Irregular Settlements in Tourist Cities and Their Relationship With Social Exclusion

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Cancun is a tourist city where conditions of wealth and well-being coexist, together with poverty and exclusion. It belongs to the municipality of Benito Juárez, where there are three areas of irregular settlements. This paper analyzes, by means of spatial visualization tools, whether the social backwardness index can explain the differences in terms of risk of social exclusion of citizens living in irregular settlements. It is found that the northern and southeastern zones present conditions that put the population at risk of exclusion, while the southern zone has a lower risk of exclusion. The differences lie in the purchasing power and educational level of the population in this zone, which allows them to cope with these deficiencies.

Keywords: irregular settlements, social backwardness, social exclusion, tourist cities, Cancun

INTRODUCTION

Cancun is located in the municipality of Benito Juarez, Quintana Roo. It is a city that was born 50 years ago and, despite having a Master Plan, it was not contemplated that the people who worked in the construction of the hotels would stay, along with their families. These groups formed the first irregular settlements in the hope of aspiring to a better quality of life.

Although these irregular settlements occurred illegally on the northern outskirts of the city, and those who lived in them had little purchasing power, the phenomenon of illegal land sales at accessible prices by *ejidatarios* (holders of shares of common lands) who owned the land to the southwest of the city also existed.

When talking about irregular settlements, there is a preconception that these areas are of low economic level and that the population living in them is in a situation of poverty due to their living conditions, lack of access to basic resources such as water and electricity, and low income

To address these situations, there have been various proposals to measure poverty and social exclusion, one of which is the concept of social backwardness, which refers to the conditions of education, housing, health and basic services available to people. If these are not available, people are considered to have a high level of social backwardness and, therefore, a high risk of exclusion.

The objective of this study is to determine whether the social backwardness index can explain the differences in the risk of social exclusion of citizens living in irregular settlements in the municipality of Benito Juárez, Quintana Roo.

The study also seeks to answer the following research question: Are all irregular settlements areas of high risk of social exclusion in the municipality of Benito Juarez, Quintana Roo?

To answer these questions, an analysis of social backwardness by BGA (Basic Geostatistical Area) was applied using the 2010 national CONEVAL (National Council for the Evaluation of Social Development Policy, in Spanish) database of the Degree of Social Backwardness by urban BGA. These data were used to generate a baseline analysis of irregular settlements in the city of Cancun.

The article presents the historical background of irregular settlements in the municipality of Benito Juárez, where they are located, the literature review on cities and irregular settlements, social backwardness and social exclusion. In the results section, graphic representations of the urban territory are presented using the Q Gis tool, to identify how the set of variables considered representative to explain social backwardness and the possibility of social exclusion of citizens living in irregular settlements are distributed. The article closes with the conclusions that answer the research question.

HISTORICAL BACKGROUND

The Municipality of Benito Juárez is located in the northern part of the state of Quintana Roo, Mexico. It is an entity with a rapid population, urban and economic growth. Its population grew from 33,273 inhabitants in 1980 to 911,503 inhabitants in 2020 (INEGI (National Institute of Statistics and Geography, in Spanish), 2021). The municipality has a territorial extension of 92,984.25 hectares, resulting from the municipal boundaries when the municipality of Puerto Morelos was created in 2015 and the urban area is 13,945 hectares, not counting the Hotel Zone and the Natural Protected Areas. (IMPLAN (Municipal Institute for Urban Development Planning, in Spanish), 2019).

Cancun is a destination that was born 50 years ago and has become the main sun and beach tourist destination in Mexico with an attraction of 6,006,822 tourists and an economic revenue of 6,847.78 million dollars (SEDETUR (Ministry of Tourism, in Spanish, 2019). The development model with which it was conceptualized was based on an extensive study of carrying capacity to know exactly what the land to be developed could support in terms of the necessary infrastructure, water treatment plants, drinking water and electricity suppliers and even the size of the landfill based on a certain number of rooms and a fixed population size in the center of the city for a 30-year horizon. (FONATUR (National Fund for the Promotion of Tourism, in Spanish), 1982).

The 1982 Master Plan indicated that the urban and tourist development of Cancun was supported by the sufficient and timely provision of basic infrastructure that would give it the opportunity to grow and meet the needs of the emerging population, both locals and tourists. However, with the passing of the years it has been possible to verify that the planning of the Integrally Planned Center (IPC) was surpassed.

One of the reasons why such planning was clearly overrun is attributed to the lack of vision in not contemplating the construction workers and the unskilled population that came in search of a job and development. These groups established the first irregular settlements (Cetto, 2020).

Cancun currently has an estimated growth rate of 2.5% according to CONAVI-SEDATU (National Housing Commission-Ministry of Agrarian, Territorial and Urban Development, in Spanish) (2019), which represents 70% of the total population of the state (COESPO (State Population Council, in Spanish), 2018). Likewise, accelerated growth has drastically increased the population density in the municipality, which went from 19.35 inhabitants/km2 in 1980 to 298.13 inhabitants/km2 by 2005, and by 2010 it was reported at 402.18 inhabitants/km2 (McCoy, et al., 2020, p. 18). Finally, according to population figures reported by the INEGI Census (2021), the current density is 979 inhabitants/km2. It is important to note that, despite offering low salaries, Cancun's salary structure is attractive to workers from other states who in their place of origin receive lower salaries and salary benefits, so they decide to migrate to this area (Aguiar Alayola, et al., 2018), which at the time triggered the growth of irregular settlements.

