure elements and important urban features of the city were analyzed through the assets inventory.

48 Relevant stresses for the city based on five scenarios leading up to 2030 were identified and analyzed through the stresses inventory.

20 Possible shocks or threats were analyzed through the shocks inventory.

Consultation with
vulnerable communities

A focused outreach effort was conducted in collaboration with the Sciences Faculty of the University of Colima, the Joint Centre for Disaster Research[48] (JCDR), and Centro Machilia[49] to gather the views and integrate the perspectives of socially vulnerable communities in the city (who are also the most vulnerable to Colima's natural threats) into the perceptions inventory.

The outreach effort was conducted in four representative areas (areas at risk from earthquakes and floods and with a large number of socially vulnerable people) through a workshop. The workshop adapted and used a methodology known as participatory 3D mapping, which enabled the participants to identify the main shocks and stresses in their neighborhoods and to quantify those factors that affect or mitigate each shock and stress. Finally, questionnaires were distributed in person to residents who did not participate in the workshop so that they could also identify and describe impacts associated with shocks and stresses.

The results of these efforts comprise almost 30% of the city's perceptions inventory. They reveal clear differences between the perspectives of institutional representatives and the resilience factors of particular concern to vulnerable communities. The latter include social stability and security, infrastructure, continuity of essential services, and urban mobility.

- Zone 1: Prados de la Estancia, Tierra y Libertad
- Zone 2: El Tívoli, Del Periodista, Los Viveros
- Zone 3: Fátima, Placetas Estadio, Villas del bosque
- Zone 4: El Diezmo

Photo: IPCO

Finally, in Phase I, two technical bodies were established to follow up and provide feedback throughout the Strategy Development Process.

Resilience Working Group[50]

Consisting of 14 municipal public administration entities

- General Directorate of Cadastre (now Cadastre Directorate)
- General Directorate for Human Development (now General Directorate for Human, Social, and Economic Development)
- General Directorate for Sustainable Development (now General Directorate for Public Works and Planning)
- General Directorate for Planning (now Planning Directorate)
- General Directorate of Public Services
- General Directorate of Traffic and Public Security (now General Directorate of Public Safety and Traffic Police)
- Directorate of Urban Development (now Directorate of Urban Development and Environment)
- Ecology Directorate (now Ecology and Environment Directorate)
- Directorate of Citizen Participation
- Institute of Development and Alternatives for Youth (now Municipal Institute for Innovation and Youth)
- Women's Institute for Colima Municipality
- Planning Institute for Colima Municipality
- Municipal DIF (Integral Development of the Family, in Spanish) System
- Municipal Civil Protection Unit

Resilience Council

Consisting of the 16 members of IPCO's Municipal Council of Social Participation for Planning (CMPSP)[51]

- Colima State Association of Village and Town Chroniclers
- Mexican Chamber of the Construction Industry (CMIC) Colima Delegation
- Colima Chamber of Commerce, Services, and Tourism (CANACO SERVYTUR)
- National Chamber of Development and Promotion of the Housing Industry (CANADEVI) Colima Delegation
- National Chamber of the Transformation Industry (CANACINTRA) Colima Delegation
- National Chamber of the Restaurants and Seasoned Food Industry (CANIRAC) Colima Delegation
- Colima State Association of Architects
- Valle de Caxitlán Association of Architects
- Colima State Association of Economists
- Colima State Association of Civil Engineers
- Colima State Association of Physicians
- Colima State Association of Notaries
- Colima State Federation of Urban and Suburban Transportation
- Technological Institute of Colima
- University of Colima
- Pro-Ecology of Colima

PHASE II

The second phase of the Colima Resilience Strategy development began in February 2017. With a public presentation on the progress of the workshops for the four Discovery Areas described in the Preliminary Resilience Assessment. These workshops were conducted as part of the "Colima in the Future" forum organized by the municipal government to showcase the most critical initiatives for building a long-term vision for the city.

Subsequently, a further, in-depth analysis of the Discovery Areas was performed. With support from AECOM[52] and other international consulting firms, the Municipality conducted four studies to gain a greater, more detailed understanding of some of the challenges and issues identified in the Preliminary Resilience Assessment and to explore solutions to be incorporated in the Colima Resilience Strategy.

DA 01 Risk management and resilient infrastructure

Analysis of capacity to prevent and respond to disasters through a resilient community perspective.

DA 02 Inclusive economic development

Evaluation of opportunities for job creation and economic development

DA 03 Compact, connected, and integrated city

Evaluation of urban growth scenarios for the Colima-Villa de Álvarez Metropolitan Area

DA 04 Sustainability and climate action

Analysis of potential GHG reductions in the city of Colima

Photo: Rodrigo Pérez y Pérez
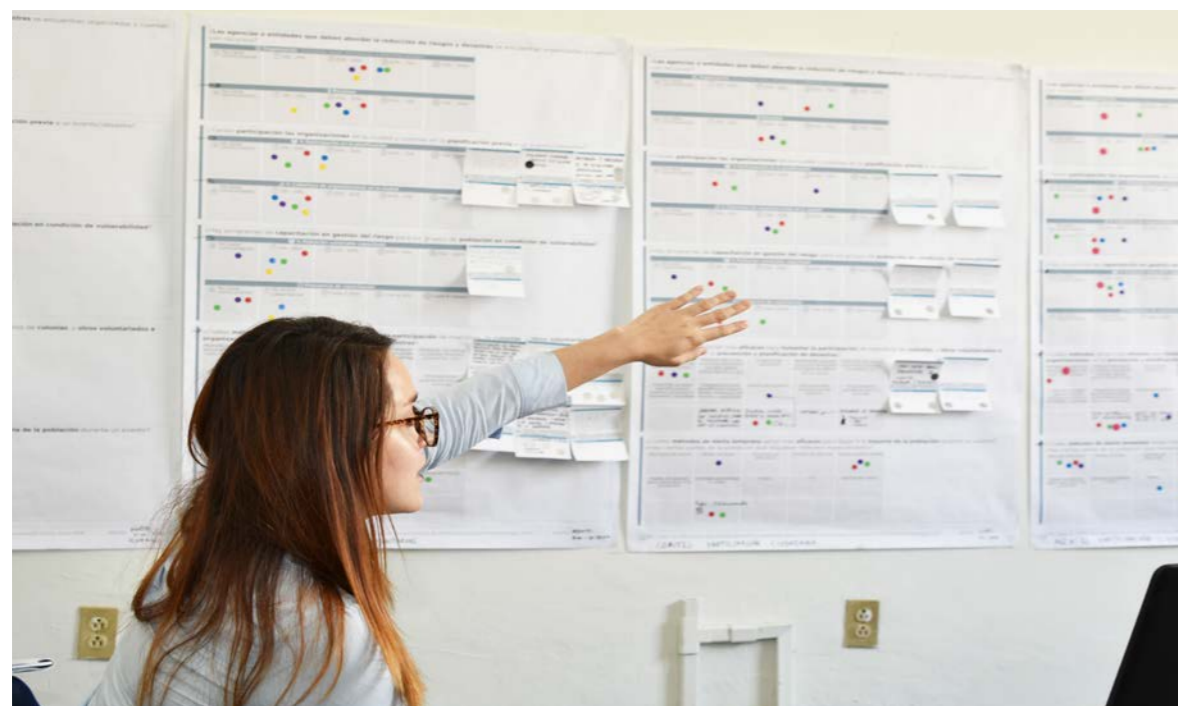
Analysis of capacity to prevent and respond to disasters through a resilient community perspective

With the support of AECOM, a study was conducted to evaluate how communities in the city of Colima could be organized and work with the government on preparedness and building the city's capacity to respond to disasters. The study also provided recommendations for risk management to achieve greater social cohesion, sustainability, and community resilience.

The analysis was carried out according to the principles of the Sendai Framework for Disaster Risk Reduction[53] and with the belief that a community-based approach to disaster preparedness strengthens the ability of communities to respond to emergencies and saves lives. To understand Colima's particular context, the City's recent risk management policies and efforts to encourage citizen participation were reviewed. Government representatives, academics, and neighborhood organizations also participated in a series of focus groups.

As a result of this work, recommendations to support a community-based approach to risk management were developed based on these five guidelines:

- Increasing community understanding of risk management
- Promoting community participation in risk management
- Strengthening neighborhood preparedness
- Developing an initiative to ensure safe public spaces
- Managing risks collaboratively

Government

Civil Society

Academy

Leaders of community-focused programs

Citizen Participation Agents

First Responders

Gender-based organizations

Citizen Participation Committees

Academic and Educational Institutions
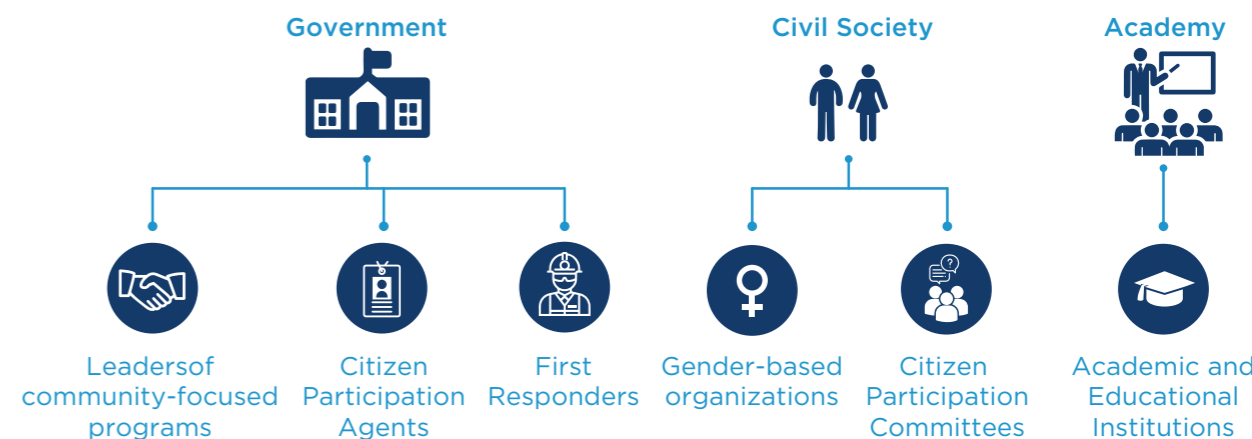
Evaluation of opportunities for job creation and economic development

With the support of Ernst & Young (EY), a 100RC Platform Partner, the Municipality conducted a study to identify value propositions and initiatives for innovation, empowerment of business owners and entrepreneurs, and diversification of the local economy.

In addition to a qualitative analysis of the information available on the city of Colima and its metropolitan area, a strategy workshop in which more than 50 business, academic, and government representatives participated was organized. Workshop participants discussed the needs and proposals of leaders of the city's economic sectors, and developed a joint vision for Colima's future economic development.
Based on the analysis and the participants' priorities, EY recommended a set of initiatives for the municipal government to introduce in the short to medium term.

Vision achieved during the workshop:
"It would be great if Colima's economy grew thanks to a boost in innovation, which would strengthen its identity and develop talent in a safe environment that encourages collective action."

Resources necessary for implementation

Time required for implementation
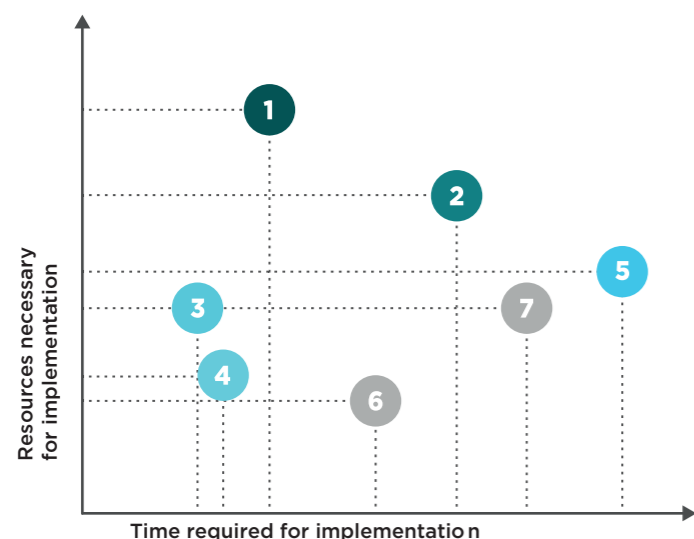
1 Trust Fund for Strategic Projects

2 Smart City Center

3 Citizen Participation Platform

4 Colima, City of Innovation

5 Digital Government

6 App for the City of Colima

7 Digital Economy

Evaluation of urban growth scenarios for the Colima-Villa de Álvarez Metropolitan Area

With the support of the consulting firm Sustainable Capital (CAPSUS), an AECOM subcontractor, and IPCO, the Municipality of Colima conducted a study to identify strategies that could boost the building of resilience in the ZMCVA in terms or urban growth.

Six urban development scenarios and more than 10 interventions or "government policy levers"[54] for 2030 were evaluated using Perfil Metropolitano 2, a platform and assessment tool. In work sessions attended by participants from the private sector and government officials from the municipalities of Colima and Villa de Álvarez, scenario features and policies were identified.

The results[55] show that the urban growth described in the current urban development program overestimates land needs by at least 50% and that the growth of urban sprawl negatively influences the results of all the indicators. Therefore, policies that encourage residential density in the central section of the city could contain growth and produce higher environmental, social, and economic benefits.

FINAL RESULTS:	Performance indicators				
	Land Consumption km²	Power Consumption kWh/capita/year	GHG Emissions kgCO₂/capita/year	Infrastructure Costs Millions MXN	Cost of Municipal Services MXN/capita
Trend	25.38	3,964	1,179	42,632	649
Growth reserves	39.75	3,828	1,150	66,771	745
Military Zone	9.75	3,484	1,036	16,474	306
ZMCV Wrkshop	10.32	3,438	1,024	17,728	308
Mixed	9.82	3,406	1,016	17,288	306
TOD Vision	7.19	3,306	990	13,621	297

(2030 Scenarios)

Analysis of potential GHG reductions in the city of Colima

With the support of AECOM and IPCO, an analysis of GHG emissions in the city of Colima was done to identify and prioritize areas that could require mitigation. This exercise was carried out using the Climate Action for Urban Sustainability tool (CURB) developed by AECOM, Bloomberg Philanthropies, C40 Cities, and the World Bank.

Students from the Technological Institute of Colima were involved in the management of the data needed for the study, which required an extensive revision of IPCO files and official documents as well as technical queries to the municipal departments of urban development and public services.

The analysis results show that energy consumption in private buildings is the largest source of GHG emissions and vehicles are the second largest source. Based on a 2010 scenario, Colima's goal is to achieve a 20% reduction in GHG emissions by 2030. The greatest mitigation potential lies in reducing emissions related to the production of electricity.

Legend (bar chart):
- Private Buildings' Power Use — 380,844
- Municipal Facilities and Buildings — 6,236
- Transport — 190,472
- Solid waste — 35,592
- Wastewater — 24,927

$tCO_2e/year$

Potential GHG reductions

20% Goal by 2030

37% Goal by 2040

54% Goal by 2050

$tCO_2e/year$

- Private Buildings' Power Use
- Base Scenario
- Power Generation
- Goal Trajectory
- Solid Waste
- Transport
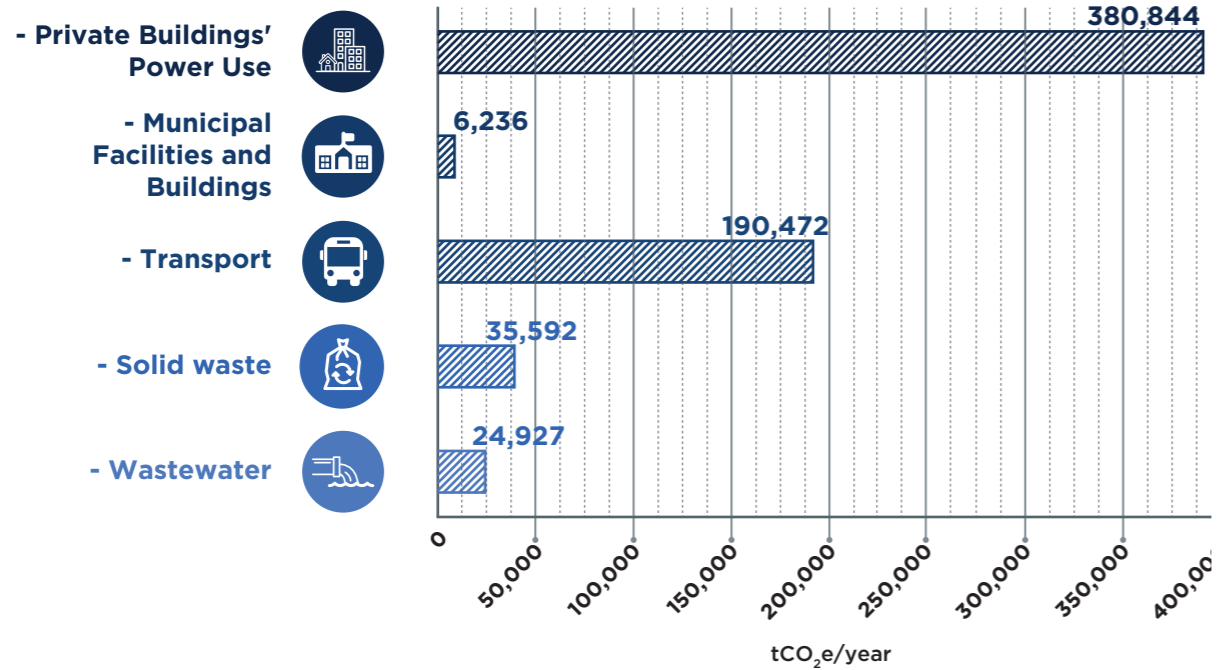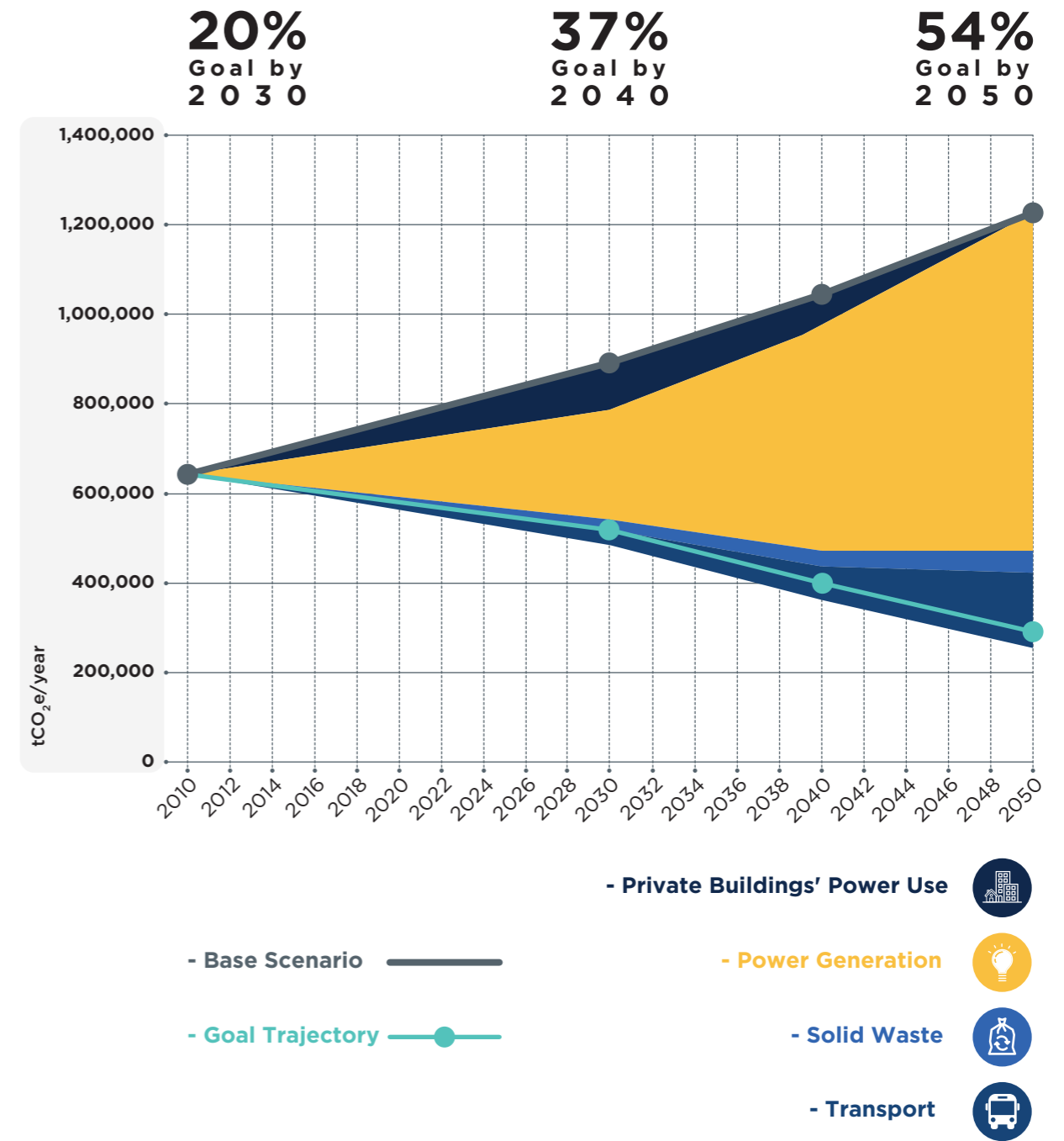
After the in-depth studies for the Discovery Areas were completed, a set of proposed actions was created based on the following:

