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Comarca Lagunera: Between the socioeconomic characterization and the availability of piped water

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ABSTRACT

Objective: This research aims to describe with sociodemographic features the municipalities that make up the Comarca Lagunera. They are located in the states of Coahuila and Durango. In Coahuila, they are: Francisco I. Madero, Matamoros, San Pedro, Torreón and Viesca; and in Durango: Gómez Palacio, Lerdo, Mapimí and Tlahualilo.

Design/methodology/approach: The methodological strategy is quantitative, using descriptive statistics as analysis technique to incorporate synthetic measures (such as indices) and proportions. The information sources come from different instances (CONEVAL, CONAPO and INEGI). In all cases, the level of disaggregation is municipal and the moment of information collection corresponds to 2020. The population volume of the municipality is described, as well as its proportion with regards to the number of inhabitants in the state. Later, the results from the Gini index, marginalization index, proportion of occupied population devoted to primary activities, and proportion of private households without access to piped water are incorporated.

Results: The municipalities that had the highest values for each of the variables are presented. In Mapimí the Gini index is 0.54; in Viesca, 36.2% of the population is dedicated to primary activities; in Tlahualilo, 4.13% of households lack piped water; and the index of marginalization in Torreón is 0.62.

Limitations on study/implications: It was not possible to present the information with a higher level of disaggregation because the chosen variables only have data available up to the municipal level.

Findings/conclusions: The use of indices allows to carry out a very useful characterization and can be strengthened by the inclusion of specific variables that account for the municipal situation.

Keywords: inequality; households without piped water; primary activities.

INTRODUCTION

The importance of the Comarca Lagunera is fundamental to understand the economic dynamics of northern Mexico. Since it is located between Coahuila and Durango, its proximity to the border links it closely with the cross-border regional economy (Aguilar, 2005). Although Monterrey is identified as the industrial capital in this circuit, Torreón and surroundings are integrated into the intense commercial exchange with Texas. Thus, the Comarca Lagunera is an essential productive enclave to understand the development of northern Mexican economy (Sierra Jiménez, 2008).

Concerning the review of background information that has examined the situation of the region from a socioeconomic perspective, the case of the study by López and Sánchez (2007) stands out; although the study makes a review about the changes in the population volume of the region of interest, the most recent data examined corresponds to the year 2005. In addition, in this case, the number of localities is presented according to their size.

Among the most recent antecedents with socioeconomic information of the region, there is the study by Enríquez, Hernández and Morales (2021). Despite the complexity and the importance of the results, information collection corresponds to the year 2015, since information from the Inter-census Survey is used. In this context, the present study updates the information with gathered in 2020 and presents an integral analysis that incorporates social and economic variables, directed at understanding their relationship with access to water in the households.

In this research, the nine municipalities that make up the Comarca Lagunera were described in sociodemographic terms. In the first place, the population volume of each of these demarcations is stated to present a general outlook, as well as the percentage that it represents with regards to the total of the states. Later, the Gini and marginalization indices are described. In addition, the percentage of the population linked to primary activities and the proportion of households that do not have access to piped water are examined.

Something that must be taken into account is that these results are framed within the metropolitan context integrated by the municipalities of Francisco I. Madero, Matamoros and Torreón —in Coahuila— and Gómez Palacio and Lerdo —which belong to Durango. These five demarcations make up the metropolitan zone (MZ) of the Lagoon, which, according to INEGI (2019), has the ninth place within the most inhabited zones of the country.

MATERIALS AND METHODS

The methodological strategy is quantitative. The type of analysis is descriptive, and the main technique is calculation of proportions and interpretation of synthetic measures (such as indices). The information inputs come from different instances (CONEVAL, CONAPO e INEGI).

First, the four variables were examined: Gini index, marginalization index, proportion of occupied population devoted to primary activities, and percentage of private households without access to piped water. Considering the disaggregation of information at the municipal level and that its date of collection corresponds to the year 2020.

The Gini and marginalization indexes are described and presented in maps, as well as the incorporation of measurements to show a general outlook of the region. Despite of this, the discussion was directed at linking the socioeconomic conditions of the municipalities analyzed through variables related to the consumption and access to water.

Regarding the Gini index, its estimation is in charge of the National Council for Evaluation of Social Development Policy (*Consejo Nacional de Evaluación de la Política de*

Desarrollo Social, CONEVAL). The marginalization index was estimated by the National Population Council (*Consejo Nacional de Población*, CONAPO), as well as the proportion of households without piped water. In the case of the percentage of population occupied in the primary sector, its calculation was made by the authors.

