FINAL REPORT

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Street Lighting Impacts in Brazil

WORLD BANK GROUP | PLAN*

DIRECTION

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1. EXECUTIVE SUMMARY

Over the next 13 years, Feira de Santana, in the state of Bahia (BA), and Aracaju, in the state of Sergipe (SE) will both benefit from significant investments in street lighting. Several studies have discussed the many benefits of this type of investment, including the effects of street lighting on people's perceptions of safety and security. This study aims to provide a baseline to support those lighting interventions and contribute to an evaluation exercise at the end of the investment cycle. The analysis contained herein tries to explore the potential impacts on people's behavior and perceptions of safety and security, especially among women. It also addresses education and job opportunities.

The study adopted a mixed-methods approach, including qualitative and quantitative tools. It conducted 21 semistructured interviews with local authorities from both cities, as well as police officers, business association representatives, civil society organizations (CSOs), and school representatives. In addition, the research team carried out phone interviews with 602 respondents living in Aracaju and Feira de Santana.

The survey data show that 56 percent of the Aracaju respondents are not satisfied with their street lighting, rating it as regular (37 percent), bad (7 percent), or terrible (12 percent). In Feira de Santana, an even larger share of the population (approximately 71 percent) think the same: 37 percent consider it regular, 9 percent consider it bad, and 25 percent rate it as terrible.

Seventy-seven respondents, or 12 percent of the total, declared they had been a victim of nighttime crime within the previous 12 months. Almost 62 percent of them saw a link between poor lighting and crime.

People from both cities feel less safe while walking on the streets during nighttime hours as opposed to walking during the day. Data also show that women feel less safe than men both during

the day and in the evening or night. Poor lighting is one of the main reasons for this sense of insecurity, although empty streets were mentioned as an even more important factor. Since perceptions of security directly affect people's behavior, 32 percent of all respondents from both cities reported that they always change routes in search of better lighting.

There is a clear difference between genders with regard to perceived security. In-depth interview responses and quantitative data suggest that women have to cope more often with insecurity than men because they also fear becoming a victim of specific types of crimes, such as sexual harassment or rape. Women living in the periphery tend to be even more strongly affected by this perception of insecurity, which confirms that urban security issues do not affect all women equally. Gender inequality intersects with other forms of discrimination and disadvantage, such as age, disability, sex, ethnicity, religion, socioeconomic status, and other factors. These may increase the risk, severity or frequency of sexual harassment and other forms of sexual violence against women and girls, both in private and public spaces.

In Aracaju, most respondents cited Santa Maria as the most dangerous district in the city, although police records indicate that Capucho and the City Center are the worst areas in terms of nighttime crime per capita. In Feira de Santana, respondents rated Queimadinha, Aviário and George Américo as the worst areas, while police records pointed to SIM and the City Center as the two areas with the most crimes per capita. Two important factors should be considered when trying to understand these discrepancies between people's perceptions and police data: underreporting, and a history of violence linked to some areas. The latter has a direct impact on perceptions, and is difficult to change, even if overall security has improved.

Finally, although a couple of respondents mentioned that poor lighting might discourage students from attending school, only one answer in the quantitative study named lighting as one of the issues that might influence dropout rates. Both qualitative and quantitative data suggest that street lighting may not affect job opportunities directly (for example, preventing people from arriving at work safely), but it could affect commercial activities and, as a consequence, reduce the number of jobs available.

2. INTRODUCTION

For centuries, people have become used to performing a number of activities after dark thanks to artificial lighting. In modern-day urban life, street lighting provides a general sense of safety and security for drivers, cyclists, and pedestrians, while also enabling commercial activities.

Not only does improved street lighting enhance visibility and orientation, but it is also one of the most common suggestions made by people as a way to prevent crime and reduce fear (Atkins, Husain, and Storey 1991).

Geography and urban dynamics can directly influence the incidence of crime. In this context, street lighting has been identified by many studies as an important factor that could affect urban violence. As such, this study's general objective is to explore the links between urban lighting and peoples' behavior and perceived insecurity.

The present study expects to contribute to improving the lighting infrastructure in Feira de Santana, in the state of Bahia, and Aracaju, the state capital of Sergipe. Starting in 2020, both cities are expected to receive significant investments in street lighting with the support of their respective local administrations, Caixa Econômica Federal (Brazil's Federal Savings Bank, also known as CAIXA), the World Bank, the International Finance Corporation (IFC), and the Global Infrastructure Facility (GIF). Hence, this study can be characterized as a baseline study.

In order to support the investments, Accenture has produced technical diagnostic reports on lighting both in Aracaju and Feira de Santana. This was done with the support of CAIXA, the World Bank, IFC, and the GIF. These reports, which were published in January 2020, explore the status of street lighting

in both cities in great technical detail, including information on the number of lighting points, the lamp technology used, and their energy consumption. Section 4 summarizes part of the report findings, emphasizing the most relevant aspects.

This study intends to contribute to future lighting and urban planning projects by recording, organizing and reporting people's perceptions of lighting and its relationship with criminal activities and human behavior. In this context, this study discusses evidence related to violence, street lighting, mobility, economic activities, and job opportunities, paying special attention to gender inequality and gender-based violence in public spaces.

