

Sixth State of the Region  
Final Research Report

# HOMICIDES IN CENTRAL AMERICA TOWARD A BETTER UNDERSTANDING OF TERRITORIAL TRENDS, CAUSES, AND DYNAMICS

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# INTRODUCTION

Central America continues to be one of the most violent regions of the world that are not at war. Although in recent years, and particularly beginning in 2015, most of the Central American countries have seen a decline in their homicide rates, they still are above the global average and those of Latin America and the Caribbean; this is particularly the case in the Northern Triangle (Guatemala, Honduras, and El Salvador).

The persistence of these elevated levels of homicides has helped make this issue become a priority in the research and public policy agendas of the isthmus. Although these agendas have been broad and varied, a number of studies have raised the need to understand and monitor the violence and insecurity at the subnational level, particularly that connected to homicidal violence.<sup>1</sup> This results from the conclusion that the homicide rates gathered at the national level do not allow an understanding of the dynamics in different territories inside the countries or for the design and implementation of public policies to be prioritized. Recently, new research has made significant advances in this field and has come up with research agendas to follow.<sup>2</sup>

This research seeks to provide up-to-date information and apply various tools of statistical analysis (such as cluster analysis) to deepen the understanding of the recent evolution and dynamics of homicidal violence at the municipal level in Central America. This study examines the three countries of the Northern Triangle, plus Costa Rica and Panama, and covers the period 2010-2017. Nicaragua could not be included in this research because of the unavailability of disaggregated information on homicides at the territorial level (see the section about data quality). In addition to seeking an understanding of changes in homicide levels in the territories, this study seeks to characterize territorial patterns of high and low homicidal violence and to identify possible explanatory factors that might be associated with these patterns and their evolution in the territories. To better under-

stand the territorial dynamics, this study employed in-depth interviews with key informants from public institutions directly connected with the issue (for example, national civil police and forensic medical institutions) and experts.

This research delves into the analysis of homicide because it is one of the most reliable indicators for studying violence and insecurity in the countries.<sup>3</sup> This is because homicide is the crime that has the least underreporting, which is particularly important in Central America, where the state's limited presence in many cases hinders the collection of statistics about criminality and violence. Furthermore, from a methodological point of view, this indicator allows a greater comparability, as the definition of homicides is uniform among the countries, which does not always happen with other crimes.

The first section of this document provides a general characterization of the current levels of violence at the national and subnational level in the region. This establishes a starting point and describes the general behavior of the subject of this study. The second section characterizes the phenomenon over time and in the territory, particularly emphasizing the evolution of homicide at the subnational level. Throughout this section, possible factors associated with territorial and temporal variations of homicidal violence are identified. To do this, in-depth interviews were conducted with key informants and subject matter experts in each country studied.<sup>4</sup> This qualitative approach allows a greater understanding of the phenomena and trends identified in the spatial and temporal analysis. Finally, the study takes an in-depth look at homicidal violence in specific groups such as women and young people and explores the relationship between homicidal violence and other crimes.

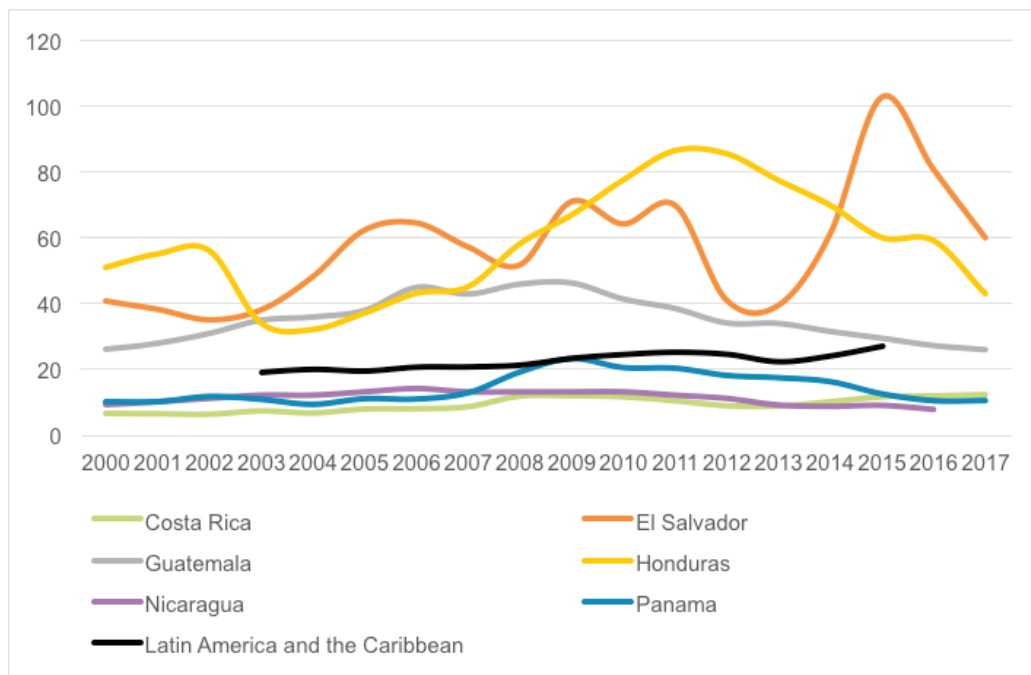
In the final section, some policy recommendations are made, based on the findings of this study. Finally, an annex reviews the quality and availability of data about homicides, and about criminality in the region in general.

# 1 | HOMICIDAL VIOLENCE IN CENTRAL AMERICA: RECENT EVOLUTION AND THE CURRENT SITUATION

Homicidal violence in Central America is mainly concentrated in the countries of the Northern Triangle. Although there have been variations over time, all the countries have high levels that have been maintained from the beginning of this century (graph 1). Although in the first part of the period Honduras and El Salvador recorded rates above 30 homicides per 100,000 inhabitants, in recent years they have been reporting rates above 50 per 100,000 inhabi-

tants, more than double the rate of Latin America and the Caribbean (22.3 in 2015) and more than eight times higher than the world level (5.3 in 2015). Panama, the country with the lowest level of homicides in the region, has had a homicide rate between 9 and 10 throughout the period analyzed. This shows how the region's levels of homicidal violence are high in comparison with the rest of the world.<sup>5</sup>

**Graph 1: Homicide rate per 100,000 inhabitants in Central America, 2000-2017\***



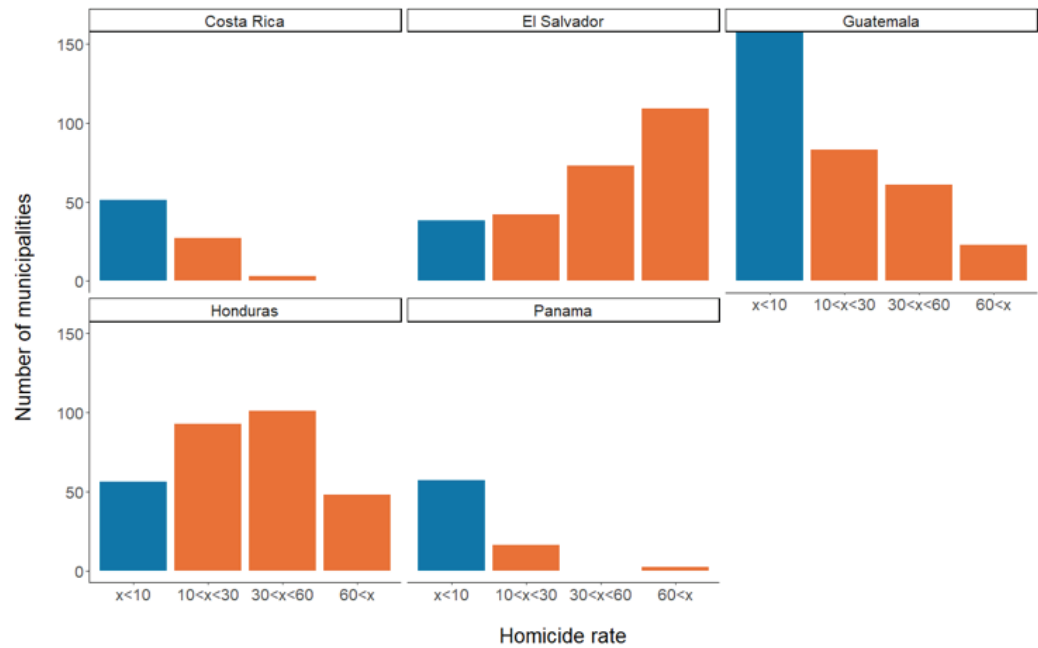
\* The data for Latin America and the Caribbean were calculated using a simple average of all the countries of the regions that reported data for the years of the graph.

Source: Compiled by the author based on data from PEN and UNODC.

Subnational level figures show that in 2017, all the countries have municipalities with high levels of homicidal violence.<sup>6</sup> There also are localities with low homicide rates (graph 2). In Costa Rica, Guatemala, and Panama a majority of localities have homicide rates below 10. In contrast, in Honduras and El Salvador a majority of municipalities have more than 30 homicides per 100,000 inhabitants. This

study seeks to understand the evolution of this phenomenon at the subnational level and the factors that can help characterize and explain these dynamics and trends. These homicide levels at the municipal level show that national level rates invisibilize diverse territorial dynamics, making it important to do an analysis over time. The information available includes the homicide rates of each municipality. The

**Graph 2: Number of municipalities by homicide rate levels,\* 2017**

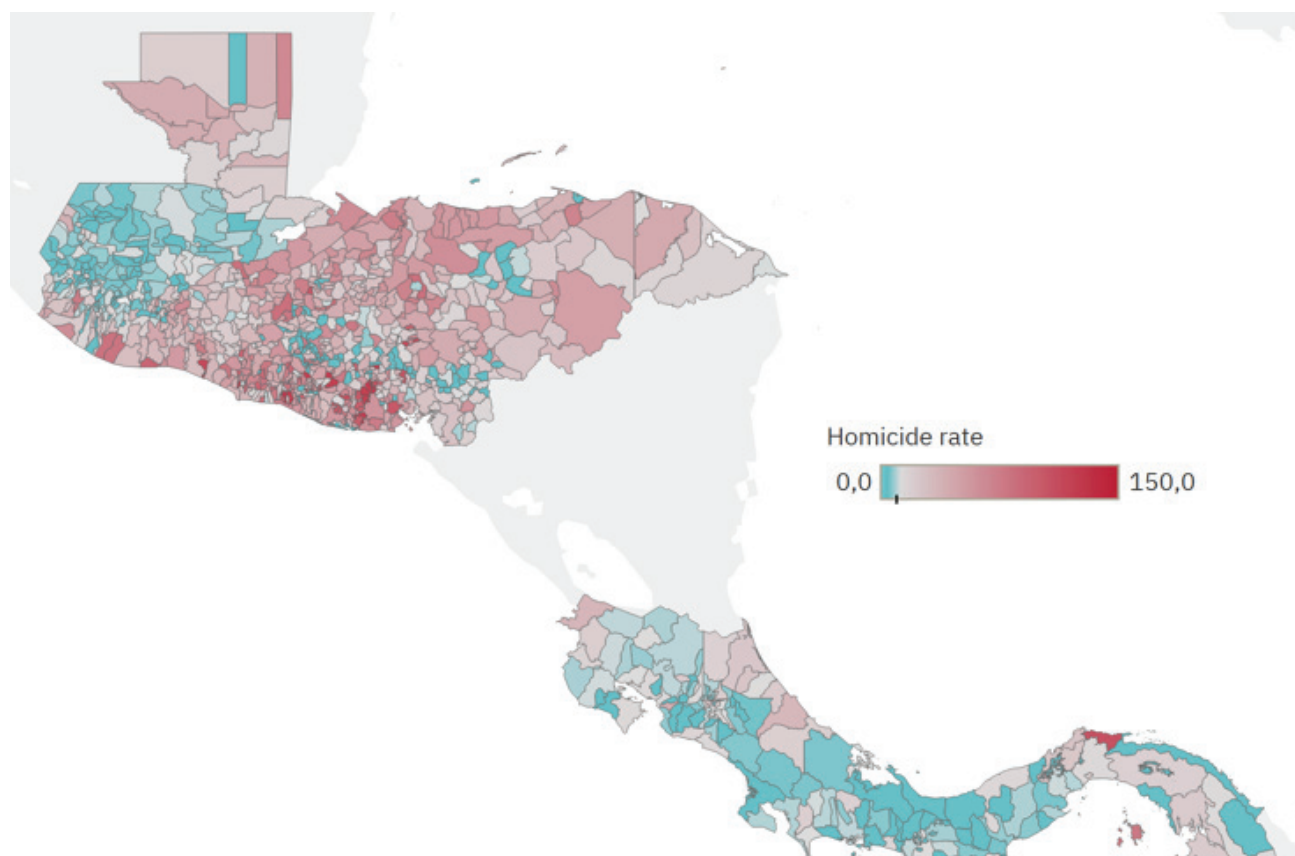


\* The color blue shows the number of municipalities with a low homicide rate (below 10 per 100,000 inhabitants).  
Source: Compiled by the author based on data from official sources of each country.

The territorial distribution of homicidal violence at the municipal level shows that the high rates are concentrated in the countries of the Northern Triangle (Honduras, El Salvador, and Guatemala) and particularly in the urban, border, and coastal zones, and are often lower in rural territories and ones where there is an indigenous population, such as is the case of the municipalities with a blue color in northwestern Guatemala in map 1. Additionally, the prov-

ince of Limón in Costa Rica (Atlantic coast zone) is one of the territories with very high rates, similar to those that exist in many municipalities in the north of the region. An in-depth examination will be made below of the territorial dynamics to better understand these phenomena through the application of various statistical tools. Additionally, the interviews allow a greater comprehension of the territorial distribution of homicidal violence in the region.

**Map 1: Homicide rate per 100,000 inhabitants, by municipality, 2017**



*Source: Compiled by the author based on data from official sources from each country.*

## 2 | TEMPORAL DYNAMICS OF HOMICIDAL VIOLENCE

The information available includes the homicide rates of each municipality over eight years, allowing a series of processes to be carried out in order to more fully understand the evolution over time of homicidal violence in each locality. This section presents some results that allow a detailed description of the observed variances. Additionally, it identifies and characterizes the cases that are of interest for this investigation because of their behavior during the period of study.<sup>7</sup> It also will analyze spatial clusters, which together with inputs from the interviews will allow a more in-depth understanding of the territorial dynamics in the region.