1 **2** **3** **4**

Fase 1

2018-2021

1.- Findings and recommendations from the in-depth studies of the Discovery Areas

2.- Proposals prepared by local experts and partners

3.- Initiatives suggested and identified during Phase I

4.- Projects of interest for the 2018-2021 administration

COMPILATION OF
ACTION PROPOSALS

119

A total of 119 proposals were summarized in a standard format developed by the Colima Resilience Office and were then analyzed using the 100RC Opportunity Assessment tool to determine which initiatives had a greater potential to help build resilience in the city.

Before the Strategy's development process was completed, a second progress report was presented to city stakeholders, who then had the opportunity to suggest additions and modifications.

50

Finally, a bootcamp was organized with the help of AECOM, 100RC, and IPCO to fully develop and prioritize the actions to be incorporated in the Colima Resilience Strategy.

ALLIANCES AND PARTICIPATION
OF STAKEHOLDERS

The participation of various sectors and institutions and the collaboration with local partners have been at the core of the Colima Resilience Strategy's development process, which has been one of its main strengths. Preparation of the city's application to become a part of 100RC involved 18 government, civil, and academic representatives. In contrast, more than 600 people particpated in the development process for the Colima Resilience Strategy.

ACADEMY:

- **Technological, Industrial, and Services Baccalaureate Center (CBTIS) No. 19**
- **University of Colima**
  - Center for Environmental Management (CEUGEA)
  - Faculty of Architecture and Design
  - Faculty of Sciences
  - Faculty of Economics
  - School of Civil Engineering
  - Faculty of Humanities and Communication
  - Faculty of Tourism
- **Technological Institute of Colima**
  - Department of Earth Sciences
  - Department of Technological Management and Bonding
- **Catholic University of Colima (UNIVA)**
- **Vizcaya University of The Americas In Colima**

COMMUNITY-BASED AND CIVIL SOCIETY ORGANIZATIONS:

- Biotopo
- Centro Machilia
- Citizen Committee ¿Cómo vamos? Colima
- Citizen Participation Committees of the Municipality of Colima
- Mexican Red Cross, Colima Delegation
- Manantlán Foundation for the Biodiversity of the Western Region (MABIO)
- La Lupita Foundation
- Colima Verde
- Las Palmas Environmental Citizens Initiative
- Pro-Ecology of Colima
- Proyecto Habitante
- Education Network for Sustainable Colima
- Ola Verde Environmental Group of the Technological Institute of Colima
- Special Group for Immediate Response in Major Emergencies (GERIEM)

PROFESSIONALS ASSOCIATIONS:

- Colima State Association of Village and Town Chroniclers
- Colima State Association of Architects
- Valle de Caxitlán Association of Architects
- Colima State Association of Biologists
- Colima State Association of Economists
- Colima State Association of Civil Engineers
- Colima State Association of Physicians
- Colima State Association of Notaries
- Colima State Association of Appraisers

GOVERNMENT AND PUBLIC SECTOR:

- Military Zone No. 20 of the National Defense Secretariat
- Colima Center of the National Institute of Anthropology and History (INAH)
- Federal Electricity Commission (CFE) Colima Zone
- Water Supply and Sewerage Intermunicipal Commission of Colima and Villa de Álvarez (CIAPACOV)
- National Water Commission (CONAGUA) Colima Local Management
- National Forestry Commission (CONAFOR) Colima State Management
- Colima State Science and Technology Council (CECyTCOL)
- Operation Management body of the Ayuquila-Armería River Basin
- Municipal Government of Comala
- Municipal Government of Coquimatlán
- Municipal Government of Cuauhtémoc
- Municipal Government of Villa de Álvarez
- Institute of the National Housing Fund for Workers (INFONAVIT), Colima Delegation
- Colima State Institute for the Environment and Sustainable Development (IMADES)
- Colima Institute of the Information and Knowledge Society (ICSIC)
- Secretariat of Agrarian, Land, and Urban Development (SEDATU), Colima Delegation
- Colima State Secretariat of Social Development (SEDESCOL)
- Colima State Secretariat of Education
- Colima State Secretariat of Infrastructure and Urban Development (SEIDUR)
- Colima State Secretariat of Mobility (SEMOV)
- Colima State Secretariat of Tourism
- Colima State Civil Protection Unit

PRIVATE SECTOR:

- Colima Association of Advisors and Consultants (ACICOL)
- Association of the Electronic and Information Technology Industry of the State of Colima (AIETIC)
- International Association of Software and the Internet (AIMSI)
- Mexican Association of Women Entrepreneurs of the State of Colima (AMMEEC)
- Mexican Association of Real Estate Professionals (AMPI)
- AVGEOS
- Mexican Chamber of the Construction Industry (CMIC), Colima Delegation
- Chamber of Commerce, Services. and Tourism of Colima (CANACO SERVYTUR)
- National Chamber of Development and Promotion of the Housing Industry (CANADEVI), Colima Delegation
- National Chamber of the Restaurants and Seasoned Food Industry (CANIRAC), Colima Delegation
- National Chamber of the Transformation Industry (CANACINTRA), Colima Delegation
- Mexican Employers' Confederation (COPARMEX), Colima Delegation
- Colima State Federation of Urban and Suburban Transportation
- MAGMA Labs
- Red Trabel Colima

INTERNATIONAL PARTNERS:

- AECOM
- Sustainable Capital (CAPSUS)
- Ernst & Young (EY)
- Massey University Joint Centre for Disaster Research

4

RESILIENT COLIMA: OUR AGENDA FOR 2030

Photo: César Aceves Alfaro

VISION

Between rivers and volcanoes...

Colima is a city that builds its quality of life through innovation and the participation of its citizens. It is open to the world, resilient, and prepared to face threats, thrive inclusively, develop sustainably, and grow in a close, connected, and cohesive manner.

STRUCTURE OF THE STRATEGY

The Colima Resilience Strategy is organized into 4 pillars consisting of 12 goals and 50 actions aimed at addressing the shocks and stresses affecting the city. The pillars represent thematic areas that correspond to the issues identified through the diagnostic and analysis efforts undertaken during the two phases of the Strategy development process. The goals specify areas of action, and the activities describe the initiatives that will make the vision of a Resilient Colima a reality by 2030.

PREPARED COLIMA

1.1 Generate knowledge and information for risk management and planning

- **1.1.1** Observatory Study of Social Vulnerability to Natural and Human Hazards
- **1.1.2** Study and Adoption of Resilient Social Practices
- **1.1.3** Spectral Seismic Zoning of the Colima-Villa de Álvarez Conurbation
- **1.1.4** Atlas of Health and Human Hazards in the Municipality of Colima

1.2 Improve local capacities to prevent and respond to disasters

- **1.2.1** Flood Forecasting and Monitoring In Real Time Using Mobile Phone and Wi-Fi Networks (EWIN)
- **1.2.2** Risk Monitoring and Communication for Atmospheric Events
- **1.2.3** Resilience to Volcanic Ash Fall
- **1.2.4** Fostering Community Participation in Risk Management
- **1.2.5** Collaborative Risk Management Model

1.3 Strengthen infrastructure and buildings to reduce risks

- **1.3.1** Maintenance of Urban Infrastructure for Public Use
- **1.3.2** Integrated Management of Urban Watercourses and Rainwater Runoff
- **1.3.3** Structural Evaluation and Reinforcement of Buildings in Colima's City Center
- **1.3.4** Municipal Building Code

PROSPEROUS COLIMA

2.1 Create favorable conditions that attract resources to and investment in the municipality

- **2.1.1** Development and Promotion Agency for the City Center of Colima
- **2.1.2** Trust Fund for strategic projects
- **2.1.3** Digital Government
- **2.1.4** Tourism Development for the Municipality of Colima
- **2.1.5** Municipal Public Market Network

2.2 Foster development in the city through social and technological innovation

- **2.2.1** Colima Innovation Agenda
- **2.2.2** Innovation Laboratory for Youth Entrepreneurship
- **2.2.3** Smart City Center
- **2.2.4** Technical Skills Training Program
- **2.2.5** Neighborhood Solidarity Economic Program

2.3 Strengthen the prevention of violence in the society and promote a culture of peace

- **2.3.1** Civic Justice Model, Victims Assistance, and Community Policing
- **2.3.2** Special Program to Prevent Violence against Girls, Adolescents, and Women
- **2.3.3** Network of Safe and Resilient Public Spaces

INTEGRATED COLIMA

3.1 Strengthen municipal and metropolitan planning and management of urban development

- **3.1.1** Metropolitan Institute for Planning and Resilience
- **3.1.2** Urban Development Program (PDU) for the Colima-Villa de Álvarez Conurbation
- **3.1.3** Municipal Program of Urban Development and Ecological Territorial Management (PMDUOET)
- **3.1.4** Partial Program for Urban Improvement (PPMU) Paseo Río Colima

3.2 Promote high-density sustainable and transit-oriented urban development (TOD)

- **3.2.1** Promoting the Use of Urban Wasteland
- **3.2.2** Housing Promotion in the Central Area of Colima
- **3.2.3** Road Modernization and Complete Streets
- **3.2.4** Regional Integrated Transport System (RITS)
- **3.2.5** Infrastructure for Users of Public Transport in the ZMCVA

3.3 Promote non-motorized mobility and road safety

- **3.3.1** Pedestrian Paths and Corridors of the Colima-Villa De Álvarez Conurbation
- **3.3.2** Bicycle Infrastructure Network for the Colima-Villa de Álvarez Metropolitan Area
- **3.3.3** Municipal Plan for Road Safety
- **3.3.4** Mobility and Accessibility in the Central Area of the City of Colima
- **3.3.5** Metropolitan Via RecreActiva

SUSTAINABLE COLIMA

4.1 Develop and promote energy and climate action policies

- **4.1.1** Initiative to Include Resilience and Climate Change Criteria in Environmental Management Tools
- **4.1.2** Municipal Climate Action Plan (PACMUN)
- **4.1.3** Program for the Implementation of Energy Efficiency and Renewable Energy Technologies in the City Of Colima
- **4.1.4** Municipal Street Lighting Modernization Project

4.2 Promote the integrated management of municipal solid waste and a circular economy

- **4.2.1** Community–Based Separation of Urban Solid Waste
- **4.2.2** Metropolitan Program for Integrated Solid Waste Management and a Circular Economy

4.3 Foster sustainable water and natural resources management

- **4.3.1** Resilience Water Plan for the Colima-Villa de Álvarez Conurbation
- **4.3.2** Local Compensating Mechanism by Hydrological Ecosystem Services
- **4.3.3** Municipal System of Protected Areas
- **4.3.4** Urban Woodland Management Plan

CROSS-CUTTING THEMES

During the Colima Resilience Strategy development process, three cross-cutting themes were defined, which represent the requirements for successful management of resilience building in Colima. These themes were first identified during development of the Preliminary Resilience Assessment and were subsequently included in the scope of some of the in-depth studies of the Discovery Areas during Phase II.

Metropolitan Governance

Despite the fact that most of Colima's resilience challenges are shared with the rest of the ZMCVA, collaboration between the municipal governments is at present limited. Each Municipality addresses its problems in isolation from the others. Initiatives for building resilience, however, must be presented from a metropolitan perspective that promotes mechanisms for coordination, collaborative development, and management.

Youth

Young people make up one of the biggest population groups of Colima and are an especially important asset for the development of the city. During the Strategy's implementation period, they will be in the most productive years of their lives. Their potential to contribute to the economic, social, urban, and cultural transformations necessary for achieving a Resilient Colima must not be wasted.

Gender Perspective

Women in in the city of Colima face a difficult set of social and economic conditions resulting from a complex web of cultural practices that make them very vulnerable. It is essential to acknowledge the role of women in society and encourage their involvement in the Strategy's implementation and in the ongoing development of the city's resilience capacity.

CROSS-CUTTING THEMES

STRUCTURE OF ACTIONS

The Colima Resilience Strategy's actions are plans, programs, studies, projects, and campaigns focused on achieving the goals of each strategic pillar. All the actions are described on a page with the following fields:

TITLE:
Name and numbering of the action based on its pillar and goal. Some actions are marked "Priority," which indicates they are considered high-impact actions or are linked to the municipal administration's project agenda for 2018-2021.

GOAL:
Name of the goal to which it contribute

Sign of priority initiatives

RESILIENCE QUALITIES:
CRF qualities that the initiative embodies.

- Reflexive:
- Ingenious:
- Robust:
- Flexible:
- Redundant:
- Inclusive:
- Integrated:

STATUS:
Current status.

- **Initiative:** Proposed and supported by the city's partners.
- **Planning:** Required technical (administrative, financial, engineering, etc.) estimates for implementing the initiative have been generated or are in the process of being generated.
- **Pilot:** A pilot project is in place, which might expand.
- **Implementation:** The initiative is already being implemented.

TIME FRAME:
Estimated time for completion.

- **Short term:** Less than 4 years
- **Medium term:** 5 to 8 years
- **Long term:** 9 to 12 years

LEADER:
The organization or institution responsible for coordinating the management of the initiative.

PARTNERS:
Partner or potential partner institutions and organizations involved and committed to the initiative's implementation.

CROSS-CUTTING THEME:
Most relevant cross-cutting theme or themes to which it is associated.

- Metropolitan Governance
- Youth
- Gender Perspective

100RC NETWORK:
100RC city or cities with similar initiatives or experience in the field.

RESILIENCE BENEFITS:
Positive impacts on the city's resilience expected as a result of the initiative's implementation

DESCRIPTION:
Brief narrative of its characteristics.

Sample action card

3.1 STRENGTHEN MUNICIPAL AND METROPOLITAN PLANNING AND MANAGEMENT OF URBAN DEVELOPMENT

3.1.1 METROPOLITAN INSTITUTE FOR PLANNING AND RESILIENCE

RESILIENCE QUALITIES:
- Integrated
- Robust
- Reflexive

DESCRIPTION:
This initiative will create an intermunicipal public management agency that will be responsible for metropolitan planning and for unifying the development visions of the five municipalities of the ZMCVA. This institute will generate and promote projects, studies, programs, and guidelines from a strategic and resilience-building perspective, and will encourage the responsible government bodies to implement metropolitan management policies that will be effective and have a positive impact on the population's quality of life. The agency will be a multidisciplinary professional and technical team, managed by a general director who will report to a council consisting of mayors and distinguished citizens (and demonstrating gender equality).

RESILIENCE BENEFITS:
This institute will facilitate the systematic and coordinated management of development in the ZMCVA, and will take economic, social, cultural, mobility, risk, resilience, and sustainability criteria into account. Through this initiative, Colima will make significant progress towards improving metropolitan governance.

100RC NETWORK:
Guadalajara (IMEPLAN) and Santa Fe (Santa Fe Metropolitan Planning Organization).

STATUS:
Initiative

TIME FRAME:
Medium term

LEADER:
IPCO

PARTNERS:
- Congress of the State of Colima
- Municipal Governments of ZMCVA

CROSS-CUTTING THEME:
- Metropolitan governance
- Gender perspective

PREPARED COLIMA

ISSUE

Colima is not sufficiently prepared to confront the various natural and human hazards that put its people at risk, particularly its most vulnerable communities. Consequently, theMunicipality must develop and strengthen a number of institutional capacities related to prevention, mitigation, and response to disasters. Currently, these capacities are weak and face major technical, budgetary, and operational constraints.

A greater understanding of events that pose risks and more information on these risks are needed. Educational opportunities must be created so that communities can develop the ability to manage their own risks. Establishing mechanisms for effective monitoring and communication of potential hazards is also critical for decision-making that can prevent damages and save lives.

To guarantee the safety of buildings and the proper functioning of urban equipment and infrastructure, comprehensive building and infrastructure assessments must be performed, Existing buildings must be reinforced or modified as needed, and building regulations must be developed to ensure the proper construction and performance of new buildings.

Lastly, risk management in the city of Colima must function based on a collaborative model in which dynamic and flexible governance allows for a wide range of governmental and non-governmental entities and organizations to get involved, and everyone must put the interests of the whole community at the forefront of their decision-making.

