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La habitabilidad urbana relacionada con la administración de los recursos en la Zona Metropolitana del Valle de México

Urban habitability related to the administration of resources in the Metropolitan Zone of the Valley of Mexico

Habitabilidade urbana relacionada à administração de recursos na Zona Metropolitana do Vale do México

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Resumen

La habitabilidad es un concepto que implica la consideración de diversos aspectos, como la infraestructura, los servicios, la vivienda y, por supuesto, la relación directa con la planeación urbana. Tomando en consideración esto, el objetivo de esta investigación es identificar la relación entre las variables que componen la habitabilidad urbana (dimensiones) y la administración de recursos económicos en las familias de la Zona Metropolitana del Valle de México (ZMVM), para lo cual se tomó como referencia la Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) de 2020. Para analizar específicamente la vivienda y los servicios dentro de la dimensión de habitabilidad urbana de servicios públicos, se calcularon los porcentajes de viviendas por áreas geoestadísticas básicas (AGEB) urbanas que carecen de dichos servicios. Esto se llevó a cabo

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mediante el uso de la herramienta Field Calculator del programa ArcGIS, así como por los datos recabados en el Censo de Población y Vivienda y en el marco geoestadístico proporcionados por el Instituto Nacional de Estadística y Geografía (INEGI) en 2020. Los resultados de la ENIGH permitieron concluir que las tres entidades que conforman la ZMVM destinan el porcentaje más alto de sus ingresos a alimentos y bebidas, lo que identifica las variables utilizadas para evaluar la habitabilidad urbana y que forman parte de los principales rubros de gasto. El más significativo es el de transporte y comunicaciones, seguido por vivienda y servicios y, en tercer lugar, educación y esparcimiento. Finalmente, se propone una corresponsabilidad de los actores involucrados en la construcción de la habitabilidad sustentada en la autogestión.

Palabras clave: administración de los recursos, habitabilidad urbana y planeación urbana.

Abstract

Talking about habitability involves a series of aspects such as infrastructure, services, housing and, of course, the direct relationship with urban planning. The objective of this research is to identify the relationship that exists between the variables that make up urban habitability (dimensions) and the administration of economic resources in families in the Metropolitan Zone of the Valley of Mexico (ZMVM).

The National Household Income and Expenditure Survey [Enigh] (2020) was taken as a reference. For the specific analysis of housing and services, in the dimension of urban habitability of public services, the percentages of housing by urban Basic Geostatistical Areas (AGEB) that do not have services were calculated, with the help of the "Field Calculator" tool of the ArcGis program and the data obtained from the Population and Housing Census and the Geostatistical Framework provided by the National Institute of Statistics and Geography [Inegi], (2020). The Enigh results allowed us to conclude that the three entities that make up the ZMVM use the highest percentage of their income on food and beverages. Identifying the variables that allowed the evaluation of urban habitability and are part of the large expenditure items. The highest is Transportation and communications, compared to urban accessibility, in second place, housing and services and in third, education and recreation. Finally, a proposal is made for co-responsibility of the actors who participate in the construction of habitability, based on self-management.

Key words: Resource administration, Urban habitability and Urban Planning.

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Resumo

A habitabilidade é um conceito que envolve a consideração de vários aspectos, como infraestruturas, serviços, habitação e, claro, a relação direta com o planeamento urbano. Levando isso em consideração, o objetivo desta pesquisa é identificar a relação entre as variáveis que compõem a habitabilidade urbana (dimensões) e a administração dos recursos econômicos nas famílias da Zona Metropolitana do Vale do México (ZMVM), para a qual tomou como referência o Inquérito Nacional ao Rendimento e Despesas do Agregado Familiar (ENIGH) de 2020. Para analisar especificamente a habitação e os serviços na dimensão de habitabilidade urbana dos serviços públicos, foram calculadas as percentagens de habitações por áreas geoestatísticas básicas (AGEB) que carecem de áreas urbanas. tais serviços. Isto foi realizado através da utilização da ferramenta Calculadora de Campo do programa ArcGIS, bem como dos dados recolhidos no Censo Demográfico e Habitacional e no quadro geoestatístico disponibilizado pelo Instituto Nacional de Estatística e Geografia (INEGI) em 2020. Os resultados do ENIGH permitiram concluir que as três entidades que compõem a ZMVM destinam a maior percentagem dos seus rendimentos à alimentação e bebidas, o que identifica as variáveis utilizadas para avaliar a habitabilidade urbana e que fazem parte das principais rubricas de despesa. O mais significativo são os transportes e comunicações, seguidos pela habitação e serviços e, em terceiro lugar, pela educação e recreação. Por fim, propõe-se uma corresponsabilidade dos atores envolvidos na construção de habitabilidade apoiada na autogestão.

Palavras-chave: gestão de recursos, habitabilidade urbana e planejamento urbano.

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Introduction

Urban habitability, considered as a problem derived from housing production, is a central concern for governments that seek the comprehensive development of communities. This situation has its roots in the implementation of the use of ejidal lands as urban land in a constitutional manner, which triggered the massive construction of housing complexes in these new urban areas, which, in general, were located at long distances from the places of work, services and equipment for the inhabitants (Casas-Álvarez, 2020; Salazar-Cruz, 2014; Salinas- Arreortua, 2016; Salinas-Arreortua and Pardo-Montaño, 2020).

In the context of this research, urban livability is defined as follows:

> A set of equipment capable of meeting the essential shelter needs of all people. Its satisfaction requires that the residential urgencies of living be covered: not only those that concern mere individual shelter, but also the public spaces, infrastructures and elementary services that constitute, together, a settlement conducive to vital reproduction (Salas-Serrano, 2008, p. 207).