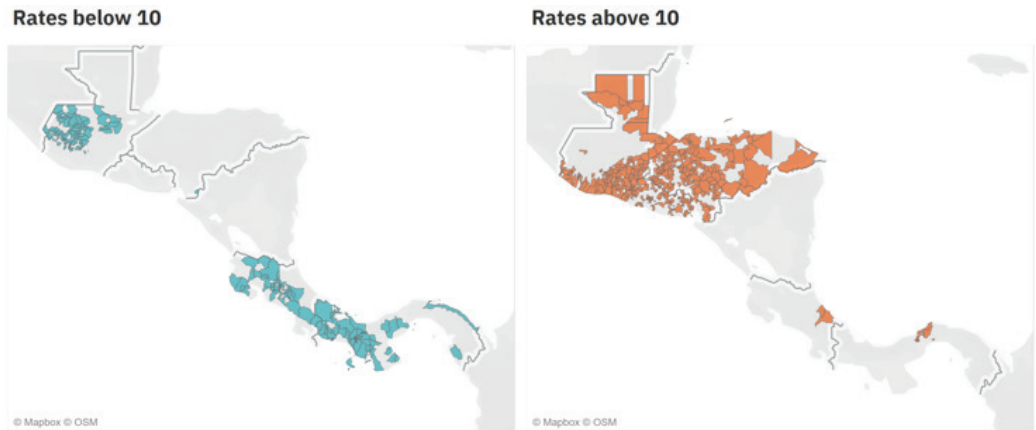
A first approach for understanding how homicidal violence evolves in each country comes from observing the variance and the average of the homicide rate over time. The variance allows the measurement of average annual changes in the rate of each municipality with respect to their arithmetic mean. Also, the average provides an idea of the level of homicidal violence that each territory suffered during the period studied. Thus, by combining both measures, it is possible to identify territories in both countries that tend to maintain the same circumstances over time, be

they low levels or high levels of violence (map 2).

Guatemala, Panama, and Costa Rica have areas with low levels of homicidal violence that are stable over time. In all cases, the majority of these municipalities are found in the center of each country (far from the coasts). The data also confirm the stability of the homicide rate that characterizes Guatemala; this will be described below using additional processing. Moreover, all the countries have municipalities with high homicide rates (more than 25 homicides per 100,000 inhabitants) and low volatility over time (a variance below the average of all the municipalities). Even though Honduras and El Salvador in general show a lot of volatility in their rates, they have many municipalities with homicidal violence that is stable over time. For its part, Guatemala has a broad concentration of territories with a high homicide rate in coastal and border areas. Finally, homicidal violence has been present in practically all of the territory of El Salvador and Honduras throughout the eight years studied. This is not the case in Guatemala, Panama, and Costa Rica, which have maintained zones of low violence during this period.



**Map 2: Municipalities with high or low homicidal violence that is stable over time,\* 2010-2017**



*\*This measures those municipalities with a standard deviation below the Central American average in all localities with a high/low homicide rate between 2010 and 2017.*

*Source: Compiled by the author based on data from official sources of each country.*

The task at hand was to characterize with greater detail these municipalities of interest. However, sociodemographic data at the municipal level are very scarce and have limits. Specifically, the timescales for these social indicators vary between countries. For this reason, these figures must be taken solely as showing a general picture of the characteristics of municipalities that tend to maintain low or high homicide rate levels.<sup>8</sup> Table 1 presents this information. This is only a preliminary exploration that seeks to highlight the potential this type of analysis could have if there were more information about this issue. The

table shows that the Central American municipalities with the most sustained homicidal violence over time have on average higher levels of poverty, greater human development, and greater population density than those with lower homicide rates. These data are contradictory and do not coincide with the findings of other studies about this issue. Additionally, the analysis for each country shows that the trends of these sociodemographic indicators vary. Some of these general behaviors will be examined more deeply below through use of the interviews.

**Table 1: Comparison of sociodemographic indicators<sup>9</sup> of municipalities with low or high violence that is stable over time\***

	Number of municipalities		Poverty		HDI		Density	
	Low violence	High violence	Low violence	High violence	Low violence	High violence	Low violence	High violence
Costa Rica	42	2	22.2	32.1	0.8	0.7	719	56.4
El Salvador	3	91	48.2	42	0.6	0.7	60.8	925
Guatemala	88	116	70	56.5	0.4	0.5	429.8	478.9
Honduras	1	156	71.6	71.5	0.6	0.6	175.2	106.7
Panama	36	3	4.5	15.3	0.6	0.8	62.2	2472.7
Overall total	170	368	52.9	58.8	0.57	0.61	415.4	445.4

\* The figures correspond to the average of each indicator for each group of municipalities. The years for the variables vary from country to country. The municipalities with low and high violence were selected based on the figures for all Central America and should be looked at in the context of the homicide levels for the entire region. The municipalities with low homicidal violence that was stable over time have an average homicide rate lower than 10 and a standard deviation below the average of the regional total during the period of study. Municipalities with high homicidal violence have average rates above 25 and a standard deviation below the regional average.

The figures for density and poverty were taken from the statistical institutes of each country. The HDI (Human Development Index) is from the UN Development Programme.

Source: Compiled by the author based on data from official sources of each country.

The analysis about the stability of the homicide rates over time also looked at municipalities that did not experience a killing over multiple years. All of the countries had some municipalities without homicides during the period studied. However, the proportion of these cases varies significantly between countries. While less than 20% of localities in Honduras, El Salvador, and Guatemala on average do not have these types of crimes on an annual basis, in Panama this figure is 42.5%. In an attempt to find explanatory factors for this study, municipalities that recorded zero killings over the space of multiple years were selected to be case studies. This type of territory exists in all the countries, making it a starting point for identifying possible factors associated with scenarios of zero homicidal violence<sup>10</sup> (table 2).

It is significant that the number of these localities is low. For example, the countries of the Northern Triangle never had more than 10% of their municipalities with zero homicides for more than six years between 2010 and 2017. And if the total population of these places is examined, the results are even less favorable. For example, Costa Rica and Panama, the two countries with the least homicidal violence, had less than 5% of their population living in localities with zero homicides for six or more years. In Honduras and El Salvador, this population represents less than 1% of the total. This shows that the phenomenon is confined to sparsely populated regions.

**Table 1: Comparison of sociodemographic indicators<sup>9</sup> of municipalities with low or high violence that is stable over time\***

	8 years	7 years	6 years	% of the municipalities**	% of the population***
<b>Costa Rica</b>	Valverde Vega, Hojancha	Acosta, San Mateo, Alvarado, Nandayure	Dota, Atenas, Zarcero	11.1	2.7
<b>El Salvador</b>	San Fernando, San José Las Flores, El Rosario	El Carrizal, Patonico, San Francisco Lempa, San José Cancasque, Gualococti, Nuevo Edén de San Juan	Azacualpa, San Antonio de la Cruz, San Isidro Labrador	4.6	0.4
<b>Guatemala</b>	Santa Catarina Barahona, Santa María Visitación, San Marcos La Laguna, San Juan La Laguna, Río Blanco	San José Chacayá, Santa Clara la Laguna, San Pablo La Laguna, San Francisco La Unión, Zunilito, Sibinal, Esquipulas Palo Gordo, San Rafael Independencia, San Juan Atitán, Patzité	Magdalena Milpas Altas, San Antonio Aguas Calientes, San José Poaquil, Santa Cruz Balanyá, Santa Catarina Palapó, San Pedro La Laguna, San Andrés Xecul, Santa Lucía La Reforma, San Bartolo, Sibilia, Cabricán, Zunil, San Antonio Sacatepéquez, San Gaspar Ixchil, El Chol	9.0	2.4
<b>Honduras</b>	None	Humuya	Potrerillos, San Matías, Vado Ancho, Lauterique	1.7	0.2
<b>Panama*</b>	No data	Remedios, Sambú, Pocrí, Kankintú, Nole Duima, Ñurum, Taboga, Río de Jesús	Gualaca, Cémaco, Los Pozos, Kuna Yala, Balboa, Santa Fe	18.6	4.7

\* In the case of Panama, there are only data beginning in 2011.

\*\* Percentage of the total of municipalities that have had zero homicides for six or more years.

\*\*\* Percentage of the approximate total of the population that has lived in municipalities with zero homicides for six or more years. For this table, the population data is from 2016.

Source: Compiled by the author based on data from official sources of each country.

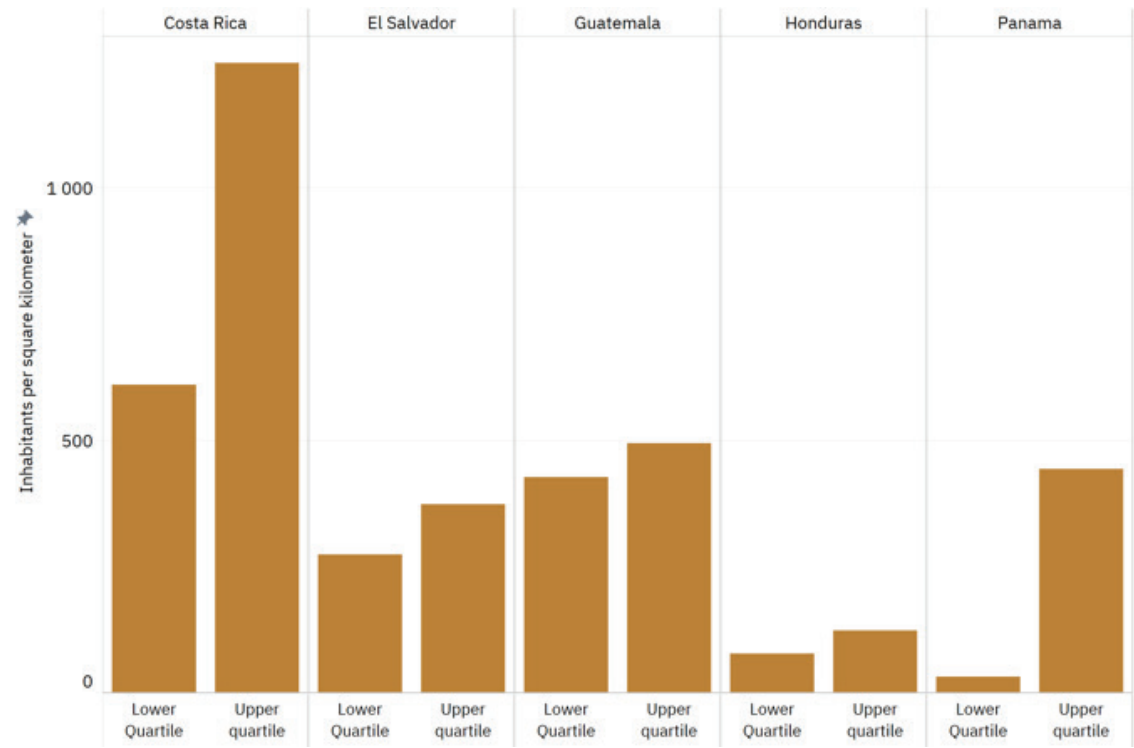
Although it is difficult to know exactly why there is zero homicidal violence in some municipalities, the interviews provide factors that are present in the majority of these localities. Many of those interviewed said these municipalities are in remote areas with very cohesive communities where crime does not have an economic foothold. These are often rural areas with small populations where people know their neighbors. The following was said during the León and Carrera interview about the characteristics of some of the more peaceful municipalities in Guatemala: "It is the social fabric that exists in these municipalities; normally they are municipalities with a large indigenous presence where a different kind of relationship takes place, even a different justice. Similarly, there are non-indigenous municipalities that have cohesion and are organized."<sup>11</sup>

The interviews conducted in Honduras backed some of the arguments mentioned in the previous paragraph. This shows how Honduran localities with low homicidal violence are associated with being in poor zones, isolated, sparsely populated, and having strong mechanisms of social integration related to daily coexistence and the use of public spaces;<sup>12</sup> however, they also are associated with

territories having little state institutional presence where organized crime actors have developed alliances with the local population. Also, rural zones with low homicide rates do have manifestations of violence against women, young people, and children, as well as high rates of sexual crimes.<sup>13</sup> A deeper look will be taken below at some of the statements made in the interviews.

These arguments also were a recurrent theme in the interviews conducted in the rest of the countries. For this reason, a more in-depth analysis is needed to better understand the relationship between homicidal violence and population density. In graph 3, the quartiles below and above the homicide rate are shown for each country and the density of each municipality is seen in the vertical axis. There is a generalized tendency in every country for the peaceful localities to be less urban, confirming what was said in the interviews. However, this is a simple comparison of averages where high levels of population density in the big cities, which are very violent in all the countries, are an important corollary. Thus, it is important to gather new data to deepen the study of these issues in future research.

**Graph 3: Average population density of the municipalities in the quartiles below and above the homicide rate, by country, 2017\***



Source: Compiled by the author based on data from official sources of each country.

An additional approach for studying how homicidal violence evolves in each country is to measure the year-on-year variation of homicides in the territories. That is, it is worth assessing to what extent homicidal violence is spatially displaced over time. For this the Pearson correlation<sup>14</sup> was estimated for each country for each consecutive pair of years. This shows the extent to which homicide rates at the municipal level vary from one year to another. High correlation coefficients indicated that the municipalities with high or low homicidal violence maintain such characteristics from one year to another. This does not mean that high correlations show that violence has not increased or decreased; they only reflect that the distribution of the violence in the territory of a country is similar to that of the previous year.

