

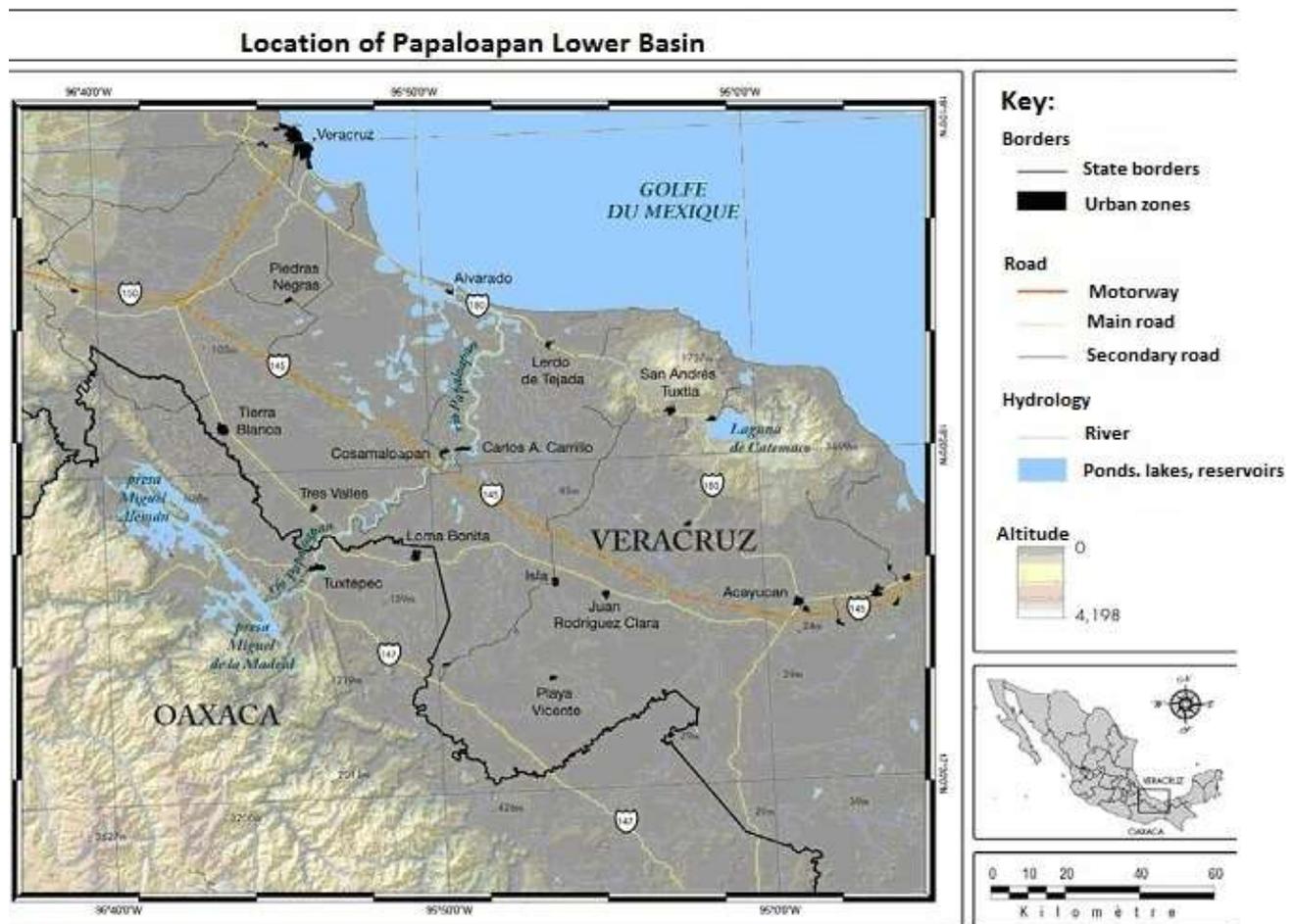
The Papaloapan River, Mexico: evolution of landscapes, reorganisation of territories.