GOALS

Link to SDGs:

1.1 Generate knowledge and information for risk management and planning

4 QUALITY EDUCATION

11 SUSTAINABLE CITIES & COMMUNITIES

1.2 Improve local capacities to prevent and respond to disasters

1.3 Strengthen infrastructure and buildings to reduce risks

9 INDUSTRY INNOVATION & INFRASTRUCTURE
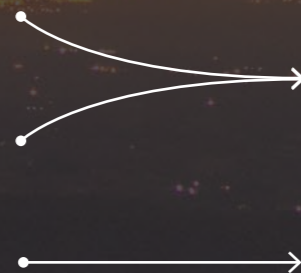
11 SUSTAINABLE CITIES & COMMUNITIES

Photo: Hernando Alonso Rivera Cervantes

1.1.1 OBSERVATORY STUDY OF **SOCIAL VULNERABILITY TO NATURAL AND HUMAN HAZARDS**

RESILIENCE QUALITIES:

Inclusive   Reflective

DESCRIPTION:

The initiative seeks to institutionalize the quantification and analysis of the various ways in which social vulnerability is expressed throughout the different population sectors in the municipality of Colima, with particular attention to young people and women. Quantitative and qualitative analysis conducted periodically and developed through desk-to-field work and human resources and outreach material will be considered. The information generated by this initiative will contribute to the creation of ways to identify, restore, and strengthen the capacities of the city's socially vulnerable population sectors to respond to the various threats to which the city is exposed. Thus it will improve the resilience capacities of the most vulnerable groups within the city.

RESILIENCE BENEFITS:

The results of the constant analysis will identify the specific vulnerabilities of every sector of the city's population and strengthen their response capacity to various types of threats. The results will also inform the creation or modification of public policies aimed at reducing the socioeconomic impacts from natural and human hazards.

100RC NETWORK:

- Río de Janeiro (Individual Resilience Indicators)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Municipal Government of Colima (Resilience Office)

PARTNERS:

- Women's Institute for Colima Municipality
- Municipal Institute for Innovation and Youth
- Municipal DIF System
- Municipal Civil Protection Unit
- University of Colima (Faculty of Sciences)

CROSS-CUTTING THEME:

Youth

Gender perspective

1.1.2 STUDY AND ADOPTION OF **RESILIENT SOCIAL PRACTICES**

RESILIENCE QUALITIES:

Integrated   Resourceful   Reflective

DESCRIPTION:

This initiative involves developing a campaign to identify, document, and understand both historical as well as recent resilient practices in Colima to mitigate and prevent shocks from natural hazards. Initially, a catalogue of society's responses over the course of several centuries will be systematically created to identify those efforts and practices that were positive and effective. The most feasible of these will then be summarized and disseminated through community and neighborhood associations, and incorporated in municipal policies.

RESILIENCE BENEFITS:

Besides identifying and disseminating local knowledge, this initiative will collect information that can potentially mitigate current risks and the impacts of future natural hazards.

100RC NETWORK:

- Vejle ("Next Practices" Catalogue)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Municipal Government of Colima (Resilience Office)

PARTNERS:

- Municipal Historical Archive of Colima
- Citizen Participation Committees
- University of Colima (Faculty of Humanities and Communication)

CROSS-CUTTING THEME:

Youth

Gender perspective

1.1.3 SPECTRAL SEISMIC ZONING OF THE COLIMA-VILLA DE ÁLVAREZ CONURBATION

RESILIENCE QUALITIES:

Robust

Reflective

DESCRIPTION:

This initiative consists of a quantitative analysis of the geodynamical characteristics of the Colima and Villa de Álvarez urban area, based on—as suggested by the CFE Seismic Design Manual—the study of environmental vibration records, the shear wave speed profiles, and the estimate of transfer functions between sites. The results will provide information on different geological formations and the seismic behavior of the different types of land on which the central metropolitan area is located.

RESILIENCE BENEFITS:

The results of the study will be of the utmost importance for the development of a seismic design that is appropriate for local conditions and to construction of buildings that will enable greater urban density. The benefits will contribute to a structurally safer city.

100RC NETWORK:

- Quito (study of seismic microzoning)
- Santiago de los Caballeros (study of microzoning and seismic hazard maps)

STATUS:

Planning

TIME FRAME:

Short term

LEADER:

University of Colima (Faculty of Civil Engineering)

PARTNERS:

- Municipal Government of Colima (Resilience Office)
- Municipal Government of Villa de Álvarez
- IPCO

CROSS-CUTTING THEME:

Metropolitan governance

1.1.4 ATLAS OF HEALTH AND HUMAN HAZARDS IN THE MUNICIPALITY OF COLIMA

RESILIENCE QUALITIES:

Integrated

Robust
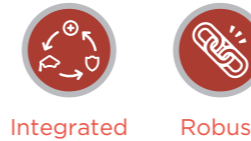
DESCRIPTION:

This initiative focuses on updating the Atlas of Natural Hazards for the Municipality of Colima to include health and human hazards. It also involves identifying the institutional processes required for integrating the Atlas into urban planning and management. This document will provide information for determining the areas with minor risks from urban development. Once health and human hazards are integrated into the Atlas, the goal will be to harmonize it with the Atlases of the other ZMCVA municipalities.

RESILIENCE BENEFITS:

This updated Atlas will help improve the decision-making processes for urban planning and management. Moreover, it will support the prevention and mitigation of risks.

100RC NETWORK:

- Surat (Pollution Zoning Atlas)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Municipal Government of Colima (Resilience Office)

PARTNERS:

- IPCO
- Municipal Civil Protection Unit
- University of Colima (Faculty of Sciences)

CROSS-CUTTING THEME:

Metropolitan governance

FLOOD RISKS IN THE CITY OF COLIMA[56]

— Municipal Boundary
— Bodies of Water
▢ Villa de Alvarez
▢ Colima

Flood Risk Level
▢ Very Low
▢ Low
▢ Medium
▢ High
▢ Very High

Arroyo Manrique

Arroyo Santa Gertrudis

Arroyo Jazmín

0   0.75   1.5   3   4.5   6
Km

1.2.1 FLOOD FORECASTING AND MONITORING IN REAL TIME USING MOBILE PHONE AND WI-FI NETWORKS (EWIN)

RESILIENCE QUALITIES:

Integrated   Resourceful   Reflective

DESCRIPTION:

This initiative focuses on building a monitoring and early warning system for floods in real time that uses mobile telecommunications and wireless Internet (Wi-Fi). Hydrometric stations and sensors would be installed throughout the Colima River and the Pereira and Manrique streams to detect water flow conditions before and during floods. A large team of Mexican and British researchers work at EWIN as well as at other leading hydraulic engineering and technology companies.

RESILIENCE BENEFITS:

In providing an early warning system, this project will help prevent damage from natural disasters today and improve the local capacity to adapt to climate change in the future.

100RC NETWORK:

• Cali (early warning system for storms)
• Da Nang (monitoring and early warning system for flood risks)

STATUS:
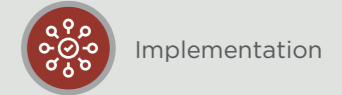
Implementation

TIME FRAME:

Short term

LEADER:

University of Colima (Faculty of Civil Engineering)

PARTNERS:

• CONAGUA
• Municipal Government of Colima (Resilience Office)
• Municipal Government of Villa de Álvarez
• Municipal Civil Protection Unit
• University of Loughborough
• Autonomous National University of Mexico (UNAM)

CROSS-CUTTING THEME:

Metropolitan governance

1.2.2 RISK MONITORING AND COMMUNICATION FOR ATMOSPHERIC EVENTS

RESILIENCE QUALITIES:

Resourceful   Reflective   Robust

DESCRIPTION:

This initiative aims to create monitoring and communications protocols for the risks related to various threats to which Colima's population is vulnerable. Among them are extreme storms or high winds caused by weather events such as mesoscale convective systems and tropical cyclones as well as air pollution from particulate matter resulting from volcanic activity (volcanic ash) or agricultural and industrial activity (e.g, fires and burning caused by land-use changes.) The goal is to model and forecast these threats as they develop, in real time, and communicate information on them in a timely fashion. Communication methods will be adapted to different groups and communities, such as young people and senior citizens. The Faculty of Sciences of the University of Colima, the Mexican Red Cross (Colima Delegation), and the civil protection units of the municipalities of the ZMCVA have previously collaborated on this issue.

RESILIENCE BENEFITS:

Efficient risk communication ensures that communities understand their vulnerabilities and the specific actions they need to take in case of a disaster. Conveying precise information helps to ensure that citizens are aware of possible threats and also could prevent or mitigate damages as well as save lives.

100RC NETWORK:

• Mexico City (Risk communication platform)

STATUS:

Planning

TIME FRAME:

Medium term

LEADER:

Municipal Government of Colima (Resilience Office)

PARTNERS:

• Mexican Red Cross (Colima Delegation)
• Horizons Foundation
• Municipal Civil Protection Unit
• University of Colima (Faculty of Sciences)

CROSS-CUTTING THEME:

Metropolitan governance

Youth

1.2.3 RESILIENCE TO VOLCANIC ASH FALL

RESILIENCE QUALITIES:

Integrated   Resourceful   Reflective

DESCRIPTION:

This action is intended to define a standard protocol for society's response to volcanic eruptions in which ash disperses over the city. The project includes a risk perception analysis and the design and implementation of an educational program for the population. It will incorporate the results of a recent analysis conducted by the International Volcanic Health Hazard Network on mitigating risks associated with the dispersal of volcanic ash. Once the project is completed, the civil protection units of other ZMCVA municipalities will receive the results.

RESILIENCE BENEFITS:

Taking appropriate action to address the dispersal of volcanic ash strengthens people's resilience in the face of this threat. It helps them prevent and mitigate the effects exposure to volcanic ash may have on their everyday life, and it may even save lives.

100RC NETWORK:

• Bangkok (Disaster Learning Centre for Earthquake and Fire Hazards)
• Puerto Rico (Communications Campaign to Build a Culture of Household Emergency Preparedness and Awareness)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Municipal Government of Colima (Resilience Office)

PARTNERS:

• Municipal Civil Protection Unit
• University of Colima (Faculty of Sciences)

CROSS-CUTTING THEME:

Metropolitan governance

1.2.4 FOSTERING COMMUNITY PARTICIPATION IN RISK MANAGEMENT

RESILIENCE QUALITIES:

Integrated   Resourceful   Inclusive

DESCRIPTION:

This is a program that focuses on creating institutional mechanisms that facilitate community participation by both professionals and volunteers, especially young people and women, in risk management. Key actions include developing educational materials and training, organizing assemblies and festivals, and providing support for initiatives that strengthen community ties.

RESILIENCE BENEFITS:

As long as people are prepared to share knowledge, the possibility of saving lives when a catastrophe occurs is higher. Furthermore, by being prepared, people can respond to threats in a more timely and direct way. Preparedness strengthens community ties and builds social cohesion.

100RC NETWORK:

- Bangkok (community-based disaster risk management)
- Mexico City (Resilient Neighborhoods)
- Santiago de Chile (Community Building Plan to Face Multi-hazard Events in the Foothills)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (Resilience Office)

PARTNERS:

- Citizen Participation Committees
- Mexican Red Cross (Colima Delegation)
- Women's Institute for Colima Municipality
- Municipal Institute for Innovation and Youth
- Municipal Civil Protection Unit

CROSS-CUTTING THEME:

Youth

Gender perspective

1.2.5 COLLABORATIVE RISK MANAGEMENT MODEL

RESILIENCE QUALITIES:

Integrated   Flexible   Inclusive

DESCRIPTION:

This initiative will establish a workgroup to manage risks collaboratively at the municipal level. The workgroup will include participants from every neighborhood, various disciplines and sectors of society (including technical experts, civil protection officers, and citizens), and civic organizations. The workgroup will meet periodically to oversee the creation and operation of neighborhood brigades and to establish communication protocols for providing information to first responders on the priorities or needs in each neighborhood when a disaster occurs. The neighborhood brigades will present the specific needs and priorities of their neighborhoods to the workgroup.

RESILIENCE BENEFITS:

This initiative could help improve the operations of first responders and in the process also improve the institutional response and strengthen links between communities and government when disasters occur.

100RC NETWORK:

- Paris (Citizens Network for Crisis Management Support and Resilience Building)
- San Francisco (Neighborhood First Response Team)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Municipal Civil Protection Unit

PARTNERS:

- Citizen Participation Committees
- Mexican Red Cross (Colima Delegation)
- GERIEM
- University of Colima

CROSS-CUTTING THEME:

Metropolitan governance

Youth

Gender perspective

1.3.1 MAINTENANCE OF **URBAN INFRASTRUCTURE FOR PUBLIC USE**

RESILIENCE QUALITIES:

Integrated   Robust

DESCRIPTION:

This initiative focuses on expanding the current analysis of important urban infrastructure elements (roads, bridges, electricity grids, water supply, and sanitation systems, among others) and implementing an action plan that will ensure their optimization and maintenance and identify investment and financing options. Efforts will be coordinated with the corresponding units at the federal and state level, especially for metropolitan service infrastructure.

RESILIENCE BENEFITS:

The plan will help the municipal government to manage its the city's resources more efficiently by reducing the costs of corrective actions. It will also identify the investments required in both the medium and long term to prevent and mitigate the potential impacts on the population of infrastructure and building failures due to earthquakes or floods.

100RC NETWORK:

- Berkeley (Investment in Regional Public Infrastructure)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Public Works and Planning)

PARTNERS:

- CIAPACOV
- CFE
- SEDATU
- SEIDUR

CROSS-CUTTING THEME:

Metropolitan governance

1.3.2 INTEGRATED MANAGEMENT OF **URBAN WATERCOURSES AND RAINWATER RUNOFF**

RESILIENCE QUALITIES:

Flexible   Robust

DESCRIPTION:

This is an environmental management program for urban watercourses and optimization of the hydraulic infrastructure that carries runoff during the rainy season. This initiative will evalute the financial investments needed for the program's implementation and take into account data from the Integrated Management Plan for Urban Watercourses and the Master Plan of Hydraulic Infrastructure for the Metropolitan Area. Moreover, it will incorporate green and blue infrastructure elements (rainwater drainage and infiltration networks, and vegetation and land containment strategies) and will involve the residents of the areas surrounding the watercourses.

RESILIENCE BENEFITS:

Implementation of this initiative would help strengthen the city's water infrastructure and mitigate floods and damages from excess runoff during the rainy season. This is particularly important, given the potential for alterations in precipitation patterns caused by climate change.

100RC NETWORK:

- Santiago de Chile (Hydrometeorological Hazards Program)
- Santiago de los Caballeros (Improved Coverage of Drainage System Infrastructure)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Public Works and Planning)

PARTNERS:

- CIAPACOV
- SEDATU
- SEIDUR

CROSS-CUTTING THEME:
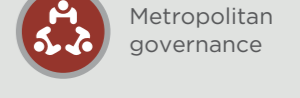
Metropolitan governance

SEISMIC RISK AT BLOCK LEVEL IN THE CITY OF COLIMA[57]

Legend:
- Municipal Boundary
- Bodies of Water
- Villa de Alvarez
- Colima

Seismic Risk Level
- Very Low
- Low
- Medium
- High
- Very High
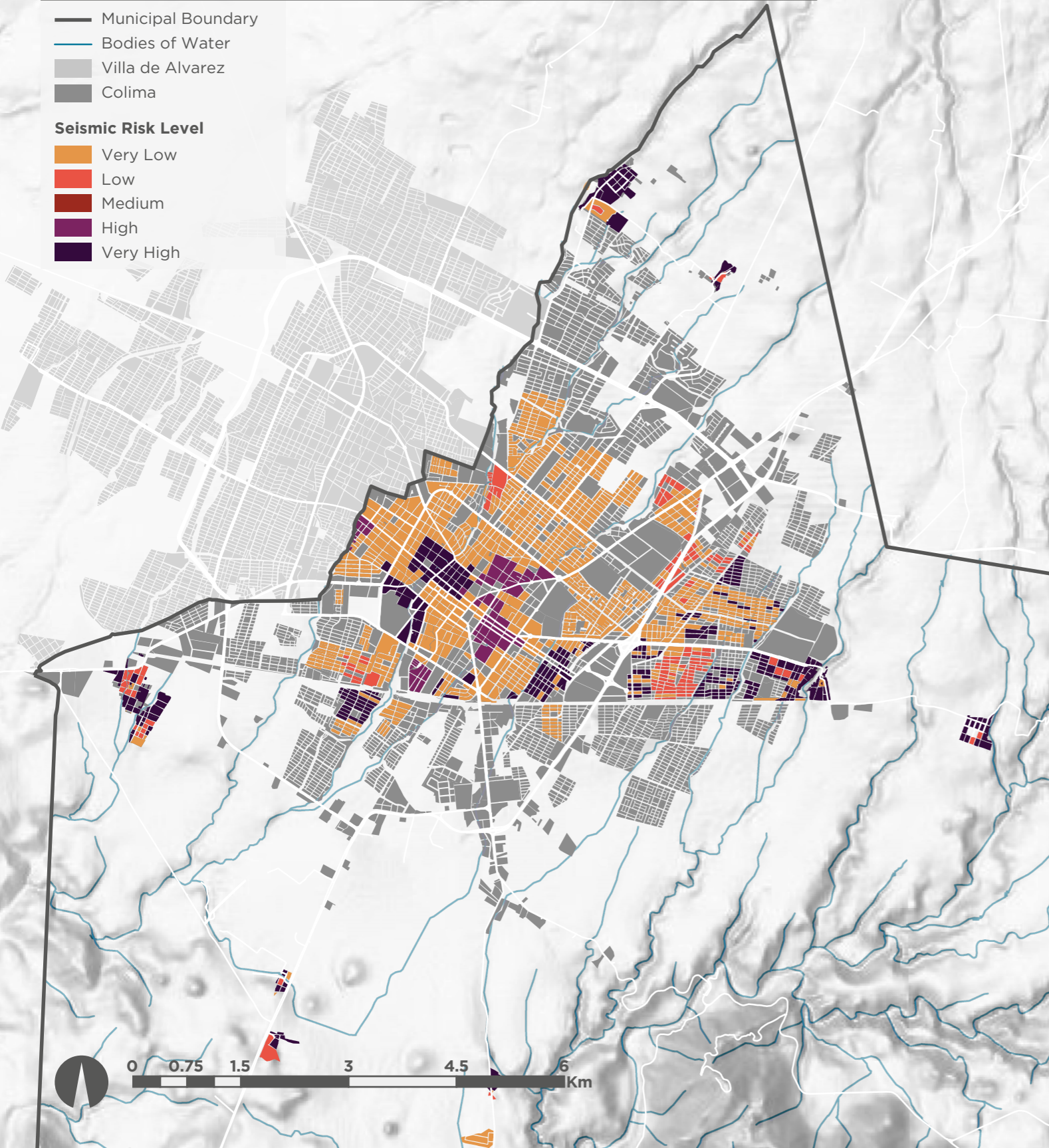
Scale: 0 — 0.75 — 1.5 — 3 — 4.5 — 6 Km

1.3.3 STRUCTURAL EVALUATION AND REINFORCEMENT OF BUILDINGS IN COLIMA'S CITY CENTER

RESILIENCE QUALITIES:

Integrated   Robust

DESCRIPTION:

This initiative focuses on a structural assessment of the buildings (houses, schools, public or heritage buildings, among others) in the city center of Colima and on an integrated action plan for their reinforcement, maintenance, or relocation. In particular, buildings that have been modified or repurposed will be examined for physical evidence of structural resilience, and an analysis using numerical models will be conducted to forecast their behavior during shocks. With regard to historical architectural styles, materials, craftsmanship, architectural practices, and traditional construction techniques will be taken into account. As for school buildings, the experience on previous protocols developed by Greka Architects, Grupo HSA, the Colima Anáhuac College and Centro Machilia will be considered. Depending on the results, this project could be extended to the rest of the city or to the entire metropolitan area.