With the microdata from Durango and Coahuila, each set of data were used separately. In every case, the National System for Classification of Occupation (*Nacional de Clasificación de Ocupación*, 2019) from INEGI was used to identify the type of occupation of each individual incorporated in the labor market. With this information, a variable was generated that grouped the occupation into only three categories: primary, secondary and tertiary activities.

RESULTS AND DISCUSSION

In the first place, the volume and the proportion of the population represented with regards to the total of the state are mentioned. Then, the study refers to socioeconomic aspects of the region.

To gain perspective of the size of the population of each municipality, the total inhabitants per municipality is presented according to information from the Population and Household Census 2020. In Coahuila, the ones that stand out are Francisco I. Madero (59,035 inhabitants), Matamoros (118,337 inhabitants), San Pedro (101,041 inhabitants), Torreón (720,848 inhabitants), and Viesca (20,305 inhabitants). From this set of municipalities in Coahuila, Matamoros is the largest one and Viesca is the one with least population. Together, these municipalities have 999,261 inhabitants, which represent 31.75% of the state's population.

In the case of Durango, between the municipalities of Gómez Palacio (372,750 inhabitants), Lerdo (163,313 inhabitants), Mapimí (26,932 inhabitants) and Tlahualilo (21,143 inhabitants), the total population that belongs to these municipalities is 584,138 inhabitants which represent 31.87% of the inhabitants of the state (1,832,650 inhabitants).

In this context, the analysis of sociodemographic variables of this zone is convenient. For this purpose, the main indicators are presented next, taking as reference the 9 municipalities that are closely linked to the Comarca Lagunera.

Gini index

According to Esquivel (2021), the most famous indicator to measure income inequality (or wealth) is the Gini coefficient. This indicator —as others— allows obtaining an estimation of inequality based on the information contained in any distribution. It is constructed from axiomatic principles and tends to have extreme values that serve as reference to know if the inequality is high or low.

In terms of interpretation, the value of this coefficient ranges between 0 and 1, and as gets higher it indicates that there is a higher degree of inequality. Next, a map is presented which includes the nine municipalities selected:
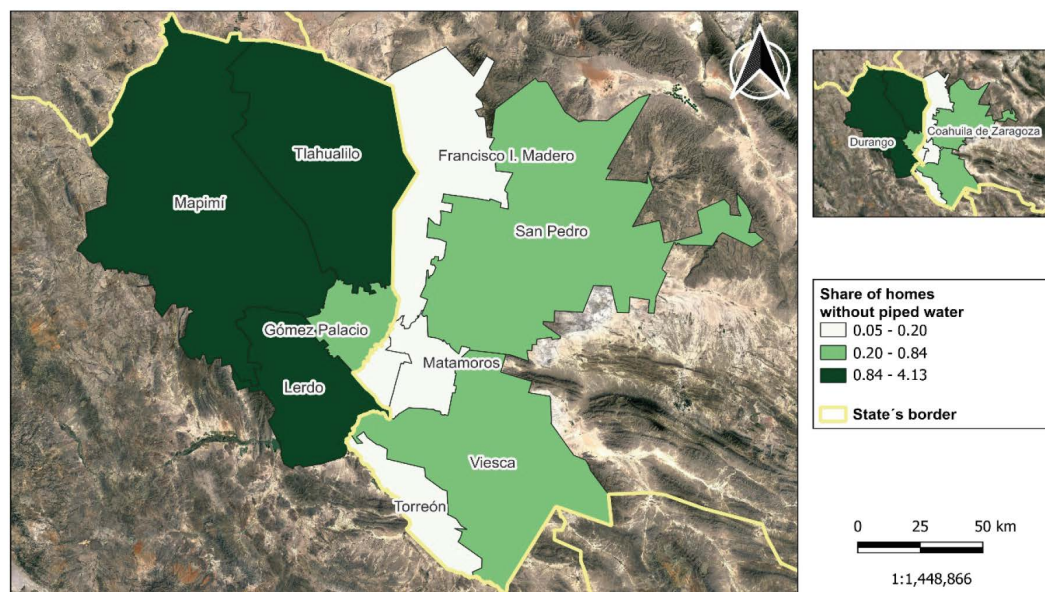
Figure 1. Gini Index, 2020.

Figure 1. Percentage of private homes without piped water by municipality (2020). Source: Prepared by the authors based on data of CONEVAL, 2020.