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Introduction

The Papaloapan River, which extends more than 300 kilometres through the western part of the Isthmus of Tehuantepec, originates from the Sierra de Oaxaca and opens into the Gulf of Mexico near the small town of Alvarado, 60 kilometres from commercial port of Veracruz, the most important in the country. Our study will focus on the lower part of the basin, between the Gulf of Mexico and the reservoirs located at the foot of the Sierra de Oaxaca (map 1). The landscape of this vast fluvial plain shows both cultural and natural homogeneous characteristics : numerous rivers, bayous and lagoons, fertile alluvial soil and settlement units (towns, villages, hamlets, isolated houses) located in proximity to main rivers and their tributaries (Tesechoacán, San Juan, Obispo).



Map 1

This task's objective is to determine, by studying the landscapes, the historical and current importance of the Papaloapan river within the region's organisation of territories. Therefore it is important to understand how today's territories are organised and to what extent this organisation is the result of former developments. The reasons and consequences of the

river's progressive loss of importance and the appropriation of these territories by the populations since the beginning of the 20th century must also be evaluated. The study will be done by analysing different activities - commercial, transport, as well as agriculture and agro-industrial activities - which are successively linked to the river and by evaluating the role the Papaloapan plays in the daily lives' of the people.

Landscapes, considered as units of study, will be discussed from different angles. According to Joan Nogué, "The landscape is both a physical reality and the cultural representation we make of it; the external and visible physiognomy of a determined portion of the land area and the social and individual perception it generates: a geographical tangible and intangible interpretation "(Nogué, 2006, 136). Our study of landscapes therefore has a dual objective: the physical forms and their transformations will be described, classified and analysed, while at the same time we will analyse and become acquainted with the inhabitants' perceptions of their territory.

1. The landscapes of the colonial era.

According to research by different historians and archaeologists, during the prehispanic era the Papaloapan basin was of great importance to trade between the Gulf Coast and the high central plateau. The Indian population (dominated by the Nahuatl and Popoloca, then by the Aztec after 1452) fished, farmed and crafted, sending their products (cotton, cocoa, feathers) inland (Velasco, 1998, 26-27). The Papaloapan was likely already used for the transportation of such goods; archaeological evidence shows the presence of settlements on the riverbanks and on the banks of its main tributaries.

Colonisation in the 16th century caused significant changes to the Papaloapan landscape the same as it did throughout New Spain, although initially there were few Spanish colonists who settled in this unattractive region due to extreme weather conditions and common diseases. A redistribution of land was caused partially due to the native population being decimated by epidemics and also because of the large areas of land were being distributed to the Spanish (*mercedes*). The Spanish authorities wished to gather the remaining Indian populations as much as possible so as to better control them, to evangelise them and to make them pay tribute, this led to the formation of new small groups of population - congregations - which settled on the riverbanks¹.

While herds of cattle grew in the immensely large Spanish estates that consisted largely of land that was prone to flooding, the main productive activities practised by the Indian populations - agriculture and fishing - were concentrated on the river fronts. The plots for growing cotton, corn and cocoa orchards were located on small areas of land, slightly elevated above the river level (Aguirre, 2008, 192). In the 18th century sugar cane was introduced to the crops from the prehispanic era; the sugar mills could be found as much in Indian territory as in the Spanish estates. They produced brown sugar, molasses and brandy which were sold at the local or regional markets (Velasco, 2003, 148-149). Fishing was done in running water but also in lagoons and swamps, as well as in the temporarily flooded lands which spread from nearby rivers during the rainy season. Another important and profitable activity was the cutting and extraction of precious wood (cedar, mahogany) (Velasco, 2003, 130-131).

¹ As in many other cases, the new settlements probably did not coincide exactly with those of the prehispanic communities that disappeared.

