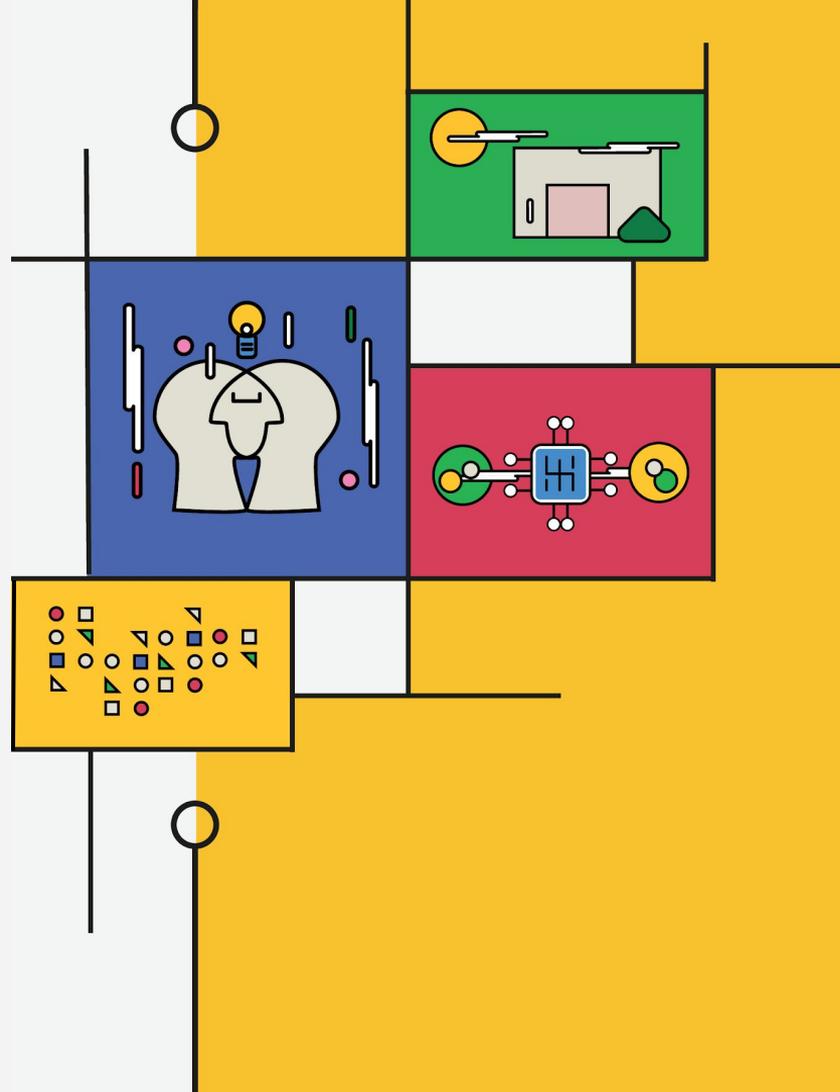


# CASE STUDY

MSDI implications on  
two Mexican municipalities  
addressing the challenges  
of climate change



CPL  
City  
Planning  
Labs



# Introduction

Mexico's General Climate Change Law (*Ley General de Cambio Climático*) establishes that **municipalities must develop, implement and evaluate local policies targeted at tackling climate change**, including both mitigation and adaptation actions.

In spite of this, few Mexican municipalities have a local Climate Action Plan (CAP), and the competences to develop one are seldom found in municipalities outside of the main urban areas (i.e. Mexico City or Guadalajara). In addition, **relevant spatial or tabular data is generally not disaggregated at a municipal level or, if it has been generated, it has probably not been recently updated.**

This case study analyses how the **current state of Municipal Spatial Data Infrastructure** in two Mexican municipalities has either **leveraged or hindered their efforts aimed at developing an integral Climate Action Plan (CAP)**, especially regarding the assessment of **climate risks and vulnerabilities (CR&V)**.