From the above, it can be indicated that the variables involved in the evaluation of urban habitability are linked to the dimensions of equipment and services, which is evidenced in research carried out by Zulaica and Celemín (2008), Ávila-Flores *et al.* (2016), Cruz-Muñoz and Insunza-Vizuet (2017), Espinal (2017) and Galindo *et al.* (2018) (figure 1).

Figure 1. Dimensions and indicators for the evaluation of urban habitability

Source: Own elaboration based on Zulaica and Celemín (2008), Ávila-Flores *et al.* (2016), Cruz-Muñoz and Insunza- Vizuet (2017), Espinal (2017) and Galindo *et al.* (2018)

Having explained the above, the objective of this research is to identify the relationship between the variables that make up urban habitability and the management of economic resources in families in the Metropolitan Zone of the Valley of Mexico (ZMVM).

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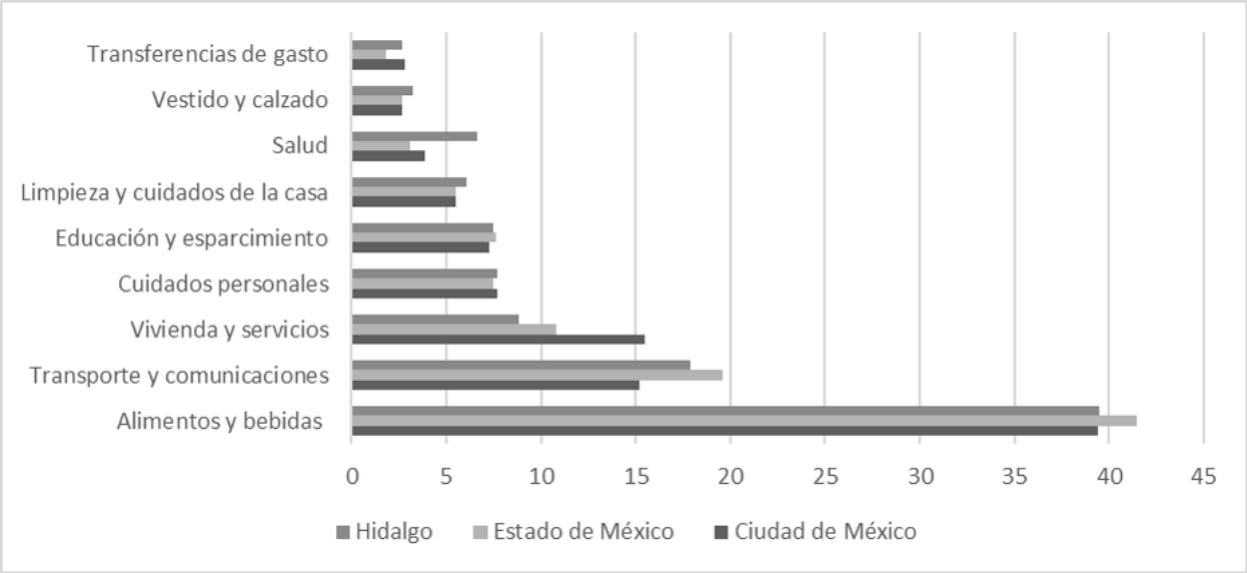
Main expenses in the homes of the ZMVM entities

The National Household Income and Expenditure Survey (ENIGH) 2020, carried out by the National Institute of Statistics and Geography (Inegi) (2020e), provides information on income and expenses at the national and state level, including their characteristics. For this work, the "Percentage distribution of total quarterly current monetary expenses by large expenditure items" has been specifically identified in Mexico City, the State of Mexico and Hidalgo (entities that make up the ZMVM) in order to determine in which category the Families allocate a greater percentage of their income (figure 2).

Figure 2. Percentage distribution of total quarterly current monetary expenditure by major items in ZMVM entities

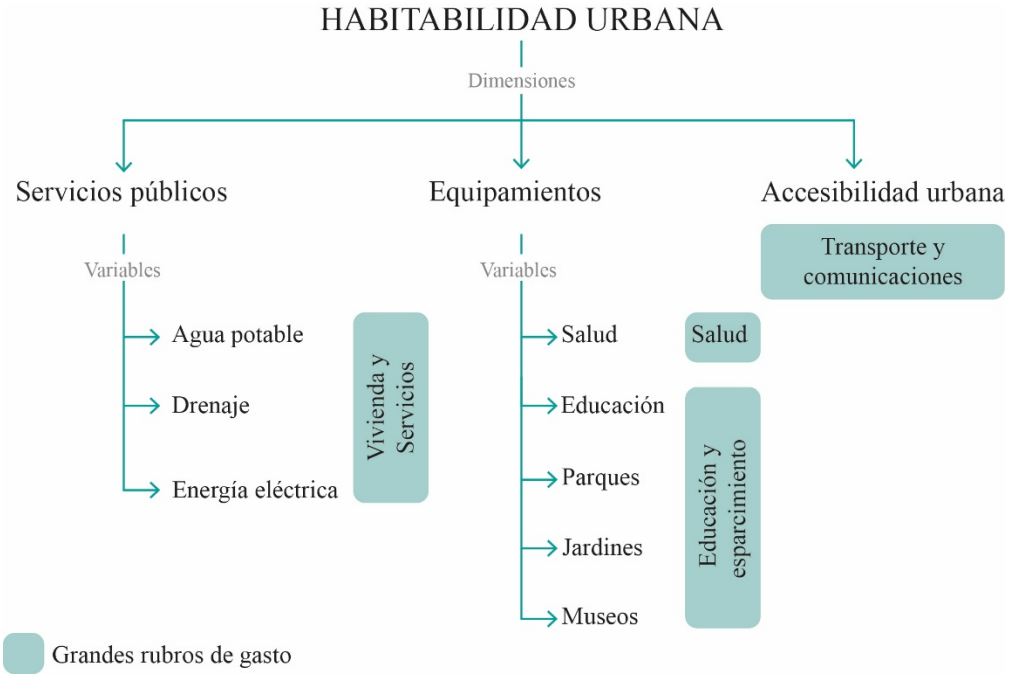


Source: Own elaboration with data obtained from the National Survey of Household Income and Expenses (Enigh) (Inegi, 2020a)

