

MEXICO



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General

Mexico - officially the United Mexican States - is a federal republic in the southern part of North America. It is bordered in the North by the United States, in the South and West by the Pacific Ocean, in the Southeast by Guatemala, Belize and the Caribbean Sea, and in the East by the Gulf of Mexico. Mexico is the fifth largest country in the Americas by total area and the 13th largest state in the world. Mexico has an area of 197 Mha (million hectares) with in 2020 a population of 129 million, or 0.65 persons per ha (Wikipedia and United Nations, 2019).

Climate and geography

The Tropic of Cancer effectively divides the country into temperate and tropical zones. Land north of the twenty-fourth parallel experiences cooler temperatures during the winter months. South of the twenty-fourth parallel, temperatures are fairly constant year round and vary solely as a function of elevation. This gives Mexico one of the world's most diverse weather systems. Areas south of the 24th parallel with elevations up to 1,000 m (the southern parts of both coastal plains as well as the Yucatán Peninsula), have a yearly median temperature between 24 to 28 °C. Temperatures remain high throughout the year, with only a 5 °C difference between winter and summer median temperatures. Both Mexican coasts, except for the south coast of the Bay of Campeche and northern Baja, are also vulnerable to serious hurricanes during the summer and fall. Although low-lying areas north of the 24th parallel are hot and humid during the summer, they generally have lower yearly temperature averages (from 20 to 24 °C) because of more moderate conditions during the winter. Many parts of Mexico, particularly the North, have a dry climate with sporadic rainfall while parts of the tropical lowlands in the south average more than 2,000 mm of annual precipitation (source: Wikipedia).

Mexico is crossed from North to South by two mountain ranges, which are the extension of the Rocky Mountains from northern North America. From East to West at the centre, the country is crossed by the Trans-Mexican Volcanic Belt also known as the Sierra Nevada. A fourth mountain range, the Sierra Madre del Sur, runs from Michoacán to Oaxaca. As such, the majority of the Mexican central and northern territories are located at high altitudes. Three major urban agglomerations are located in the valleys between these four elevations: Toluca, Greater Mexico City and Puebla.

Existing polders

Lake Texcoco was a natural lake within the Valley of Mexico (Figure 1). Lake Texcoco is best known as where the Aztecs built the city of Tenochtitlan, which was located on an island within the lake. After the Spanish conquest of the Aztec Empire, efforts to control flooding by the Spanish led to most of the lake being drained. The lake basin is now almost completely occupied by Mexico City. Mexico City suffered from periodic floods; in 1604 the lake flooded the city, with an even more severe flood following in 1607. Under the direction of Enrico Martínez, a drain was built to control the level of the lake, but in 1629 another flood kept most of the city flooded for five years. The Spanish authorities decided to keep the city at the current location. Eventually the lake was drained by the channels and a tunnel to the Pánuco River, but even that could not stop the floods, since then most of the city was flooded. The flooding could not be completely controlled until the 20th century. In 1967, construction of the deep drainage system (*Drenaje Profundo*), a network of several hundred kilometres of tunnels, was done, at a depth between 30 and 250 m. The central tunnel has a diameter of 6.5 m and carries rain water out of the basin. The eastern discharge tunnel was inaugurated in 2019 (Alcocer and Williams, 1996; Wikipedia). In fact this system has created by far the highest polder in the World.



Figure 1. Former Lake Texcoco (Alcocer and Williams, 1996; Madman, 2001)

The Group Polder Development (1982) mentions that along the entire coastal region of the States of Veracruz, Tabasco, Campeche and Yucatan inundated zones can be found. These areas are permanently or periodically inundated or swamp areas. In some parts land has been reclaimed in a form of raised fields or floating island agriculture.

General characteristics of existing polders in Mexico are shown in Table I.

Proposed polders

No proposed polder could be identified.

Pictures of polders

The pictures by Prof. Adriaan Volker are shown in Table II.

References

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Lelystad, June 2021

Table I. General characteristics of existing polders in Mexico

Name	Reclamation	Area in ha	Type *)	Latitudes	Longitudes	Elevation in m+MSL	Land use
Lake Texcoco	17 th century		RLL	19° 25' N	99° 08' W	2236	Urban and agriculture
Polders in the coastal region of Veracruz			RLL	19° 08' N	96° 10' W	1	Urban and agriculture
Polders in the coastal region Tabasco			RLL	18° 21' N	92° 54' W	2	Urban and agriculture
Polders in the coastal region of Campeche			RLL	19° 59' N	90° 25' W	2	Urban and agriculture
Polders in the coastal region of Yucatan			RLL	20° 54' N	90° 13' W	4	Urban and agriculture
Total							

*) RLL = reclaimed low-lying land; LGS = land gained on the sea; DL = drained lake

Table III. Pictures on lowland and polders in Mexico by Prof. Adriaan Volker

		
<p>A2 001/V.2.1 Vertidor lowland area</p>	<p>A2 002/V.2.2 Vertidor lowland area</p>	<p>A2 003/V.2.3 Vertidor lowland area</p>
		
<p>A2 004/V.2.4 Vertidor lowland area</p>	<p>A2 005/V.2.5 Vertidor lowland area</p>	