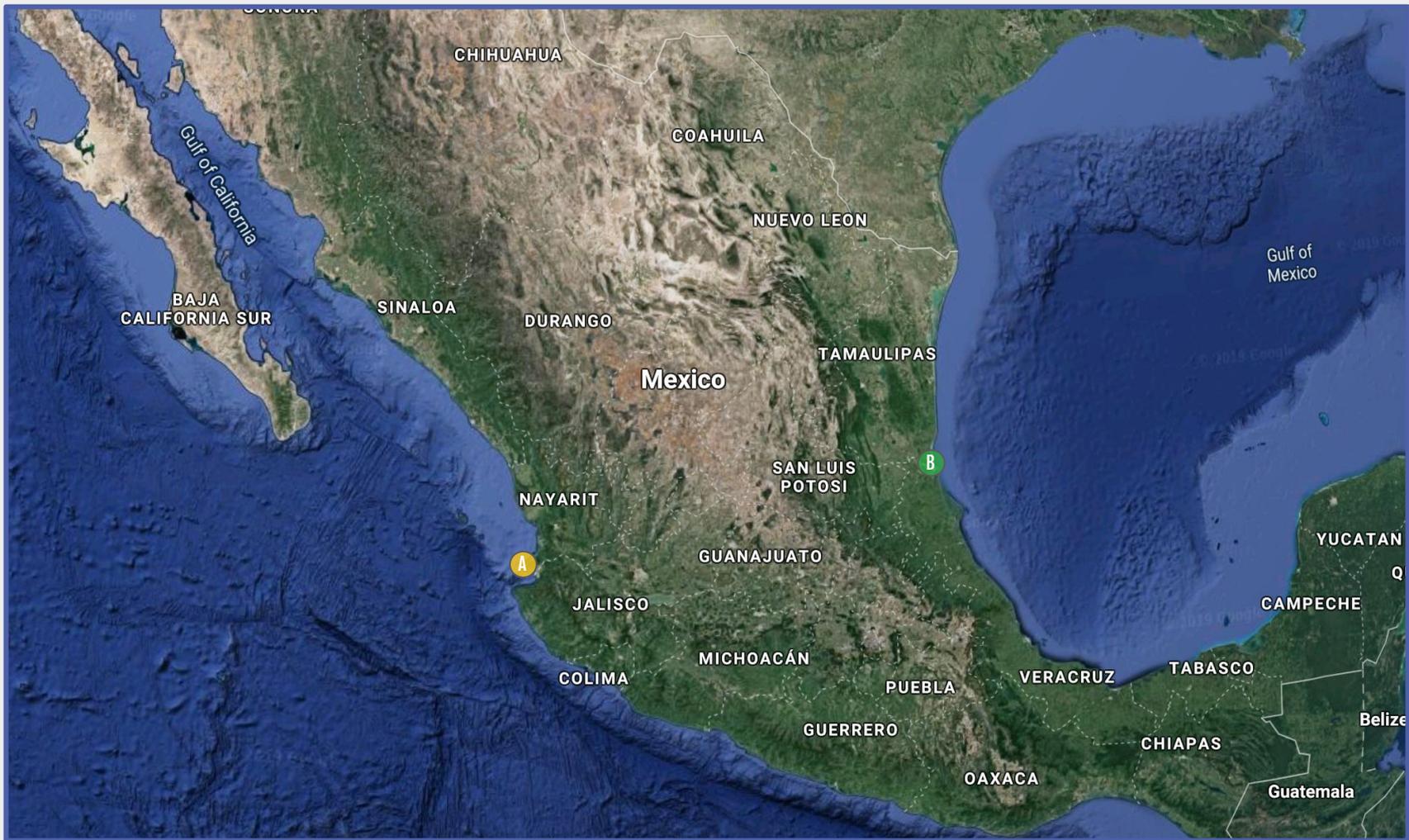
# Context: City A and City B

## City A

A coastal municipality in the Pacific Coast of Mexico with an area of 773 km<sup>2</sup> and a population of approx. 165,000 inhabitants, scattered around small-sized towns. A popular travel destination, its economy is based on tourism and agriculture. It forms a conurbation with an adjoining municipality located in a neighboring state. The rapid urbanization of the municipality, on account of its recent economic growth, has put pressure on the availability of natural resources to sustainably meet the needs and demand of local residents and guests.