Urban habitability and large spending items

The ENIGH results allow us to conclude that the three entities that make up the ZMVM allocate the highest percentage of their income to food and beverages. For the development of this research, the variables that allow evaluating urban habitability and that are part of the main expenditure items were identified (figure 3).

Figure 3. Coincidence of urban habitability variables and large expenditure items of families in Hidalgo, State of Mexico and Mexico City



Source: Own elaboration with data from the National Survey of Household Income and Expenses (ENIGH) (Inegi , 2020), Espinal (2017), Ávila-Flores *et al.* (2016), Zulaica and Celemín (2008), Galindo *et al.* (2018) and Cruz-Muñoz and Insunza- Vizuet (2017)

Likewise, in figures 2 and 3 you can see the nine major items of expenses in which families distribute their income, that is, transportation and communication, housing and services, education, equipment and health. These items are related to the variables that allow evaluating urban habitability, and are listed according to the highest to lowest percentage of expenditure they represent.

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Materials and methods

The work was carried out following a deductive approach, with an exploratory, descriptive and correlational nature (Hernández -Sampieri *et al.,* 2006). Likewise, the method of quantitative geography was used, which focuses on classifying study areas and representing them on maps as part of the regionalization process, similar to the process carried out with the variables that make up the dimensions of urban habitability (Buzai and Montes- Galbán, 2021).

Within the framework of quantitative geography, spatial analysis was used as a type of methodology, following the perspective of Buzai and Montes- Galbán (2021), who point out that geographic information systems (GIS) are tools that allow studying the human scale. in a stratified reality where different theories can explain each of the levels obtained.

Calculator tool were used to calculate the percentages of homes by urban basic geostatistical areas (AGEB) that lack services, as part of the analysis of the housing and services category, as well as the habitability dimension. urban public services. This was executed using data obtained from the Population and Housing Census and the geostatistical framework provided by INEGI in 2020 (table 1).

Table 1. Categories used to obtain averages of public service variables

Category or indicator 2020	Mnemonic
Total inhabited private homes.	TVIVPARHAB
Inhabited private homes that do not have electricity.	VPH_S_ELEC
Inhabited private homes that do not have piped water in the area of the home.	HPV_WATERFV
Inhabited private homes that do not They have drainage.	HPV_NODREN

Source: Own elaboration with data from the Population and Housing Census (Inegi, 2020b)

Furthermore, to evaluate the variables of health, education, parks, gardens and museums in relation to urban habitability - which coincide with the large items of health, education and equipment expenditures - geoprocesses were carried out in the ArcGIS program using the Reclassify tool. These geoprocesses were based on data from the National Statistical Directory of Economic Units (DENUE) and the geostatistical framework provided by INEGI in 2020. In this regard, it should be noted that only public activities were considered and the number of personnel employed in the aforementioned tasks was used, measured by urban AGEB.

Finally, the road corridors were obtained from the geostatistical framework of Inegi (2020c) and the accesses proposed by Reyes-García (2020), along with the urban AGEB of the ZMVM, to analyze their proximity or distance from each other.

Results

Dimension *public services* and expenditure item *housing and services*

Figure 4 represents the percentage of homes in the Metropolitan Zone of the Valley of Mexico (ZMVM) that do not have access to piped water, measured by urban basic geostatistical area (AGEB). It is observed that the highest percentage range between 71% and 100% is represented to a lesser extent, as are the ranges between 41% and 70%, and between 19% and 40%. Therefore, it can be stated that the lowest range, which goes from zero to 4%, is the one that predominates, which suggests that the supply of drinking water does not constitute a significant problem in the ZMVM, since almost all homes They have this service.