The different products - cotton, leather, tropical wood, brandy, molasses, textiles, dried fish - were transported by boat to the Gulf's main ports (Alvarado, Veracruz) then to the West Indies and Spain, or to the Sierra de Oaxaca, the high central plateau and the inland of New Spain (Velasco, 2003, 118). Many products from Europe also circulated in the opposite direction, beginning at the ports. In the localities of Cosamaloapan and Tlacotalpan, which became increasingly important throughout the colonial era as boarding points for goods, the Spanish dealt with the transport and trade of produce. Transport by water (on the river, its tributaries and secondary rivers) had a key role in how the territory was organised. The water transport was supplemented by a dense network of mule tracks which notably connected the Papaloapan lower basin with the regions of Cordoba and Orizaba and then Mexico.

Throughout the colonial era, the Papaloapan was a place of intense living, around which organised subsistence activities (fishing, agriculture) and business (commercial agriculture, harvesting of precious woods) revolved and where water was an essential element. The annual floods allowed for aggradation, fertilisation of the land and the renewal of fishing waters. The river was also the main communication channel, linking the localities on the river and its tributaries, as well as connecting the region to the rest of New Spain, with the Gulf Coast and finally Europe.

2. The modernisation of the Porfiriato era

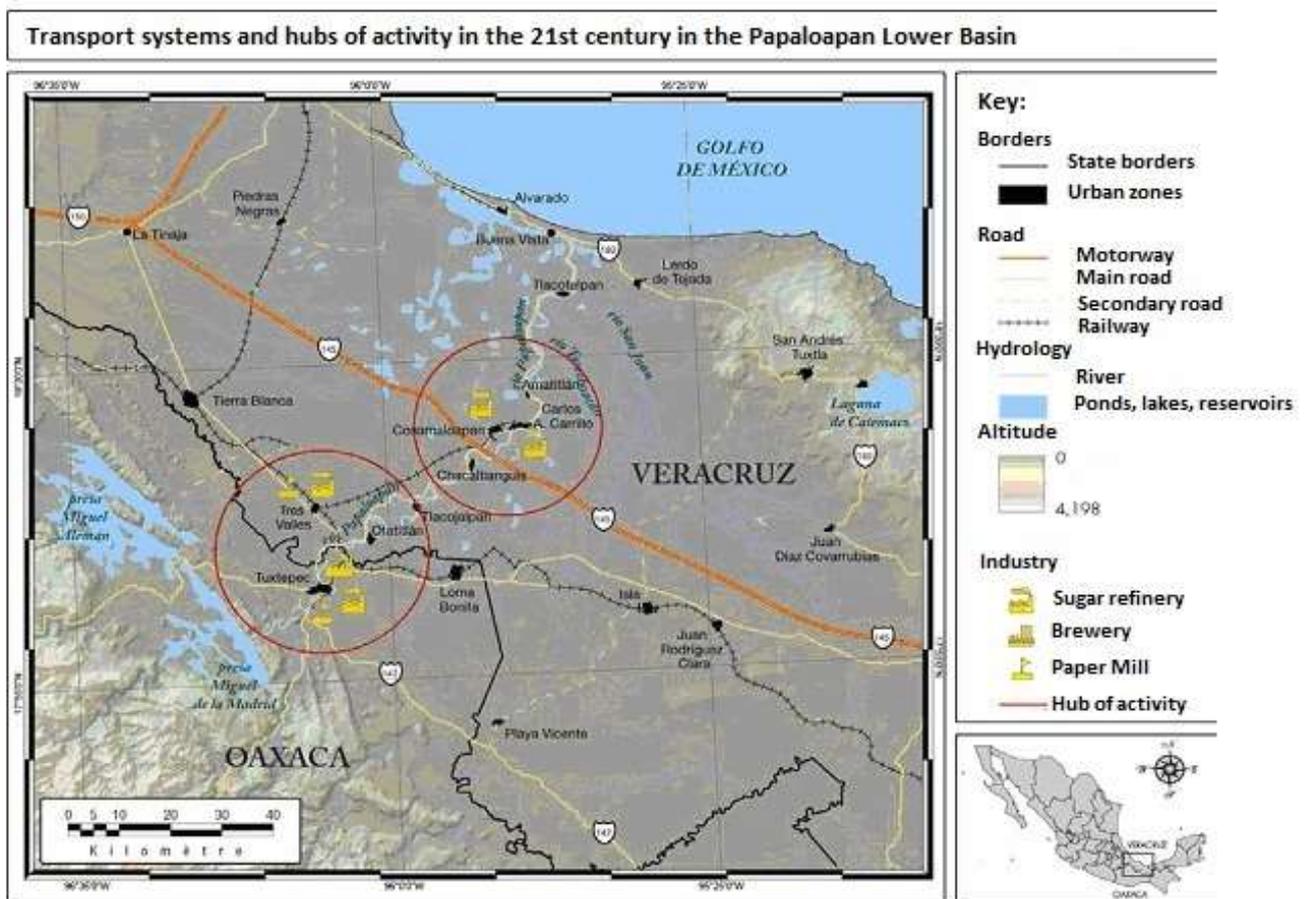
If the first part of the 19th century² can be considered as an extension of the colonial era, in the second part significant changes were seen throughout the entire country during the period of stability of Porfirio Diaz' dictatorship (1876-1910). This period of stability was aided by foreign investments which enabled the construction of railways, the colonisation of previously untouched regions, modernisation and the creation of new industries, and the improvement of irrigation systems.