RESILIENCE BENEFITS:

Implementation of the project will help ensure the structural safety of buildings in the center of the city, as some of them are highly vulnerable due to the number of people that use them. the The project would also reduce the economic damage and loss of lives from seismic events. Moreover, the structural reinforcement of landmark buildings that are now vulnerable would help preserve the city's unique heritage.

100RC NETWORK:

- Cali (Evaluation of the Physical Infrastructure of Public Educational Institutions)
- San Francisco (Refurbishment of High-Risk Public Buildings)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Urban Development and Environment)

PARTNERS:

- INAH Colima Center
- Colima State Association of Architects
- Valle de Caxitlán Association of Architects
- Colima State Association of Civil Engineers
- Technological Institute of Colima
- IPCO
- University of Colima (Faculty of Civil Engineering)

CROSS-CUTTING THEME:

Metropolitan governance

1.3.4 MUNICIPAL **BUILDING CODE**

RESILIENCE QUALITIES:

Robust

DESCRIPTION:

This initiative consists of the creation of a building code for Colima that establishes the requirements and specifications for the design and construction of safe, accessible, and sustainable buildings in the municipality. The code will be based on best practices, cutting-edge technology, and the provisions of the new General Law on Human Settlements, Territorial Planning, and Urban Development. Until now, these provisions are supossed to be found in various municipal construction regulations and technical standards; therefore, adjustments to the corresponding municipal regulations will be necessary. Furthermore, in the code development process, strategies will also be identified that will ensure the code's enforcement.

RESILIENCE BENEFITS:

Cutting-edge laws will help ensure that the city's buildings are robust and resilient to the shocks to which the city is exposed. Resilent buildings are better able to protect the lives of those who use them. The new code of regulations will include issues that have not been addressed in the current regulations, such as how buildings can be constructed and adapted to better withstand the effects of climate change.

100RC NETWORK:

• Buenos Aires (Reform of Urban Building Codes)
• New Orleans (Standards for Resilient Design)
• Puerto Rico (Update of Construction Codes)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Colima Municipal Government (General Directorate for Urban Development and the Environment)

PARTNERS:

• Colima State Association of Architects
• Valle de Caxitlán Association of Architects
• Colima State Association of Civil Engineers
• Technological Institute of Colima
• International Code Council
• IPCO
• University of Colima (Faculty of Architecture and Design, and Faculty of Civil Engineering)

CROSS-CUTTING THEME:

Metropolitan governance
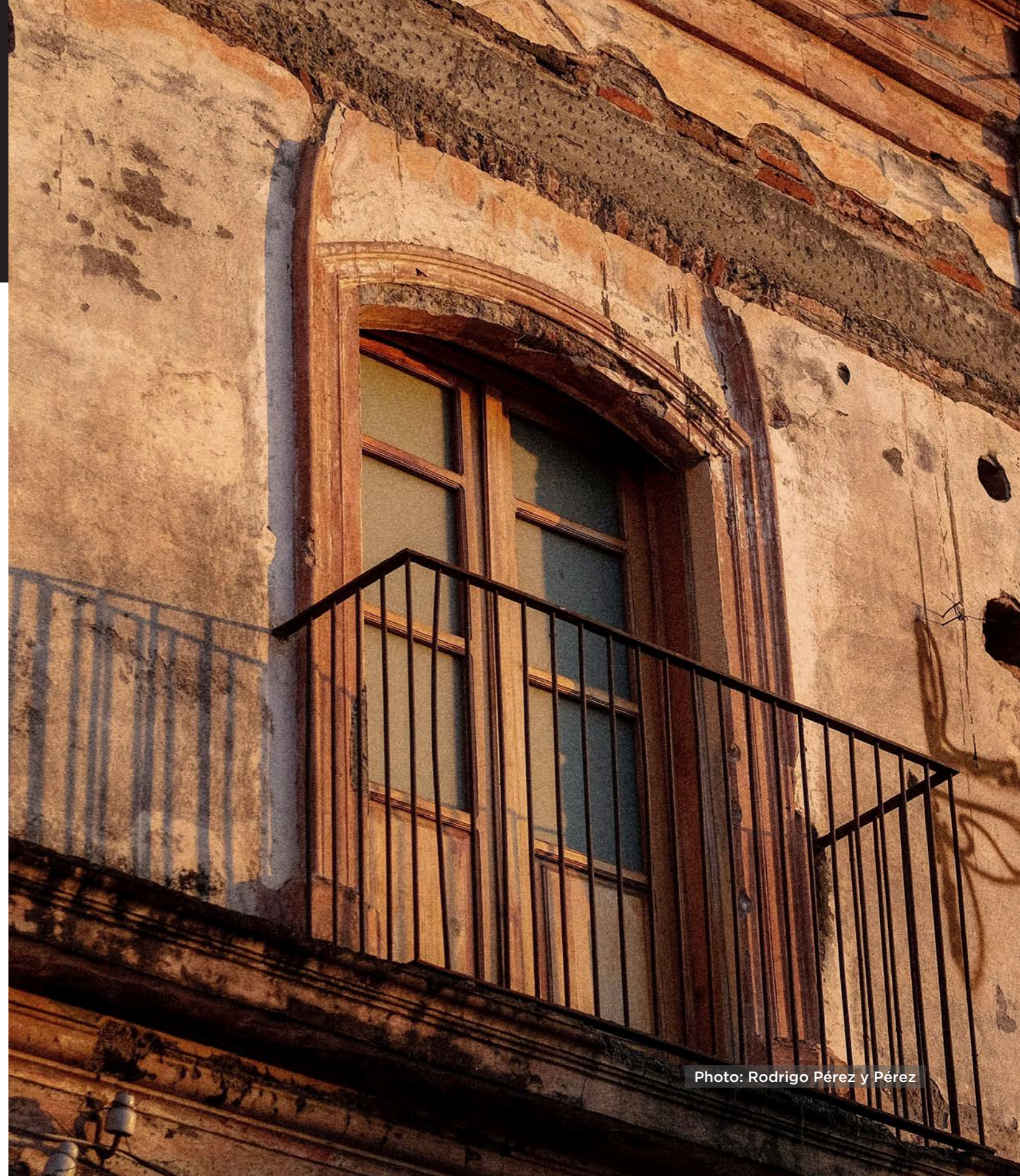
Photo: Rodrigo Pérez y Pérez

PROSPEROUS COLIMA

ISSUE

To build a resilient future for Colima, the local economy must be strengthened by improving its productivity and diversity. Efforts to ensure the city's prosperity must be based on social inclusion. The economy must not marginalize vulnerable groups, must foster job creation and economic opportunities in an equitable manner, and must help prevent violence and juvenile delinquency.

In order to achieve this, the Municipality must create conditions that attract investment and capital, must attract and retain human talent, and must promote innovation as the way to create high-value economic opportunities. The Municipality should promote sectors with the potential for growth, such as tourism and education, and should work to harness Colima's socio-economic strengths, which are significant services and infrastructure, positive relationships between local government offices and business organizations, and strong relationships with professional associations.

GOALS

Link to SDGs:

2.1 Create favorable conditions that attract resources to and investment in the municipality

8 DECENT WORK AND ECONOMIC GROWTH 11 SUSTAINABLE CITIES & COMMUNITIES 17 PARTNERSHIPS FOR THE GOALS

2.2 Foster development in the city through social and technological innovation

1 NO POVERTY 8 DECENT WORK AND ECONOMIC GROWTH 9 INDUSTRY, INNOVATION & INFRASTRUCTURE 10 REDUCED INEQUALITIES

2.3 Strengthen the prevention of violence in the society and promote a culture of peace

5 GENDER EQUALITY 10 REDUCED INEQUALITIES 11 SUSTAINABLE CITIES & COMMUNITIES 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Photo: Edgar Alejandro Preciado Victorino

2.1.1 DEVELOPMENT AND PROMOTION AGENCY FOR THE CITY CENTER OF COLIMA

RESILIENCE QUALITIES:

Integrated   Flexible   Inclusive

DESCRIPTION:

This initiative creates a decentralized municipal public agency that is responsible for leading, implementing, managing, and evaluating strategic actions by the government and citizens that contribute to the environmental, social, economic and urban revitalization of the city center. With the creation of this agency, it will be possible to evaluate criteria and guidelines for the development of plans, programs, studies, projects, events, actions, workgroups, and services, and to execute their management and implementation in a standardized way. A technical-political committee composed of representatives from industry, business, neighborhoods, and organizations in the central area of the city will oversee this initiative and report its results to the Colima City Council. The Management Plan for the Central Zone of the City of Colima as well as the Partial Plan for Urban Improvement "Paseo Río Colima" Identified the need for this type of agency.

RESILIENCE BENEFITS:

Greater inclusion and coordination between different regulatory agencies (government agencies, inhabitants, organizations, academic institutions, professional associations) would contribute to the sustainability, resilience, and quality of life in the central area of the city.

100RC NETWORK:

- Mexico City (Historic Center Authority)
- Medellin (Agency for Cooperation and Investment)
- Thessaloniki (Decision-making and Integrated Planning Models for Commercial Districts)

STATUS:
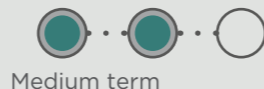
Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Human, Social and Economic Development)

PARTNERS:

- Colima State Association of Village and Town Chroniclers
- CANACO SERVYTUR
- CANIRAC
- INAH Colima Center
- Colima State Association of Architects
- Valle de Caxitlán Association of Architects
- Colima State Association of Civil Engineers
- CMIC
- IPCO
- SEIDUR

2.1.2 TRUST FUND FOR STRATEGIC PROJECTS

RESILIENCE QUALITIES:

Resourceful   Flexible

DESCRIPTION:

This initiative will create a trust to finance transformative projects in the municipality of Colima. It will explore mechanisms for private equity to finance initiatives or establish sponsorships or advertising schemes that ensure the financial sustainability of municipal projects. Resource management will require maximum transparency as well as the involvement of the academic sector and civil society in decision-making and investment monitoring. Each project or initiative must be evaluated based on its social benefits, using feasibility studies, financial models, and risk analysis. The evaluation process must be linked to the Development and Promotion Agency for the city center of Colima proposed in Action 2.1.1, which could consider the results in the financing of metropolitan projects.

RESILIENCE BENEFITS:

This trust will clarify the basis for decisions regarding financial investment in projects to strengthen Colima's capacity to manage resources that foster resilience building in the city.

100RC NETWORK:

- Bristol (resilient city financing structure)
- Oakland (financing tools for resilience projects)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Human, Social, and Economic Development)

PARTNERS:

- Business Coordination Board

CROSS-CUTTING THEME:
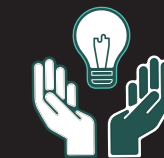
Metropolitan governance

2.1.3 **DIGITAL** GOVERNMENT

RESILIENCE QUALITIES:

Resourceful   Flexible

DESCRIPTION:

This initiative will implement a program to make the processes of the municipal government more efficient, agile, and transparent through the use of information and communication technologies. The program will ensure that citizens can make payments and request documents and services online. The aim is to redesign processes and implement changes that support new, automated processes; revise and adjust current regulations so that government authority can be validated electronically; and begin a communications campaign targeted to citizens and public servants that includes a change management strategy. This project will build on previous efforts to simplify the application process for business and construction licenses, and will become the foundation of more complex plans for the urban electronic infrastructure in the future.

RESILIENCE BENEFITS:

Facilitating the application process for business or event permits and licenses is an attractive way to foster investment and increase municipal revenue. Furthermore, digital data management will help the Municipality capture and organize information for its treasury and administrative departments.

100RC NETWORK:

• Berkeley (city information technology systems)
• San Francisco (Public Digital Service Strategy)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Human, Social and Economic Development)

PARTNERS:

• AIETIC
• AIMSI
• ICSIC

2.1.4 **TOURISM DEVELOPMENT** FOR THE MUNICIPALITY OF COLIMA

RESILIENCE QUALITIES:

Integrated   Inclusive

DESCRIPTION:

This initiative will implement a comprehensive program of projects aimed at transforming the municipality of Colima and its surroundings into an attractive tourist destination. Its main elements include identifying and refurbishing tourist locations, making an inventory of places for ecotourism, generating loans and other fiscal incentives for activities and projects that promote tourism, and developing intermunicipal agreements for collaboration on the development of regional tourism.

RESILIENCE BENEFITS:

Tourism is a sector with great growth potential, which represents a significant opportunity for attracting resources and investment and for increasing revenue in the local service sector. Increasing tourism could also help diversify the city's economic base and link it more closely with rural communities.

100RC NETWORK:

• Bangkok (roadmap for promoting tourism)
• Santa Fe (specialized tourism)
• Semarang (promotion of ecotourism and edutourism)

STATUS:

Planning

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate for Human, Social and Economic Development)

PARTNERS:

• CANACO SERVYTUR
• CANIRAC
• Municipal governments of ZMCVA

CROSS-CUTTING THEME:

Metropolitan governance

2.1.5 MUNICIPAL PUBLIC MARKET NETWORK

RESILIENCE QUALITIES:

Reflective   Robust

DESCRIPTION:

This initiative will establish a network of urban and rural markets to expand the number of market spaces in Colima. It will rehabilitate, build out, and improve the facilities of the Francisco Villa, Constitución, and Alvaro Obregon marketplaces, highlighting their architectural beauty and cultural importance. The project will involve young people in creative and artistic activities that will help beautify and popularize the marketplaces.

RESILIENCE BENEFITS:

Saving municipal tianguis and marketplaces could help improve the local economy. Promoting these places as a tourism attraction could result in economic diversification of the local economy and a greater concentration of revenue locally.

100RC NETWORK:

- Athens (Varvakeios Downtown Food Market)
- Santa Fe (North Market and Progress Market)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government

CROSS-CUTTING THEME:

Youth

Photo: Edgar Alejandro Preciado Victorino

2.2.1 COLIMA **INNOVATION AGENDA**

RESILIENCE QUALITIES:

Integrated   Resourceful   Inclusive

DESCRIPTION:

This initiative will focus on developing and implementing an action plan to promote entrepreneurship and technology in the municipality. Developed by citizens and key stakeholders, this action plan's goal is twofold: to transform Colima into a national model for innovation and to promote a culture of innovation among all levels of society, especially among the young and those in the business sector.

RESILIENCE BENEFITS:

By fostering innovation at all levels of society, the municipality will create an urban economy that is more adaptable, competitive, and sustainable. Moreover, this agenda will capitalize on Colima's current demographics. In becoming an urban model of innovation, Colima will accelerate the process of transformative change that will generate creative solutions to the issues the city faces.

100RC NETWORK:

- Christchurch (supporting and enabling innovation and creativity for economic diversification and value creation)
- Medellin (Ruta N)
- Santiago de Chile (Start-up Chile)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Think Colima

PARTNERS:

- CECyTCOL
- ¿Cómo vamos? Colima
- Colima Municipal Government
- Municipal Institute for Innovation and Youth

CROSS-CUTTING THEME:

Youth

Metropolitan governance

2.2.2 **INNOVATION LABORATORY** FOR YOUTH ENTREPRENEURSHIP

RESILIENCE QUALITIES:

Resourceful   Inclusive

DESCRIPTION:

This initiative will create a dedicated space where young people can participate in entrepreneurship and incubation workshops for innovative projects. The space will offer collaboration opportunities for emerging businesses, consulting, mentoring, and training; it will also help develop financing for projects and provide networking opportunities. The Innovation Laboratory is expected to foster the development of 100 new businesses (with a gender-neutral perspective) in Colima over a period of three years.

RESILIENCE BENEFITS:

This initiative will help develop and support emerging young entrepreneurs who will contribute to the city's economy. It will also encourage the professional development of young people and create job opportunities.

100RC NETWORK:

- Buenos Aires (Innovation Park)
- Ciudad Juárez (Technology Hub)
- Santa Fe (City of Entrepreneurs)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Municipal Institute of Innovation and Youth

PARTNERS:

- CECyTCOL
- Colima Municipal Government
- Think Colima

CROSS-CUTTING THEME:

Youth

Gender perspective

2.2.3 SMART CITY CENTER

RESILIENCE QUALITIES:

Integrated   Resourceful

DESCRIPTION:

This initiative consists of a project to implement technologies associated with Smart Cities in the historic city center of Colima, which is especially important from both an economic and tourism perspective. To achieve this, the initiative's workplan will address four areas: connectivity (free Wi-Fi hotspots), security (smart cameras, panic buttons, and LED lighting), alerts (real-time alerts for traffic, climate, and pollution updates), and marketing (brand logo associated with the initiative).

RESILIENCE BENEFITS:

A new image of the city center as a place of innovation and safety, new economic opportunities, urban renewal, citizen participation, and collaborations between institutions are among the expected benefits.

100RC NETWORK:

• Amman (ICT and Smart City Action Plan)
• Montreal (resilient development for a smart city)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (Resilience Office)

PARTNERS:

• AIETIC
• AIMSI
• ICSIC

CROSS-CUTTING THEME:

Youth

Gender perspective

2.2.4 TECHNICAL SKILLS TRAINING PROGRAM (MAGMA HACKERS ACADEMY)

RESILIENCE QUALITIES:

Resourceful   Inclusive

DESCRIPTION:

This initiative will establish an educational institute focused on the identification, development and fostering of Mexican talent based on two approaches: the first aims to address the growing need for high-quality software developers through an intensive, specialized mentoring program that will help recent, inexperienced graduate students or software developers to work in top software companies; and the second is a new approach to improve the development conditions and well-being of economically vulnerable groups, such as young people and women, through a technological skills development program that helps them enter the labor market or build quality self-employment, which will contribute to the improvement of society.

RESILIENCE BENEFITS:

In addition to including and integrating the economically vulnerable population in the labor market, this initiative will help build adaptive capacities for upcoming technological changes, such as robotization and automation.