## City B

A coastal municipality in the Gulf of Mexico, it forms a conurbation with four other municipalities. Relatively small-sized (46.6 km<sup>2</sup>), all its population (approx. 210,000 inhabitants) can be classified as urban. Its economy is based on the industrial sector, mainly oil refining. With an average altitude of 8 meters above sea level, the municipality is vulnerable to sea level rise and flooding due to extreme weather and climate events.



# Context: Climate Action Planning in City A



The Municipal Planning Institute (IMPLAN) is the institution in charge of developing the CR&V Assessment for City A. The following table summarizes the diagnostic of the municipality's competences in relation to MSDI, which could either leverage or hinder climate action planning in the municipality.

## Institutional Arrangements

- Cooperation with the neighbouring municipality with which it forms a conurbation (sharing of data and methods).
- Lack of institutional arrangements to share data with some local government departments.

## People

- Specific team within the IMPLAN responsible for the CAP and the CR&V Assessment.
- Personnel with experience on the use of GIS and spatial data management.

## Data

- Spatial data already generated and recently updated (they developed the Risk Atlas for the municipality).
- Information generated as part of their local urban plan. Information on historical land-use changes.
- Mapped risks: flash and coastal floods, wildfires, droughts.

## Systems

- Computers with GIS software to process and analyze spatial data related to climate risks and vulnerabilities.

# Context: Climate Action Planning in City B



The local Directorate of Environment and Climate Change is the institution in charge of developing the CR&V Assessment for City B. The following table summarizes the diagnostic of the municipality's competences in relation to MSDI, which could either leverage or hinder climate action planning in the municipality.

## Institutional Arrangements

- Lack of institutional arrangements to share data and cooperate with other local government departments, the academia or the industrial sector.
- Cooperation only with the Metropolitan Planning Institute to share data (the local team has to go and physically retrieve maps or data).

## Data

- Difficulties collecting spatial data related to climate risks and vulnerability.
- Maps are being generated by another institution (the Metropolitan Planning Institute). No protocols in place regarding data standards.

## People

- The CR&V Assessment is being developed by students and interns from a local university. No specific human resources within the responsible institution have been assigned to the project.
- Personnel without experience on the use of GIS and spatial data management.

## Systems

- The team in charge of the project does not have a permanent computer to access and analyze relevant data.
- Maps and spatial data is being processed in computers outside of the responsible institution.

Given the **same amount of time** to develop their  
Climate Risks and Vulnerability Assessments...

How do you think each  
municipality would fare?