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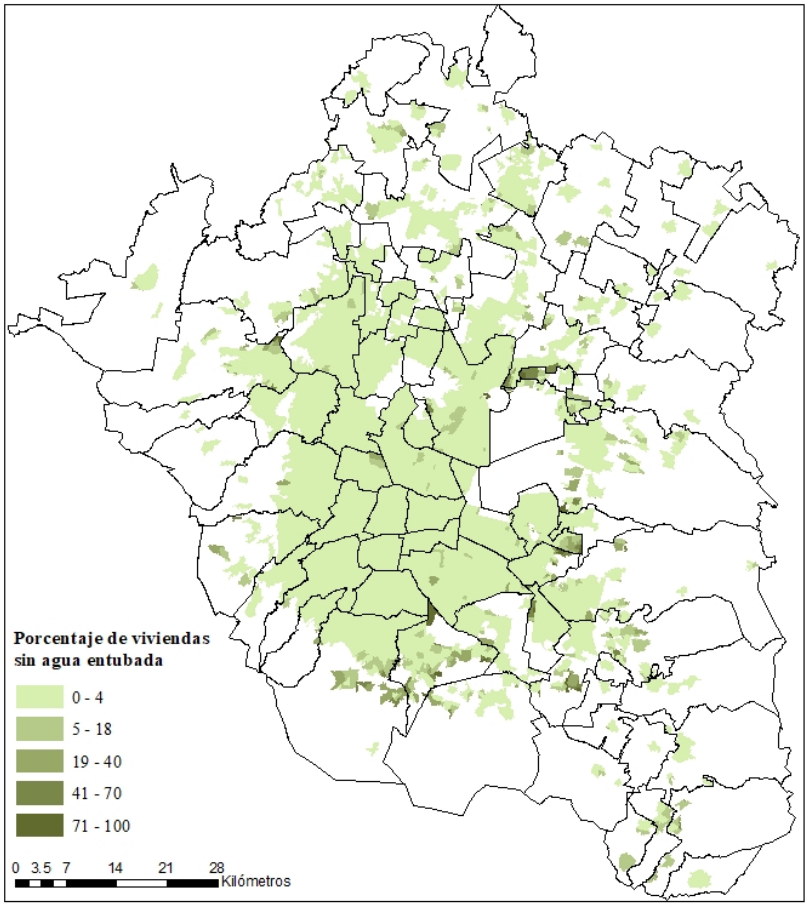
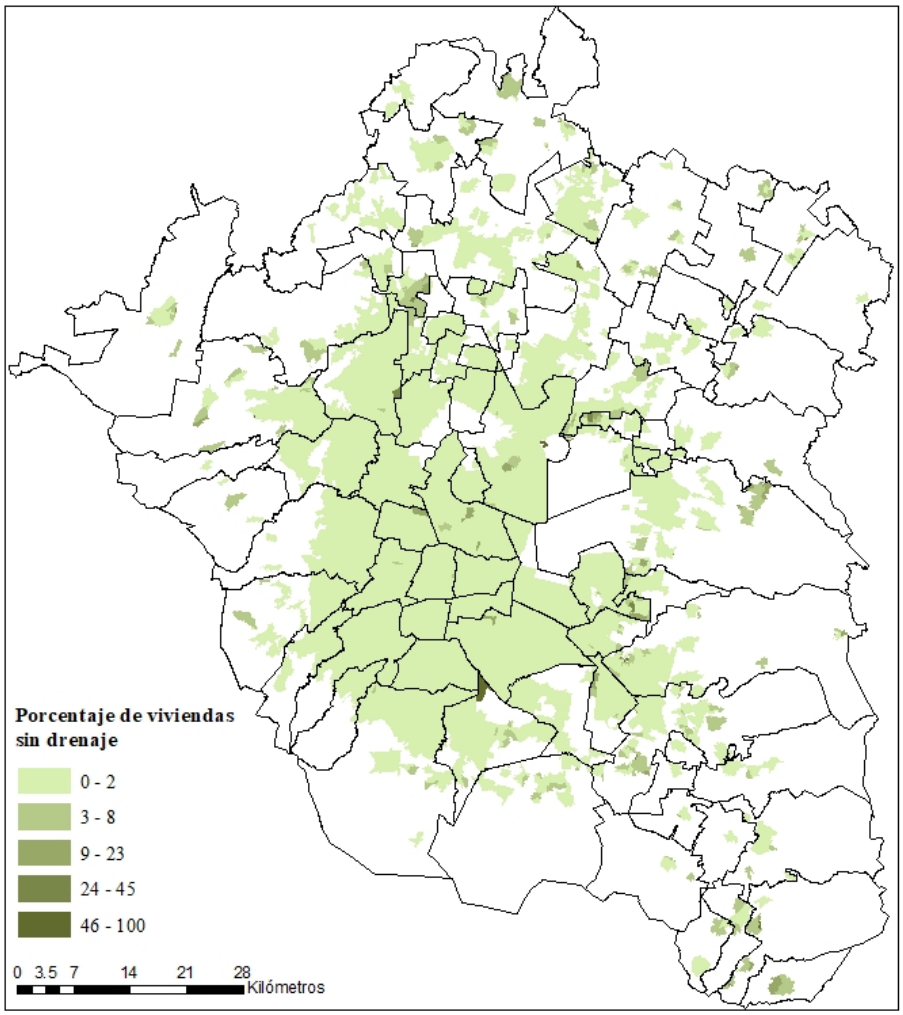
Figure 4. Homes that do not have piped water service supplied by the public service



Source: Own elaboration with databases from the 2020 geostatistical framework and the Population and Housing Census (Inegi, 2020b)

Figure 5 shows the percentage of homes in the ZMVM that do not have drainage service. Note that the lowest range, which goes from zero to 2%, has an even greater predominance than in the previous case, and the highest ranges, such as 41% to 70% and 71% to 100%, are practically zero. This shows that there is no significant deficiency in the provision of this service.

Figure 5. Homes that do not have drainage service



Source: Own elaboration with databases from the 2020 geostatistical framework and the Population and Housing Census (Inegi, 2020b)

Likewise, the majority of homes in the urban AGEB of the ZMVM have electricity service. In fact, the coverage of this service is so satisfactory that the highest percentage of absence of this service is 39.13%. That is, urban AGEBs are not identified where 50% or more of the homes lack this service, as can be seen in figure 6. Therefore, the variables of the public services dimension, as well as housing and services in urban habitability, along with the large expenditure items, do not present significant deficiencies in the ZMVM.