In the late 19th century and the beginning of the 20th century, innovations in transport were introduced to the Papaloapan lower basin. Steamboats were used to subsidise river transport and increase commercial activity, motor vehicles began to travel on trails and tracks which became impassable for part of the year due to flooding. However it was the railway, inaugurated in 1903 that travelled between the port of Veracruz and the Isthmus of Tehuantepec, which progressively changed the organisation of territory in the region. Built to the west and south of the river to avoid marshland and areas prone to flooding, the railway became the main method of transporting passengers and merchandise, from the Isthmus to the port of Veracruz, or between the Isthmus and the town of Cordoba, which was necessary to reach the high plateau and Mexico. With the railway, the localities of Tierra Blanca (where the railway branches into three), Tres Valles, Papaloapan, Isla and Rodriguez Clara were created or developed (map 2). In 1913 a new route was constructed between Tres Valles and Cosamaloapan-Carlos A. Carrillo because the two sugar mills (San Gabriel and San Cristobal) of the two neighbouring river villages would benefit from the new mode of transport (map 2). Other small groups of population also appeared along the Nopaltepec - Estación Tuxtilla route.

Activities were reorganised based on these railway communities, towards which the flow of passengers and merchandise converged. However, river transport was used in order to reach or get closer to the railway stations as much as it was still used to connect the localities

² Turbulent times due to the War of Independence, and the instability of successive governments.

(Tlacotalpan, Cosamaloapan, Chacaltianguis, Tlacojalpan, Otatitlán). In 1902, a metal bridge was constructed in the village of Papaloapan which allowed the track to go over the river and thus connected the states of Veracruz and Oaxaca, gaining strategic importance. During the first decades of the 20th century, both passengers and merchandise came from neighbouring villages, sometimes by land, more often by river in small boats or canoes, heading towards the small station where the train for Veracruz, Cordoba and Tehuantepec passed daily. The Tuxtilla station located on the Tres Valles-Carlos A. Carrillo branch is another intersection point between the river and the railway line where the inhabitants of Chacaltianguis, Tuxtilla, Paraíso Novillero, Tlacojalpan and surrounding hamlets would come together. This is also the case with Cosamaloapan and de Carlos A. Carrillo, which experienced an unprecedented economic and demographic boom. Towns far from the railways, such as Tlacotalpan, an inland port of great importance during the late 19th century, experienced a relative decline.