The results show that among the municipalities with highest level of inequality there is Mapimí (0.54), followed by Viesca (0.48) and Torreón (0.45). In opposite position, there are San Pedro and Tlahualilo (both with 0.38). Although the range between the highest and the lowest values is close, we must recognize that, given the type of construction of the index, a change of 0.1 is relevant.

In this context, the municipality of Mapimí stands out for having the highest degree of inequality compared to the group of demarcations analyzed. This is important inasmuch as this municipality is not part of a metropolitan zone and the fact that it has a higher degree of inequality can represent that it has more adverse conditions.

Proportion of population devoted to the primary sector

The review of the general context of inequality and the limitations of resources in municipalities leads to examining which of them requires a greater amount of water resources according to its productive structure. To examine this, the proportion of the population devoted to primary activities represented has been calculated with regards to the total occupied population. The inputs used to present this result also correspond to census data.

The municipalities of Viesca (36.4%), Tlahualilo (36.2%) and Mapimí (28.8%) are shown in dark green and they have the largest proportion of occupied population in primary activities. In the opposite situation and in white color, there are the municipalities of Lerdo (6.5%) and Torreón (2%), both characterized for being large cities whose economy is closely linked to tertiary activities. This recalls the importance of the urban structure: the large population centers have a predominantly tertiary economy.
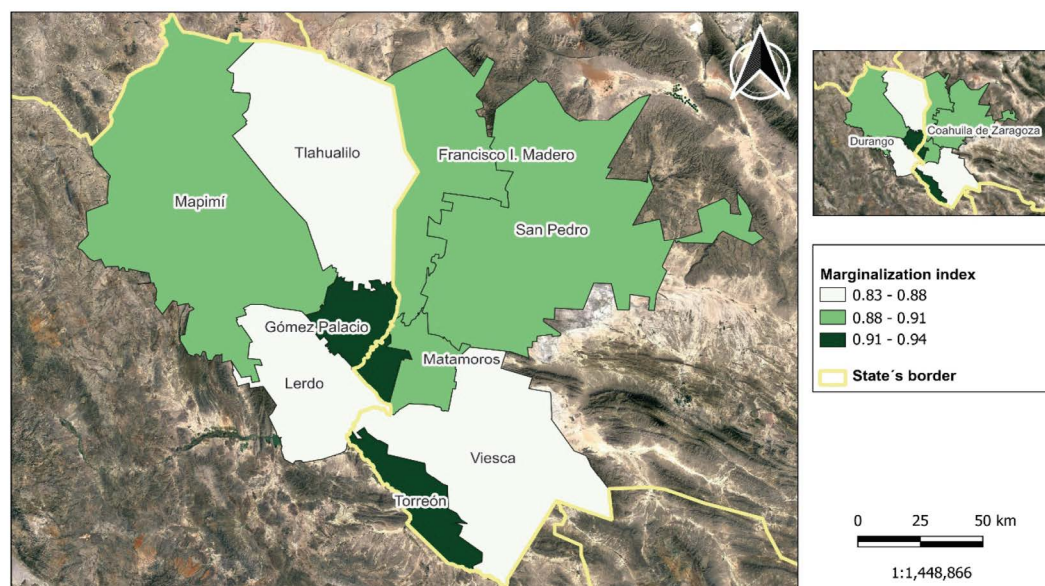
Figure 2. Percentage (%) of economically active population devoted to the primary sector by municipality, 2020. Source: Prepared by authors based on the Mexican census data (INEGI, 2020).

Private households without access to piped water

Finally, a variable related to access to water is presented. This variable was incorporated with the intention of completing the outlook, that is, the proportion of the workforce that performs primary activities accounted for what happens in the public sphere, while understanding the percentage of households without piped water approximates the analysis to the private dimension.

It is important to point out that, according to CONAPO (2021), this variable is part of the construction of a marginalization index. In this regard, it was decided to analyze it separately with the intention of observing differences between the municipalities, since although it is true that they make up the same economic region, the access that households have to water is unequal between municipalities. Next, the results are shown (Figure 3).

Figure 4 shows that Tlahualilo (4.13%), Lerdo (3.2%) and Mapimí (1.15%) have the highest percentages of private households without access to piped water. Although these percentages are apparently 'low', it should be remembered that the impossibility of having piped water calls into question their physical accessibility. This dimension is one of the 6 factors that make up the right to water (Dominguez and Flores, 2016). In the case of the municipalities with lower percentages, this also reminds us that with larger localities there is more urban infrastructure, which -among other things- provides the water service.