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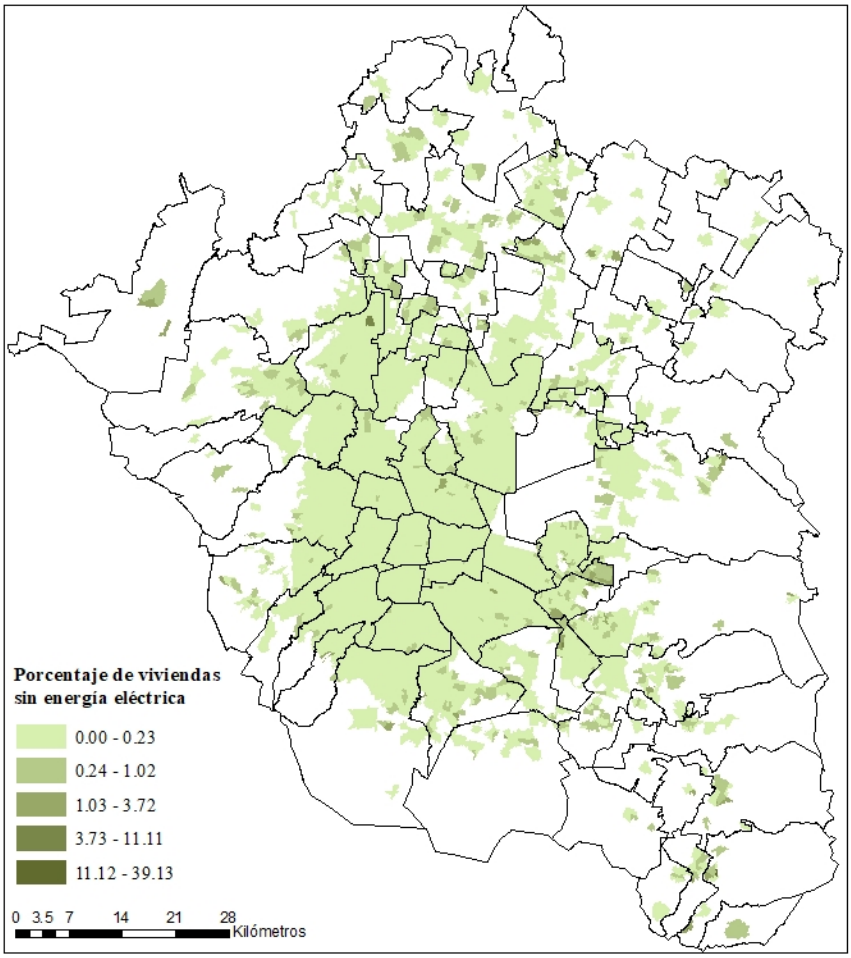
Figure 6. Homes that do not have electricity service



Source: Own elaboration with databases from the 2020 geostatistical framework and the Population and Housing Census (Inegi, 2020b)

Dimension of *equipment* and expenditure items *for education, recreation* and *health*

The variables involved in this dimension and the expense items were measured and represented by the average number of personnel employed in the corresponding activities. Figure 7 shows that these activities refer to education. In fact, the activities with the largest number of employed personnel are mainly found in the center of Mexico City. On the other hand, activities with between 56 and 87 employed people are dispersed within Mexico City, while those between 24 and 40 people are distributed mainly in the State of Mexico and in municipalities of the state of Hidalgo.

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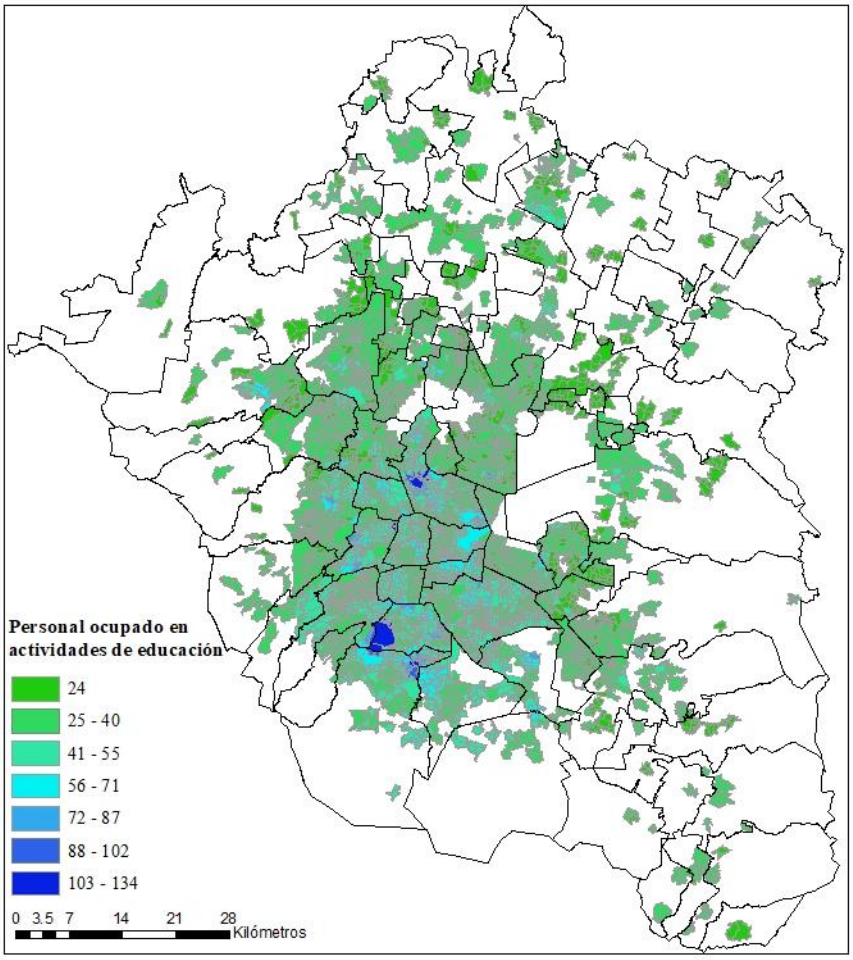
This distribution can be interpreted as that the schools with the highest educational level are concentrated in Mexico City, while the urban AGEB of the State of Mexico mainly have basic education schools, since their predominant range is between 24 and 55 busy people.