Map 2

The development of the railway network, which enabled larger quantities of produce to be transported and exported, was helped further by the appearance of more anthropised landscapes which were a result of the expansion of commercial crops. During the first part of the 20th century, the harvesting of precious wood increased due to foreign investment. The large pastures that were meant for extensive livestock farming were steadily replaced by plantation crops - coffee, banana, pineapple, sugar cane (Vargas, 2005, 226) - which were strictly commercial, responding to internal demand and increasing international demand for

tropical products. The arrival of American export companies saw an increase in the number of banana plantations growing in the fertile lands in the lower basin where they achieved excellent results. The plantations also reached the first foothills of the Sierra de Oaxaca and the lowlands of the Isthmus (Santamaria, 2011, 89-92). Sugar cane also experienced an important growth which went hand in hand with the modernisation of sugar refineries and their increased capacity (in San Cristobal, 938 000 tons of cane were processed during the 1950-51 crop cycle). Crops progressively spread over a large portion of cultivable land, from the Gulf Coast (Lerdo de Tejada, Angel R. Cabada, Saltabarranca) to the base of the Sierra de Oaxaca (Tuxtepec, Tres Valles). Other crops such as pineapple, cotton, tobacco and mango plantations were also given land space, growing on new land or substituting traditional subsistence crops such as corn, black bean and rice.

Thus, the river remained an important centre of activity at the beginning of the 20th century. It continued to be used as an additional mode of transport to the railways and it was on its banks that plantation crops achieved the best results. As for fishing - freshwater fish and saltwater fish (that came seasonally with the current) - continued to make a significant contribution to the local economy). It is interesting to note that it was also the centre of numerous cultural and religious protests.

3. The development of road transport and centres of activity during the second part of the 20th century

During the second part of the 20th century, the Papaloapan landscape changed profoundly. The Papaloapan Commission was created in 1947 by presidential decree as a result of the disastrous floods in 1944 which nearly entirely destroyed the town of Tuxtepec and affected all the towns downstream. The Commission immediately got to work on a variety of projects which were designed to help avoid future flooding such as the construction of the Temascal Dam (1949-1955) which was also made to produce electricity, and river development projects which aimed to remove the river's main meanders and increase the water flow. As these projects took place, health centres, schools, infrastructures for water sanitation and drainage, and most especially, roads were also constructed. One such road follows the river between Alvarado and Tuxtepec (and goes as far as Oaxaca), built between 1948 and 1950, a large portion of the road sits on an embankment which simultaneously protects the localities from flooding. Another major road, in the north-west/south-east direction, connects La Tinaja to the new town of Ciudad Alemán and then Sayula (map 2).

As a result, both people and goods moved increasingly by land. River transport declined rapidly despite the Commission's objective to re-establish river transport with its hydraulic projects. Because of deforestation and high levels of erosion upstream, and especially due to the construction of a second dam in 1986 (Cerro de Oro) the river silted up, all the more rapidly as the river was no longer dredged. The boats which connected the towns together ceased transport between 1950 and 1960. The transport of sugar cane to the refineries by barge also stopped during the 1980s, and then only the remaining boats in Tuxtepec, Chacaltianguis and several ferryboats in Tlacojalpan, Rancho Nuevo were used to cross the river in strategic places. As for rail transport, it also became less important after 1950. Secondary railway lines, such as the one which linked Tres Valles to Carlos A. Carrillo, were closed and later dismantled. As for the main railway line which connected Veracruz to the Isthmus, passenger numbers gradually declined before it was shut down for good in 1998.

Road transport then became predominant throughout the basin, more so for the transport of passengers than merchandise.