The problem of irregular human settlements in the municipality of Benito Juarez is a situation that has existed since the origin of Cancun, as they proliferated increasingly inside and outside the urban boundary. Over time, their proliferation has increased and has put pressure on the urban development of the city. Currently, it is estimated that there are 88 irregular settlements in the municipality of Benito Juárez (INSUS (National Institute for Sustainable Land, in Spanish) Quintana Roo, 2020).

According to reported data1 there is an average growth rate of 31% in Benito Juárez between 2016-2019. According to the documentary follow-up that was performed, it was estimated that there is a number of about 23,748 lots in irregular condition in Benito Juárez, which could represent about 84,768 inhabitants, approximately 10.07% of the inhabitants of Cancun are in an irregular settlement, which is equivalent to almost 35% of the municipal territory (McCoy, et al., 2020).

In addition to the irregular settlements there is a strong problem with irregular developments of ejido (communal) lands that are disincorporated from the National Agrarian Registry and that, subsequently, are lotified and sold but do not have the proper incorporation to the municipality, so they lack all the basic services. In 2019, 11 irregular developments were closed in the municipality of Benito Juárez in which 14,775 residential lots were detected (McCoy, et al., 2020)

Despite these descriptions, the living conditions of the inhabitants of some irregular settlements are not in accordance with the definitions of vulnerability or social exclusion; in fact, we can even say that the opposite is true. So, are social backwardness and irregular settlements necessarily related to poverty and social exclusion? This is something that is explored in this document.

THEORETICAL FRAMEWORK

The city cannot be observed in a disjointed way, since in it we find groups that can enjoy a good quality of life and others for whom daily life is full of limitations. The city is also a physical and functional environment where inequalities are reproduced. The Economic Commission for Latin America and the Caribbean (ECLAC) points out that a city that contains inequalities is a segregated city, a situation that, in the municipality analyzed in this study, has deepened in recent years due to socioeconomic inequality, coupled with the rapid and disorderly growth of the city and its peripheries. In order to understand these inequalities, it is necessary to understand poverty from a multidimensional approach, the most extreme effect of which is social exclusion.

An example of segregation are irregular or precarious settlements, which the United Nations Human Settlements Program (UN-Habitat) describes as housing "in overcrowded conditions, or made without durable materials, or lacking improved water or sanitation services" (UN-Habitat, 2018, p. 14). From the legal perspective, it is delimited to an irregular settlement where there are dwellings that are located on land owned by ejido, communal, federal, state or municipal public property, or private individuals. It is likely that they do not have title to the property or land tenure (Ruiz Hernández, 2015).

The rapid and inefficient growth of cities in recent decades has had a significant economic, social and environmental impact. According to the Inter-American Development Bank (2011) the lack of planning and/or inadequate planning, as well as incorrect enforcement of existing regulations, have generated disorderly occupation and irrational land use patterns, contributing to excessive internal displacement and urban congestion. In Latin America approximately 27% of the urban population lived in 2011 in irregular neighborhoods, and in Mexico, UN-Habitat (2018) estimates that at least 38.4% of the population inhabits inadequate housing (p. 14).

Who lives in irregular settlements? The Ministry of Social Development (SEDESOL, (in Spanish), 2010) considers that irregular settlements concentrate low-income families, which has a negative impact on the reproduction of the poverty cycle and generates more irregular settlements. Given this situation, according to SEDESOL (2010), it is very difficult to generate public policies for urban planning and housing.

Ruiz Hernández (2015) also considers that there is a relationship between irregular settlements and urban marginality, due to specific spatial characteristics such as periphery, hillside housing, slopes; and social characteristics such as concentrations of poverty, low land value, irregular real estate market and

overcrowding. In addition, this includes the lack of access to services such as drinking water, drainage and durable constructions.

How does a population come to settle and maintain itself in an irregular settlement? There are different mechanisms through which the exercise of power generates an unequal weighting of the life of certain subjects, which leaves some sectors of the population exposed to undignified living conditions, creating differentiated and socially segregated citizenships in the urban space. (Herranz & San Pedro, 2019).

Alegría (2020) exemplifies that segregation by location is an inevitable product of the distributive mechanisms of resources and housing in an urban space, which negatively affects the groups that in the social distribution of income are at the bottom of the social pyramid, since this regressive redistribution of income caused by socio-residential segregation deepens their poor living conditions, increasing their social vulnerability.

The elements of economic inequality and socio-spatial segregation also lead people to social exclusion, a concept that involves both an objective and a subjective dimension as it considers elements of the person and the conditions in which they find themselves at that moment (García & Nava, 2016). The authors point out that the objective factors may be spatial location, difficulty in accessing the labor market or lack of language proficiency, while the subjective factors affect how people perceive themselves.

Then, the result of poverty is social exclusion, defined from Castel's perspective (García & Nava, 2016) as a process that affects both people and territories and its origin is in distribution and consumption relations and production relations. According to this author, social exclusion is the ultimate result of the rupture of social ties. However, social ties go beyond the support networks that a person may have; they are also related to the level of education, job insecurity, social coverage and the fragility of family support. The greater the support network, level of education and social security coverage, the lower a person's risk of becoming socially excluded.

Exclusion implies the rupture of the social fabric, leaving excluded groups "outside" of it (Brugué, et al., 2002). The frontiers are constantly changing, as are the effects and intensities and, therefore, cannot be explained by a single cause. In fact, the effects and disadvantages derive from an accumulation of unfavorable circumstances that are often interrelated. However, it is not a dichotomous situation, but a process that, according to Castel (1995), consists of three stages or zones:

- Integration zone: People with stable employment, who belong to and have social networks, consume and participate in political and cultural life.
- Vulnerability zone: Includes people in a situation of labor or social instability. Vulnerability can be an objective or subjective situation of material, economic or psychosocial origin that leads the person to experience helplessness, due to the fragility of the personal, family or community support available to them (González & Guinart, 2011).