Figure 7. Average number of employees engaged in educational activities



Source: Own elaboration with databases from the National Statistical Directory of Economic Units (DENUE) (Inegi, 2020d)

On the other hand, in the case of health-related activities, the lowest ranges of employed personnel, ranging from 26 to 46 people, continue to be present in a large part of the State of Mexico, although in smaller numbers than in the previous variable. On the other hand, activities with more than 66 employed people continue to be concentrated in the center of the ZMVM, especially in the urban AGEB of the municipalities near Mexico City.

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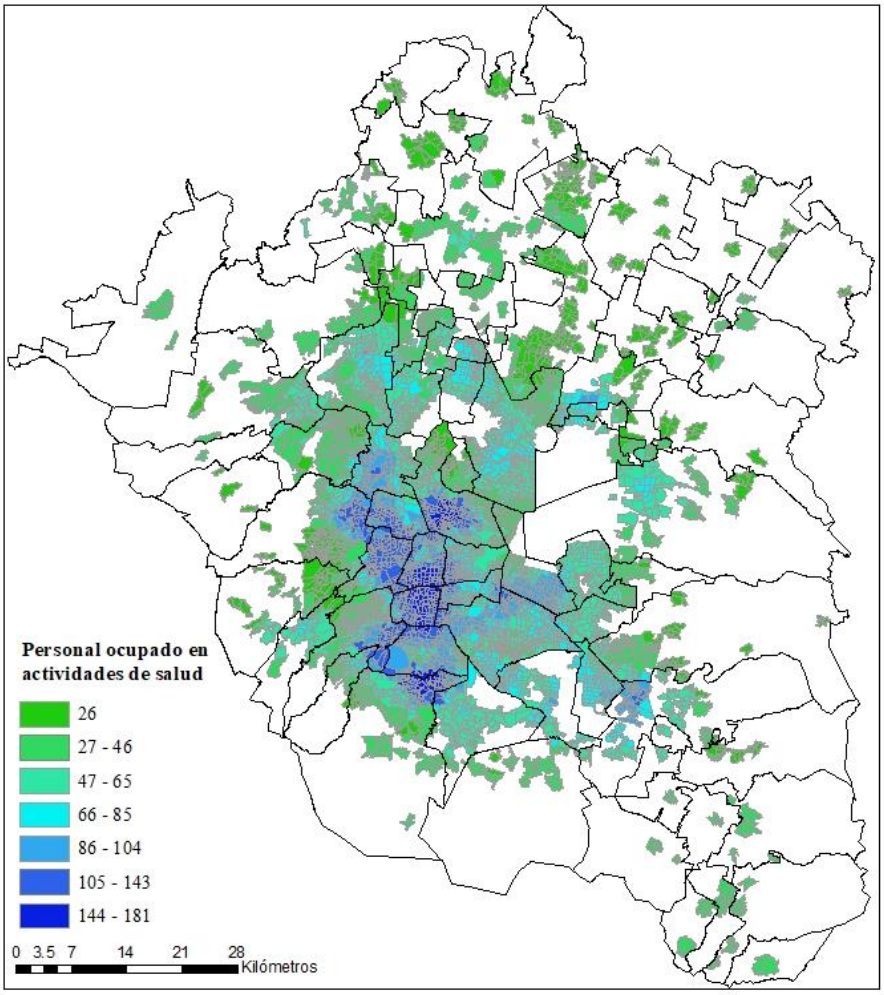
However, it is important to highlight that the urban AGEB located near the limits of the ZMVM are those that have lower level health services, since they have a small number of employed personnel, as shown in figure 8.

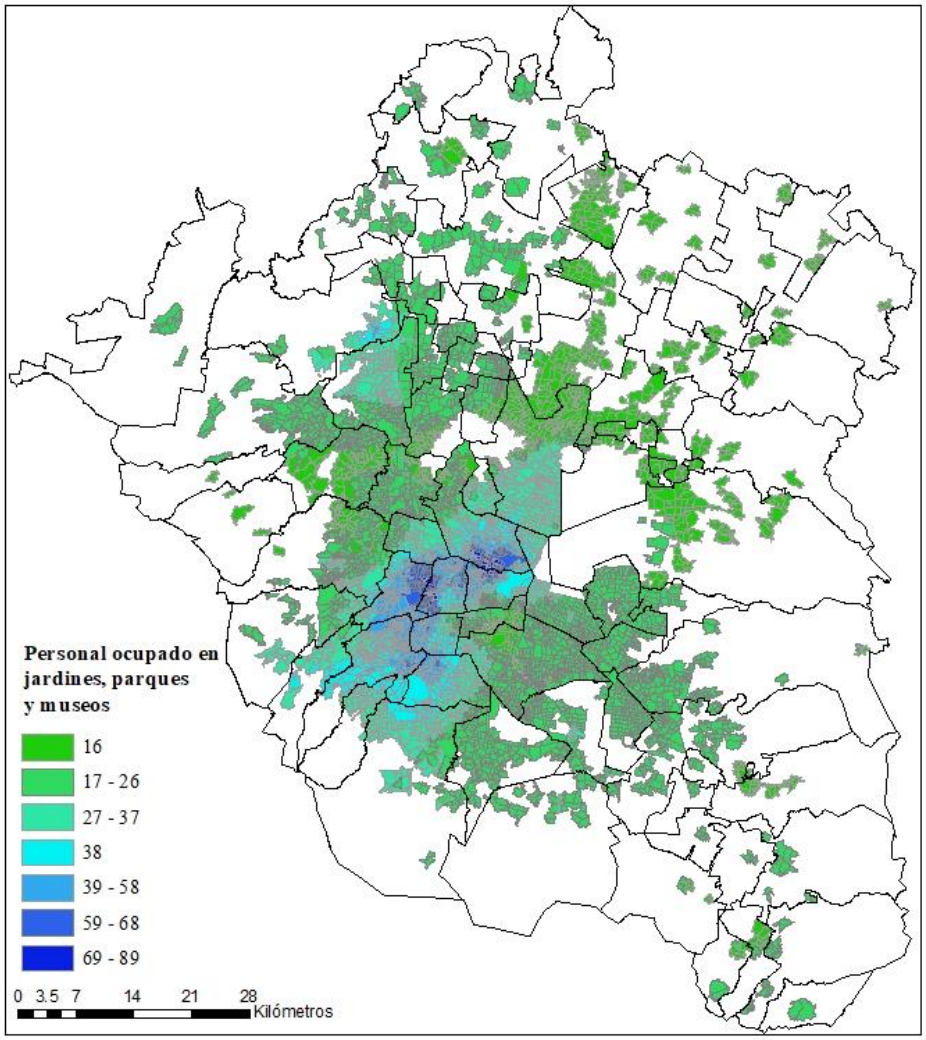
Figure 8. Average number of employees engaged in health activities