This result reminds us of the importance that presenting variables, additional to the indices, allows complementing the analysis. For example, in the case of Tlahualilo, the value of the marginalization index functioned as a first approximation to the situation of the municipality, although reviewing the percentage of households without piped water strengthens the analysis and above all, it allows us to understand that beyond the demand for water being be covered to satisfy the productive needs of the municipality, there is a lack in the urban use of the vital liquid.
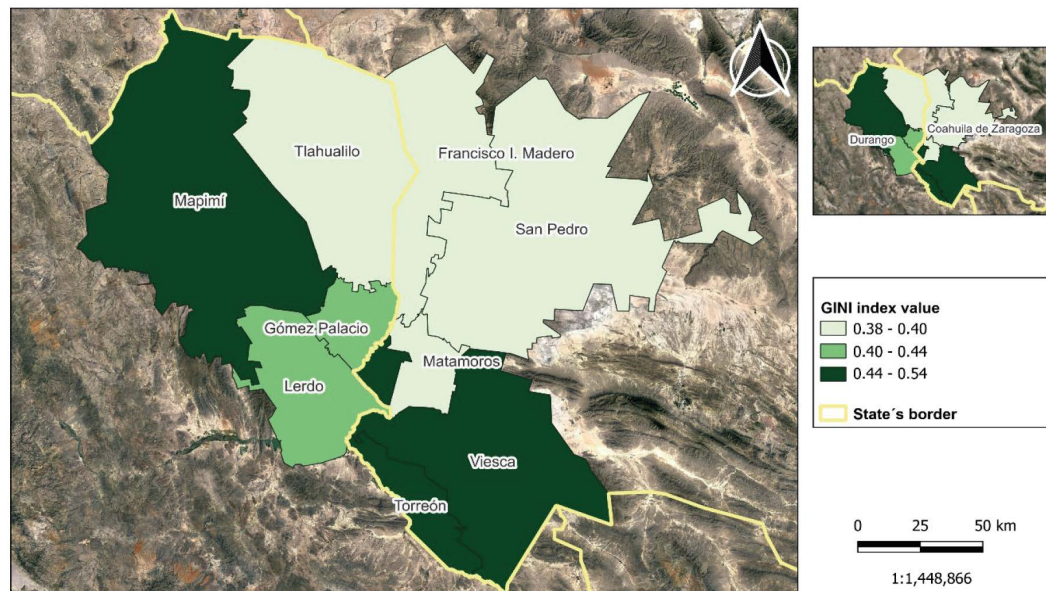
Figure 3. Percentage (%) of households without piped water by municipality, 2020. Source: Prepared by the authors based on data from CONAPO.

The next variable is incorporated with the intention of presenting a general synthesis that allows contrasting the general situation of the municipalities with the characteristics analyzed.

Marginalization index

Measuring the marginalization index informs about the intensity of the deprivation and social exclusion of the population; it is a synthetic measure that serves to understand the situation of the municipalities, despite its utility. Including it is important in order to note the relevance there is in incorporating non-synthetic measures to analyze the situation of the municipalities more meticulously. In this case, the normalized values between 0 and 1 are shown: if the figure is higher, the degree of deprivation is higher. Its estimation is in charge of the National Population Council (*Consejo Nacional de Población*, CONAPO) and is presented in the Figure 4.

The map shows that Torreón (0.94) and Gómez Palacios (0.93) are prominent with high degrees of marginalization. This deserves to be reviewed with greater depth, since it calls into question whether the economies of agglomeration in large metropolis serve as mechanisms to inhibit poverty and marginalization (Sobrino, 2015). Therefore, it would be expected for both cities that are part of the MZ of the Comarca Lagunera to have a lower value in this index.