Exclusion zone: Individuals who are unemployed and experience a situation of social isolation. This refers not only to precariousness but literally to being excluded from social ties.So, what are the factors that entail a risk of social exclusion? Table 1 shows the risk factors for social exclusion.

TABLE 1
RISK FACTORS FOR SOCIAL EXCLUSION

Dimension	**Indicators**
Economic	Poverty
	Dependence on public support
Labor	Unemployment
	Labor precariousness
Education	Low level of education
	Illiteracy

Health services	Disability
	Low access to health services
	Mental illness
Housing	Not being legal owners of the property
	Poor living conditions
	Poor housing conditions
	Poor access to basic services (sewage, potable water, electricity)
Relational	Domestic violence
	Fragmentation of family life (e.g., single-parent families)
	Community rejection
Citizenship and participation	Restricted access to participatory and citizenship processes
	Restriction of rights due to criminal proceedings
	Low or no political and social participation

Source: (Oriol, 2013)

Thus, from the perspectives reviewed, it seems that irregular settlements are irremediably related to poverty and social exclusion, leading to the construction of differentiated citizenships, which implies unequal distribution of rights and guarantees that produce effects of precariousness and specific segregation (Herranz & San Pedro, 2019). However, the authors of this paper question whether all irregular settlements, with the presence of risk elements described above imply risk of social exclusion. For this purpose, they choose to review the measurement of the Social Backwardness that CONEVAL (National Council for the Evaluation of Social Development Policy, in Spanish) carries out in Mexico, since it covers most of the elements that make up the risk factors of social exclusion.

Social Backwardness

Social backwardness is a concept that is part of several attempts to measure multi-caused poverty, in this case, by the Mexican government, trying to solve an old and still unsolved problem, such as trying to measure the level of development of a country or region.

The main obstacle is that it is complicated to define the concept of development. Benita and Gómez (2013) simplify the concept by considering development as "progress in the living conditions of the population and can be interpreted as greater well-being" (p. 266). These authors relate development with well-being and expect that most of the population will have access to them. However, they point out that, due to structural issues, there are areas and groups that reach this well-being more easily than others. As a result, there are geographic and population gaps, which have been attempted to be operationalized with social and economic indicators.

One of these measurement proposals is social backwardness. This is considered by CONEVAL (2010) to be a measure that aggregates the variables of education, access to health services, basic services, adequate space and quality of housing, as well as of the household, and its objective is to identify the relative position of the observed zone (state, municipality, locality or BGA) with respect to its peers. The measurement of social backwardness allows the classification of geographical areas according to access to the benefits of social development, in order to organize and identify those that have benefited the least.

Benita & Gómez (2013) point out that a weakness of the measurement of this construct is that it is used at very large levels of integration, which brings with it the idea of homogeneity within these areas. They also clarify that it is not an indicator of poverty per se, since it does not include data on monetary income,

but that, by considering dimensions related to this phenomenon, it can be considered an approach to approximate poverty, assuming that social conditions contribute to poverty or to getting out of it. In fact, the authors use this concept since its elements coincide with the risk factors for social exclusion.

The Social Backwardness Index is a weighted measure that summarizes four indicators of social deprivation (education, health, basic services, and housing quality and space) in a single index that aims to rank the observation units according to their social deprivation (CONEVAL, 2010).

TABLE 2
SOCIAL DEPRIVATION AND ITS COMPONENT INDICATORS

Social deprivation	Indicators
Education	Percentage of the population aged 15 years and over who are illiterate. Percentage of the population aged 6 to 14 years not attending school. Percentage of households with population between 15 and 29 years old, with an inhabitant with less than 9 years of education. Percentage of population aged 15 years and older with incomplete basic education
Access to health services	Percentage of population not entitled to health services
Housing quality and space	Percentage of inhabited private homes with dirt floor Average number of occupants per room
Basic housing services	Percentage of inhabited private households without toilet or sanitary facilities Percentage of inhabited private households without piped water from the public water supply. Percentage of inhabited private households without sewage system Percentage of inhabited private households without electricity
Household assets	Percentage of inhabited households without a washing machine Percentage of inhabited households without a refrigerator

Source: Own elaboration with information from CONEVAL (Poverty maps in Mexico, 2007)

The information source for the estimation of this index is the database of the "Main Results by Locality" (ITER, in Spanish)) for 2000, 2005 and 2010. Once the Social Backwardness Index is estimated, the observation units are classified into five degrees of social backwardness, which are: very low, low, medium, high and very high social backwardness.

Upon analyzing the information on irregular settlements in the city of Cancun, there are three areas of settlements with high and medium levels of social backwardness, which could lead to social exclusion. In these areas, the lack of municipality and legality causes lack of access to health centers, education, basic services, household spaces and quality, so they become areas at risk of exclusion, with few social opportunities for the inhabitants (Miguel Velasco & Martínez García, 2017).

However, when integrating more data, inconsistencies between zones are observed, which will be presented in the results.

METHODOLOGY

A spatial representation analysis of the territory was carried out using Q Gis software and taking data from the 2010 Population and Housing Census by Urban BGA of the municipality of Benito Juárez in the urban localities of Cancún and Alfredo V. Bonfil.

With this, we intend to answer the research question as to whether the social backwardness index can explain the differences in terms of the risk of social exclusion of citizens living in irregular settlements in the municipality of Benito Juárez, Quintana Roo.