The analysis shows that El Salvador and Honduras present, between 2010 and 2017, correlation coefficients

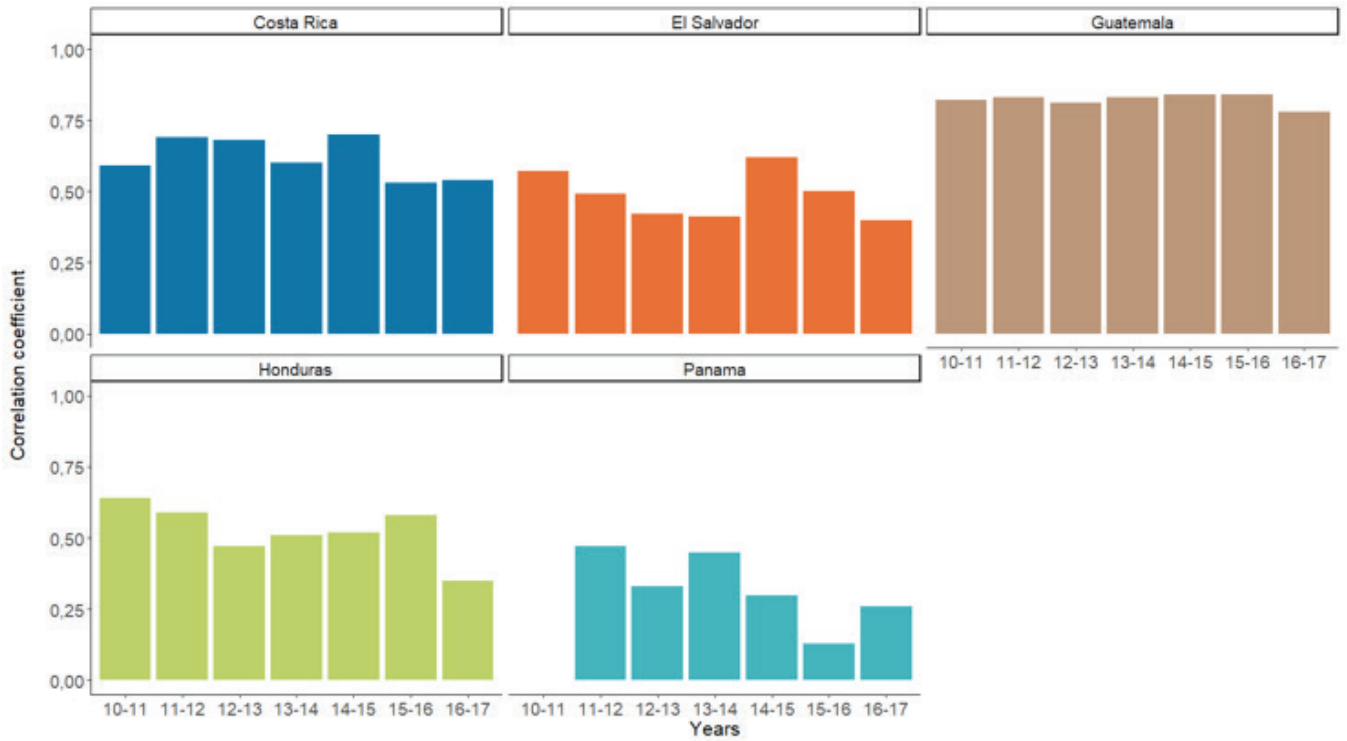
close to 0.5 (graph 4). That is, they have moderate correlations, which reflect slight variations in homicide levels from one year to another. Costa Rica, with an average correlation of 0.62, and Guatemala with 0.82 show more temporal stability in the violence levels of their municipalities. The case of Guatemala shows a significantly high stability in homicidal violence by municipality. This coincides with the observation made previously about the permanence over time of low homicide rates in the northwestern highlands of this country. On the other hand, Panama had a correlation coefficient of 0.32 over the period. This is an indicator that the killings in this country are not limited to specific territories but rather that where they occurred has varied over the years.

Limiting these estimates is that the number of municipalities, as well as their size and the average number of inhabitants, vary inside a country and between countries.

Panama, for example, has the smallest number of municipalities (76) in the region, which could be associated with its low correlation coefficients. On the other hand, El Salvador has, on average, the smallest municipalities in terms of area (80 km<sup>2</sup>) and the least populated ones (24,888

inhabitants) in the region. This could explain some of the volatility observed in its homicide rates. For these reasons, another exercise, as seen below, was conducted to go into greater depth about homicidal violence's evolution over time.

**Graph 4: Correlation coefficients of the homicide rates by municipality, 2010-2017**



Source: Compiled by the author based on data from official sources of each country.

Up to this point the analysis has consisted of a description of the behavior at the spatial and temporal levels of homicidal violence. While various characteristics of each country have been identified that allow possible factors associated with these behaviors to be addressed, these elements are not validated by statistical criteria that allow

a rigorous identification of zones with significantly high homicidal violence. For this reason, this phenomenon will be addressed below using spatial cluster analysis, which allows a deeper examination of some of the findings that have been identified to this point.

# 3 | ANALYSIS OF SPATIAL CLUSTERS AND FACTORS ASSOCIATED WITH HOMICIDAL VIOLENCE

The recent specialized literature has addressed the issue of crime in Central America and other regions through spatial cluster analysis.<sup>15</sup> This study broadens these analyses by using data for more countries over a greater period of time. These tools were used to analyze populations with specific demographic characteristics, as will be seen below. The interviews that were conducted will be referred to throughout the text, providing a greater depth of possible explanations for the phenomena described.

This work uses spatial cluster and spatial outlier analysis (Anselin Local Moran's I). The advantage of this technique is that it can identify, using statistical criteria, the level of significance of spatial patterns. Specifically, the analysis allows the calculation of a Local Moran's I, a Z score, and type of cluster for each entity (municipality). This means it is possible to identify and characterize groupings of localities according to their and neighboring municipalities' homicide rate levels. When there is a pattern with sufficient evidence to rule out that it is a product of randomness, a cluster is identified as significant and classified in accordance with the categories described in the next paragraph.<sup>16</sup>

This study identifies five types of violence in municipalities: those with high levels of violence and that are surrounded by municipalities with high violence (dark red, labeled as high-high in the maps); those with high rates but that are surrounded by localities with lower values (light red labeled as high-low on the maps); those that have low homicidal violence and have neighbors with equally low indicators of homicides (dark blue, labeled as low-low on the maps); municipalities with low violence and that are ringed by localities with high homicidal violence (light blue, labeled as low-high on the maps); and those that do not have a significant pattern and thus cannot be classified in one of the previous categories (white).

It is also possible to calculate the Global Moran's I indicator. This analysis can show whether there is enough evidence to determine if a country has homicide rate distributions that fit geographic patterns that could benefit from the spatial analysis employed in this article. A positive and significant factor for this indicator is for localities with low or high homicide rates to be spatially separated in clusters with similar levels of violence. If a country has a random pattern in its distribution of localities with high or low homicide rates, the indicator will be near zero and will not be significant. This analysis provides a reliable criterion for defining whether relevant geographic factors exist so that the distribution of homicidal violence in a determined territory can be understood.<sup>17</sup>

It is necessary to clarify that the analysis was done separately for each country; if the region were examined in its totality, the clusters would not allow the identification of differences inside each country. This means that the groupings must be interpreted in relation with the average homicide rates in each country and that levels of homicidal violence between countries should not be compared.

A first finding is that, with the exception of Costa Rica, all the countries have, in all years, a positive and significant Global Moran's I indicator. That is, there is sufficient statistical evidence to affirm that municipalities with high or low homicidal violence in each country tend to group themselves in agglomerations of localities with similar homicide rate levels. A detailed analysis will be presented below.

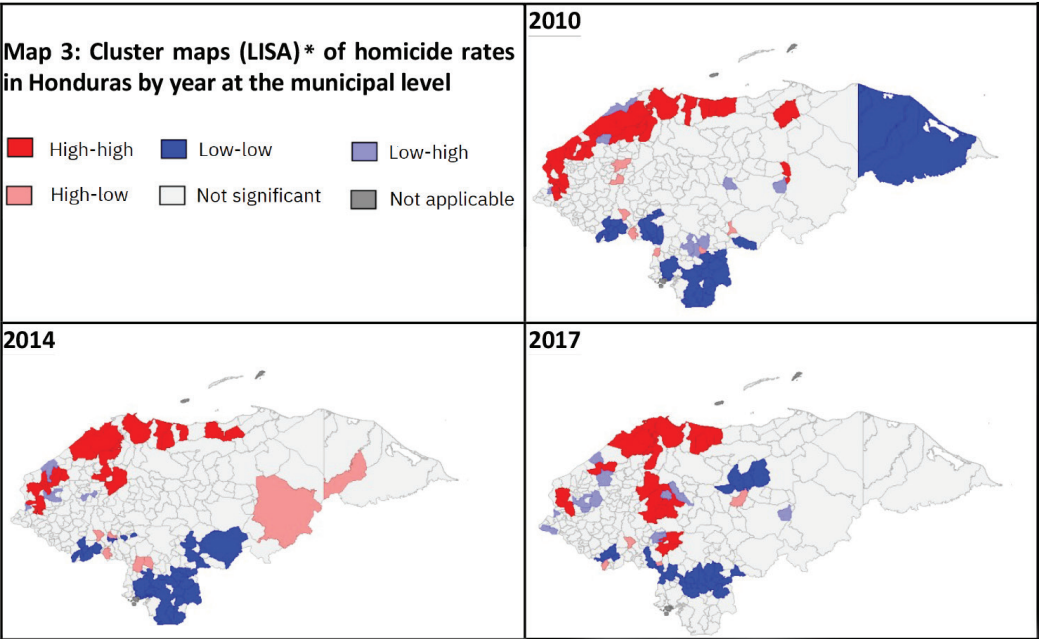
Honduras has demonstrated stability in its main clusters of homicidal violence (map 3). Over the years it has maintained a grouping of municipalities with high rates around San Pedro Sula. This cluster extends to most of the northeastern border with Guatemala. However, recently this pattern appears to have varied, as fewer territories with

high levels of homicide rates are now seen in this zone. Also, in 2017, a new cluster of high homicidal violence emerged in the department of Comayagua in the center of the country. Also, it is significant that there has been stability in a cluster of low homicidal violence in the area where the departments of Choluteca, Francisco Morazán, and El Paraíso meet in the south of the country. A significant aspect is that the two cities with the greatest number of killings in Honduras (San Pedro Sula and Tegucigalpa) present different situations: While San Pedro Sula is inside a high-violence cluster, Tegucigalpa is in a zone that does not have a statistically significant spatial pattern for homicide rates. This to say that despite the high homicide rates in this city, the adjacent areas present variable levels of homicidal violence.

In terms of the violence in Honduras's big cities, it is important to refer to what was said in the interviews. Interviewees said that in some urban zones, such as the Pedregal sector in Tegucigalpa or Villafranca where criminal actors tied to drug trafficking, drug peddling, gangs, and extortion have a strong presence and operations, homicide

rates are low. This is associated with the level of territorial control by organized crime; in some cases even the police cannot enter, and bodies of victims of gang confrontations are disappeared to avoid having “red numbers” that could alert authorities and justify an intervention.<sup>18</sup>

Moreover, the interviews in Honduras help provide a greater understanding of some of the changes observed over time. The prioritization of certain territories by the police, the military, and public policies is a factor directly associated with the reduction in homicide rates. However, some of those interviewed say this improvement is relative because it is associated with a temporary displacement (accommodation) of the gangs and the drug traffickers that probably signifies that there will be a deterioration in other territories and that the groups will return once the presence and control of the state is reduced.<sup>19</sup> Similar dynamics in other countries will be highlighted further below, helping account for the spatial and temporal evolution of homicidal violence.



\* LISA: Local Indicators of Spatial Association. The category “not applicable” refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing. At the beginning of this section, there is an explanation of all categories shown on the maps.

Source: Compiled by the author based on data from official sources of each country.

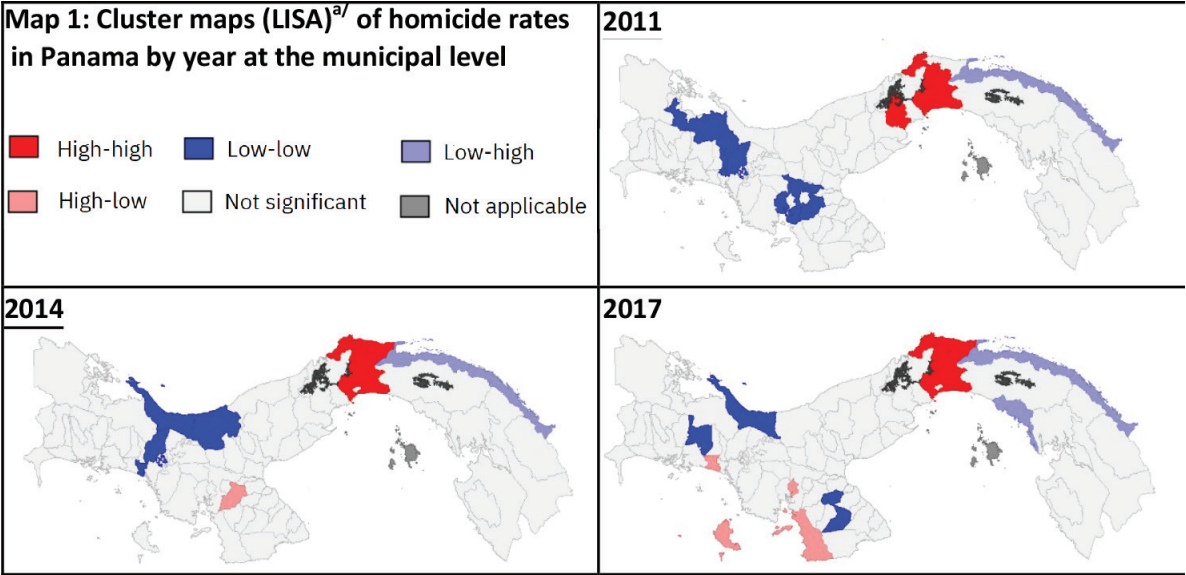


The maps of Panama show a territory with few stable clusters over time (map 4). This is in keeping with the results obtained in the section where the intertemporal correlations of homicide rates at the municipal level were analyzed. The exception is the grouping of municipalities east of Panama City that have a high homicidal violence that is stable over time. It is important to point out that in the west of the country, various clusters with low homicide rates have emerged over time. Standing out among them, in 2014 and 2017, is a grouping to the north of the Comarca Ngöbe-Buglé.

In the case of Panama, the interviews allowed the identification of various elements connected with some of the dynamics of homicidal violence detailed earlier. People interviewed said the volatility of the rates observed in the territories is an important element. The interviews showed that these variations result from displacements of criminal violence.<sup>20</sup> Those interviewed said these displacements have taken place, above all, in Panama province, where the

development of the center of the city has displaced people to sectors of the periphery with little institutional presence. This could also be related to the fact that many actions by authorities do not have a territorial focus; as a result, specific factors associated with violence in each locality are not addressed.<sup>21</sup> These movements of homicidal violence could account for the focal points of violence that have emerged both to the east as well as to the west of the department of Panama.

The interviews also emphasize that another distinctive element of homicidal violence in Panama is that an important proportion of the violence does not result from factors related to organized crime and drug trafficking. Those interviews suggested that one component of crime stems from challenges involving citizen coexistence. Part of this phenomenon results from the incapability of judicial institutions to adequately remedy demands for justice and conflicts involving coexistence in society.<sup>22</sup>



a/ LISA: Local Indicators of Spatial Association. The category “not applicable” refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing. At the beginning of this section, there is an explanation of all categories shown on the maps.