Another determining factor for transformation of landscapes and the reorganisation of territories was the industrial development in the towns of Tuxtepec, TresValles and to a lesser extent in Carlos A. Carrillo. A paper mill (1954), sugar refinery (1969) and later a brewery (1984) were successively installed in the town of Tuxtepec, causing an exponential demographic increase and spreading the locality³, which "encroaches" on the surrounding fertile and cultivable land. Tres Valles, 20km from the river, experienced a similar development, while in Cosamaloapan and Carlos A. Carrillo the sugar agro-industry continued. Today the San Cristobal refinery is still the most productive in the country (39,410 hectares harvested, 2,013,307 tons of cane processed in 2009).

The dynamics of the region have henceforth been determined by these large centres of activity more so than by the river. The modes of transportation converge towards these centres. The railway is maintained for the use of the industries in Tres Valles and Tuxtepec. New major roads were being built: one road, constructed towards the end of the 1980s on the right riverbank, links Tuxtepec and Cosamaloapan. A motorway which was built in the 1990s connects Veracruz to Coatzacoalcos by going through Cosamaloapan.

Industry development has caused another extremely negative consequence for the river, as the industries dispose toxic waste directly into the water with little control, causing severe pollution. Furthermore, the localities dispose of their waste water in the river, as there are no water treatment factories⁴. As a result, the flora and fauna linked to the river are withering and many species disappearing altogether.

Fishing has declined sharply and is no longer practised by some professionals, especially in the case of localities located upstream (Tuxtepec, Otatitlán) which are most affected by the pollution. Fishermen frequently prefer to fish in the dead water of the meanders and secondary rivers which are less contaminated. In addition, cultivated land no longer benefits from the fertilising floods, which became rare after the Commission's projects. Chemical fertilisers have become necessary and contaminate the soil, and rodent numbers which were previously suppressed by the floods are now on the rise.

Conclusion

The work done by the Papaloapan Commission, followed by the development of industrial centres of activity has greatly changed the landscape of the Papaloapan lower basin. The river is no longer used as a mode of transport and its use as a fertilising element and food source has greatly diminished. Activities linked to the natural environment such as agriculture and fishing, have become less important in the localities than previously as since many inhabitants work in the secondary or tertiary sectors and are less involved with the river and so rarely subjected to its vagaries.

However, surveys and interviews ascertain that the river is still an important part of the landscape to the populations. The banks of the Papaloapan are regularly visited during holiday periods and especially during festive periods. Processions such as the Virgin of Candlemas of Tlacotalpan and the Black Christ of Otatitlán are still held on boats. The annual nomination of the Chacaltianguis beauty queen takes place on the small island of Chacalapa. Bulls still cross the river before being let loose in the village streets of Amatitlán, Chacaltianguis and Tlacotalpan for patron saint festivals. The river also continues to be very

³ 155,766 inhabitants in 2010 compared to 5 823 in 1950 (Censo INEGI).

⁴ CONAGUA analyses (Comisión Nacional del Agua) performed at 4 different locations show that the water is contaminated with chemicals and faecal coliform more strongly around Tuxtepec than further downstream.

present in the imagination and memories of the people. The elderly often refer nostalgically to a clean river, a place for swimming, fishing and walking. Children include the river when they draw their villages⁵. Adults refer to it constantly because of the associated risks despite the work that has been done (Tlacotalpan, Chacaltianguis and Paraiso Novillero were affected by flooding in Summer 2010), but also because it is a place of meeting and celebration. The river is also at the heart of several projects, like developing ecotourism on Chacalapa island, purifying the water (*Unidos por el río Papaloapan* Association in Tuxtepec), and further work is still being done to protect the population from flooding (reinforcing the protective barriers). The river still has a strong presence in peoples' imaginations and is still a concern, although in losing its main characteristics it now has less of an effect on the inhabitants' daily lives.

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⁵ Exercise completed by two classes of levels 3 and 4 (children aged between 8 and 10) in Tlacotalpan (Miguel Z. Cházaro Primary School) and in Chacaltianguis (Vicente Guerrero Primary School) in May 2012. 4 in 12 children in Tlacotalpan and 10 in 23 children in Chacaltianguis included the river as a feature of their village.