The variables analyzed in addition to the social backwardness indicator are presented below. The variables that are part of the risk factors for social exclusion were compared, and the corresponding variables were selected in the measurement of social backwardness. Finally, the authors integrated other variables that allow a better glimpse of the differences between the three zones of irregular settlements.

Specifically, as education/work, average schooling is considered; as housing, the condition of the house is considered an asset associated with the conditions with which the inhabitants must face different events (natural and social); the sanitation and drinking water services available; and to estimate household income, homes with Internet and those with their own automobile are considered.

Access to health services, as well as their location, and the possession of a refrigerator as a factor for food preservation due to the warm weather were also included.

TABLE 3
COMPARISON OF SELECTED FACTORS AND VARIABLES

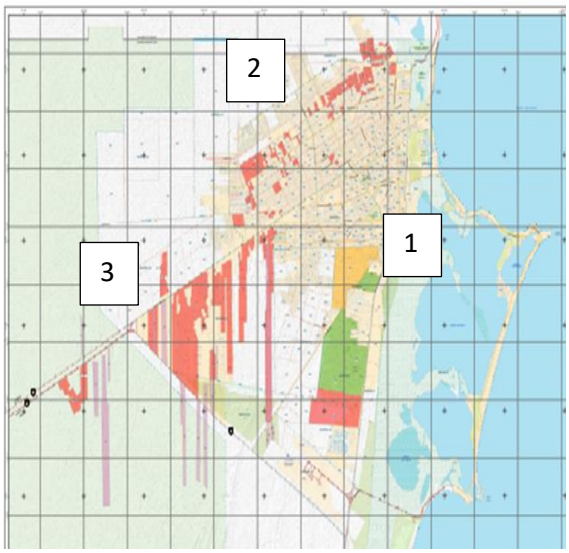
Risk factors for social exclusion	**Social backwardness indicators**	**Indicators contributed by the authors**
Economic	Household assets	Internet at home Private automobile ownership
Labor	-	Unemployment
Education	Average grade of education	
Health services	Access to health services	Location of health centers
Housing	Basic household services (sewage, piped water inside the household and toilet) Housing quality and space (dirt floor and overcrowding)	Existence of refrigerator
Relational	-	-
Citizenship and participation	-	-

Source: own elaboration

RESULTS

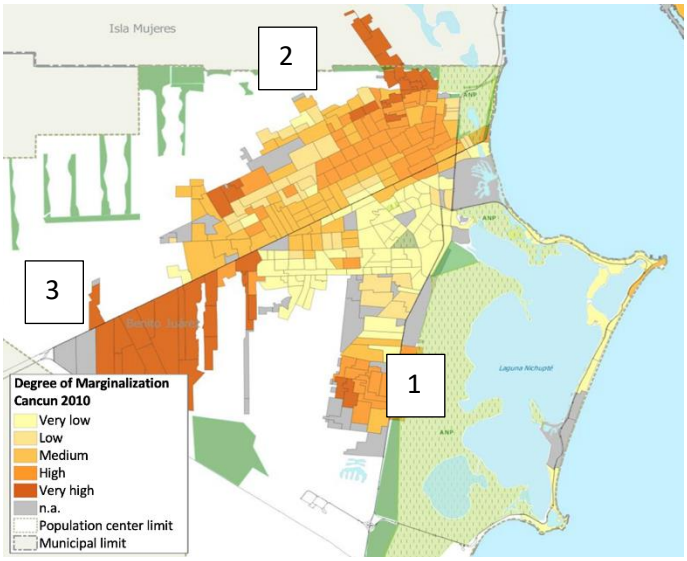
In the Municipality of Benito Juárez there are three main areas where irregular settlements are located: (1) to the south towards the Riviera Maya on Luis Donaldo Colosio Avenue; the Ejido Alfredo V. Bonfil; (2) to the north, on the border with the municipality of Isla Mujeres and (3) to the west of the city towards the exit to Mérida, on López Portillo Avenue; (4) to the west of the city towards the exit to Mérida, on López Portillo Avenue.

FIGURE 1
DISTRIBUTION OF ZONES OF THE CITY OF CANCÚN 2020



Source: IMPLAN, Cancún

FIGURE 2
DEGREE OF MARGINALIZATION BY BGA 2010



Source: PIMUS Study--Centro de Estudios del Transporte S.C, Plan Integral de Movilidad Urbana Sustentable de Cancún (PIMUS, in Spanish)), 201, Government of Quintana Roo.

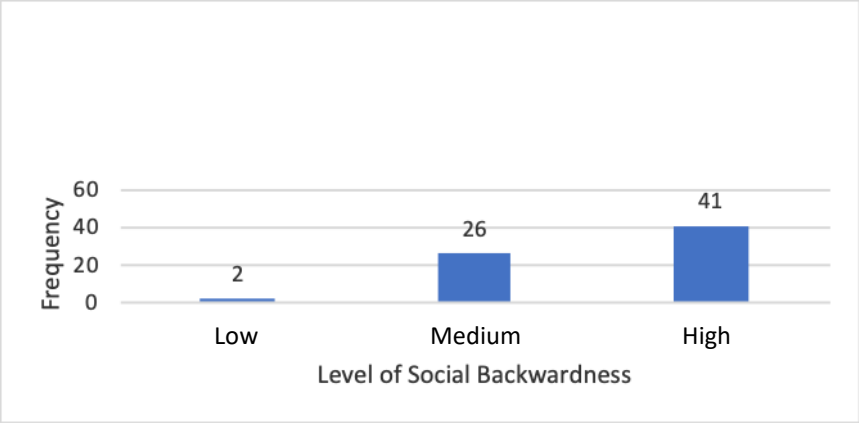
In the map it is possible to observe the different irregular zones, the difference in colors is related to the possibility of regularization in the short, medium and long term according to the municipal authorities. Thus, the green zone has conditions for regularization in the short term, followed by the yellow zone in the medium term and the zone marked with red are settlements that, due to the conditions they have, the authorities believe that regularization could be sought in the long term.