100RC NETWORK:

• Buenos Aires (Jobs of tomorrow)
• Mexico City (HolaCode)

STATUS:

Planning

TIME FRAME:

Short term

LEADER:

Magma Hackers

PARTNERS:

• Colima Municipal Government

CROSS-CUTTING THEME:

Youth

Gender perspective

2.2.5 NEIGHBORHOOD **SOLIDARITY ECONOMIC** PROGRAM

RESILIENCE QUALITIES:

Reflective   Robust   Inclusive

DESCRIPTION:

This initiative creates and implements a sound, integrated, and scalable program aimed at supporting and strengthening small and medium businesses (with a focus on young people and women-led businesses) that offer neighborhood services, such as grocery stores. This initiative seeks to stop the disappearance of small neighborhood businesses, which are primarily located in the poorest parts of the city. This negative trend has contributed to economic inequality in the city and to the socioeconomic vulnerability of low- and medium-income households.

RESILIENCE BENEFITS:

Initiatives that strengthen and support small and medium businesses are very important to reducing social isolation, inequality, and the effects of poverty. This initiative could also help businesses continue to operate after a disaster.

100RC NETWORK:

- Atlanta (Fund and program for maintaining affordability of small businesses)
- México City (Tenoli)
- Pittsburgh (stimulating the development of small businesses)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government

PARTNERS:

- CANACO SERVYTUR
- CANIRAC
- COPARMEX

CROSS-CUTTING THEME:

Youth

Gender perspective

Photo: César Aceves Navarro

2.3.1 CIVIC JUSTICE MODEL, VICTIMS ASSISTANCE, AND COMMUNITY POLICING

RESILIENCE QUALITIES:

Reflective   Robust   Integrated

DESCRIPTION:

This initiative aims to strategically strengthen the operations of the General Directorate of Public Security and Traffic Police regarding the oversight, prosecution, and tracking of crimes committed by minors and other social conflicts arising from the challenging conditions of urban life. It incorporates best practices that have been effective in reducing crime rates and improving the public perception of security in the city. A "Civic Judge" has been appointed within the organizational structure of the municipality, a municipal commission for the social prevention of violence has been established, and the municipal government has assumed responsibility for public security, which was formerly the responsibility of the state government.

RESILIENCE BENEFITS:

Improving institutional capacities for addressing, monitoring, and resolving social conflicts and violations of laws can prevent conflicts from escalating into crimes and violence. It could also increase the population's confidence in the ability of government officials to ensure peace and security in the city.

100RC NETWORK:

- Cali (Social laboratories for Building Peace)
- Medellin (Guarantees of Non-Repetition of Violence)

STATUS:
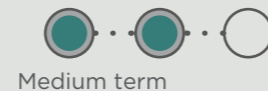
Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate of Public Security and Traffic Police)

PARTNERS:

- State Center for the Social Prevention of Violence and Crime
- Business Coordinating Board

CROSS-CUTTING THEME:

Youth

Gender perspective

2.3.2 SPECIAL PROGRAM TO PREVENT VIOLENCE AGAINST GIRLS, ADOLESCENTS, AND WOMEN

RESILIENCE QUALITIES:

Integrated   Resourceful

DESCRIPTION:

This program consists of workshops, lectures, film discussions, talks and cultural activities at elementary schools for students, teachers, and parents. The aim is to educate and raise awareness of gender-related violence. These activities will incorporate recommendations from the Gender Violence Alert for the Municipality of Colima.

RESILIENCE BENEFITS:

The prevention of gender violence is an urgent need. Gender violence affects the social development as well as the physical and mental health of girls, adolescents, and women, and it contributes to inequality and discrimination. This initiative aims to empower women and girls, and to ultimately benefit the communities in which they live.

100RC NETWORK:

- Ciudad Juarez (Community leadership program)
- Medellin (Safe Cities for Women)
- Santa Fe (program against gender violence)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Women's Institute for Colima Municipality

PARTNERS:

- Colima State Women's Institute
- Colima Municipal Government
- Municipal DIF System

CROSS-CUTTING THEME:

Youth

Gender perspective

2.3.3 NETWORK OF **SAFE AND RESILIENT PUBLIC SPACES**

RESILIENCE QUALITIES:

Flexible   Robust   Inclusive

DESCRIPTION:

This initiative will create a network of public spaces designed with resilience elements, such as environmental technologies and green infrastructure. Each public space will contain a "security point" where neighbors and government officials can gather when a crisis or disaster occurs. The initiative also aims to promote activities and events protected by the police and featuring music and dance as well as opportunities for exchanging ideas on projects to improve and beautify the city's neighborhoods. In 2018, a map was produced of the 108 potential security points identified by the Municipal Civil Protection Unit, the Directorate of Citizen Participation, and the General Directorate of Public Security and Traffic Police.

RESILIENCE BENEFITS:

Communities that are organized to improve the security of their neighborhoods and that know how to respond to crime generally have capacities that will allow them to organize to prevent and mitigate other types of human and natural threats. This is an important opportunity to improve community response and resilience capacities across the city.

100RC NETWORK:

• Mexico City (Resilient and Safe Public Spaces)
• Ciudad Juarez (Building Resilient Parks)

ESTADO:

Pilot

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (Resilience Office)

PARTNERS:

• Citizen Participation Committees
• SEDATU
• SEIDUR

CROSS-CUTTING THEME:

Youth

Gender perspective

RESILIENT PARK
ORIENTAL GARDEN

A community-designed public space called the Oriental Garden, which was to be built over part of an old street, was canceled in 1999 when the city's east bypass was constructed. During the second half of 2018, the Municipality completed the construction of the Oriental Garden. The park's neighbors had worked for more than 20 years to convince the city to transform the field into a public recreation space.

The new park's security point not only serves as a meeting point for neighbors and public officials when there is an emergency, but is also a symbol of the now Resilient Park because it became a shelter for the neighbors during the aftershocks of the earthquake on January 21, 2003.

This was the first park designed from the start according to the guidelines of the IPCO Handbook on Participatory Processes for the Design of Public Spaces. Moreover, the project forms part of the implementation of the commitments set out in the Memorandum of Understanding between SEDATU and 100 Resilient Cities in 2017.

Photo: Adrián F. Labastida Salgado

INTEGRATED COLIMA

ISSUE

Colima needs to move away from its distant, dispersed, and disconnected urban development pattern and transform itself into a more compact, connected. and equitable city. To achieve this, existing urban planning initiatives must be strengthened and a a new urban planning and management model must be adopt at the metropolitan level.

To better integrate the city, mobility problems must be addressed, particularly by promoting non-motorized modes of transportation and by improving the quality and conditions of public transport. Changes in the urban infrastructure that facilitate accessibility and road safety are needed

Lastly, the expansion of the city must be contained to avoid the environmental, economic, and social impacts of uncontrolled and unplanned growth, and to achieve this, the Municipality must promote occupancy within its urban boundaries and more density in the city's central area.

GOALS

Link to SDGs:

3.1 Strengthen municipal and metropolitan planning and management of urban development.

11 SUSTAINABLE CITIES & COMMUNITIES   15 LIFE ON LAND   17 PARTNERSHIPS FOR THE GOALS

3.2 Promote high-density sustainable and transit-oriented urban development (TOD)

9 INDUSTRY, INNOVATION & INFRASTRUCTURE   11 SUSTAINABLE CITIES & COMMUNITIES   13 CLIMATE ACTION

3.3 Promote non-motorized mobility and road safety

3 GOOD HEALTH AND WELL-BEING   9 INDUSTRY, INNOVATION & INFRASTRUCTURE   11 SUSTAINABLE CITIES & COMMUNITIES   16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Photo: Adrián F. Labastida Salgado

3.1.1 METROPOLITAN INSTITUTE FOR **PLANNING AND RESILIENCE**

RESILIENCE QUALITIES:

Integrated   Reflexive   Robust

DESCRIPTION:

This initiative will create an intermunicipal public management agency that will be responsible for metropolitan planning and for unifying the development visions of the five municipalities of the ZMCVA. This institute will generate and promote projects, studies, programs, and guidelines from a strategic and resilience-building perspective, and will encourage the responsible government bodies to implement metropolitan management policies that will be effective and have a positive impact on the population's quality of life. The agency will be a multidisciplinary professional and technical team, managed by a general director who will report to a council consisting of mayors and distinguished citizens (and demonstrating gender equality).

RESILIENCE BENEFITS:

This institute will facilitate the systematic and coordinated management of development in the ZMCVA, and will take economic, social, cultural, mobility, risk, resilience, and sustainability criteria into account. Through this initiative, Colima will make significant progress towards improving metropolitan governance.

100RC NETWORK:

- Guadalajara (IMEPLAN)
- Santa Fe (Santa Fe Metropolitan Planning Organization)
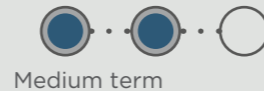
STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

IPCO

PARTNERS:

- Congress of the State of Colima
- Municipal Governments of ZMCVA

CROSS-CUTTING THEME:

Metropolitan governance

Gender perspective

3.1.2 **URBAN DEVELOPMENT PROGRAM** (PDU) FOR THE COLIMA-VILLA DE ÁLVAREZ CONURBATION

RESILIENCE QUALITIES:

Integrated   Reflective   Flexible

DESCRIPTION:

This initiative will develop and implement the PDU of the conurbation, a planning instrument that will identify the provisions, urban strategies, and general policies for urban development in the municipal capitals of Colima and Villa de Álvarez. Its goal is to balance the tasks and benefits of urban renewal, optimization, and territorial management between the two municipalities with an integrated approach. It will also encourage an urban model of reslience that incorporates the conurbation's vision of a metropolitan area aligned with new state and federal regulations for human settlements, land-use planning, and urban development.

RESILIENCE BENEFITS:

Implementing the program will encourage establishment of an urbanization process that is transparent and takes into account the interests and needs of all citizens with respect to territorial development, and that therefore contributes to the quality of life of everyone living in the conurbation.

100RC NETWORK:

- Athens (Resilient District)
- Santa Fe (metropolitan urban planning regulations)

STATUS:

Initiative

TIME FRAME:

Long term

LEADER:

Municipal Governments of Colima and Villa de Álvarez

PARTNERS:

- CANADEVI
- CMIC
- Colima State Association of Architects
- Valle de Caxitlan Association of Architects
- Colima State Association of Civil Engineers
- Technological Institute of Colima
- IPCO
- SEIDUR
- University of Colima (Faculty of Architecture and Design and Faculty of Civil Engineering)

CROSS-CUTTING THEME:

Metropolitan governance

3.1.3 MUNICIPAL PROGRAM OF **URBAN DEVELOPMENT AND ECOLOGICAL TERRITORIAL MANAGEMENT** (PMDUOET)

RESILIENCE QUALITIES:

Integrated   Reflexive   Inclusive

DESCRIPTION:

This initiative will implement the PMDUOET (in construction), a planning instrument that summarizes the goals and strategies for planning and managing human settlements within the municipality to achieve sustainable urban development. The PMDUOET defines land-use and zoning regulations for the municipal territory that correspond to the needs of its inhabitants. Unlike the PDU, which is an instrument limited to the central area of the city, this program regulates all the local and urban communities of the municipality. Land management and planning initiatives and strategic projects that provide solutions to the different territorial needs and issues in Colima will be implemented.

RESILIENCE BENEFITS:

This program will contribute to the development of public policies regarding human settlements, land-use planning, and urban development. It will focus on building an urban-rural network that does not excessively strain natural resources. In other words, the program will define how the city can transition to an orderly, equitable and inclusive urban development model.

100RC NETWORK:

- Santiago de los Caballeros (municipal land-use planning).

STATUS:

Planning

TIME FRAME:

Long term

LEADER:

Municipal Government of Colima (General Directorate for Urban Development and the Environment)

PARTNERS:

- CIAPACOV
- IMADES
- SEDER (Colima State Secretariat of Rural Development)
- SEIDUR.

CROSS-CUTTING THEME:

Metropolitan governance

3.1.4 PARTIAL PROGRAM FOR **URBAN IMPROVEMENT** (PPMU) PASEO RÍO COLIMA

RESILIENCE QUALITIES:

Integrated   Reflexive   Inclusive

DESCRIPTION:

This initiative focuses on implementing the PPMU, which was recently approved by the municipal council. It includes strategies for integrating the Colima River into the urban and economic structure of the city center. These strategies will be based on the emerging needs of the population and will aim to transform the river into a healthy, safe environment that is a model for the conservation of local biodiversity. An urban marketing plan, a program for human development and social cohesion through art, a program for the restoration and conservation of the river's hydraulic conditions, a protocol for citizen response to risks and disasters, and projects for safe streets and open public spaces along the river are among the initiatives envisaged in the program.

RESILIENCE BENEFITS:

Implementation of the PPMU Paseo Río Colima will help Colima capitalize on the important productive capacity of the central part of the city. It will also reduce the pressure on the municipality's natural areas, which are currently cut off from the social and economic vitality of the central area.

100RC NETWORK:

- Los Angeles (healthy and connected river system)
- Medellin (river parks)
- Santiago de Chile (Integrated Project for the Mapocho River)
- Santiago de los Caballeros (Master Plan "Vive el Yaque")

STATUS:

Planning

TIME FRAME:

Long term

LEADER:

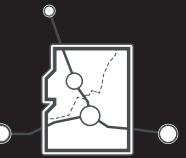Colima Municipal Government (General Directorate for Urban Development and the Environment)

PARTNERS:

- CANACO SERVYTUR
- CIAPACOV
- CONAGUA
- IMADES
- INSUVI (Institute of Land
- Urbanization and Housing in the State of Colima)
- SEIDUR

PROPORTION OF UNOCCUPIED HOUSING AND WASTELAND IN THE CITY OF COLIMA[58]

Legend:
- Municipal Boundary
- Bodies of Water
- Villa de Álvarez
- Colima
- Urban Wasteland 2012
- Large Urban Gaps

Unoccupied Blocks
- Less unoccupied
- More unoccupied
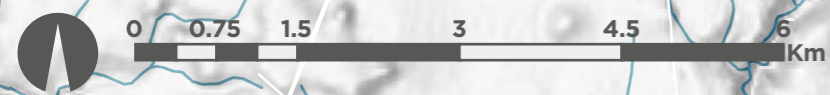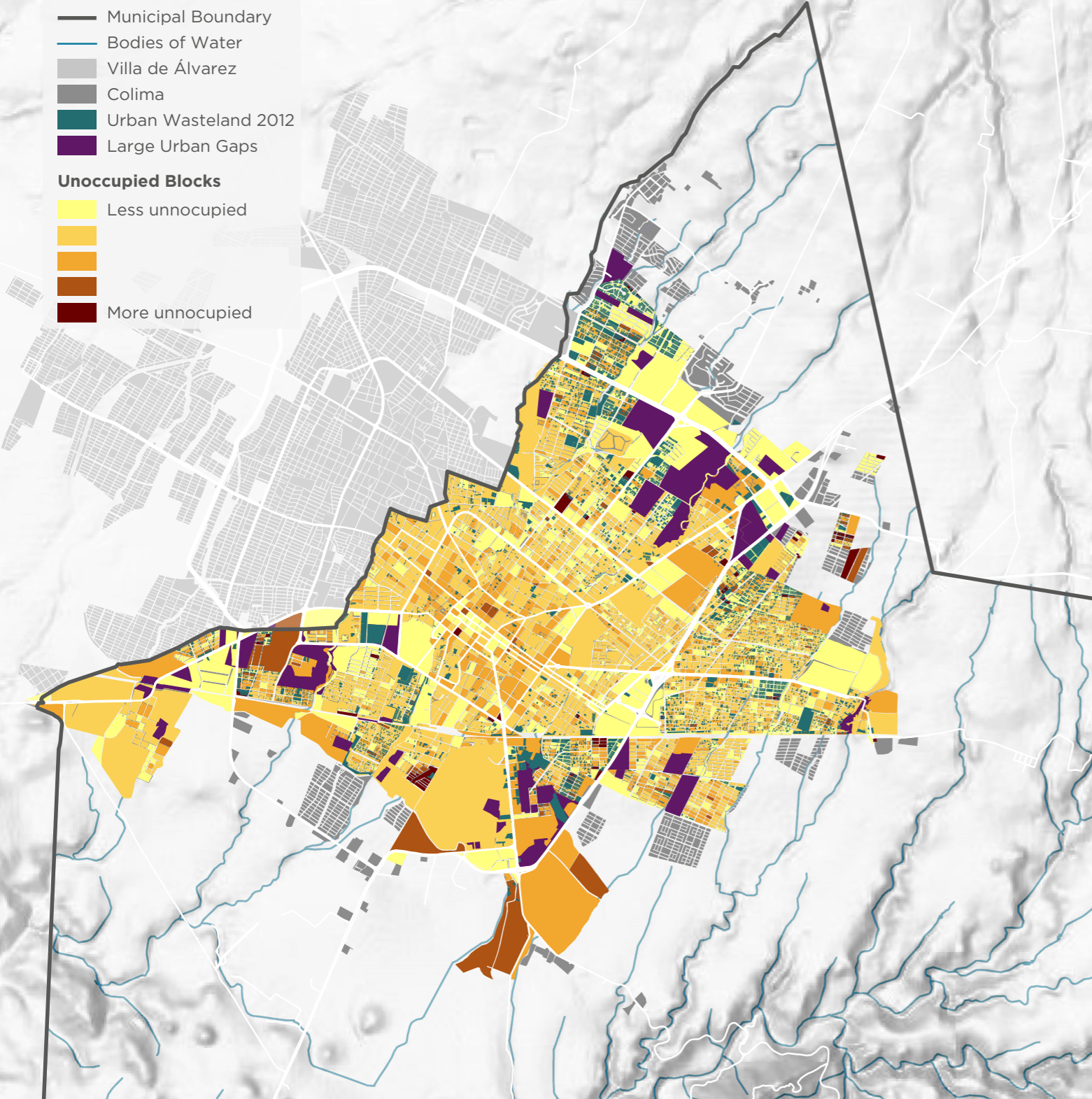
Scale: 0 — 0.75 — 1.5 — 3 — 4.5 — 6 Km

3.2.1 PROMOTING THE USE OF URBAN WASTELAND

RESILIENCE QUALITIES:

- Integrated
- Resourceful
- Flexible

DESCRIPTION:

This initiative will create a program that encourages the use of intra-urban wastelands by providing subsidies for their development and increasing the property tax levied on two types of underutilized or abandoned property: urban wasteland in the city and urban wasteland in the city center. First, a geostatistical analysis must be performed to identify, quantify, and classify the wastelands so that land-use policy changes and promotion can be made to incorporate them in the real estate market.

RESILIENCE BENEFITS:

Better use of urban land could help increase proximity to transportation, employment, and urban services for at least 20% of the population of the ZMCVA by 2030.