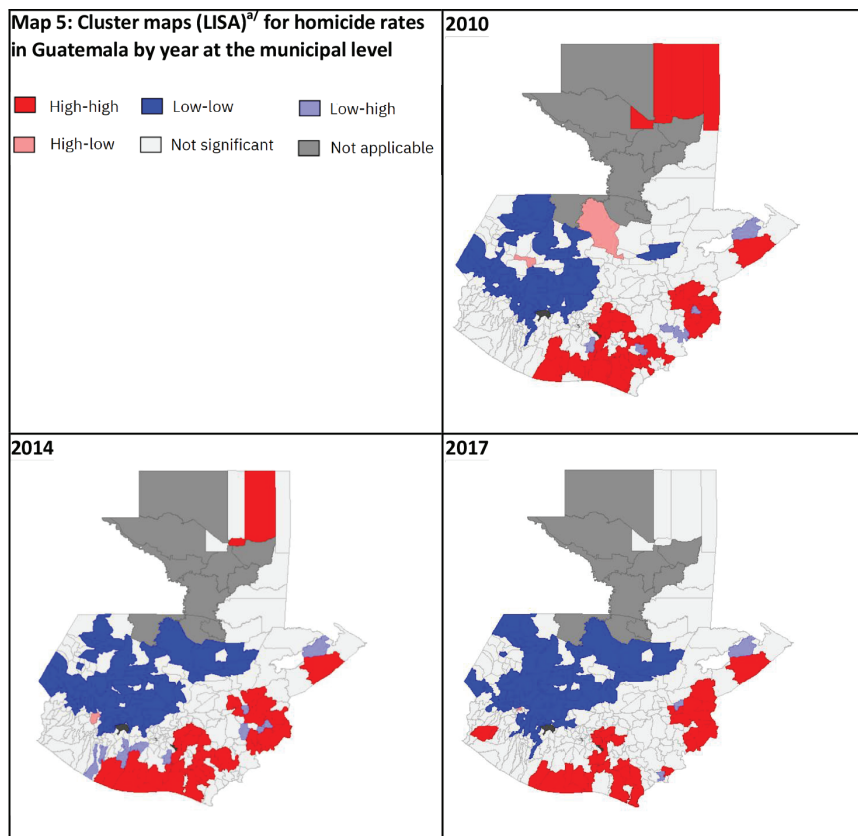
Source: Compiled by the author based on data from official sources of each country.

The case that presents the most consolidated groupings is Guatemala (map 5), where the value of the Global Moran's I indicator is the closest to 1 in the region in all years. This reflects what was previously said about the high stability over time of Guatemalan municipalities' homicide rates. This consistency can be associated with a territorial separation between peaceful localities and places with greater homicidal violence; this separation makes it very complicated for there to be positive or negative changes in the municipalities of each cluster from one year to the next. Specifically, the zones with low homicide rates are concentrated in the northwestern plateau. In contrast, to the south and southeast of the country, there are municipalities with constantly high homicidal violence. Note that many of these homicides occur at the border with Honduras, and that this area also has clusters of high rates of killings. For example, in the north of the country, specifically in the department of Petén, there also are groups of localities with high violence.<sup>23</sup> In some of these municipalities, the analysis does not deliver results because of the limited number of "neighbors" these localities have.

The interviews put forward arguments that make it possible to understand these strong territorial patterns. Emphasis is again placed on the presence of criminal gangs in localities with high homicidal violence. A number of important elements explain the presence of these organizations. Some municipalities function as drug-trafficking corridors, which is why they are commonly found on borders or coasts.<sup>24</sup> This explains the clusters with high homi-

cide rates seen in the south and east of the country. This is also seen in the north, in Petén, where there are various municipalities with high homicidal violence; these municipalities border Mexico.

With respect to the phenomenon of the rise in violence in Guatemala between 2000 and 2008, the interviews emphasized the existence of institutional vacuums in the country after the Peace Accords as an important factor. New groups of criminals developed during this time. Some of these gangs go back to the times of war. The people interviewed said the later reduction in homicidal violence is connected with new crime-fighting legislation and its consequent embodiment in institutions with greater capacities for combating homicidal violence. This indicates that institutional coordination strategies have been implemented for investigating and combating crime. Also, legislation has been carried out that allows judicial structures to have more effective tools to combat organized crime. Such assessments recognize success in the public policies that have been executed, a trait that was not spoken about in the interviews in other countries. However, some of those interviewed emphasized that the reasons for the drop in crime are not at all clear.<sup>25</sup> They said this could have resulted from changes in the ways in which criminal gangs operate, which could mean that the decline is not a product of government action.



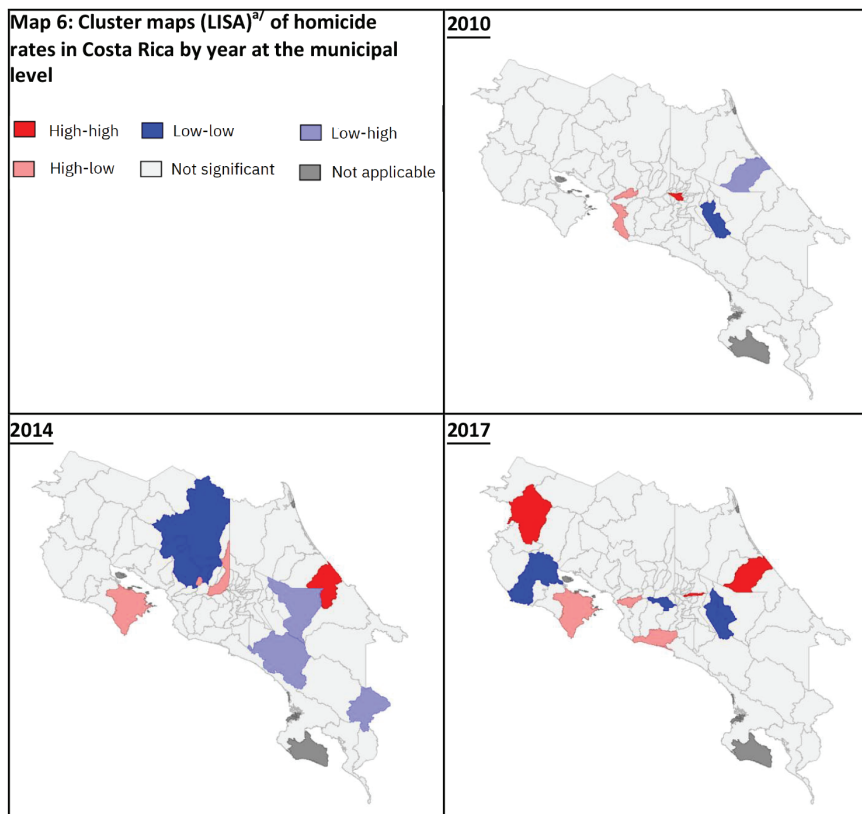
a/ LISA: Local Indicators of Spatial Association The category “not applicable” refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing. At the beginning of this section, there is an explanation of all categories shown on the maps.

Source: Compiled by the author based on data from official sources of each country.

Costa Rica is the only country that does not show a significant global pattern of territorial distribution of homicidal violence over time (map 6). Nevertheless, it is possible to identify important trends at the local level. In Limón province particularly, various municipalities repeatedly stand out as having high homicidal violence. Additionally, in recent years, the presence of high violence in cities on the Pacific coast has been evident; this also has been observed in recent research about the issue.

These findings have been confirmed by specific research about homicidal violence in Costa Rica. Beginning with the *Tercer Informe Estado de la Región*,<sup>26</sup> the presence of zones of high homicidal violence has been observed in Limón; these have been connected with drug trafficking. More recently, Sánchez<sup>27</sup> confirmed this reality

and also described the rise of this phenomenon on the Pacific coast. Furthermore, the cluster analysis for Costa Rica is in keeping with Sánchez in that the greater part of the territory of this country does not show significant agglomerations of homicidal violence.<sup>28</sup> The availability of data in Costa Rica allowed Sanchez to identify, through an econometric model, factors associated with homicide rates. The results for the most part coincided with those identified by similar research. Thus, factors such as levels of poverty, unemployment, and migrant population are positively related with homicidal violence. On the other hand, years of schooling are negatively related. In contrast to what was said in the previous section, the study finds that variable density does not have a connection with homicide rates in Costa Rica.



a/ LISA: Local Indicators of Spatial Association The category “not applicable” refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing. At the beginning of this section, there is an explanation of all categories shown on the maps.

Source: Compiled by the author based on data from official sources of each country.

Finally, El Salvador presents an atypical pattern (map 7). This is because it shows two characteristics that are not seen simultaneously in the other countries. First, there is instability in the location of the clusters of high and low homicidal violence. At the same time, these clusters are distributed all over its territory. Another important element is that violence in El Salvador appears to have been displaced toward the east, where there is less population, which also is an atypical characteristic in the region. This behavior was previously recognized in a study of El Salvador involving the years 2010-2015.<sup>29</sup>

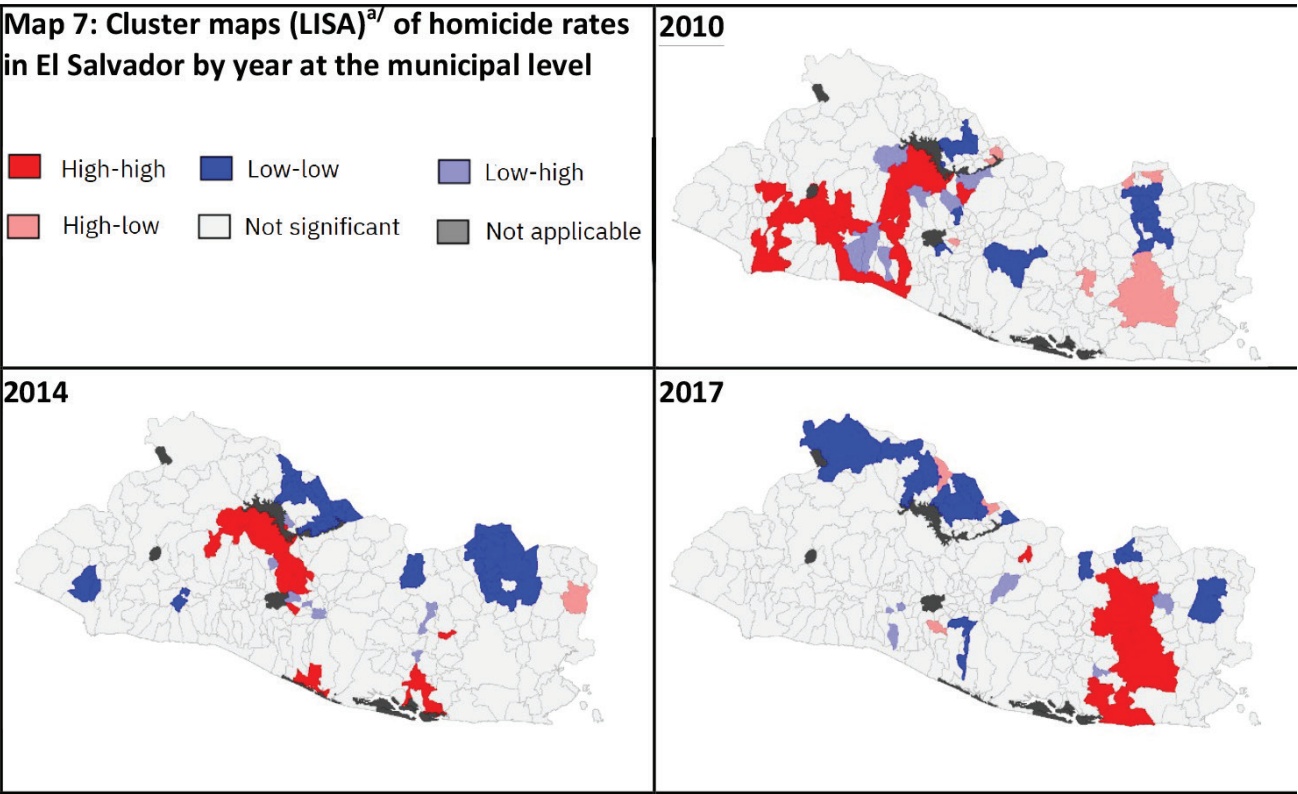
The interviews shed light on various elements that aid in the understanding of the high volatility in El Salvador.

For example, iron-fisted police strategies have had positive results in certain territories. Nevertheless, once these strategies are halted or moved elsewhere, the levels of violence increase again. One important aspect addressed by the people interviewed and that was mentioned earlier is Salvadoran municipalities' limited size in terms of area and their smaller populations. This characteristic helps explain some of the abrupt variations in homicide rates because just one new homicide in localities with a lower number of inhabitants can significantly increase the rate. On the other hand, there is the phenomenon where some localities are used as operations centers to commit crimes in neighboring places; this can mean that the number of homicides

reported in some places can overestimate the real levels of violence. It is important to highlight that these phenomena probably also occur in the other countries. Nevertheless, those interviewed in El Salvador gave importance to this aspect.<sup>31</sup>

Finally, the interviews in El Salvador show some differences with respect to what was said in Panama and Guatemala. One of the principal differences with other coun-

tries is that in El Salvador, homicidal violence is present both in rural and urban areas.<sup>32</sup> Indeed, those interviewed explained that this follows the reconfiguration of homicidal violence described in the preceding paragraph, a change that took place, in large part, in response to government action. Thus, many gangs found refuge from tough police action in areas away from the cities.



a/ LISA: Local Indicators of Spatial Association. The category “not applicable” refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing. At the beginning of this section, there is an explanation of all categories shown on the maps.

Source: Compiled by the author based on data from official sources of each country.