The areas marked with light pink on the map are newer subdivisions that have been developed in irregular conditions.

As can be seen in Figure 2, these irregular zones also coincide with the visualization of marginalization by BGA in the municipality. At the state level, Cancún is located among the municipalities classified as having “low” and “very low” levels of urban marginalization; however, the analysis of BGAs shows that, although the hotel zone, the downtown area and some surrounding neighborhoods have “very low” levels of marginalization, the peripheral neighborhoods in the north and west of the city have “high” and “very high” levels of marginalization.

According to the degree of social backwardness, of the total number of BGAs, 69 fall into the category of irregular settlements, of which 41 have high social backwardness, 26 have medium social backwardness and 2 have low social backwardness (Figure 3).

FIGURE 3
FREQUENCY OF IRREGULAR SETTLEMENTS ACCORDING TO THEIR LEVEL OF SOCIAL BACKWARDNESS



Source: own elaboration with data of Social Backwardness by Urban BGA of CONEVAL year 2010.

Below are the results grouped according to the risk factors of Social Exclusion.

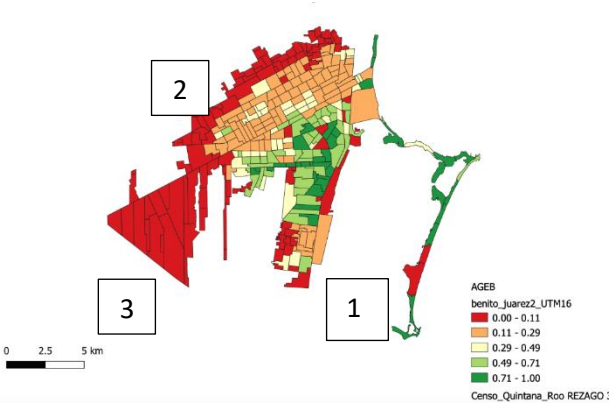
Economic

Since the Social Backwardness Index does not directly collect data on income, measures that are indirectly related to income were used, such as ownership of a car and internet connection at home. Having a refrigerator was also considered, since it implies the use of electric energy for food preservation in a warm area such as Benito Juárez.

FIGURE 4
PERCENTAGE OF INHABITED HOUSEHOLDS WITH AUTOMOBILES

Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

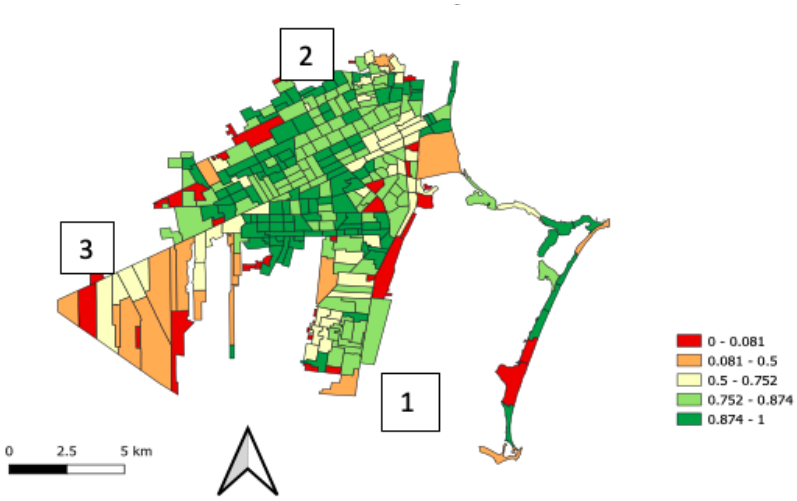
FIGURE 5
PERCENTAGE OF INHABITED HOUSEHOLDS WITH INTERNET



Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

Taking the Internet and the automobile as a differentiating element of better income, it can be observed that the AGEB's that correspond to the irregular settlements located in zone 1 have, in a great majority, Internet service and automobile (Figure 4 and 5).

FIGURE 6
DISTRIBUTION OF THE PERCENTAGE OF INHABITED PRIVATE HOMES WITH REFRIGERATORS



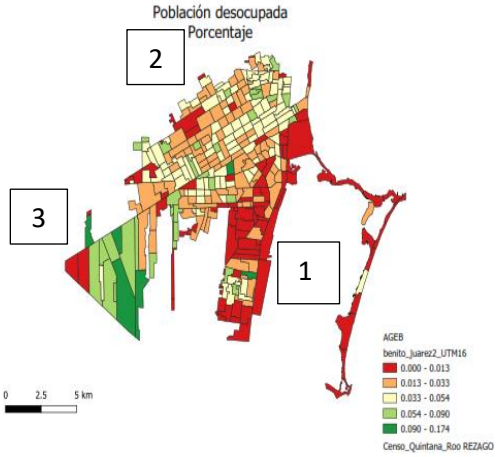
Source: own elaboration with data from INEGI 2010 Census.

With respect to refrigerator ownership, it is observed that in zones 1 and 2 the presence of this appliance is constant, but not in zone 3 (Figure 6).