100RC NETWORK:

- Athens (mega resilience project for vacant buildings) and Rome (Rome Factory, a regeneration plan for abandoned public buildings used for different purposes)

STATUS:

Initiative

TIME FRAME:

Long term

LEADER:

Colima Municipal Government (General Directorate for Urban Development and the Environment)

PARTNERS:

- IPCO
- Business Coordinating Board
- SEIDUR
- SEMOV

CROSS-CUTTING THEME:

Metropolitan governance

Youth

URBAN POPULATION DENSITY IN THE CITY OF COLIMA[59]

Legend:
- Municipal Boundary
- Bodies of Water
- Villa de Alvarez
- Colima

Population Density
Units: inhabitant/hectare
- 0.00 - 3.70
- 3.70 - 56.93
- 56.93 - 102.86
- 102.86 - 171.23
- 171.23 - 3292.07
- Not Measurable
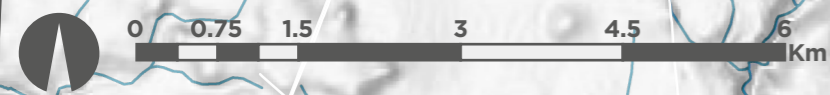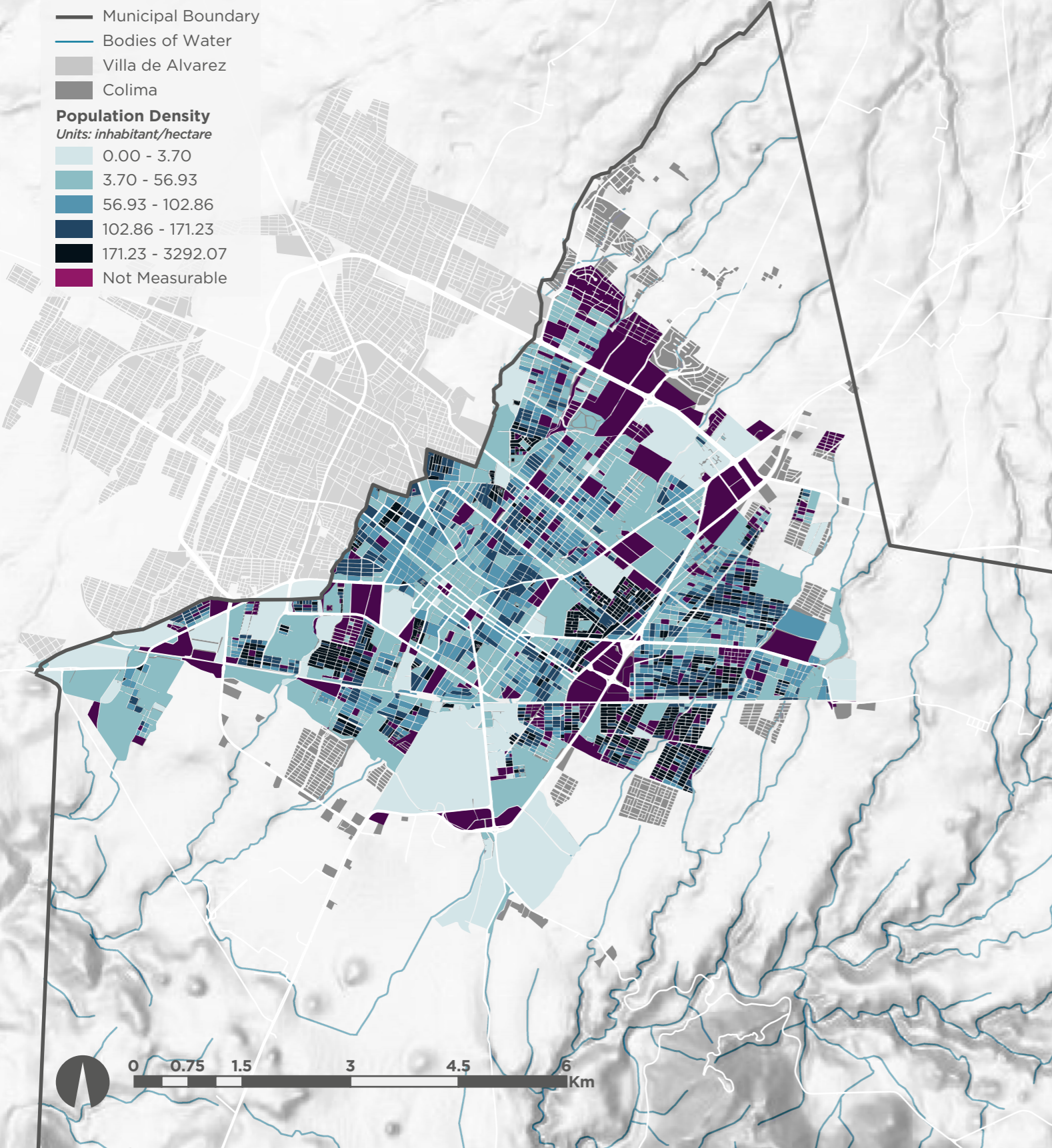
Scale: 0 0.75 1.5 3 4.5 6 Km
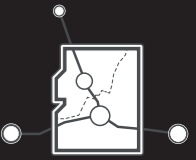
3.2.2 HOUSING PROMOTION IN THE CENTRAL AREA OF COLIMA

RESILIENCE QUALITIES:

Reflexive   Resourceful   Flexible

DESCRIPTION:

This initiative will create a program to promote the refurbishment, rehabilitation, and development of housing in the central area of the city of Colima, which plans to reach a density of 20 households per hectare (the minimum stated preliminarily by the PMDUOET). The initiative aims to facilitate the restoration and preservation of historic buildings through tax incentives proposed by the INAH, such as an exemption from property taxes. The Regulation of Investment Incentives for the Municipality of Colima and the Regulation for the Protection and Sustainable Revitalization of Buildings in the Historic City Center of Colima set a precedent for this initiative. This program will attract young people to live in the city center, where the city's senior population is currently concentrated.

RESILIENCE BENEFITS:

Policies which encourage residential density in the central section of the city foster high-density but planned growth and produce a number of environmental, social, and economic benefits in the long term.

100RC NETWORK:

- Oakland (acquisition and rehabilitaion of abandoned and blighted properties into green, healthy, and permanently affordable homes)

STATUS:

Initiative
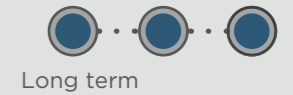
TIME FRAME:

Long term

LEADER:

Colima Municipal Government (General Directorate for Urban Development and the Environment)

PARTNERS:

- INAH Colima Center IPCO
- Business Coordinating Board
- SEIDUR
- SEMOV

CROSS-CUTTING THEME:

Youth

3.2.3 ROAD MODERNIZATION
AND COMPLETE STREETS

RESILIENCE QUALITIES:

Flexible   **Robust**   **Inclusive**

DESCRIPTION:

This initiative will integrate a number of strategic projects, and their schedules and construction activities, so that the remodeling of the city's main road axes will include resilience and sustainable mobility concepts. In particular, it will promote the criteria for a Complete Street. This means that the road design must be inclusive, i.e., it must accommodate pedestrians of all age groups and with all types of motor skills, and all means of transport (bicycles, motorcycles, buses, and cars). Preliminary proposals to redesign Niños Héroes Avenue, Boulevard Carlos de la Madrid Béjar, and Boulevard Camino Real will be examined through a "resilience lens."

RESILIENCE BENEFITS:

Implementing this project will help improve the city's image, increase property values, and reduce road accidents. It will particularly benefit pedestrians from the neighborhoods surrounding the main road axes and the cyclists who ride across the Colima-Villa de Alvarez conurbation.

100RC NETWORK:

- New York (Transformation of Dangerous arterial roads into Vision Zero Great Streets)
- San Francisco (Liveable Streets)

STATUS:

Planning

TIME FRAME:

Medium term
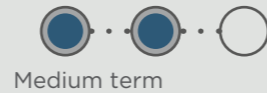
LEADER:

Colima Municipal Government (General Directorate of Public Works and Planning)

PARTNERS:

- Chambers of Deputies of the Congress of the Union
- IPCO
- SEMOV

CROSS-CUTTING THEME:

Metropolitan governance

★ # 3.2.4 REGIONAL **INTEGRATED TRANSPORT** SYSTEM (RITS)

RESILIENCE QUALITIES:

Integrated   **Flexible**   **Robust**

DESCRIPTION:

The RITS will integrate the different modes of public transportation in the state of Colima under a single entity that will manage operations, infrastructure, image, information, tariff, and service quality. This long-term project requires a solid foundation based on six main governing principles: management and regulation of transport operations, service quality and infrastructure based on user needs, sufficient infrastructure for operations, a collection system, business organization, and institutional strengthening. The size of the state is such that its inhabitants have been able to commute daily to the largest urban centers to access services and satisfy daily needs; however, this becomes harder everyday. That is why the project's main goal is to implement a new transport system that takes advantage of the current territorial conditions. More control over public transport will improve safety and accessibility for users. It will also facilitate measures to prevent gender violence and provide fare discounts for students and senior citizens.

RESILIENCE BENEFITS:

Ensuring that the transport systems can continue to operate during any type of man-made or natural crisis is essential for the resilience of the city. The project also aims to ensure that the population's daily life does not result in any activity that could produce accumulated stress. Therefore, to ensure the quality of life for everyone in the state of Colima, implementation of this project is a priority.

100RC NETWORK:

- Mexico City (expansion of an integrated and innovative public transport system),
- London (Transport for London)
- Buenos Aires (Integrated Public Transport)

STATUS:

Planning

TIME FRAME:

Long term

LEADER:

SEMOV

PARTNERS:

- IPCO
- Municipal Governments of the ZMCVA
- SEIDUR
- Colima State Secretariat of Planning and Financing

CROSS-CUTTING THEME:

Youth

Metropolitan governance

Gender perspective

DENSITY OF OFFICIAL PUBLIC TRANSPORT STOPS IN THE CITY OF COLIMA[60]

Legend:
— Municipal Boundary
— Bodies of Water
Villa de Alvarez
Colima

Stops Density
Less dense
...
Denser
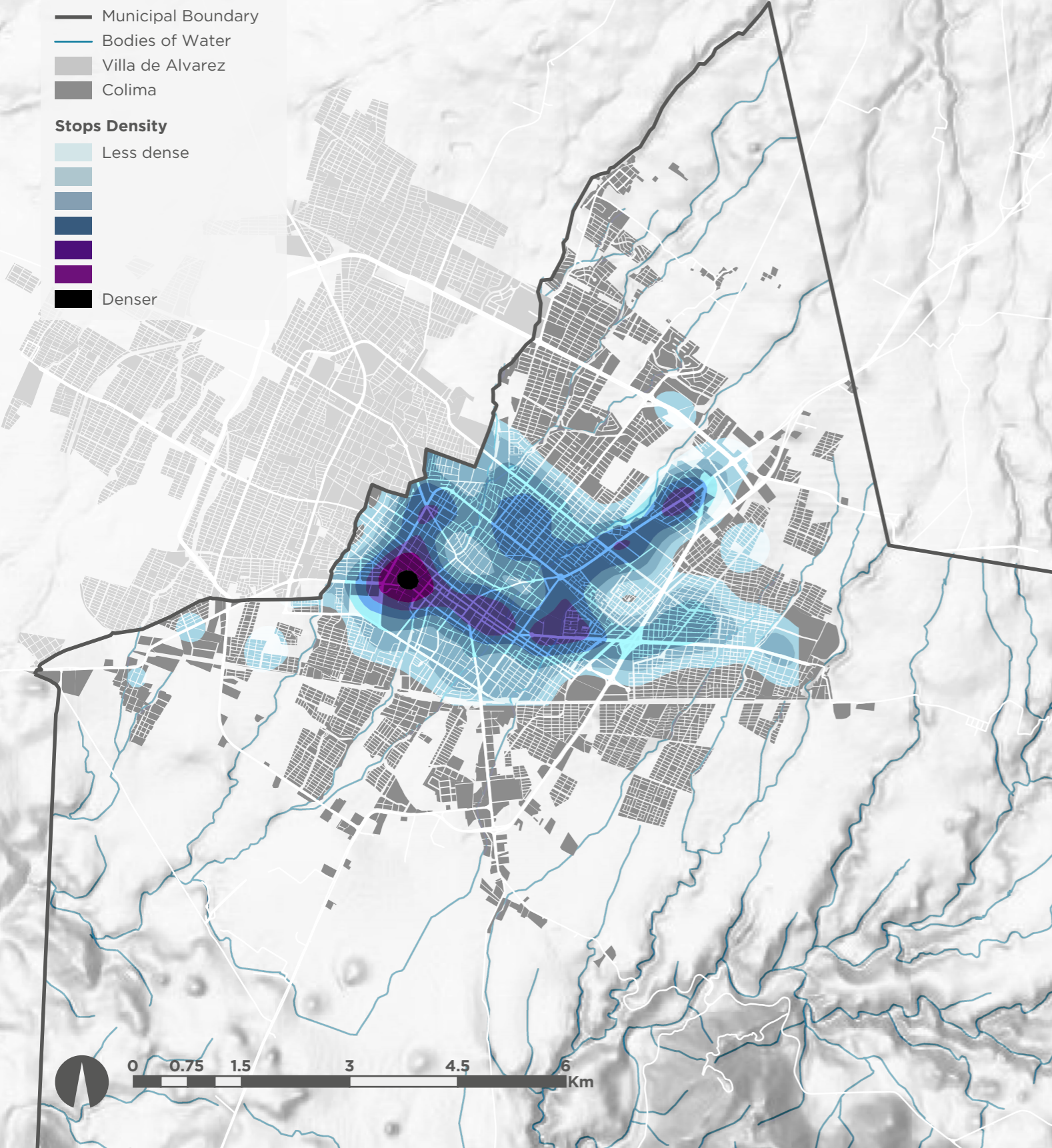
Scale: 0 0.75 1.5 3 4.5 6 Km
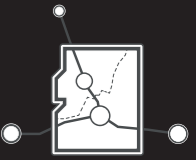
3.2.5 INFRASTRUCTURE FOR **USERS OF PUBLIC TRANSPORT** IN THE ZMCVA

RESILIENCE QUALITIES:

Integrated Flexible Robust

DESCRIPTION:

This project will formalize and improve public transport stops, i.e., the zones or areas from which any user of public transport accesses the system, which can vary depending on physical conditions and service demand. The infrastructure of the stops is a key and indispensable component to the transformation of public transport, expected after the implantation of the RITS at a state level. It works as a platform to integrate the rest of the RITS components given that with its implementation there will be improvements in the cost efficiency to provide the service without the need to reduce the current supply.

RESILIENCE BENEFITS:

The population will be able to enter the transport system in a safe, accessible, and connected manner from the different stops, which reflect service demand and user needs. This implementation is essential for the correct functioning of the service, during both normal conditions and periods of crisis. Moreover, improving access to public transport could help prevent incidents of sexual harassment and gender violence.

100RC NETWORK:

• Santiago de Chile (Safe Location Plan)

STATUS:
Initiative

TIME FRAME:
Short term

LEADER:
SEMOV

PARTNERS:
• IPCO
• Municipal Governments of the ZMCVA
• SEIDUR
• Colima State Secretariat of Planning and Financing

CROSS-CUTTING THEME:
Youth

Metropolitan governance

3.3.1 PEDESTRIAN PATHS AND CORRIDORS OF THE COLIMA-VILLA DE ÁLVAREZ CONURBATION

RESILIENCE QUALITIES:

Integrated   Inclusive

DESCRIPTION:

This initiative will conduct a feasibility study to identify strategic projects based on pedestrian demand and number of trips, and subsequently will build a number of interconnected paths and corridors throughout the Colima-Villa de Álvarez conurbation. While the work is under way, some tactical urban activities will be held to promote the project and provide road safety education.

RESILIENCE BENEFITS:

This type of infrastructure not only protects pedestrians, who are the most vulnerable population in the mobility pyramid, but it also makes daily walking more attractive and comfortable (walks make up 33.8% of the daily trips in the city of Colima). Moreover, the project could help replace motorized travel with travel by foot, thus reducing GHG emissions and improving people's health.