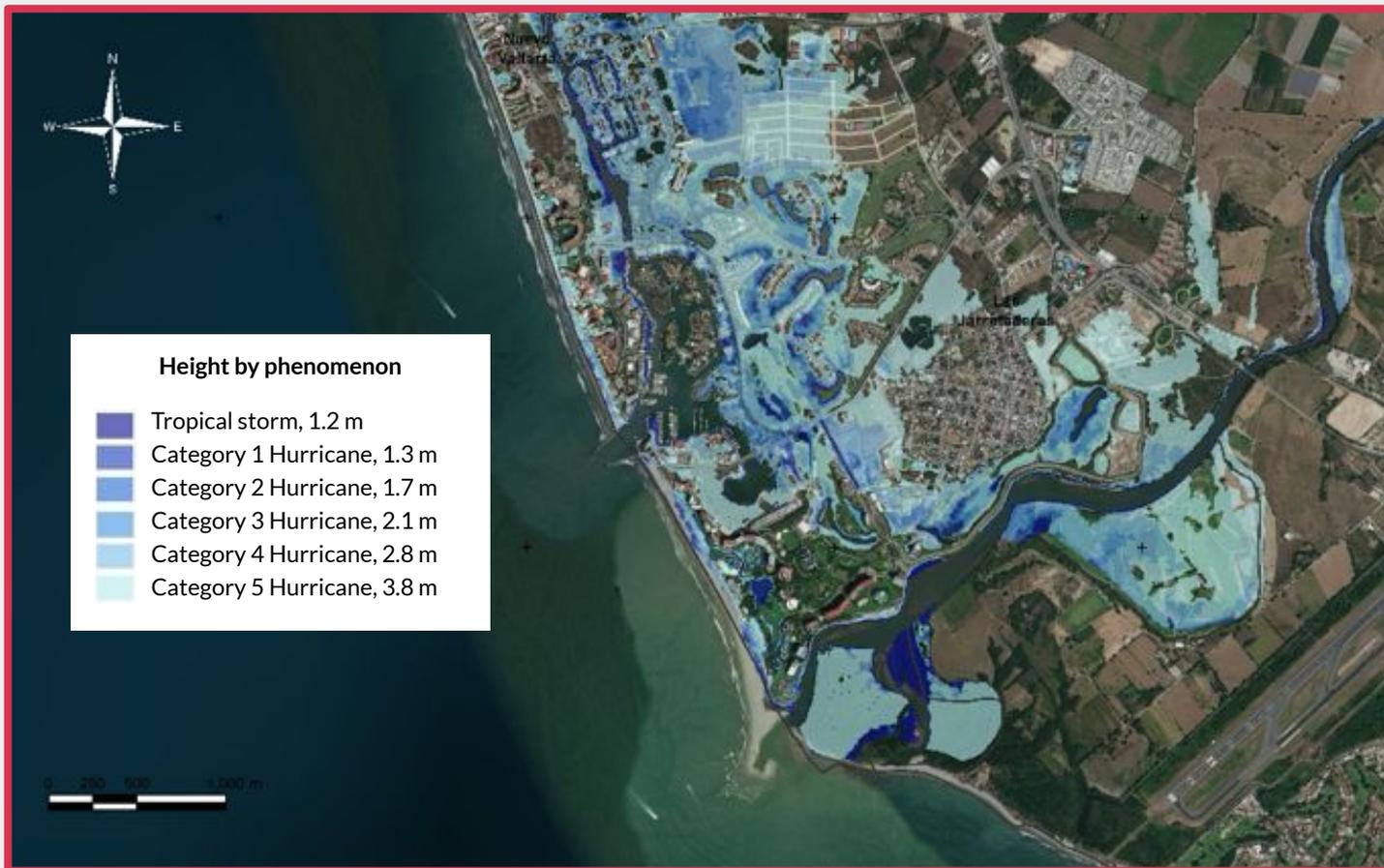


# Conclusions

So far, **City A** has been able to generate maps that describe the level of risk in different areas of the municipality in relation to coastal and flash floods, droughts, and wildfires. In addition, they have been able to use as an input, georeferenced climate scenarios that indicate the expected changes in temperature and precipitation in Mexico due to climate change. They are also integrating these results in their Municipal Urban Planning Instruments. Their ability to generate this kind of results has been the product of many different factors, including:

- Experienced and committed personnel with knowledge regarding GIS and spatial data processing, along with adequate hardware and software.
- Communication with other stakeholders, including the local civil protection department. However, they have not engaged all of the local government departments that should be considered in the decision-making process for climate adaptation actions.
- Use of previously generated data (this data has been converted to an adequate format and is stored in a database within the IMPLAN).

## Example no. 1: Flooding areas in City A due to storm surges





# Conclusions

Meanwhile, **City B** has been unable to generate maps that describe the level of risk in different areas of the municipality in relation to flooding, the main climate hazard affecting the city (according to the local team, >80% of the city could flood in a worst-case scenario where a Category 4 hurricane hits the city). Their inability to generate this kind of results has been the product of many different factors, including:

- Lack of cooperation with other local government departments, including urban planning institutes, as well as the academic and private sectors.
- Lack of experienced personnel (most of the project's team is composed by young students or interns) and no dedicated experts on the use of GIS and spatial data processing.
- The local team has not used previously generated information and is mostly generating new data (or requesting it to other departments, a process that has been a very slow and inefficient). In addition, whenever data has been received, inconsistencies regarding the format and characteristics of the data, along with misinterpretations of the requests, have complicated its usage.