Labor and Education

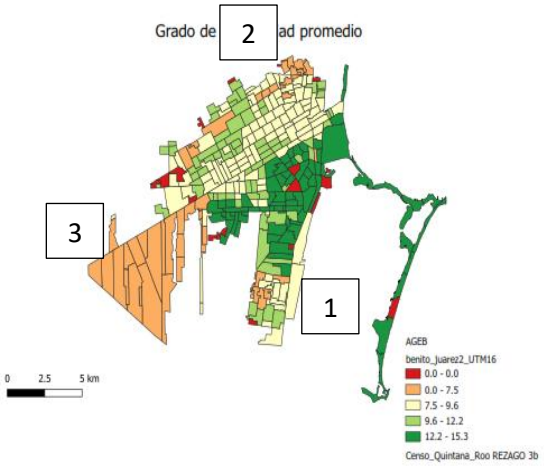
This dimension presents the results of the percentage of unemployed population (Figure 7) and the average level of education (Figure 8), since these skills are tools that help the population to move up the social ladder or to face the risks they encounter.

FIGURE 7
PERCENTAGE OF UNEMPLOYED POPULATION



Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

FIGURE 8
AVERAGE LEVEL OF EDUCATION



Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

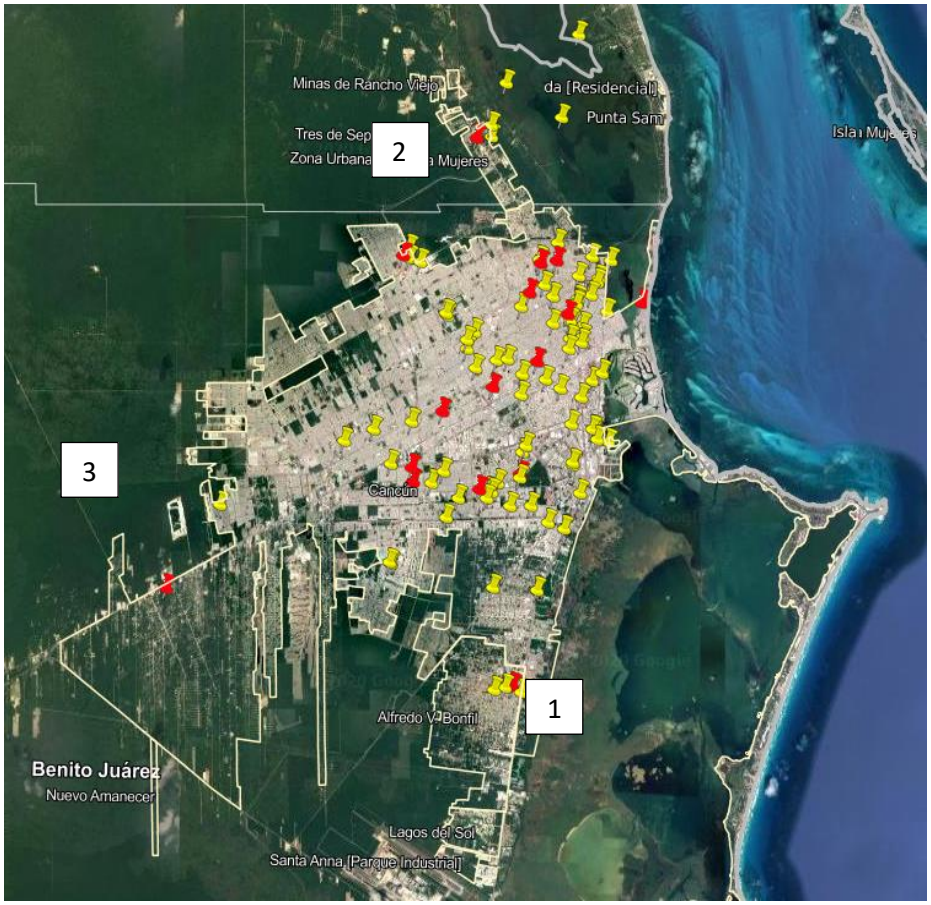
In relation to unemployment as a risk factor, it was detected that zones 1 and 2 of irregular settlements have a lower level of unemployment, especially zone 1, which allows these families to better cope with unforeseen events. On the other hand, in zone 3, according to the spatial representation, it is possible to observe that the level of unemployment is very high, which means that most people do not have a job, which makes their level of risk of exclusion higher.

When observing the territorial representation (Figure 8), it is possible to note that the irregular settlements located in zones 1 and 2 present less risk, since their average level of education is in the middle and high levels. The same is not true for zone 3, which has education levels between 0 and 7.5 years, which puts them at a disadvantage, since they have greater difficulty in accessing the labor market and specialized jobs.

Health Services

Figure 9 shows access and proximity to health services. The red dots are public health services and the yellow dots are private medical offices.

FIGURE 9
PRESENCE OF PRIVATE MEDICAL OFFICES AND PUBLIC HEALTH SERVICES

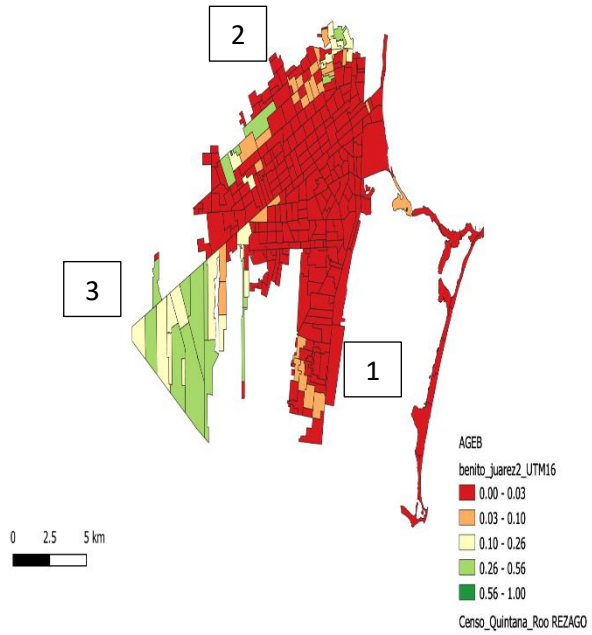


Source: Mccoy, Et Al., 2020, With Data From INEGI's Espacio Y Datos De México Platform, 2020.