100RC NETWORK:

• Athens (expansion of the pedestrian zones of the city)
• Quito (Walkable Quito)
• Santiago de Chile (Santiago Walks)

STATUS:

Planning

TIME FRAME:

Medium term

LEADER:

Municipal Governments of Colima and Villa de Álvarez

PARTNERS:

• IPCO
• SEIDUR

CROSS-CUTTING THEME:

Metropolitan governance
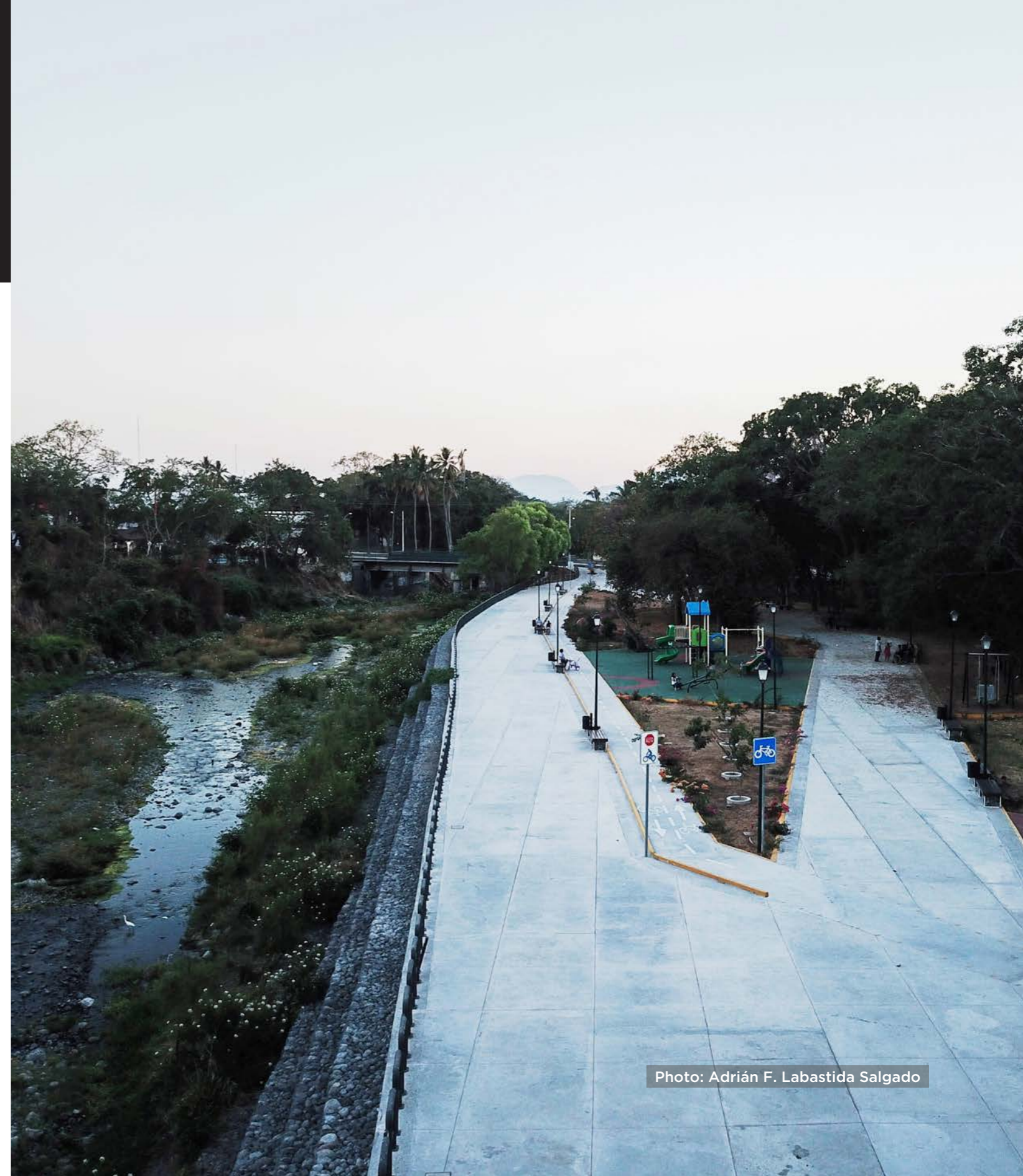
Photo: Adrián F. Labastida Salgado

CYCLE PATHS PLANNED AND IN OPERATION IN THE CITY OF COLIMA[61]

Legend:
— Municipal Boundary
— Bodies of Water
  Villa de Alvarez
  Colima

Bicycle Network
— In operation
▪▪▪ Planned
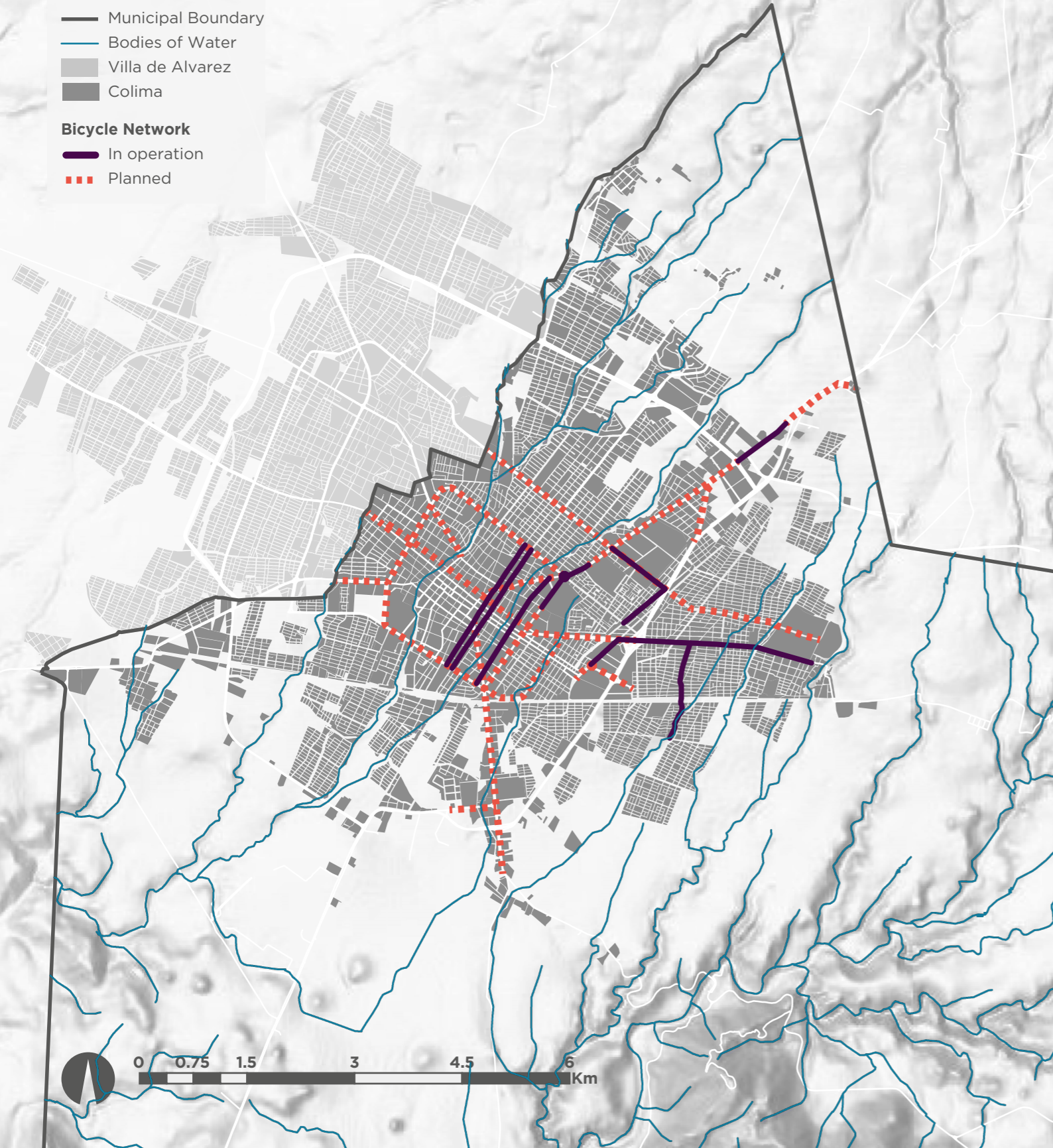
0 0.75 1.5 3 4.5 6 Km

3.3.2 BICYCLE INFRASTRUCTURE NETWORK FOR THE COLIMA-VILLA DE ÁLVAREZ METROPOLITAN AREA

RESILIENCE QUALITIES:

Integrated   Flexible   Resourceful

DESCRIPTION:

This initiative will build a main cycle infrastructure network with strategic projects based on feasibility studies of road sections, paving, and equipment (installation of bicycle parking stations) designed according to specific technical criteria. These projects must provide technical solutions that make the bicycle a convenient and safe transport alternative (for young men and women, in particular). Feasibility studies for the city of Colima and some strategic projects at a metropolitan level have been completed. This initiative will be linked to Action 3.3.1 to establish a non-motorized mobility network throughout the ZMCVA.

RESILIENCE BENEFITS:

Providing a safer bicycle network infrastructure for existing bicyclists could increase the number of short bicycle and intermodal trips and thereby decrease the number of motorized trips, thus reducing GHG emissions.

100RC NETWORK:
• Mexico City (extension of the Bicycle Path Network)
• Santiago de Chile (Plan Santiago Pedaleable)

STATUS:
Planning

TIME FRAME:
Medium term

LEADER:
SEMOV

PARTNERS:
• Municipal Governments of the ZMCVA
• IPCO
• SEIDUR

CROSS-CUTTING THEME:
Youth

Metropolitan governance

Gender perspective

Municipal Boundary
Bodies of Water
Villa de Álvarez
Colima

Road Accidents - Density
Less density of accidents

More density of accidents

0   0.75   1.5   3   4.5   6
Km
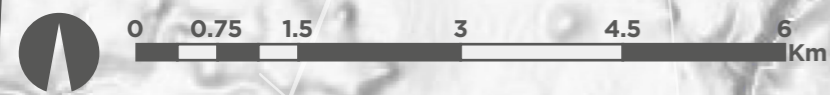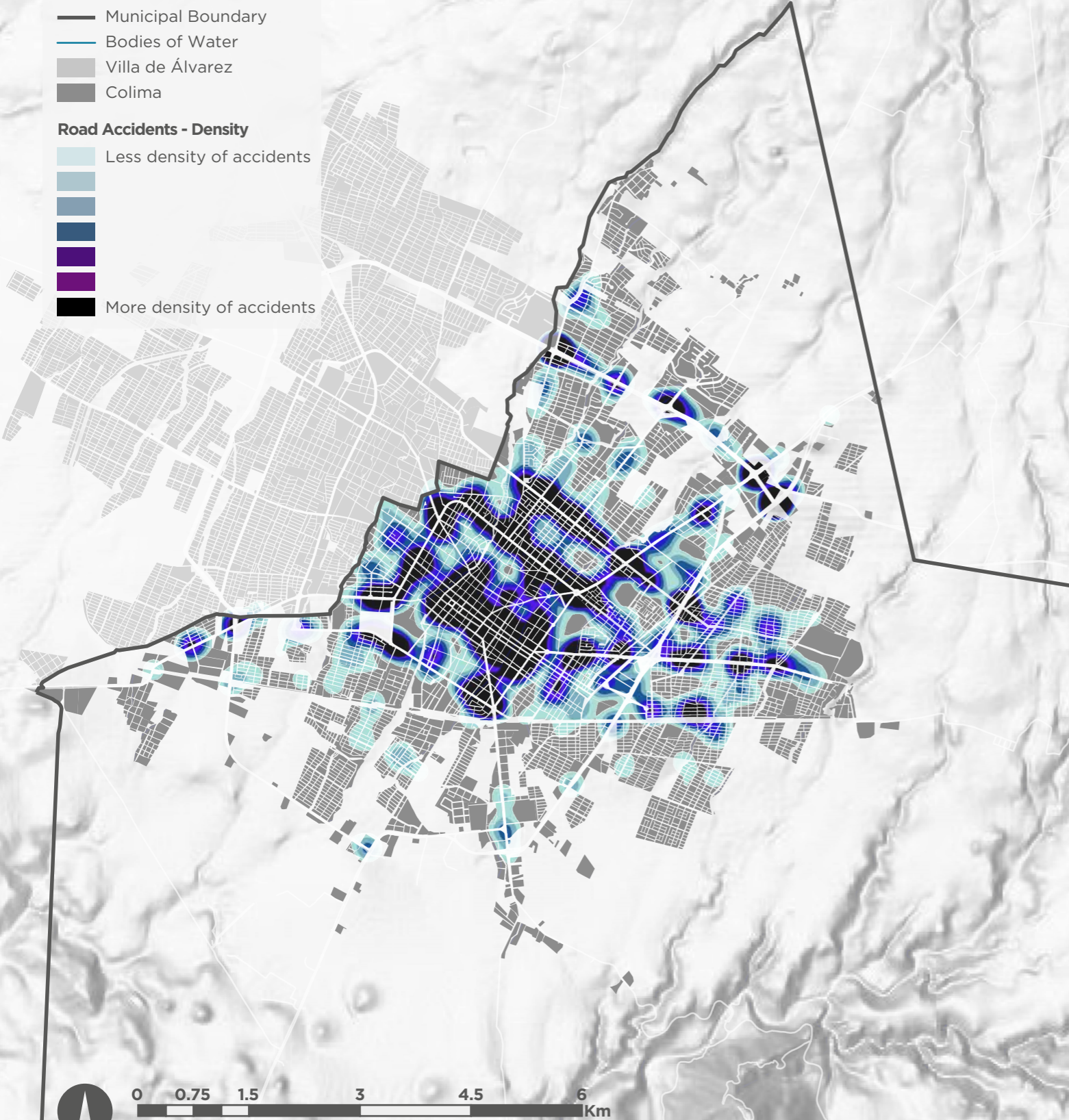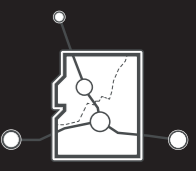
3.3.3 MUNICIPAL PLAN FOR **ROAD SAFETY**

RESILIENCE QUALITIES:

Robust   Inclusive   Reflective

DESCRIPTION:

This initiative aims to implement an action plan with measures to reduce road traffic accidents (and thereby deaths), medical costs, and damage to public roads and private property. The initiative will be based on a study that analyzes the current status of road safety in the city, with a focus on physical, administrative, and political issues. The study will also review various proposals for projects to mitigate these issues.

RESILIENCE BENEFITS:

In Colima previous experience has shown that traffic incidents could be reduced by alcohol-level tests on weekends and holidays, talks on road safety, and lower speed limits in specific areas of the city (Zonas 30), among other actions. Implementing this plan will have a positive impact on risk reduction and improve the prevention and response to road accidents.

100RC NETWORK:

• Bangkok (reduction in road fatalities through changes in driver behavior and new technologies)
• Mexico City (Vision Zero Initiative)
• Surat (raising awareness on road safety through education and training)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government

PARTNERS:

• IPCO
• Colima State Secretariat of Health and Social Welfare
• SEMOV
• World Resources Institute (WRI) Mexico

CROSS-CUTTING THEME:
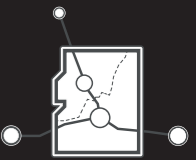
Youth

Metropolitan governance

3.3.4 MOBILITY AND ACCESSIBILITY IN THE CENTRAL AREA OF THE CITY OF COLIMA

RESILIENCE QUALITIES:

Reflective   Integrated   Inclusive

DESCRIPTION:

This initiative will develop and implement an integrated mobility and accessibility plan for the central area of the city. The plan will enhance the current transport system by integrating new transport modes and encouraging non-motorized mobility. To encourage walking, this initiative aims to improve the quality of the built environment, which will also increase tourist and commercial activity in the area.

RESILIENCE BENEFITS:

Mobility is one of the main challenges to increasing economic activity in the area; consequently, the benefits from the resilience project are multidimensional. Improving mobility along with improving the quality of the built environment will have the added benefit of enhancing accessibility for vulnerable users, such as people with disabilities and senior citizens.

100RC NETWORK:

- Quito (Pedestrianization Model of the Historic Center)
- Mexico City (transforming public spaces to promote active mobility)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

IPCO

PARTNERS:

- Municipal Government of Colima
- Technological Institute of Colima
- SEMOV

CROSS-CUTTING THEME:

Metropolitan governance

3.3.5 METROPOLITAN **VIA RECREACTIVA**

RESILIENCE QUALITIES:

Integrated   Inclusive   Resourceful

DESCRIPTION:

This initiative improves and expands the Colima Via RecreActiva, which currently operates on Sunday mornings in one section of Felipe Sevilla Avenue, with personnel and resources from the municipal government of Colima. However, it is expected to be independently managed, as it already is in other cities in Mexico. It may also expand and incorporate road sections from Villa de Álvarez and Comala in the future.

RESILIENCE BENEFITS:

This project is an important opportunity for people to learn about the benefits of an active lifestyle and non-motorized mobility. Various groups will be involved, including cyclists, athletic groups, sport clubs, animal organizations, and citizens committed to the mobility and sustainability agenda. Therefore, its implementation and expansion are particularly important for building resilience capacities in the medium term.

100RC NETWORK:

- Mexico City (Vía Recreactiva)
- Santiago de Chile (CicloRecreoVia)
- Semarang (pedestrian and bicycle road)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Municipal Governments of Colima, Villa de Álvarez, and Comala

PARTNERS:

- IPCO

CROSS-CUTTING THEME:

Metropolitan governance

PILLAR 4
SUSTAINABLE COLIMA

ISSUE

Colima's resilience is inseparable from the city's environmental sustainability. Therefore, Colima must lay the groundwork for a municipal policy that ensures the proper utilization of natural resources, minimizes the city's impacts on the environment, and fosters mitigation and adaptation to climate change from both a multi-institutional and metropolitan perspective.

The Municipality must encourage actions that reduce local GHG emissions, in particular those generated by energy consumption in buildings and by various modes of transportation, to fulfill the national commitment to the goal of the Paris Agreement of a 22% emissions reduction by 2030. In addition, some public services such as water supply and urban solid waste management must be transformed to be implemented from an integrated perspective that considers systemic aspects such as the water cycle and circular.

Finally, Colima must recognize the importance and value of the ecosystems inside and outside the city and promote measures aimed at preserving biodiversity.

GOALS

Link to SDGs:

4.1 Develop and promote energy and climate action policies
→ 7 AFFORDABLE AND CLEAN ENERGY | 11 SUSTAINABLE CITIES & COMMUNITIES | 13 CLIMATE ACTION | 15 LIFE ON LAND

4.2 Promote the integrated management of municipal solid waste and a circular economy
→ 11 SUSTAINABLE CITIES & COMMUNITIES | 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

4.3 Foster sustainable water and natural resources management
→ 6 CLEAN WATER AND SANITATION | 11 SUSTAINABLE CITIES & COMMUNITIES | 12 RESPONSIBLE CONSUMPTION AND PRODUCTION | 15 LIFE ON LAND

Photo: Edgar Alejandro Preciado Victorino

4.1.1 INITIATIVE TO INCLUDE **RESILIENCE AND CLIMATE CHANGE CRITERIA** IN ENVIRONMENTAL MANAGEMENT TOOLS

RESILIENCE QUALITIES:

Integrated **Flexible**

DESCRIPTION:

This initiative involves a collaboration with IMADES to analyze the current environmental management in terms of environmental impact and ecological territorial management in order to make changes that incorporate resilience and climate change criteria. The initiative requires updating the current guidelines on the environmental impacts used to evaluate building projects and economic development activities in the state of Colima, and reviewing the existing ecological territorial management models in the ZMCVA.

RESILIENCE BENEFITS:

Managing Colima's environmental resources from a resilience perspective could help preserve and protect the territory's natural resources and thereby prevent risks and vulnerabilities to the city from environmental degradation.

100RC NETWORK:

• Mexico City (Cross axis of resilience in the General Program for Urban Development)

STATUS:

Initiative

TIME FRAME:

Short term
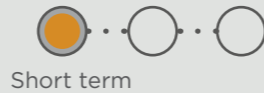
LEADER:

IMADES

PARTNERS:

• Colima Municipal Government (Resilience Office)
• Colima University (CEUGEA)

CROSS-CUTTING THEME:
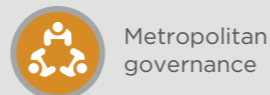
Metropolitan governance

4.1.2 MUNICIPAL **CLIMATE ACTION PLAN** (PACMUN)

RESILIENCE QUALITIES:

Integrated **Reflective** **Flexible**

DESCRIPTION:

This initiative will develop and implement an environmental public policy instrument aimed at guiding the local implementation of actions, strategies, and projects for mitigation and adaptation to climate change. The PACMUN will determine a set of actions with milestones and will estimate the resources needed to implement them. The actions will cover urban solid waste management, land regulations, management of green and forest areas, technological modernization, environmental education, among others. While an inventory of urban GHG emissions already exists, other analyses will be conducted as needed.

RESILIENCE BENEFITS:

A program with specific actions to address climate change in the municipality is essential to reduce threats and build urban resilience to the impacts of climate change.