Source: Own elaboration with databases from the National Statistical Directory of Economic Units (DENUE) (Inegi, 2020d)

Finally, figure 9 shows a map where parks, gardens and museums are analyzed together. In this case, the services with the largest number of employed personnel are found in the urban AGEB in the northern part of Mexico City. However, as in the previous cases, activities with fewer employed personnel predominate, which are mainly distributed in the State of Mexico and the municipality of Tizayuca in the state of Hidalgo.

Figure 9. Average number of employees engaged in recreational activities



Source: Own elaboration with databases from the National Statistical Directory of Economic Units (DENUE) (Inegi, 2020d)

Urban accessibility dimension and *transportation* and *communications* expense items

Figure 10 shows the road corridors and accesses, which facilitates the identification of the most favored and disadvantaged urban AGEB due to their proximity to these roads. In this regard, it is concluded that those with the least access are the most distant from the center, that is, those that are located within the State of Mexico.

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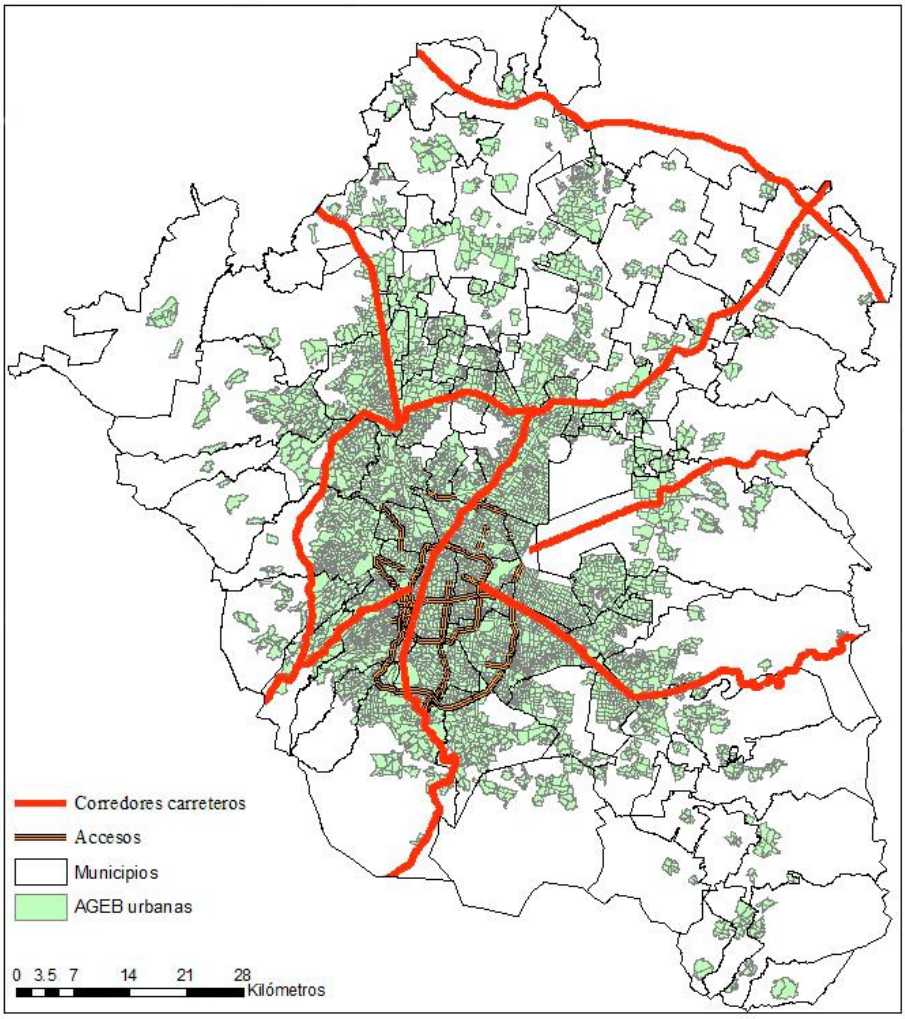
Figure 10. Kilometers from the center to the road corridor or closest access to the urban AGEB that make up the ZMVM



Source: Own elaboration with databases from the 2020 geostatistical framework, the INEGI and the access classification of Reyes-García (2020)

The first major expenditure item presented in the National Survey of Household Income and Expenses (ENIGH) is *transportation and communication,* which is compared with the urban accessibility variable. Now, if the results of the map are considered, it can be concluded that a large part of the ZMVM is close to an access or road corridor, which highlights the importance of analyzing factors such as public transportation in this area.