As shown in Figure 9, most private medical offices and public health services are located in the center of the city. Thus, although zones 1 and 2 have few clinics and medical offices, their proximity to the center and to more transportation routes allows them greater access to medical services, while in zone 3 there is practically no presence of health services.

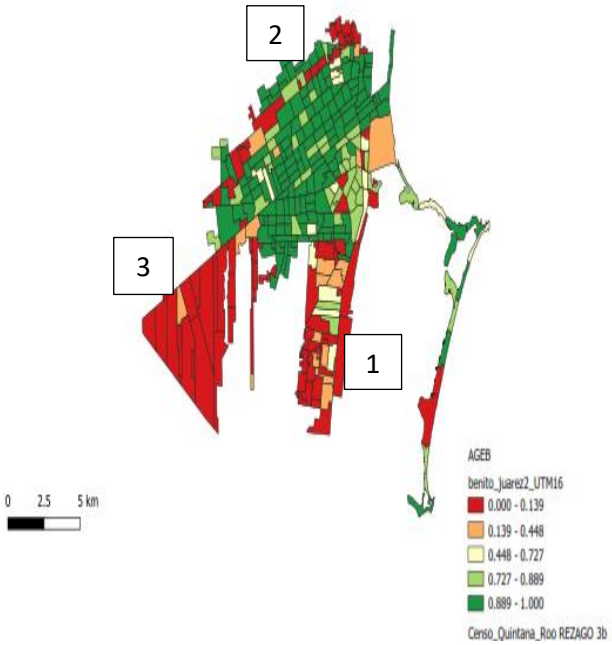
Housing

FIGURE 10
PERCENTAGE OF INHABITED PRIVATE HOMES WITH DIRT FLOORS



Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

FIGURE 11
PERCENTAGE OF INHABITED PRIVATE HOMES WITH DRINKING WATER INSIDE THE HOUSEHOLD

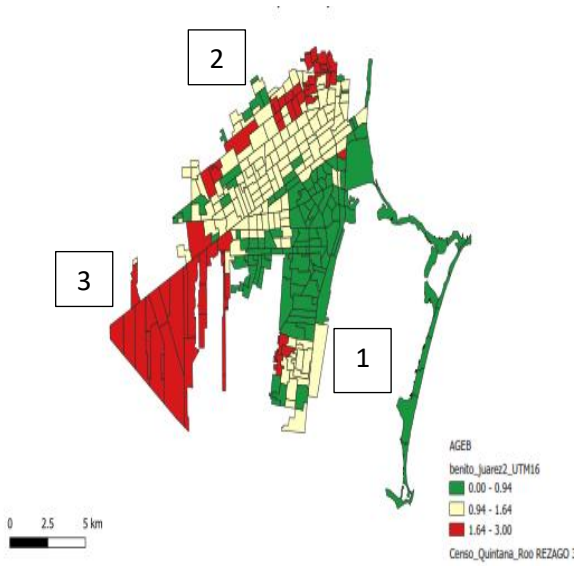


Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

Figure 10 shows the number of houses with dirt floors. In zone 1 there is little presence of dirt floors, in zone 2 there is more presence, and in zone 3, practically the entire cluster has houses with dirt floors.

Figure 11 shows the distribution of houses with piped drinking water inside the house. It can be seen that the zone with the highest presence of potable water inside the home is zone 2, despite being an irregular settlement. Zones 1 and 3 show the lowest frequency of this service.

FIGURE 12
AVERAGE OCCUPANCY PER ROOM



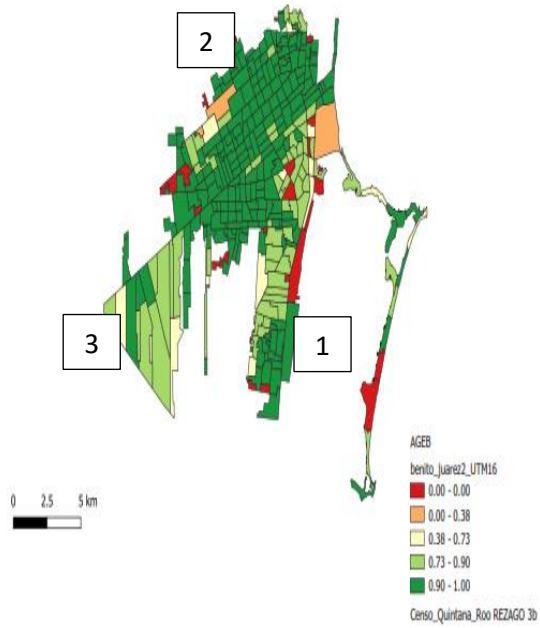
Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

In relation to the risk factor of overcrowding in housing, this was calculated using the variable of average occupancy per room and it was possible to observe that zone 1 presents low overcrowding, followed by zone 2, where there is a greater presence of overcrowded housing. Zone 3 is the zone with the highest presence of this risk factor almost in its entirety.

This is primarily explained by the fact that the houses in zone 1 are spacious, with several rooms in addition to the living areas of the house, as well as families with few members, which makes it possible for them to live in a house with the necessary conditions of personal space as well as comfort.