# 4 | CHARACTERISTICS OF HOMICIDE VICTIMS

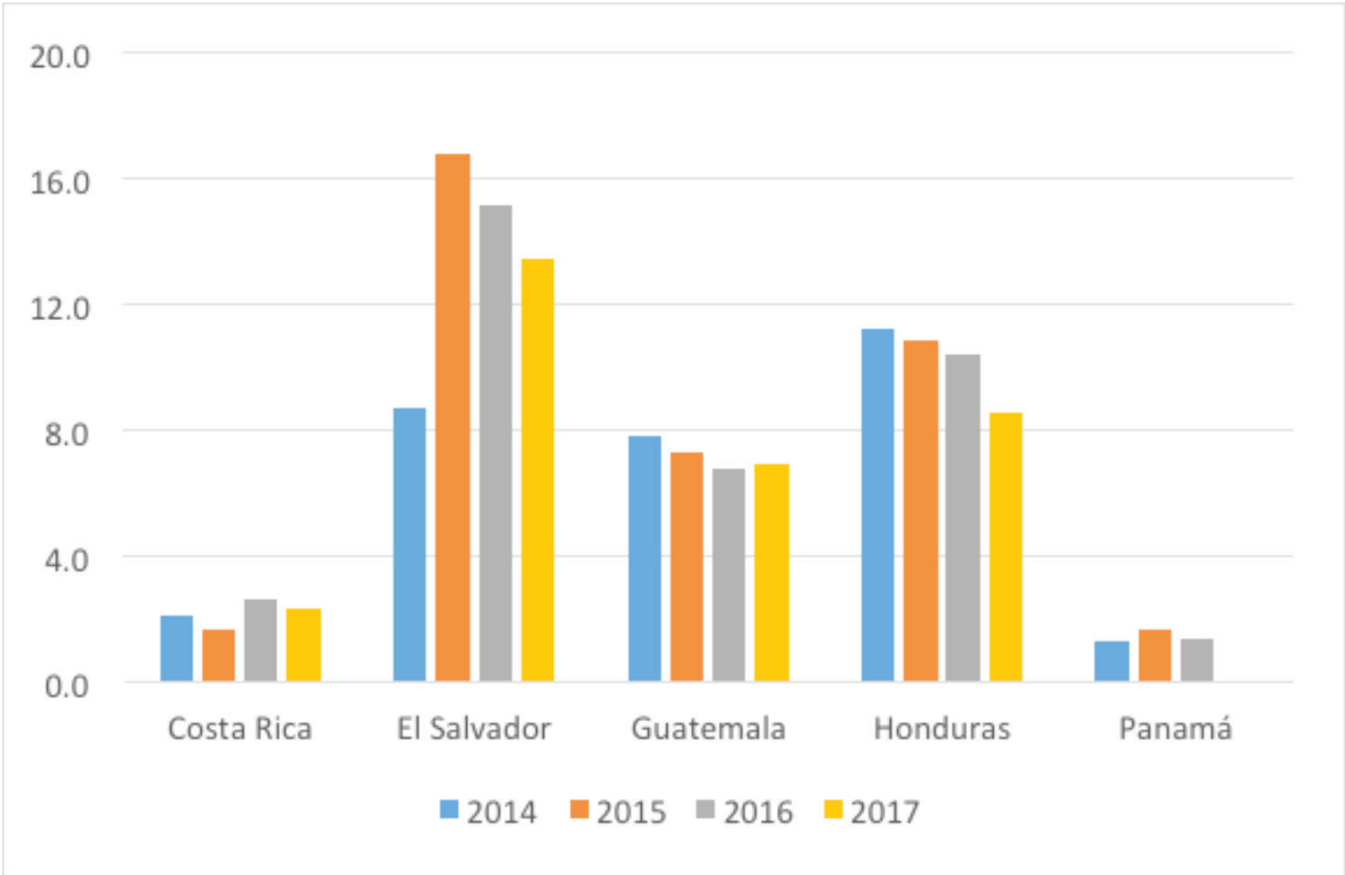
This study seeks to broaden knowledge about homicidal violence against specific populations at the municipal level. But the data for these cases are scarce and have inaccuracies. This means that the data is for a shorter time-frame than that covered by the homicide data. In some countries no information exists about the victims in a percentage of killings, and there are discrepancies between the data of various institutions (see the last two sections of this document). Nevertheless, these are official figures, and what information that has been gathered can expand the description of homicidal violence among certain populations, following lines of research outlined by Ingram and Curtis. These authors have developed a series of studies about the utilization of cluster analysis to describe homicidal violence on specific populations. This work seeks to broaden and contribute to this agenda.

A first area of analysis is that of homicides of women. Because information about femicides does not exist at the subnational level, in the following paragraphs this study will use homicides of women as a proxy. This variable does not discriminate between killings where the victim was killed because she was female and those where she was killed for other reasons. Despite this limitation, this data is a tool for taking a first approach to this type of crime. A detailed analysis of each country shows a slight downward trend in the rates in recent years. This is particularly notable in El Salvador, Guatemala, and Honduras (graph 5). Nevertheless, El Salvador continues to be the country with most

elevated figures in the region (13.5 homicides of women per 100,000 inhabitants). On the other hand, countries such as Panama and Costa Rica have had volatile rates in recent years, which shows that the problem continues in these countries. It is important to highlight that this evolution takes place in a context where, in the majority of countries, homicide rates are tending downward. These data show that all of the countries of the region face important challenges when it comes to violence against women.

A number of people interviewed provided valuable input that underlines the challenges and problems for reducing violence against women. In Panama, the relatively small numbers of femicides impede understanding about the seriousness of the problem of domestic violence against women. The people interviewed say this is even more worrisome because there is no public policy to reduce this type of violence against women. Those interviewed also said that information about violence against women is not always captured by authorities. In Honduras, where there is a trend toward an increase in disappeared women, it is significant that the a majority of reports of violence against women come from the cities; this could be associated with problems involving data collection and reporting of these crimes. Also, this comes in a context in which the authorities do not have a public policy to deal with the particular characteristics of this type of violence. As can be seen, countries still have notable vacuums in knowledge and policy about this kind of crime.

**Graph 5: Homicide rates against women (per 100,000 women), 2014-2017**



Source: Compiled by the author based on data from official sources of each country. El Salvador and Guatemala InfoSegura, based on official sources.

To deepen understanding about violence against woman, the analysis of geographical clusters realized earlier was replicated, but only for homicide rates against women (map 8). A first finding is that, contrary to what occurred with homicidal violence in general, when only the killings of women are examined, the global indicators of spatial autocorrelation are only significant in Guatemala. Thus, in this type of violence, there are no global spatial patterns (general for each country) that help explain the distribution of these crimes. It should be pointed out that this does not exclude the existence of significant local patterns that allow the identification of municipalities located in clusters

of interest.

In the case of Guatemala, the pattern identified earlier is repeated (map 5). Specifically, in the south and east of the country, municipalities characterized by high homicidal violence against women clump together. In contrast, in the northwest of the country there is a zone that presents low homicide rates against women. While this pattern is significant, these clusters cover fewer areas than those observed by examining homicidal violence in general.

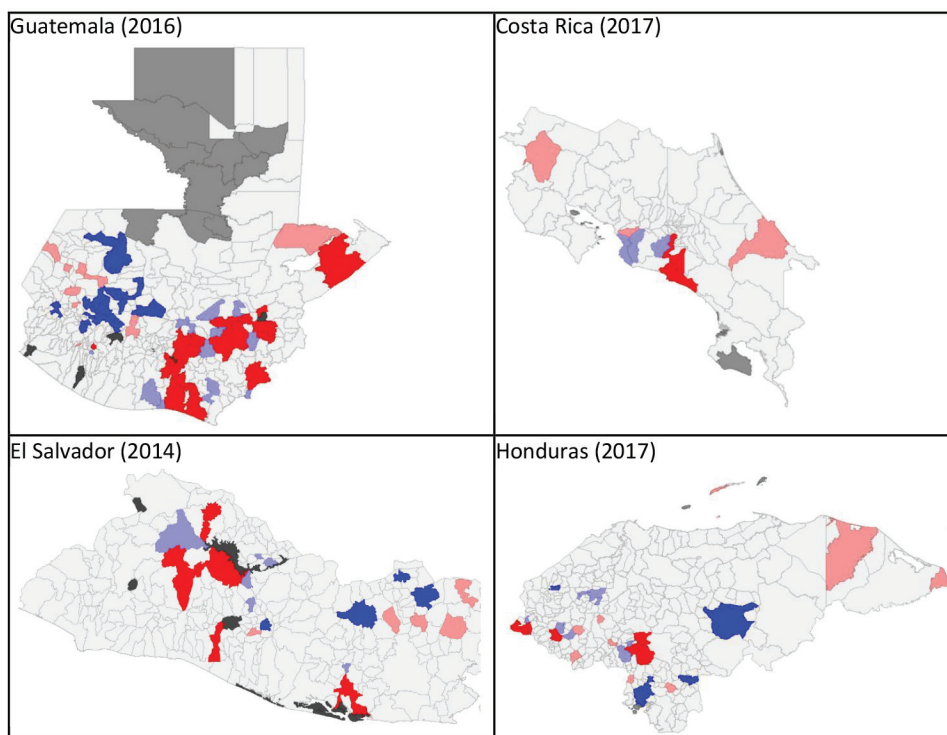
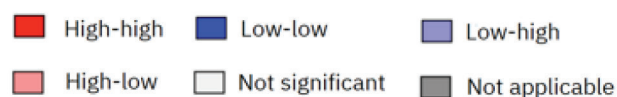
In the rest of the countries a clear relation is not seen between the patterns observed in the case of women and those studied for homicides in general. It is only possible



to identify some characteristics for future study. In Costa Rica, there is a continuation of a trend where high levels of violence are concentrated on the coasts. In El Salvador, a cluster of high violence is repeated to the north of San Salvador, specifically in the north of the departments of

Cuscatlán, San Salvador, and La Libertad. Finally, it is significant that the cluster of high homicidal violence against both sexes that was seen over time in the zone of San Pedro Sula in Honduras disappears.

**Map 8: Cluster maps (LISA)a/ of homicide rates against women at the municipal level\***



\* This shows the most recent year for which there was available data for each country. In the case of Panama it was not possible to access figures disaggregated at the municipal level. The category "not applicable" refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing. At the beginning of the previous section, there is an explanation of all categories shown on the maps.

Source: Compiled by the author based on data from official sources of each country.

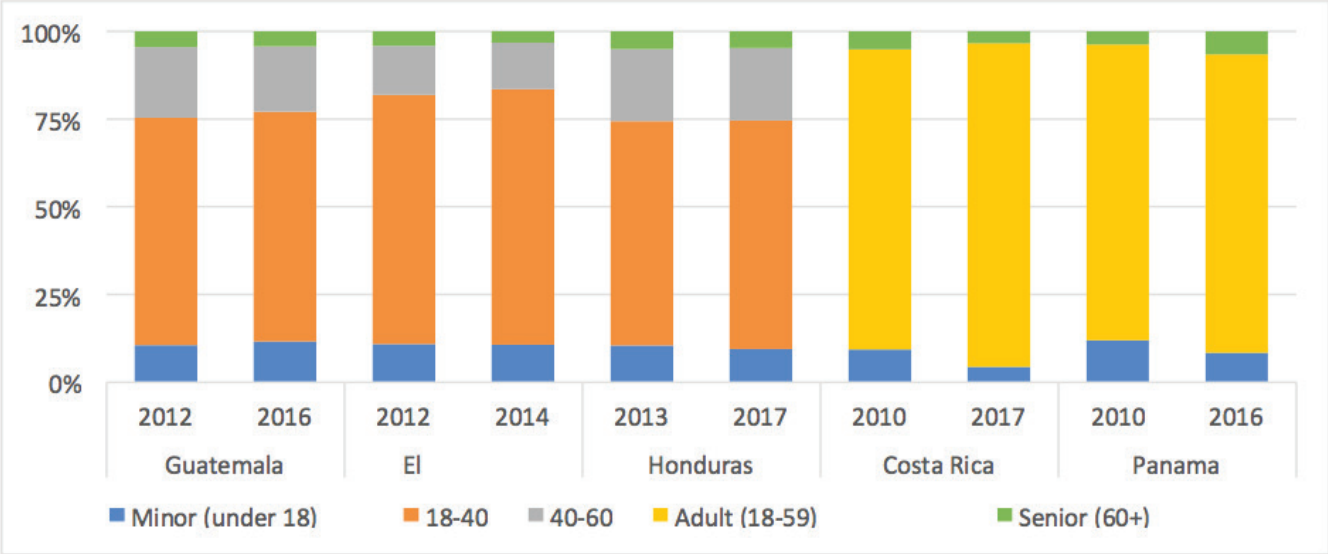


A second analysis of the characteristics of the victims centers on age. In this case, again, the availability of information complicates the implementation of specific analyses. Furthermore, there are additional limitations because the countries do not report specific ages of the victims; also, the different age intervals used by the organizations gathering data in each country make it difficult for there to be uniformity and comparability when the data is processed (see the methodological annex). Nevertheless, this does not stop specific analyses from being made for each country. First, there is the conclusion a number of earlier studies arrived at: The principal victims of homicides are young people. Graph 6 shows that the norm in all the countries is that close to 10% of homicides are committed against minors. Also, the majority of those killed are young adults. While the data do not allow the exploration of this cohort in every country, it can be seen that adults under

30 are the greatest target for homicides. For example, in El Salvador between 2012 and 2014, 48% of homicide victims were between 18 and 30. In Honduras between 2015 and 2017, 29% of the victims were between 22 and 29 and in Guatemala in 2016 the same age range represented 28% of victims. This is a clear characteristic of homicidal violence in the region; for this reason, it is important to identify its territorial distribution. A first characteristic is that in this case (contrary to the homicides of women) global significance tests show that there is a pattern of spatial autocorrelation. This is expected, given that homicides against young people represent a high percentage of total killings. The clear pattern of spatial autocorrelation seen in the homicide total is in part a result of the distribution of crimes against young people (map 9).

The data show that in Guatemala, the characteristics described in previous sections are repeated. This confirms

**Map 8: Cluster maps (LISA)\* of homicide rates against women at the municipal level\***



\* The most recent and oldest year for which data were available. Not all the countries have the same age intervals because the categorization by the sources did not allow the generation of uniform groupings.