In addition to this distinction, it is important to note that, jointly, the values of the municipalities that make up the region are high. This leads us to consider that it is a marginalized region even despite the relevance that it has in its productive development. The fact that the region has great economic importance in the metropolitan and national context does not necessarily reflect an improvement in the living conditions of the population.
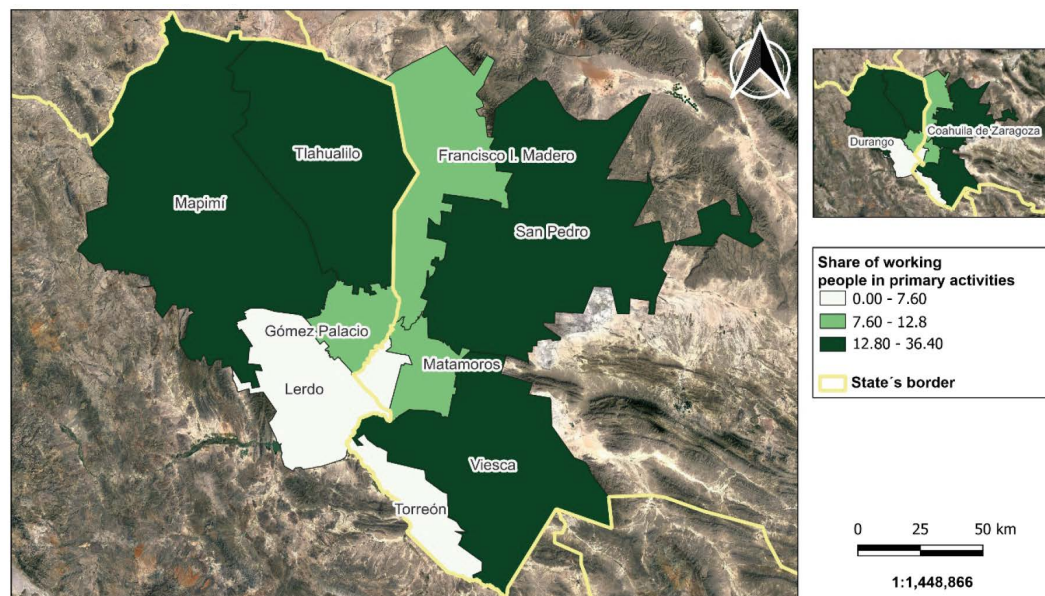
Figure 4. Marginalization index by municipality, 2020. Source: Prepared by the authors based on data from CONAPO.

CONCLUSIONS

In sum, the municipalities that have the highest values in each of the variables analyzed are presented here: Mapimí has a Gini index of 0.56, Viesca is the demarcation where 36.2% of the economically active population is devoted to primary activities. In Tlahualilo, 4.13% of private households do not have access to piped water, while in Torreón the marginalization index is 0.62. It was seen that in the largest localities there is better access to the water service, and this is closely related to the fact that the large urban centers have better infrastructure in services.

This synthesis of results allows us to recognize that although it is true that synthetic measures such as the marginalization or Gini index allow approaching the general situation of the municipalities, reviewing specific variables allows us to make a more rich analysis of the situation in the municipalities. In this case, the fact that the demarcations selected are part of the same economic region points to the fact that between them there is certain homogeneity; however, examining access to piped water allows identifying the existing contrasts between municipalities.

REFERENCES

Aguilar, I. (2005). Monterrey: avances y rezagos de una metrópoli mexicana de cara al nuevo siglo. En C. Arce, E. Cabrero, & A. Ziccardi, Ciudad del siglo XXI: ¿competitividad o cooperación? (págs. 273-308). Ciudad de México: Porrúa/CIDE/Cámara de Diputados.

CONAPO. (2021). Índice de marginación por entidad federativa y municipio 2020. Nota técnico-metodológica. Ciudad de México: CONAPO.

Domínguez, J., & Flores, J. (2016). Derecho humano al agua y al saneamiento. Ciudad de México: Instituto Mexicano de Tecnología del Agua-Colegio de México.

Enríquez, A., Hernández, H., & Morales, J. (2021). Hidroarsenicismo en la Comarca Lagunera. *Revista Enfoques*, 21-43.

Esquivel, G. (2021). Indicadores de desigualdad. Conceptos y evidencia para México. En J. Heath, Lecturas en lo que indican los indicadores. Cómo utilizar la información estadística para entender la realidad económica de México (págs. 225-240). Ciudad de México: Banco de México.

INEGI. (2019). Sistema Nacional de Clasificación de Ocupaciones. Ciudad de México: INEGI.

INEGI. (2019). Zonas metropolitanas: Censos Económicos 2019. Ciudad de México: INEGI.

López, Á., & Sánchez, Á. (2007). Comarca Lagunera: procesos regionales en el contexto global. Ciudad de México: UNAM.

Sierra Jiménez, J. A. (2008). Llegó la maquila al ejido. Diversificación económica y organización familiar en La Florida, una localidad de la Comarca Lagunera. 296. Centro de Investigaciones y Estudios Superiores en Antropología Social CIESAS.

Sobrino, J. (2015). Medición y determinantes de la pobreza en las principales ciudades de México. En CONAPO, La situación demográfica de México, 2015 (págs. 147-165). Ciudad de México: CONAPO.