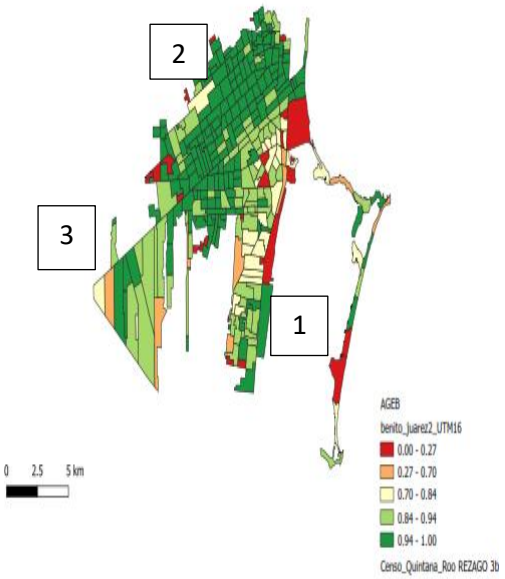
These conditions are also favorable in times of an adverse environmental situation such as a hurricane, reducing the risk of flooding or loss of property.

FIGURE 13
PERCENTAGE OF INHABITED HOUSING UNITS WITH DRAINAGE



Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

FIGURE 14
PERCENTAGE OF INHABITED HOUSING UNITS WITH TOILET FACILITIES



Source: own elaboration with data from INEGI 2010 Census. Key: AGEB: BGA.

One point that is noteworthy is the analysis of the variable distribution of inhabited private households with sewage, because according to the spatial representation of the data from the 2010 Population Census, practically the entire municipality has sewage, including the irregular settlements and subdivisions and even

where there is no drinking water and where it is known that cenotes are used as a system to dispose of soapy and sewage water.

It is important to point out that these same AGEBs also have toilets. It seems that they haven't understood what drainage is and what it's for. The problem is the contamination of the groundwater that this type of situation generates, increasing the vulnerability not only of those who live in the irregular settlements but also of the city and its inhabitants in general.

CONCLUSIONS

Traditionally, irregular settlements are generally perceived as areas at risk of social exclusion. In the city of Cancun and Ejido Alfredo V. Bonfil there are three main clusters of irregular settlements.

Although the three zones present the characteristics of irregular settlements, they do not behave in the same way and do not bring their population close to social exclusion in the same intensity.

When analyzing the data yielded by the 2010 Census and organized by the CONEVAL as variables of the Social Backwardness Index, in the aforementioned zones we find elements in common: such as the lack of legality in land tenure and the absence of municipal public services.

However, the differences are found in the analysis of social risk factors, based on the variables that make up the Social Backwardness Index, such as overcrowding, the presence of a refrigerator at home, health services and educational level, in order to estimate a public approach to measure multifactorial poverty.

The concept of social backwardness includes elements that are presented as deficiencies in the three zones, however, zone 1 has better prospects for land legalization in the near future, presence of internet at home, refrigerator and private automobile.

This zone includes part of the Ejido Alfredo V. Bonfil, where non-municipalized land without basic services was acquired by people with a good economic level, taking advantage of the good price and the vision of growth of the city, either to build their homes or to develop housing complexes at that time or in the future. Therefore, they have lower unemployment rates, higher educational levels, greater presence of toilets in the home, and low overcrowding.

The most significant deficiencies are access to drinking water and health services; however, being the area with the greatest presence of private automobiles, they are better able to reach areas where these services are available.

In the case of zone 2, located in the north of the municipality, the maps show a greater presence of risk factors for social exclusion. For example, in terms of land tenure, legalization is planned for the long term. Although they have electricity and a refrigerator, they have practically no internet at home and an average presence of their own automobile, which indicates low purchasing power. However, this area is well connected to the city center by public transportation, so it presents fewer problems when seeking health services.

The presence of unemployed people is medium, and the level of education is medium to low. Although there are few homes with dirt floors, overcrowding is high, and access to piped drinking water is also scarce. Sewage and toilets are not a problem in this area.

The greatest risk of exclusion is found in zone 3, since this is where the greatest number of social deprivations are concentrated: housing with dirt floors, overcrowding, no legal land tenure, no piped drinking water, no internet at home or refrigerator, little access to health services, high percentage of unemployment and low level of education. However, they report having toilets and sewage.

So how can it be explained that the three irregular areas of a city, with all the deficiencies they imply, do not generate the same risk of social exclusion?

This is because the inhabitants have different capacities to face risks in a differentiated manner. The purchasing power, occupation and level of education, as well as access to means of communication (private automobile or public transportation and internet at home) in the settlements of the southern zone of the city allow them to have greater participation and influence, as well as the possibility of remedying the absence of municipal public services, than those inhabitants of the northern and southwestern zones of Cancún.

Thus, citizens in zones 2 and 3 are at greater risk of social exclusion. In addition, it should be considered that risk also includes territorial, climatic and cultural factors. The areas with the greatest scarcity of resources are more vulnerable to a hydrometeorological phenomenon because their homes lack the necessary structures to face this type of phenomena and could lose all of their assets as a result.

The above shows that the irregularity of the settlements has different origins and therefore its solution must have different arrangement schemes since those who live in an irregular settlement in an area where income is higher have the economic possibilities to reach a solution in relation to land tenure, and since they already have services that they managed themselves so it is more economical for the authority to integrate and regularize them to begin to receive property income from these areas that are currently outside the cadastral record .

Finally, the concept of Social Backwardness cannot be used indiscriminately and without considering other factors to make decisions regarding public policy in irregular settlements, since these do not ensure the risk of social exclusion by themselves.

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ENDNOTE

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