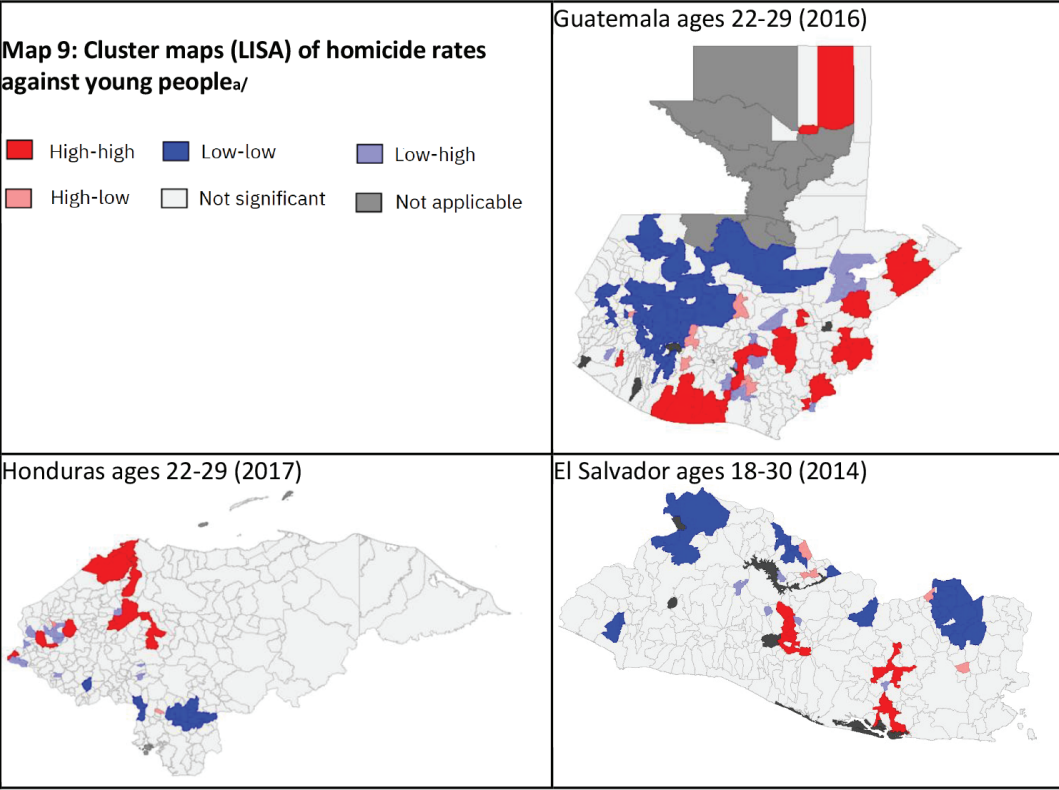
Source: Compiled by the author based on data from official sources of each country.

that homicidal violence in the country has a marked and stable territorial pattern over time. It is significant that these characteristics show few variations even when the killings of populations with specific demographic characteristics are studied. These data provide important inputs for developing security policies in Guatemala.

In Honduras, two clusters seen earlier in the general analysis repeat to a lesser extent. One is a grouping of municipalities with high violence in the northwest, in the zone of San Pedro Sula. The other is a cluster to the south of the country, in municipalities to the south of Tegucigalpa at the intersection of the departments of Francisco Morazán, Choluteca, and El Paraíso. Still, it is significant that there are fewer significant clusters in comparison with the

general analysis. In particular, it stands out that in the case of homicides against young people, in 2017 the grouping observed previously in the department of Comayagua is not seen.

Finally, the analysis of killings of young people in El Salvador confirms the country's high volatility of homicidal violence. The clusters of homicides perpetrated against young people do not coincide with those observed in the case of women nor in the general pattern of homicidal violence. This, added to the high volatility over time described previously, demonstrates that homicidal violence in El Salvador is the least predictable in the region, as it does not follow specific temporal patterns and shows variations depending on the characteristics of the victims.



<sup>a/</sup> The most recent year in which data was available for each country was used. The countries do not report the specific ages of the victims, and as a result it is not always possible to utilize uniform age ranges. The category "not applicable" refers to those areas that, due to their geographic location, do not have enough neighbors to make it possible to do the statistical processing.

At the beginning of the previous section, there is an explanation of all categories shown on the maps.

Source: Compiled by the author based on data from official sources of each country.

# 5 | WEAPONS USED IN HOMICIDES

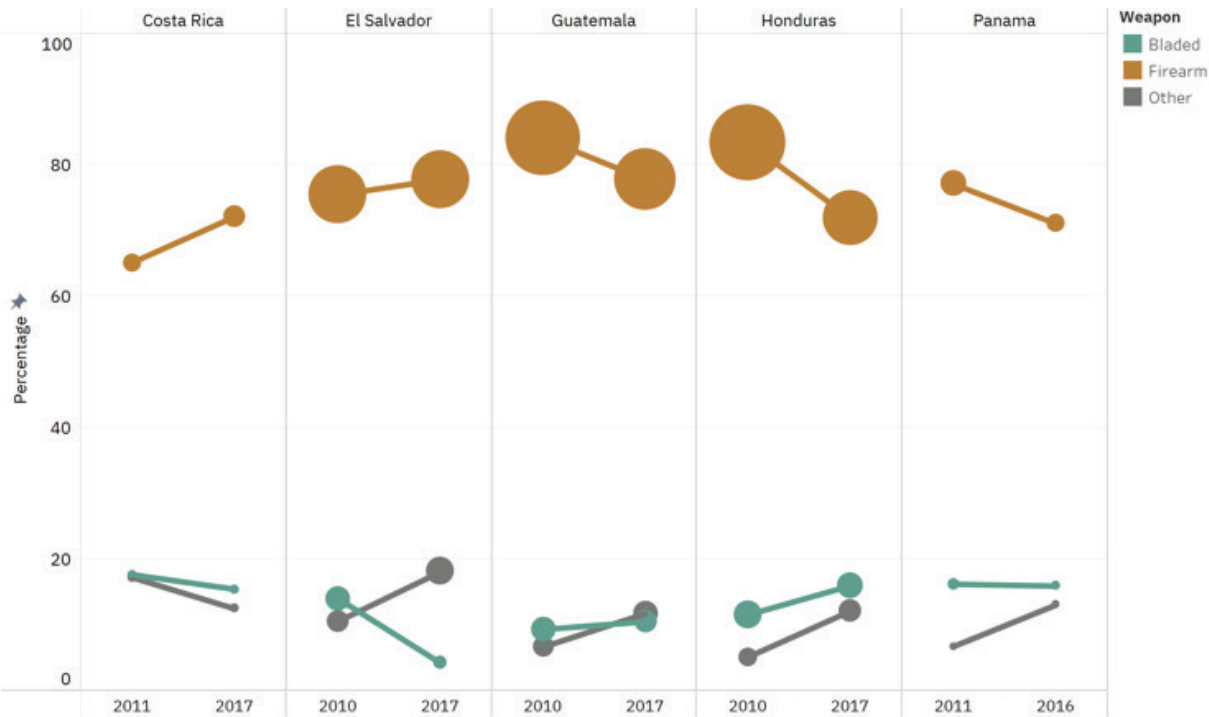
An important characteristic of homicides in Central America is that the majority are perpetrated with firearms. For this reason, this study sought to examine the evolution of this type of killing in order to describe the region's homicidal violence in greater detail. It needs mention that in all the countries, the relevant data has some limitations. For example, there are homicides where it is not known what weapon was used or how the crime was committed. Furthermore, data is not available in all the countries for all the years studied. For Panama, figures from 2016 were used. In 2010, of the close to<sup>37</sup> 17,300 homicides in which the type of weapon is known, 14,000 (81%) were perpetrated with a firearm and only around 2,000 were committed with bladed weapons. At the end of the period studied, in 2017, the number and proportion of homicides committed with a firearm fell to 9,900 (76% of the total). This reduction also was associated with a drop in the number of homicides in the entire region.

A country-specific analysis shows important differences in behavior over time for the causes of death (graph 7). Guatemala, Honduras, and Panama have reduced the quantity and percentage of homicides committed with fire-

arms. In Guatemala, the number of cases fell from more than 5,000 in 2010, which represented 84% of total homicides, to 3,430 in 2017 (78% of the total). In Guatemala, Honduras, and Panama this phenomenon coincides with an increase in the proportion of killings perpetrated with bladed weapons and by other methods; however, the numbers of these types of homicides have not increased.

In contrast, Costa Rica and El Salvador have seen an increase in their proportion of homicides committed with firearms and also growth in the number of these crimes. In 2017 Costa Rica had 136 more homicides where a gun was used than in 2011, which represents an increase of 7 percentage points in their share of the total. This behavior coincides with a slight but steady growth in recent years of homicidal violence in Costa Rica. In 2017, it was the only country out of the five studied that experienced growth in its homicide rate. El Salvador saw the number of killings committed by a firearm rise by 64 cases, which represented an increase from 75% of the total to 78%. In El Salvador, even though homicides have been trending downward in recent years, homicide levels still are among the highest in the region during the last two decades.

**Graph 7: Homicides by weapon used, 2010, 2017\***



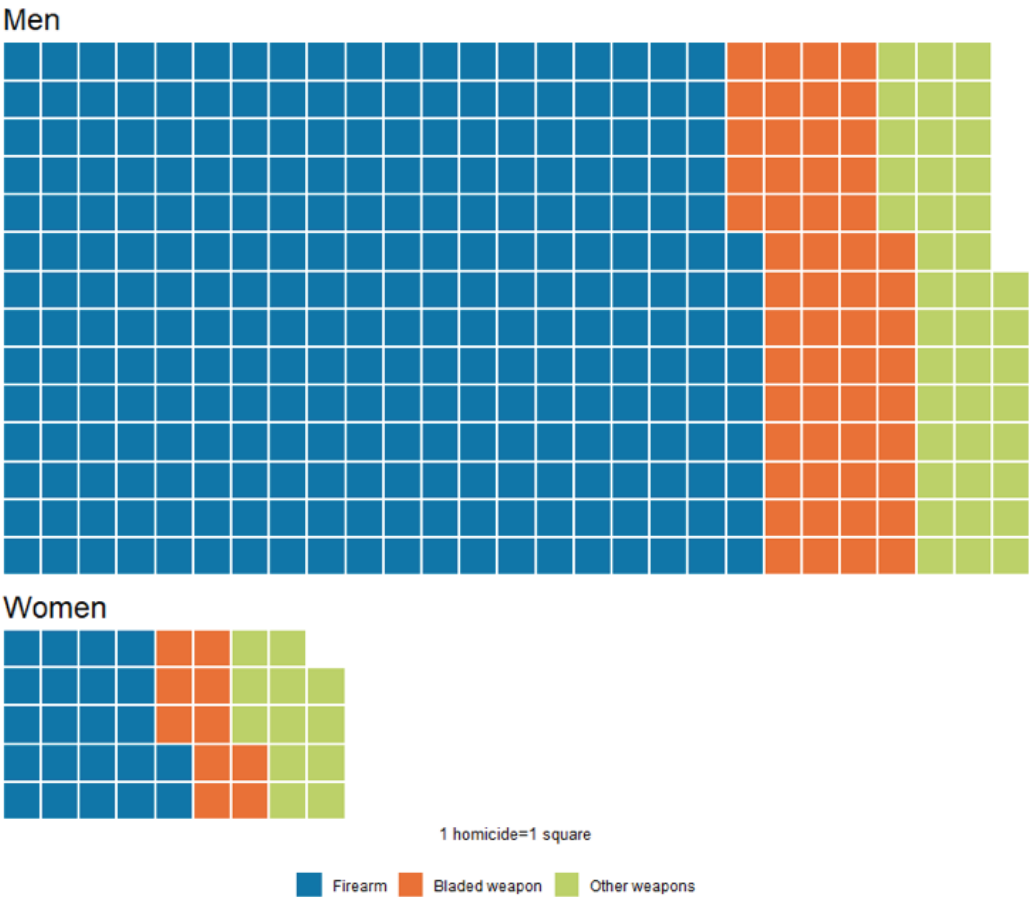
\* The size of the circles reflects the quantity of homicides. The “Other” category groups together various weapons and/or methods. Among these, standing out are deaths by strangulation/asphyxiation and blunt objects.

Source: Compiled by the author based on data from official sources of each country.

An aspect of interest combining the analysis in this section with the previous one is how the causes of death vary by sex of the victim. There is little information about this issue. Nevertheless, the data from Panama and Honduras are illuminating. For both sexes, deaths by gunfire are the majority. Nevertheless, women are killed less by guns than men are. For example, in Panama (graph 8), 74% of homicides of men were committed with a gun in 2016. In contrast, only half of female victims were killed with firearms. In Honduras, firearms were used in 73% of the killings of men in 2017 but in two-thirds of homicides of women.

This analysis indicates that violence against women has features that must be addressed through specific programs. This also was evidenced in the case of the disappearances, where patterns show that women are particularly affected. Additionally, the figures underline the serious problem associated with firearms in the region. It is important to note that guns are associated with other problems and crimes beyond homicides.

Graph 8: Homicides by weapon used and sex of the victim in Panama, 2016



Source: Compiled by the author based on data from the Dirección del Sistema Nacional Integrado de Estadísticas Criminales (SIEC).

## 6 | RELATION BETWEEN HOMICIDAL VIOLENCE AND OTHER CRIMES

Because the levels of underreporting of homicide rates are low, this is thought to be the best indicator to measure violence in societies. This does not mean that it is not important to study the incidence of other crimes with a view to better characterize violence. For this reason, this study undertook an exploration of the relation between homicides and other violent crimes and those against property at the municipal level. Given that the collection of these types of data in Central America was not done in the past, information about crimes against property and life that was available in a uniform way in various countries was included.<sup>38</sup> This took place with a view toward using the information to make a first approach with a regional focus to this issue. The study found weaknesses in the available data, which impede the generation of conclusions of major importance on this issue. Nevertheless, this does not prevent the identification of some patterns that can be explored with greater detail in future studies that are based on more detailed information.<sup>39</sup> These results were expected because, as seen in the section about the availability and quality of data, the data about other crimes have a series of limitations that were evident when the information was gathered and that were spoken about in some of the interviews.

To analyze whether a relationship exists between municipalities with high homicidal violence and an elevated incidence of other violent crimes and ones against property, the Spearman correlation coefficients<sup>40</sup> of homicide rates and other crimes were estimated. Note that this estimation was made based on rates and not on absolute figures. This is because the use of absolute figures would lead to spurious (high) correlations that would be the result of an additional omitted variable (size of the population) and would not represent a true relationship between both studied variables. Thus, using rates allows a comparison of the incidence of each crime while avoiding having the values

of the coefficients result from the effect of population size.

Table 3 shows positive but low correlations. It should be noted that the different types of crimes are phenomena that some theoretical currents attribute to similar explanatory factors.<sup>41</sup> For this reason, larger coefficients than those found in the study were expected. However, the low correlations could be the result of the underreporting that characterizes the majority of crimes. Thus, it follows that a crime that people have important incentives to report, vehicle theft, shows the highest coefficients in most countries.<sup>42</sup> But crimes where victims have incentives to not make a report (or even to hide that a crime took place) such as rape and kidnapping show very low correlation coefficients.