100RC NETWORK:

• Athens (Climate Change Mitigation Action Plan)
• Bristol (Climate Change Adaptation Plan)
• New Orleans (Climate Action Plan)

STATUS:

Planning

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate of Urban Development and the Environment)

PARTNERS:

• IPCO

CROSS-CUTTING THEME:

Metropolitan governance

4.1.3 PROGRAM FOR THE IMPLEMENTATION OF **ENERGY EFFICIENCY AND RENEWABLE** ENERGY TECHNOLOGIES IN THE CITY OF COLIMA

RESILIENCE QUALITIES:

Resourceful   Flexible   Redundant

DESCRIPTION:

This initiative analyzes energy use and consumption. It reviews various initiatives that can increase energy efficiency and expand the existing capacity of renewable energy in the city. Both changes to municipal buildings and regulatory changes that encourage energy-related requirements in new construction and real-estate developments are being considered. Photovoltaic systems to generate electricity, photothermal systems to heat water, and construction systems and electrical grids for the efficient use of energy are among the technologies that could be used.

RESILIENCE BENEFITS:

This initiative will help to mitigate GHG emissions and to expand the installed capacity of decentralized systems to generate renewable energy, which could come into operation if the centralized systems of energy production and distribution fail after a shock. Moreover, it will help reduce operational costs in municipal buildings and help manage the increasing energy demand.

100RC NETWORK:

- Da Nang (research into energy efficiency in buildings)
- New York dDevelopment of renewable power sources)
- Sidney (affordable access to renewable and resilient energy)

STATUS:

Initiative

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (General Directorate of Urban Development and the Environment)

PARTNERS:

- CECyTCOL
- IPCO

CROSS-CUTTING THEME:

Metropolitan governance

4.1.4 MUNICIPAL **STREET LIGHTING MODERNIZATION** PROJECT

RESILIENCE QUALITIES:

Flexible   Robust

DESCRIPTION:

This initiative will renovate the street lighting system by replacing the current high-pressure sodium vapor technology lamps with LED technology. The transition will be implemented incrementally, starting with areas that particularly need to be well-lit for safety reasons (for example, places that are popular and frequented at night, such as the city center).

RESILIENCE BENEFITS:

At present, 85% of the lamps in the street lighting system fail every year, often leaving roads and areas of the city with no service for days or weeks. This project will therefore not only help to improve lightning in the city but will also improve the safety of public spaces throughout the city. Moreover, it could reduce energy consumption as much as 35% per year, which would be a significant cost savings. Lastly, the project will also contribute to mitigating GHG emissions.

100RC NETWORK:

- Ciudad Juarez (Safe Corridor for Women)
- Rio de Janeiro (Implementation of LED lights)
- Santiago de los Caballeros (Municipal Lighting Project)

STATUS:

Initiative

TIME FRAME:

Short term

LEADER:

Colima Municipal Government (General Directorate for Public Services)

PARTNERS:

- IPCO

CROSS-CUTTING THEME:

Gender perspective

4.2.1 COMMUNITY-BASED SEPARATION OF URBAN SOLID WASTE

RESILIENCE QUALITIES:

Resourceful   Flexible   Robust

DESCRIPTION:

This initiative establishes several collection centers for urban solid waste in some neighborhood community spaces (parks, gardens, or sports facilities) so that the inhabitants can separate their waste; manage the collection, monetization, and marketing of the waste themselves; and use the resources obtained to improve the community in ways previously determined through consensus. This project would first need to raise environmental awareness and teach waste separation through courses, talks, and workshops. Collection center containers should facilitate the separation of the solid waste (plastic, aluminum, glass, paper and cardboard, and used vegetable oil), and it should promote a culture of solid waste management (recycled and reused waste) instead of a culture of garbage. The initiative aims to continue the effort of the neighborhood of Las Palmas, and create a scalable, replicable pilot project for other areas of the municipality or the ZMCVA.

RESILIENCE BENEFITS:

Inadequate urban waste management in Colima is a critical issue, that has already resulted in crises, including a fire in the municipal sanitary landfill in 2018. This initiative will not only help reduce the amount of solid waste that arrives at the final disposal site, it will also allow the municipal government to reduce the operating costs of the sanitation service, and neighbors will have an opportunity to generate extra income for environmental improvements in their communities.

100RC NETWORK:

- Santiago de Chile (Santiago Recycles)
- New York (Zero Waste Initiative: Give every New Yorker the opportunity to recycle and reduce solid waste)

STATUS:

Planning

TIME FRAME:

Short term

LEADER:

Colima Municipal Government (Resilience Office)

PARTNERS:

- IMADES
- Las Palmas Environmental Citizens Initiative

CROSS-CUTTING THEME:

Metropolitan governance

Youth

4.2.2 METROPOLITAN PROGRAM FOR INTEGRATED SOLID WASTE MANAGEMENT AND A CIRCULAR ECONOMY

RESILIENCE QUALITIES:

Integrated   Inclusive

DESCRIPTION:

This initiative establishes clear guidelines for the comprehensive management of urban solid waste in the metropolitan area, and the implementation of strategies and specific actions that involve the participation of different sectors of society, (citizens, organizations, and government entities). The initiative will develop communication and training on methods to reduce the production of solid waste and to separate, recycle, and dispose of waste. This initiative reflects an inclusive and participatory vision of achieving Zero Waste.

RESILIENCE BENEFITS:

This initiative is essential to improving coordination between the different entities involved in solid waste management in the ZMCVA because it will reduce both operating costs and waste generation (and all the environmental impacts associated with waste generation).

100RC NETWORK:

- Amman (Waste Management Framework)
- Santiago de los Caballeros (Comprehensive Plan for Waste Management)
- Pittsburg (Creation of a circular economy in Pittsburgh)

STATUS:

Planning

TIME FRAME:

Medium term

LEADER:

Municipal Governments of the ZMCVA

PARTNERS:

- IMADES
- IPCO

CROSS-CUTTING THEME:

Metropolitan governance

4.3.1 RESILIENCE WATER PLAN FOR THE COLIMA-VILLA DE ÁLVAREZ CONURBATION

RESILIENCE QUALITIES:

Integrated   Reflective   Flexible

DESCRIPTION:

This initiative will develop an action plan to improve the conurbation's water resilience, particularly with respect to the availability and quality of water, in collaboration with government agencies responsible for water management in the three levels of government and with civil society. The initiative will begin with a systematic analysis of the local water system, conducted with the support of local and international specialists, to design a road map of public policy interventions that will help ensure a sufficient supply of quality water for the long term. Additionally, this project will generate useful information for other community initiatives and the "Water for Colima" cross-institutional effort, which coordinates and encourages the proper care, use, and protection of forests and the water bodies in the northern and eastern areas of the state of Colima.

RESILIENCE BENEFITS:

This initiative will help improve understanding of the local water system and trigger actions towards protecting the few, overtaxed resources that supply water for the city of Colima and its conurbation.

100RC NETWORK:

- Mexico City (Water resilience as a new paradigm for water management)
- New York (Protect the city's water supply and maintain the reliability and resiliency of the water supply system)
- Rotterdam (Water Sensitive Rotterdam)

STATUS:

Planning

TIME FRAME:

Medium term

LEADER:

Colima Municipal Government (Resilience Office) and Municipal Government of Villa de Álvarez

PARTNERS:

- CIAPACOV
- River-Armería Basin Commission
- CONAGUA
- Deltares
- MABIO Foundation
- IMADES
- SEIDUR

CROSS-CUTTING
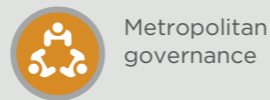
Metropolitan governance

4.3.2 LOCAL COMPENSATING MECHANISM BY HYDROLOGICAL ECOSYSTEM SERVICES

RESILIENCE QUALITIES:

Integrated   Robust

DESCRIPTION:

This initiative will encourage citizen participation in the financing of sustainable projects that focus on the conservation of the biodiversity of the Manantlán Biosphere Reserve and that ensure maintenance of the hydrological and environmental services that benefit the Colima-Villa de Álvarez conurbation. This initiative seeks to promote an integrated territorial management with a basin-oriented approach in order to conserve and restore the forest areas of the northern part of the state of Colima and part of Jalisco that are critical to the water supply as well as to improve the living conditions of the communities that live there.
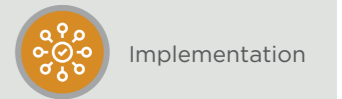
RESILIENCE BENEFITS:

The compensation schemes generate resources in the long run, which allow the regeneration of the watershed catchment areas to ensure water supply to the cities.

100RC NETWORK:

- Mexico City and Santiago de Chile (Water Fund)

STATUS:

Implementation

TIME FRAME:

Short term

LEADER:

MABIO Foundation

PARTNERS:

- Colima State Water Commission
- Ayuquila-Armería River Basin Commission
- Communities and ejidos
- CONAFOR
- IMADES
- Water utilities of ZMCVA

CROSS-CUTTING THEME:

Metropolitan governance

Youth

4.3.3 MUNICIPAL SYSTEM OF **PROTECTED AREAS**

RESILIENCE QUALITIES:

Integrated   Reflective   Flexible

DESCRIPTION:

This initiative will generate and define an environmental policy with strategies for systematic and integrated planning for urban and natural ecosystems. Through this initiative, selected areas for biodiversity conservation will be defined, regardless of the federal Protected Natural Areas, and the necessary institutional mechanisms to ensure sustainable management will be created.

RESILIENCE BENEFITS:

This initiative will help conserve the natural resources of the municipality's rural areas and the remaining natural areas within the city. It will also expand the technical knowledge needed for sustainable management of municipal natural resources.

100RC NETWORK:

- Melbourne (Metropolitan Urban Forest Strategy)
- Santa Fe (West Urban Natural Reserve)
- Toyama (Conservation of Rural Landscapes and Forests)

STATUS:

Planning

TIME FRAME:

Short term

LEADER:

Colima Municipal Government (General Directorate for Urban Development and the Environment)

PARTNERS:

- IPCO
- IMADES

CROSS-CUTTING THEME:

Youth

Metropolitan governance

4.3.4 URBAN **WOODLAND MANAGEMENT PLAN**

RESILIENCE QUALITIES:

Integrated   Flexible   Inclusive

DESCRIPTION:

This initiative will develop and implement an integrated plan for tree management in the municipality's urban area. The plan's aim will be to strengthen and expand actions already implemented regarding registration and geolocation, reforestation with native species, improvements to public spaces, and environmental education for children and young people.

RESILIENCE BENEFITS:

Careful management of municipal trees could help increase the amount of vegetation in the city and thereby increase the ecosystem benefits provided by trees and urban forests, which help mitigate the effects of climate change.

100RC NETWORK:

- Buenos Aires (Plan for Urban Forestry and Metropolitan Bio-Corridors)
- New York (One Million Trees NYC)

STATUS:

Planning

TIME FRAME:

Short term

LEADER:

Colima Municipal Government (General Directorate for Urban Development and the Environment)

PARTNERS:

- CONAFOR
- IMADES
- IPCO

CROSS-CUTTING THEME:

Youth

INSTITUTIONALIZATION OF THE RESILIENCE STRATEGY

In developing the Resilience Strategy, Colima has made adjustments in the structure and operations of the municipal government so that resilience can be institutionalized. First, the Municipal Council of Colima approved an agreement in December 2016 that modifies the municipal government regulation regarding creation of a Resilience Office. Moreover, in January 2018, the Municipal Council of Social Participation for Planning agreed to participate on the city's Resilience Steering Committee. Thus, there is now an entity responsible for managing and monitoring the actions defined in the Strategy and a collegial body of representatives from the private sector, the academic world, and civil society committed to monitoring and supporting its implementation.

The current administration 2018-2021, headed by Mayor Leoncio Morán Sánchez, is committed to working towards the implementation of the actions defined in the Resilience Strategy after incorporating them in the Municipal Development Plan, and linking short-term and long-term goals. This is the first of four municipal administrations, which during the 2019-2030 period, will have a guiding instrument for improving the resilience of the city and thereby the living conditions of its inhabitants.

For Resilient Colima, the institutionalization of the Resilience Office must be completed and the municipal administration must encourage the implementation of the Strategy's actions in coordination with local, national, and international partners. The Colima Resilience Strategy is a living document that can be updated and modified depending on the evolving challenges and priorities of the city. That is why, in addition to monitoring compliance with the Strategy, the Resilience Office will ensure the relevance of the Strategy to the challenges and priorities of the city as they evolve.

We invite you to join this initiative and together we will build a resilient future for the city of Colima.

Photo: Alicia Salazar Urzúa

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APPENDIX

- **Acknowledgments**
- **Endnotes**
- **References**

Photo: Arturo Yael Contreras

ACKNOWLEDGMENTS

ENDNOTES

1. This section was mainly developed from the script of the documentary "Colima: 500 years in 25 minutes", elaborated by IPCO.

2. Estimation generated from data of the 2015 Population Survey Data from the National Institute of Statistics and Geography (INEGI).

3. Data generated by IPCO in 2018.

4. Estimation generated from data of the 2015 Population Survey Data from the National Institute of Statistics and Geography (INEGI).

5. Data generated from IPCO for the Municipal Urban Development and Ecological Territorial Management Program 2019.

6. National Accounts data 2015 and Economic Census 2014 by INEGI.

7. Estimate generated for Colima and Villa de Álvarez municipalities from the data provided by the Water Supply and Sewerage Intermunicipal Commission of Colima and Villa de Álvarez (CIAPACOV) in 2018.

8. Estimate generated from the data provided by the Federal Electricity Commission Colima Superintendence Area (CFE) in 2018.

9. Estimate generated from data in the Municipal and District Government of National Census 2017 and INEGI Population Survey 2015.

10. Estimates from the Colima State Secretariat of Mobility (SEMOV) Sectorial Mobility Program 2016-2021.

11. Measurement of Mexican Poverty 2015, prepared by the National Council for Evaluation of Social Development Policy (CONEVAL).

12. 2015 Mexican Republic Earthquake Regionalization, prepared by the Federal Electricity Commission (CFE).

13. Natural Hazards Risk Atlas of the Municipality of Colima 2014.

14. Socioeconomic impact of the earthquake occurred on January 21 of 2003 in the state of Colima, elaborated by the United Nations' Economic Commission for Latin America and the Caribbean (ECLAC).

15. Natural Hazards Risk Atlas of the Municipality of Colima 2014.

16. Designed with the maps of the Natural Hazards Risk Atlas of the Municipality of Colima 2014.

17. Natural Hazards Risk Atlas of the Municipality of Colima 2014.

18. Analysis of Atmospheric Phenomena Generated from Heavy Precipitation in the Period 2000-2013 in the surrounding area of Colima-Villa de Álvarez, prepared by Rosario del Carmen Ríos García.

19. Master Program of Harbour Development of Manzanillo Port 2015-2020, prepared by the Secretariat of Communications and Transport (SCT) of the Federal Government.

20. Peña Colorada Company's data, published at: http://www.pcolorada.com/.

21. Estimates generated from 2015 INEGI Data of Population Survey 2015.

22. Current situation of young boys and girls in Mexico, Sociodemographic Analysis (2000), prepared by the National Population Council (CONAPO).

23. Poverty in Urban and Metropolitan Areas of Mexico 2012, prepared by CONEVAL.

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25. Designed with IPCO maps and INEGI data from the 2010 Census of Population and Housing.

26. Economy Vocation Study of Colima Municipality 2010, prepared by IPCO.

27. Estimates generated from 2017 Colima Municipality data based on combined financial statements.

28. 2016 Basic Index of Prosperous Cities of Colima, prepared by UN HABITAT.

29. 2018 Mexico Index of Peace, prepared by the Institute for Economics and Peace.

30. Ibid.

31. Colima City Urban Development Plan 2000.

32. 2010 Partial Program of Urban Development for Colima's Central Area.

33. Estimate generated from year 2000 data in the Urban Development Plan of Colima City and the 2015-2018 Municipal Development Plan of the Colima Municipal Government.

34. Estimate generated from the 2000 General Population and Housing Census and the INEGI 2015 Population Survey data.

35. Prepared with IPCO cartography and data from the Colima Municipality General Directorate for Urban Development and the Environment.

36. Urban Reform, 100 Ideas for Mexican Cities (2013), prepared by Mexico CTS EMBARQ.

37. Spatio-temporal land-use changes in the Colima-Villa de Álvarez metropolitan area, and their relationship to floodings (2017), elaborated by Myrna Lorena Pérez González et al.

38. Estimate generated from the Statistics of Registered Motors Vehicles 2017 data and the 2015 INEGI Population Survey.

39. Cities Safer by Design, prepared by Ben Welle and others.

40. Management Program to Improve Air Quality in the State of Colima 2015.

41. Threats that impacted the city during the last century; among them are hurricanes and epidemics. Outbreaks of diseases transmitted by certain vectors, such as dengue and chikungunya, may become more common due to climate change.

42. Information provided by the Intermunicipal Commission for Potable Water and Sewage of Colima and Villa de Álvarez (CIAPACOV) in 2017.

43. Estimate generated for the Colima and Villa de Álvarez municipalities from 2018 data provided by CIAPACOV.

44. Estimate generated from the 2017 National Census of Municipal Government and Delegations and the 2015 INEGI Population Survey data.

45. Ibíd.

46. Colima State-Owned Soil and Forestry Inventory 2013.

47. Prepared with IPCO maps and INEGI land use and vegetation vector data set information, Scale 1: 250 000, VI Series (National Ensemble).

48. The JCRD is a collaboration between Massey University and GNS Science of New Zealand that focuses on social aspects of disaster management.

49. Centro Machilia is a Mexican Civil Association dedicated to research, development, and evaluation of social programs.

50. The names of the municipal agencies existing during the administration 2015-2018 are showed as this was the period in which such Working Group was in operation.

51. The Resilience Steering Committee is a consulting and decision-making entity for diagnostic analysis, strategy contribution, proposal assessment, instruments and actions for planning, as well as for outreach programs that are part of IPCO government structure.

52. AECOM is an American corporation that specializes in international consulting, construction, and administration services; it served as Colima's strategic partner, providing technical advice to the city during the development of Phases I and II of the Resilience Strategy.

53. The Sendai Framework is a voluntary agreement adapted by the State members of the United Nations that seeks disaster risk reduction and significant reductions in loss of life, livelihoods, health, and the economic, physical, social, cultural, and environmental assets of people, companies, communities, and countries.

54. As "Policy Levers" are considered projects, programs, regulations, or policies that can shape the future of the city.

55. The results are available for visualization and analysis at the website of Perfil Metropolitano (www.urbanperformance.in/mexico) as well as more information about the methodology used for the estimations is available.

56. Prepared with the maps of the Natural Hazards Risk Atlas of the Municipality of Colima 2014.

57. Ibíd.

58. Prepared with cartography of the Municipal Development Plan 2018-2021 of Colima Municipal Government.

59. Ibíd.

60. Prepared with cartography provided by SEMOV.

61. Prepared with cartography provided by IPCO and SEMOV.

62. Prepared with cartography of the Municipal Development Plan 2018-2021 of Colima Municipal Government.

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