Secondly, we find the *housing and services category.* In this regard, it can be indicated that, according to the results of the variables of the *public services dimension,* this is more affected. In fact, there is a possible relationship between the percentage of spending in this area and the reduction of problems in the urban habitability variable.

In third place is *education and recreation,* which receives a little less than 10% of income. Although a significant proportion of income is not available for this item, it is affected, as is the *health variable,* which is positioned in the seventh item of expenditure. In both cases, a greater impact is seen on these urban habitability variables despite receiving a lower percentage of spending.

Discussion

Regarding the condition of urban habitability, it is worth highlighting that the urban AGEB that are most affected are usually located on the peripheries of the Metropolitan Zone of the Valley of Mexico (ZMVM). This phenomenon coincides with what was expressed by Moreno-Olmos (2008), who points out the trend of a large reproduction of housing in the peripheries without adequately considering the necessary services and equipment. Consequently, the families that live in these locations face a greater investment in transportation to access services, equipment and workplaces located in the central area.

Finally, it should be highlighted that, although there are studies on urban habitability that evaluate and identify areas with different conditions, using various methods (Ávila-Flores *et al.,* 2016; Cruz-Muñoz and Isunza- Vizuet , 2017; Espinal, 2017) , no investigations have been presented so far that provide a quantitative comparison with the expenditure items.

Conclusions

Taking as reference the dimensions indicated, in terms of public services, specifically *housing* and *services,* it was observed that drinking water and drainage supplies do not represent a problem in the ZMVM. Likewise, in relation to electrical energy, the majority of homes in the urban basic geostatistical areas (AGEB) of the ZMVM have this service.

On the other hand, in the *equipment dimension* and the items of expenditure on *education and recreation,* the schools with the highest educational level are concentrated in Mexico City, while in the urban AGEB of the State of Mexico, basic education schools predominate. In terms of health, the areas with the least access to health services are usually located on the peripheries of the ZMVM, especially on the limits of the State of Mexico. As for parks, gardens and museums, the services with the largest number of employed personnel are found in the urban AGEB in the north of Mexico City, but activities with fewer employed personnel predominate, mainly in the State of Mexico and the municipality of Tizayuca, Hidalgo.

Finally, regarding the *urban accessibility dimension and the transportation* and *communications* expenditure items, the urban AGEB with the least access to these roads tend to be the most distant from the center, that is, those located within the State of Mexico.

Future lines of research

It is recommended to focus specifically on the impact that urban and territorial planning has as a strategy to reduce social inequality and promote balanced development in communities. To achieve this, it is necessary to promote public policies that reduce the gaps between the different social strata and work on the development of quantitative indicators that describe the morphology of the city, as well as qualitative aspects related to the urban environment. These indicators must go beyond the closed space of the home or the available services, and objectively consider the built space in which users must transit and fully develop (Navarrete-Chávez *et al.,* 2021).

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Proposal

This proposal takes as a reference the National Program for Territorial Planning and Urban Development (PNOTDU) —whose main purposes include contributing to the achievement of the approaches expressed in the 2030 agenda and being directly linked to 10 of the 17 sustainable development goals (SDGs)— with in order to unify efforts to eradicate poverty, protect the planet and guarantee the inclusion of the individual, key elements to promote coexistence, peace and prosperity (Secretaría de Desarrollo Agrario, Territorial y Urbano [SEDATU], 2021). Specifically, this program focuses on the correlation and comprehensive work of the actors involved in urban planning with the purpose of visualizing the development of individuals within their communities to foster an environment of coexistence and co-responsibility. Starting from the axiological part of the house, experienced in families, we seek to apply the norm as a development guide and manifest it in the evolving society (table 2).

Table 2. Co-responsible actors in comprehensive urban planning

Comprehensive planning - Co-responsible actors – SELF-MANAGEMENT		
ACTORS	BASIS	ACTION
Family (members)	It should be considered the core of society. According to the CPEUM (2023) " women and men are equal before the law, this will protect the organization and development of the family (…). Every family has the right to enjoy decent and decent housing. The Law will establish the necessary instruments and support in order to achieve this objective."	In the family they must identify and live in and with values, which will impact their communities. Propose your vision through public consultations, based on your needs and promotion of common well-being.
Government (public administration)	The CPEUM in its art. 3, Right to education, section. II, section C, refers to the "integrity of families." You must be directly responsible and work for the security and comprehensive development of citizens in (housing and surroundings) their communities.	It must design, promote and apply public policies that privilege human coexistence, designing protocols that promote, through regulatory guidance, ideal urban planning based on the geography and needs of the communities.
Developers (public and private administration)	They must act as a customer relationship manager. Through instruments such as CRM (Customer Relationship Management), which facilitate communication and comprehensive coexistence based on comprehensive urban planning.	Design, propose and create friendly urban spaces, based on respect and congruence with regulations.
Society	Network made up of individuals that develop in a geographic space.	Society must build constructive spaces and relationships that cause well-being and comprehensive development.

Source: Own elaboration with regulatory data from CPEUM and SEDATU

Thanks

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