By analyzing all the crimes at the national level, it is possible to identify additional evidence to account for low correlation coefficients. For example, between 2010 and 2014, in no year were more than 30 kidnappings reported in El Salvador; this is clearly a low figure for a country with such a high level of criminality. Similarly, Honduras in 2016 and 2017 reported fewer than 30 kidnappings per year, which again demonstrates that the data about these crimes are not reliable. This situation is similar in the other countries. According to the latest victimization survey in Panama, in 2016, 55% of people who were victims of a crime did not report the offense. In the case of Honduras, this indicator rose to 70% in the same year.<sup>43</sup> As can be seen, the analysis of other crimes provides additional evidence about the challenges the region's countries have to improve the quality of statistical information about crime. Currently, it is not possible to draw reliable conclusions from the available data.

**Table 3: Correlation coefficients of homicide rates compared with the rates for other crimes at the municipal level, 2017\***

	Costa Rica	El Salvador	Honduras	Guatemala
Theft	0.23	-0.02	No data	No data
Robbery	0.12	0.22	No data	0.50
Vehicle theft	0.40	0.24	No data	0.37
Kidnapping	0.21	0.09	0.13	0.09
Rape	0.32	0.12	0.12	0.13

\* For the case of El Salvador the figures are from 2014, as it was not possible to access more recent data. Panama is not included because this crime data is not disaggregated at the municipal level.

Source: Compiled by the author based on data from official sources of each country.

It is important to highlight an element that was underlined in many of the interviews in some of the countries, because it involves an important argument about this issue. Interviewees repeatedly emphasized that the governments of Central America do not focus enough on combating crimes other than homicides. The countries have a central policy objective to reduce homicide rates, but as a result they disregard the fight against crimes such as gender-based violence, crimes against property, and violence against children. Indeed, this helps explain some of the gaps in the region involving information about other manifestations of violence and crime. This shows how greater research is needed to achieve a better understanding about the relationship between homicidal violence and other crimes. Countries should consider having complemen-

tary policy objectives, as a focus on only one goal can be counterproductive.

This was repeatedly brought up in the Panama interviews. The interviewees said that despite the high underreporting of data on other crimes, a growth in the number of these offenses had been observed in the country. Those interviewed attributed this increase to two possible causes. One is the excessive emphasis of the authorities on stopping homicidal violence, which allows other types of violence to persist. The interviewees also say that police actions particularly focus on violence related to drug trafficking and gangs, leaving to one side other crimes and homicides that come from different societal roots. One more element related to this is that there is extensive impunity for minor crimes such as theft.

## Box 1: Analysis of disappearances

The study of homicidal violence in Central America has shown the need to analyze the disappearances of persons. It is likely that many disappearances are unregistered homicides, as the institutions only report as homicides those cases where the victim's body is found. As in the case of homicides, disappearances are a serious problem in the Northern Triangle countries.<sup>46</sup> According to the National Civil Police in El Salvador, the rate of disappearances per 100,000 inhabitants was 35.11 in 2014. In the same year the homicide rate in El Salvador was 61.3. In Guatemala, according to National Statistics Institute (INE) data, the disappearance rate was 17.7 in 2017. In the same year, the homicide rate was 26.1. While the magnitude of disappearances is lower than that of homicides, it still involves rates greater than 10 occurrences per 100,000 inhabitants; this should be enough to place greater importance on research about this issue and its relationship with homicides and crime policy.

Some studies and news media<sup>47</sup> have pointed out that during the gang truce that took place in El Salvador in 2012 and 2013, the reduction in homicides was seen as a consequence of an increase in disappearances. This is because the gangs had an interest in showing a commitment to the truce in order to win concessions from governmental authorities. In interviews conducted in El Salvador, this same argument was used to explain the reductions in killings during the truce.<sup>48</sup> Nevertheless, the interviews did not provide additional, documented evidence to back up these claims.

In contrast, there is research where no evidence was found to back these earlier assertions. In a recent study, Carcach and Artola<sup>49</sup> examined disappearances and homicides at the subnational level in El Salvador during the time of the truce between the gangs. The authors found a spatial correlation between homicides and disappearances. This

could mean that both crimes stem from similar underlying factors. Nevertheless, the study's statistical analysis also found no evidence that the gangs had lowered homicide levels during the truce by disappearing bodies. LaSusa<sup>50</sup> also reported that there was a continued growth in disappearances in the months after the truce had ended; this indicates that the increase in disappearances during the truce may not explain the drop in homicides.

Additionally, other research<sup>51</sup> has found that the demographic profiles of disappeared persons in El Salvador during the time of the truce and subsequent years differ from those of homicide victims. For example, a greater proportion of women and children are victims of disappearances than is the case with homicides. According to figures from the Sistema de Información y Gestión Automatizado del Proceso Fiscal (SIGAP, or Information and Automated Management System for the Prosecution Process), in 2012 48% of the disappeared persons were women, while 43.3% were men. This contrasts with the figures for homicides, where the majority of those killed are men. These data indicate that the rise in disappearances cannot be directly attributed to the reduction in the homicide rate. The studies cited here are isolated ones that must be backed by other approaches to this phenomenon.

A main factor that limits analysis of disappearances is significant gaps in the data about this issue. For this reason, the discrepancies between the two views about disappearances cannot be resolved until the countries take steps to eliminate these deficiencies.<sup>52</sup> In the case of El Salvador, various organizations say the monitoring institutions perform for these types of crime reports is deficient. In this regard, it was found that police organizations, during the time of the truce, modified the methodologies for estimating and determining the number of persons who were reported as



having disappeared. Additionally, there are discrepancies between the figures of the Forensic Medicine Institute and the National Police. It is thus impracticable to draw conclusions using data that lack sufficient scientific rigor. These criticisms were reiterated in the interviews conducted in El Salvador; also, those interviewed in the rest of the countries of the Northern Triangle and Panama<sup>53</sup> expressed concerns about the matter.

One other important element extracted from the interviews is that in Honduras, the disappearances of young women are one of the main manifestations of violence against women.<sup>54</sup> However, the information that comes from governmental authorities about the issue is not reliable, to the point that social organizations document these cases themselves. This characteristic of the disappearances in Honduras coincides with a finding INCIDE made about the high proportion of disappearances of women in El Salvador. Additionally, an increase in the disappearances of women in Guatemala has been observed since 2010; the figures went from fewer than 1,000 in 2010 to 2,077 in 2016. In this same period the figures on disappearances of men have grown at a lesser pace; in 2016 628 more women disappeared than men.<sup>55</sup>

# 7 | RECOMMENDATIONS AND FINAL COMMENTARY

This investigation has analyzed the characteristics and trends of homicidal violence in the municipalities of Central America over an eight-year period. Territorial patterns inside each country have been identified that help show the factors associated with places that have high or low homicide rates. This study is a starting point for understanding, in future research, the effects of public policies, external factors, and the demographic dynamics of violence in the region. The research agenda must focus both on quantitative and geographical analysis and in qualitative research techniques that explore the associated or explanatory factors for the dynamics connected with violence in the territories.

Beyond these contributions of an academic nature, the statistical processing, the review of databases, and the interviews conducted for this research turned up elements that allow important recommendations to be made for the formulation, monitoring, and evaluation of security policies both at the national and regional level.

Findings common to all the countries will be presented below. These should be understood in light of other inputs from the literature that specializes in this material<sup>56</sup> and that focus on a paradigm of citizen coexistence and prevention.<sup>57</sup> Although the implementation of security policies faces challenges and different characteristics in each country, this work contributes recommendations that could be important for the management and evaluation of these actions.

## Deepening the Territorial Focus of Security Strategies

The spatial analysis that has fed this study is based on a current of academic research oriented toward the evaluation and generation of public policies on security based on

data and empirical evidence. A number of policy and scientific evaluation initiatives of these types of programs have been implemented in countries such as Colombia, Mexico, and Brazil.<sup>58</sup> In particular, these projects concentrate on identifying areas of high criminality (hot spots) where policing efforts and governmental action can be channeled. The first assessments have indicated that these policies have minor but positive results.<sup>59</sup> Additionally, they have a greater capacity for reducing violent crimes (such as homicidal violence) than for reducing common crime.<sup>60</sup> In a region such as Central America, in which countries face severe fiscal limitations<sup>61</sup> for making a high and sustainable investment in security policies throughout their territories, having current and territorially disaggregated information is key for optimizing the use of available resources and for evaluating in a timely manner the actions implemented to combat violence and organized crime. Recently, countries such as Guatemala and El Salvador<sup>62</sup> have promoted security policies that center on territorial prioritization and that are based on the processing of statistical information. This is a vital step forward that could be replicated and perfected in other countries in the region.

The statistical processing undertaken in this study enables each country to concentrate its policing efforts to disincentivize criminal activity in regions of high homicidal violence (red areas on the maps). Additionally, the maps have the potential to orient preventive actions in places of high risk and identify best practices that may be associated with territories of low homicidal violence (light blue on the maps). The territorial dimension also shows the need to fortify institutional coordination in the local, regional, and national arena, as well as between municipalities and the national institutions that have presence in the territories.

This study has highlighted that there are zones with clusters of high homicidal violence at some of the

borders.<sup>63</sup> This transnational character of homicidal violence is reinforced by the fact that in various coastal zones throughout Central America there are municipalities with high rates of killings. This finding should spur international and intergovernmental coordination to combat this type of homicidal violence, which the data show has been stable over time. The reality of the situation should also be an additional incentive to actively promote regional integration; as the Proyecto Estado de la Región [State of the Region project]<sup>64</sup> has shown, this integration has not progressed at the speed necessary to resolve the region's key challenges.

## Generating State Policies That Are Sustained over Time

The temporal dimension analyzed in this study shows that homicidal violence has the potential to move about the territory. The most illustrative case is El Salvador, where year upon year there is a significant variation in the municipalities that have high homicidal violence (see the second section). This underlines how the utilization of the spatial dynamics of crime should not be seen as a substitute for combating the structural causes of homicidal violence. Also, it must be emphasized that security policies need to be sustainable over time and space, which means generating institutionalized state policies that do not depend on the commitment of specific officials or political cycles. On the contrary, the policies' execution and continuation must be the result of rigorous evaluations of their impact on each locality.<sup>65</sup>

A particularly important finding mentioned frequently in the interviews is that there is no detailed understanding of the effects of the multiple programs against violence undertaken in the countries of Central America.<sup>66</sup> This limits the continuity and sustainability of the interventions and their results. There are some preliminary hypotheses that come from partial interim reviews and assessments made by governmental bodies and by civil society. Gaps in the

availability of disaggregated territorial data prevent the scientific corroboration of the suitability of government actions that have taken place.

## Broadening the Reach and Quality of the Statistical Information

This study has found that the countries need to make advances in improving methodological rigor, geographical precision, temporal periodicity, comparability, and social legitimacy of their data about crime in order for this information to be an effective and precise tool for decision-making, monitoring, and evaluation of public policies. It should be noted that the review of the data and the interviews conducted for this study show that the data in the studied countries have improved and are more detailed than they were a few years ago. The countries have generated individualized databases for crime with certain information about the victims, the location of the occurrence, and other details about the offense.<sup>67</sup> But efforts must be made to provide continuity to and broaden the work carried out, incorporating in the records and databases relevant information that characterizes the crimes and the victims. In particular, all the countries should include precise information about the territorial location of the events, including, when possible, the geographic coordinates, and improving the protocols for recording and classifying crimes.

The discrepancies between the figures published and utilized by various institutions also should be sorted out. While some of these inconsistencies occur as a consequence of their being collected in various stages of criminal investigation, the explanations provided for these differences are not always clear. Certainly, the countries have made efforts to overcome this limitation. They have created working groups where officials from various institutions reconcile the figures so that coherent official data from all the institutions involved can be published. Both the review made for this study and the interviews in each country show that these groups have made improvements in the

management of statistical information;<sup>68</sup> nevertheless, this effort must be deepened and perfected. Also, the methodologies and protocols that working groups utilize for harmonizing the data about criminality should be revealed and clearly stipulated. This because it is not always possible to identify the underlying reasons that account for the different versions of the databases that institutions publish. This is necessary for guaranteeing the quality of the data and to thus generate analyses that are more conceptually precise. Important initiatives in this area have also been recently promoted in the region;<sup>69</sup> this should gradually provide greater transparency and legitimacy to the public data. If this continues for a number of years it, a rigorous monitoring could be put into place and provide a vast improvement in the generation of statistics about the subject.

The specification of work methodologies is a mechanism for generating legitimacy and confidence in the official figures. This is particularly important because there is distrust in the entire region about the work of police and judicial bodies and, consequently, in their statistics.<sup>70</sup> Auditing methodologies for the information could include the participation of experts and representatives of civil society organizations directly connected with the analysis and monitoring of violence in each country. This could contribute to fortifying accountability and citizen participation in these processes.

In this context, where the bodies in charge of public security have little social legitimacy, an effective citizen participation in public policies in Central America does not exist. The *Tercer Informe Estado de la Región* (2008) showed that the countries of Central America share a series of common traits that complicate the implementation of effective security policies. It has been documented that, in general, the states are weak, have weak mechanisms of internal coordination, and enjoy little trust from their citizenry.<sup>71</sup> In recent years this situation has been exacerbated and resulted in an institutional political crisis in several countries (Nicaragua, Honduras, and Guatemala), which limits capacities for management and implementation of effective public policies, including those involving securi-

ty. Best international practices in the formation of public policies for security emphasize the importance of interventions with robust mechanisms of accountability, citizen participation, and strengthening the technical skills of the personnel.<sup>72</sup> This is a chronic weakness in the management of most of the countries' public policies; further progress in this strategic area could generate long-term results and transform the current situation.

## Promoting the Formation of Focused Policies Based on Empirical Evidence

For the most part, this study recommends that when it comes to security matters, policies must be based on empirical evidence collected and analyzed using rigorous scientific standards. This aspiration is complicated to implement; nevertheless, this work has suggested various actions that would enable progress in this direction.

The spatial analysis based on territorially disaggregated data of the homicides of women and young people (see the section about victim characteristics) shows that the generation of databases with better sociodemographic information enable the design of policies focused on protecting specific populations. It has been observed that the majority of killings are committed against young men through use of a firearm.<sup>73</sup> As long as more data are collected in an individualized and georeferenced form about types of crimes, weapons used, criminal suspects, and victims, it will be possible to generate specific policies and actions to optimize the use of resources and efforts and achieve greater efficacy and efficiency. Also, both in the analysis about weapons used and in the section about disappeared persons, it was suggested that crimes against women have particular characteristics with respect to ordinary homicidal violence that must be addressed with specific measures.

Additionally, the interviews led to the conclusion that the underlying factors for homicidal violence in Central America have variations in the territories. Also, while the presence of organized crime is an element related to a large part of the violence, it is necessary to study in greater depth

other types of crimes whose causes are not directly connected with this phenomenon. For example, in the interviews there was recurrent mention of the issue of domestic violence, which has received less attention from the countries' authorities.<sup>74</sup> Thus, the understanding of the factors associated with the different types of violence is a key input for promoting focused policies about the factors underlying the violence.

Information generated through the statistics in many cases winds up not being utilized for formulating, monitoring, and evaluating public policies. Articulation and alliances between public institutions, academia, and specialized civil society organizations could contribute to strengthening this process. It is common for the institutions to possess information but to lack the teams and specialized human resources to process and analyze the data. Civil society organizations usually have technical capacity and primary data generated through their work with the community and various actors; this capacity and data that can be valuable for understanding in greater detail the problems and situations society seeks to confront and for evaluating the results attained. In addition to providing technical backing, joint efforts between various actors could be key for generating confidence and giving political viability to the proposals.

## Endnotes

- 1 Mathew Ingram and Karise Curtis, "Violence in Central America: A Spatial View of Homicide in the Region, Northern Triangle, and El Salvador," in *Crime and Violence in Central America's Northern Triangle: How U.S. Policy Responses are Helping, Hurting and Can be Improved*, ed. Eric Olson (Washington, DC: Woodrow Wilson International Center for Scholars, 2015); Gabriel Demombynes, "Drug Trafficking and Violence in Central America and Beyond" (Washington: World Bank, 2011); Rogelio Granguillhome Ochoa, "¿Qué subyace tras los altos costos del crimen en el Triángulo Norte? Tendencias recientes en crimen y victimización," in *Los costos del crimen y de la violencia: Nueva evidencia y hallazgos en América Latina y el Caribe*, ed. Laura Jaitman (Washington, DC: Inter-American Development Bank, 2017).
- 2 See, for example:
  - Matthew Ingram and Curtis Karise, "Homicide in El Salvador's Municipalities: Spatial Clusters and the Causal Role of Neighborhood Effects, Population Pressures, Poverty, and Education," working paper (Washington, DC: Woodrow Wilson International Center for Scholars, 2014).
  - Laura Jaitman, ed., *Los costos del crimen y de la violencia: Nueva evidencia y hallazgos en América Latina y el Caribe* (Washington, DC: Inter-American Development Bank, 2017).
- 3 United Nations Office on Drug and Crime (UNODC), *Global Study on Homicide 2013* (Vienna: United Nations, 2014).
- 4 Because the State of the Nation had already conducted research related to homicides at the subnational level in Costa Rica, no interviews were made in this country.
- 5 See, for example, UNODC, *Global Study on Homicide 2013*.
- 6 Details about the data and research techniques used in this work are provided at the end of this document in the Methodological Annex.
- 7 Localities with homicidal violence that is atypically high, low, or with a lot of volatility throughout the period studied.
- 8 The limitations of these sociodemographic data at the municipal level make it difficult to perform quantitative studies to statistically verify some of the factors commonly associated with homicidal violence.
- 9 Poverty is calculated based on the poverty line method and uses the estimates made by each country. The Human Development Index (HDI) is an index of indicators of life expectancy, education, and per capita income (a higher number is better). Density is calculated as the number of inhabitants divided by square kilometers.
- 10 On the occasion of the *Tercer Informe Estado de la Región [State of the Region Report]* a similar focus was used to identify successful experiences in citizen security matters.
  - See José María Rico, "Experiencias exitosas en materia de seguridad ciudadana," presentation prepared for the *Tercer Informe Estado de la Región* (San José: Programa Estado de la Nación, 2007).
- 11 Mayda de León, interviewed by Mario Herrera, September 24, 2018.
- 12 Migdonia Ayestas, interviewed by Mario Herrera, August 31, 2018; Ronny Velásquez, interviewed by Mario Herrera, September 7, 2018.
- 13 Fabricio Herrera, interviewed by Mario Herrera, August 27, 2018.
- 14 This indicator shows the extent to which two variables are related in linear form. A coefficient of 1 shows a perfect positive correlation. A value of -1 shows a perfect negative correlation. Finally, a coefficient of 0 shows that the two variables have no linear relation (independence).
- 15 See, for example:
  - Leonardo Sánchez, "Patrones territoriales y factores sociodemográficos asociados al narcotráfico y homicidios en Costa Rica" (San José: Programa Estado de la Nación, 2018).
  - Granguillhome Ochoa, "¿Qué subyace?"
- 16 For more information, see Luc Anselin, "Local Indicators of Spatial Association—LISA" (*Geographical Analysis* 27, no. 2 (1995): 93–115).
- 17 This indicator is significant and has important consequences for the type of econometric processing that must be done to analyze the variable of interest.
- 18 Esdras López, interviewed by Mario Herrera, September 7, 2018. The issue of disappearances will be discussed in greater depth below in Box 1.
- 19 Fabricio Herrera interview; Sofía Martínez Fernández, interviewed by Mario Herrera, September 18, 2018. This finding is repeated in other countries in the region. This, in turn, is similar to what has been studied in Mexico, where the displacement of violence in space result from arrangements or conflicts between organized crime groups. See Laura Calderón, Octavio Rodríguez and David Shirk, *Drug Violence in Mexico: Data and Analysis through 2017* (San Diego: Justice in Mexico, University of San Diego, 2018).
- 20 Severino Mejía, interviewed by Mario Herrera, August 23, 2018.
- 21 Alexander Alleyne, interviewed by Mario Herrera, August 21, 2018.
- 22 Ibid.
- 23 The border zone of southern Mexico does not stand out for being particularly violent. Nevertheless, there are municipalities with very high homicidal violence in this zone. See Calderón, Rodríguez, and Shirk, *Drug Violence in Mexico*.

- 24 Mynor Beltetón, interviewed by Mario Herrera, October 9, 2018; Maribel Carrera and Mayda de León interview.
- 25 Walter Menchú, interviewed by Mario Herrera, October 3, 2018.
- 26 Programa Estado de la Nación (PEN), *Tercer Informe Estado de la Región en Desarrollo Humano Sostenible* (San José: PEN, 2008).
- 27 Leonardo Sánchez, *Patrones territoriales y factores sociodemográficos asociados al narcotráfico y homicidios en Costa Rica* (San José: Programa Estado de la Nación, 2018).
- 28 There are discrepancies in the specific agglomerations identified as significant in both studies, because Sánchez used districts as the geographic unit studied.
- 29 Instituto Centroamericano de Investigaciones para el Desarrollo y el Cambio Social (INCIDE), "El Salvador: Nuevo patrón de violencia, afectación territorial y respuesta de las comunidades (2010-2015)" (San Salvador: INCIDE, 2016).
- 30 Carlos Ramos, interviewed by Alberto Mora, August 21, 2018.
- 31 Fabio Molina, interviewed by Alberto Mora, August 21, 2018.
- 32 Edgardo Amaya, interviewed by Alberto Mora, August 22, 2018; Fabio Molina interview.
- 33 Ingram and Curtis, "Violence in Central America."
- 34 InfoSegura data based on data from the Attorney General's Office.
- 35 Alexander Alleyne interview. Still, Panama has developed various instruments for reducing violence against women. These include the programs of the Security Ministry's Gender Division.
- 36 Neesa Medina, interviewed by Mario Herrera, September 11, 2018.
- 37 For Costa Rica, no data were obtained concerning the type of weapon used in 2010; for this reason, figures from 2011 were used. Similarly, for Panama figures were used from 2016, not 2017.
- 38 This shows that the selection criteria for the studied crimes was not directly related to theory or previous studies about the subject, but was limited to data availability.
- 39 A very useful tool for exploring this issue beyond the administrative records is victimization surveys, which have been gaining importance in various countries in the region. See, for example:
  - Instituto Universitario en Democracia, Paz y Seguridad (IUDPAS), "Percepción Ciudadana sobre Inseguridad y Victimización en Honduras" (Tegucigalpa: Universidad Nacional Autónoma de Honduras, 2016).
  - Observatorio de Seguridad Ciudadana, "VIII Informe de Seguridad Ciudadana: IV Encuesta de Victimización y Percepción Social de la Seguridad" (Panama City: United Nations Development Programme, 2017).
  - DIGESTYC, "Encuesta de Victimización y Percepción de Inseguridad/Encuesta de Cultura de Paz" (San Salvador, 2018).
  - DIGESTYC, "Encuesta Nacional de Violencia contra la Mujer" (San Salvador, 2017).
- 40 Spearman correlations were used because the presence of a significant number of zeroes means the relation between variables is not always linear (Pearson correlations measure the strength of linear associations).
- 41 For example, this is the case when it comes to the economic theory of crime.
- 42 Another possible theory that could account for the correlation between vehicle theft and homicides is that both are related to organized crime networks.
- 43 IUDPAS, "Percepción Ciudadana"; Observatorio de Seguridad Ciudadana, "VIII Informe."
- 44 Alexander Alleyne interview.
- 45 Severino Mejía interview.
- 46 This analysis of this issue focused only on Northern Triangle countries because that is where the research has discussed in the greatest detail the possibility that variations in homicidal violence are connected with disappearances. Given that volatility in the annual homicide rates in Costa Rica and Panama is much lower, this theory has not been used to explain homicidal violence in those countries.
- 47 Hannah Stone, "La Oscura Cuestión de las Desapariciones en El Salvador: Una Investigación de El Faro," *InSight Crime*, 2013; Juan José Rivera Virués, "Pandillas, desaparición de personas y derechos humanos en El Salvador," master's thesis (Mexico City: FLACSO, 2014).
- 48 Carlos Ramos, interviewed by Alberto Mora, August 21, 2018; Raúl García, interviewed by Alberto Mora, August 21, 2018.
- 49 Carlos Carcach and Evelyn Artola, "Disappeared persons and homicide in El Salvador, *Crime Science* 5, no. 1 (2016): article 13.
- 50 Mike LaSusa, "Desapariciones en El Salvador bajan desde tregua de pandillas," *InSight Crime*, September 20, 2016.
- 51 INCIDE, "El Salvador: Nuevo patrón."
- 52 Stone, "La Oscura Cuestión."
- 53 Esdras López interview; Neesa Medina interview.
- 54 Neesa Medina interview.



- 55 InfoSegura, "Violencia contra las mujeres a lo largo del ciclo de vida: Fast Track para Guatemala" (San Salvador, 2018).
- 56 See, for example, Wilson Center Latin American Program, "Decálogo para la seguridad ciudadana a nivel local: Síntesis prescriptiva de elementos y desafíos para el éxito de una política pública en seguridad local" (Washington, DC: Wilson Center, 2014)
- 57 See, for example: Laura Chioda, *Stop the violence in Latin America: A look at prevention from cradle to adulthood* (Washington, DC: World Bank, 2016); Laura Chinchilla and Doreen Vorndran, "Seguridad ciudadana en América Latina y el Caribe: Desafíos e innovación en gestión y políticas públicas en los últimos 10 años" (Washington, DC: Inter-American Development Bank, 2018)
- 58 Mathew C. Ingram and Marcelo Marchesini da Costa, "A Spatial Analysis of Homicide Across Brazil's Municipalities," *Homicide Studies* 21, no. 2 (2017): 87–110; Miguel Flores and Eduardo Rodríguez-Oreggia, "Spillover Effects of Homicides across Mexican Municipalities: A Spatial Regime Model Approach," EGAP Tecnológico de Monterrey (June 2014)
- 59 Anthony Braga, Andrew Papachristos, and David Hureau, "The Effects of Hot Spots Policing on Crime: An Updated Systematic Review and Meta-Analysis," *Justice Quarterly* 31, no. 4 (2012): 633–663.
- 60 Christopher Blattman, Donald Green, Daniel Ortega, and Santiago Tobón, "Place-based interventions at scale: The direct and spillover effects of policing and city services on crime" (2019).
- 61 ICEFI, "Perfiles Macrofiscales de Centroamérica: Comparación de cifras estimadas al cierre de 2018 con el presupuesto de 2018 y el cierre de 2017" (Guatemala City, 2018).
- 62 InfoSegura, "Índice de Priorización de Municipios: Herramientas para la priorización y focalización de políticas en materia de seguridad ciudadana" (San Salvador, 2017); Ministerio de Gobernación, Guatemala, "Índice de Priorización Municipal de Guatemala" (Guatemala City, 2018).
- 63 For example, the border between Honduras and Guatemala and the border between Guatemala and Mexico.
- 64 Programa Estado de la Nación (PEN), *Quinto Informe Estado de la Región en Desarrollo Humano Sostenible* (San José: PEN, 2016).
- 65 Central America, in order to properly assess these programs, needs a greater territorial disaggregation of data. The most precise analyses use data connected at the street or neighborhood levels.
- 66 For example, the box about disappeared persons analyzed the effects of the truce between gangs on homicides in El Salvador. Despite the magnitude of the phenomenon, the results of this policy still are not clear.
- 67 Although the databases exist, not all the countries have them available for consultation.
- 68 Today, for example, the Unidad Técnica de Coordinación Institucional (UTECI, or the Technical Unit for Institutional Coordination) harmonizes the figures of various institutions in Honduras, and the tripartite round table in El Salvador and the Department of Information and Analysis of the Security and Justice Ministry in El Salvador facilitate the harmonization of data about criminality with variables of important analytical value. Additionally, in Panama there are nine thematic panels, in which official institutions seek to improve the quality of the data about this issue.
- 69 UTECI, "Protocolo para la Conciliación de Datos" (Tegucigalpa, 2016).
- 70 Alexander Alleyne interview; Neesa Medina interview; Fabricio Herrera interview.
- 71 Programa Estado de la Nación (PEN), *Tercer Informe Estado de la Región en Desarrollo Humano Sostenible* (San José: PEN, 2008).
- 72 Chinchilla and Vorndran, "Seguridad ciudadana."
- 73 This is a verified result in various countries of the region and has also been observed in other latitudes. Chioda, *Stop the violence*.
- 74 Alexander Alleyne interview; Neesa Medina interview.
- 75 Recently, important initiatives have been undertaken, backed by the InfoSegura Project implemented by the UN Development Programme, to validate and harmonize data about crime in Central America. Given that the new statistics cover a smaller period of time than that utilized in this study and that their publication took place after the collection of data for this study, they could not be included. Some of the initiatives are: Unidad Técnica de Coordinación Institucional (UTECI, or the Technical Unit for Institutional Coordination) in Honduras, the tripartite round table in El Salvador, and the coordinating office for citizen security statistics in Guatemala.