3. RESEARCH METHODOLOGY

The research team used both quantitative and qualitative research methods for this study. After a careful desk review, which included studying the relevant literature as well as gathering administrative data from state and local governments, the team conducted 21 semistructured interviews with local authorities, police officers, business association representatives, civil society organizations (CSOs), and school representatives. Due to the COVID-19 pandemic, all interviews were conducted remotely in June 2020, over the telephone or via Zoom.

After concluding all of the in-depth interviews, the team reviewed and analyzed all recordings, and coded their content with the support of Atlas.ti software.

The research team also conducted quantitative interviews over the phone in September 2020. The total sample included 602 observations—301 per municipality. The team followed a stratified sampling method based on district sizes (see Annex 2). The margin of error for a 95-percent confidence interval is plus or minus 4.7 percentage points. The data were collected by Action Pesquisas de Mercado [1], and phone numbers were obtained from Mídia Mundial [2] and Net Br@zil Comércio e Representações Ltda [3].

For the quantitative study, respondents ranged from 18 to 70 years of age, with an average of 42. With regard to gender, 40.86 percent of all respondents were female, and 59.14 percent were male.

In addition to a Final Report, and with a view to providing a better understanding of the results, the research team also produced a video with some of the most relevant responses.

[1] www.actionpesquisas.com.br
[2] http://www.midiamundial.com.br
[3] www.edsonfranzen.com.br

4. LIGHTING INVESTMENTS IN FEIRA DE SANTANA AND ARACAJU

The Feira de Santana (BA) and Aracaju (SE) projects were selected through a public call issued in July 2018 by the Support Fund for the Structuring of Concession and PPP Projects (Fundo de Apoio à Estruturação de Projetos de Concessão e PPP—FEP CAIXA). The call aimed to support public-private partnerships in street lighting. In addition to CAIXA's technical advice, the contract with the FEP allowed the project to be developed in cooperation with the World Bank/GIF/IFC, a multilateral organization with expertise in structuring partnership projects. The activities are funded by each municipality (10 percent), the Global Infrastructure Facility—GIF/IFC (45 percent), and FEP CAIXA (45 percent), under Federal Law no. 13529/2017.

The specialized technical services consist of technical advisory activities to be provided by CAIXA, as well as specialized technical consultancy to support the execution of feasibility studies and the production of the required documentation for the bidding process. The concession structuring services cover technical aspects such as engineering, as well as economic, financial, legal, and socioenvironmental aspects for the preparation of projects, reviews, reports, and other information.

The Feira de Santana studies started in June 2019. They were completed one month before schedule, which enabled the launch of public consultations on January 23, 2020. The bidding round was scheduled for the second half of 2020.

The Feira de Santana PPP has an estimated value of R$235.4 million over a 13-year term. It aims to provide an administrative concession for the provision of street lighting services, including development, modernization, expansion, energy efficiency, operation and maintenance of the street lighting grid, initially for 60,500 lighting points.

The Aracaju studies started in June 2019, and were also completed a month ahead of schedule. Public consultations were launched on January 24, 2020, and bidding was scheduled to start in the second half of 2020.

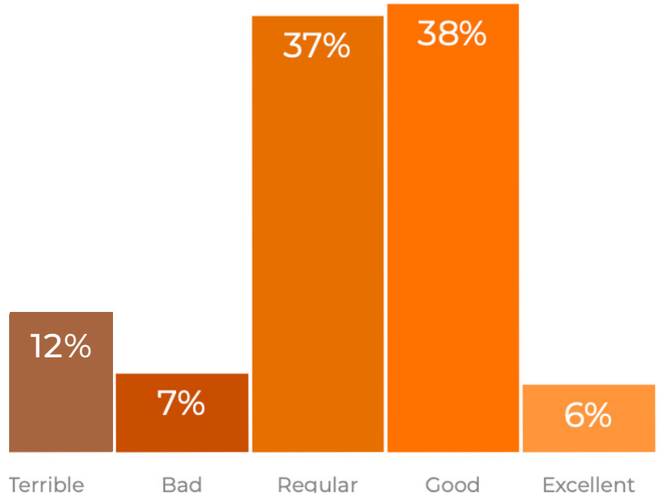
The Aracaju PPP has an estimated value of R$239 million, and a 13-year-long term. It aims to provide lighting services to the municipality, including development, modernization and expansion, energy efficiency, and operation and maintenance of the street lighting network, initially for 58,763 lighting points.

The partnership is expected to improve the quality of life of the population, and modernize the lighting system currently used to illuminate municipal monuments. Its additional benefits include timely repair of lamp failures; environmentally-correct disposal of faulty lamps; reduction of greenhouse gas emissions; increased investment and job creation; recovery of degraded areas and enhanced commercial opportunities; traffic safety; and personal security.

5.STREET LIGHTING IN ARACAJU: CHARACTERISTICS AND PERCEPTIONS

The quantitative data gathered in September 2020 indicate that most people in Aracaju rate their local street lighting as either regular or good. Only 6 percent of interviewees rated local lighting as excellent.

Figure 1: Public lighting rating - Aracaju (SE)



According to the Aracaju Technical Diagnostic Report, produced in January 2020 by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, Aracaju has 58,763 street lighting points. Over 95 percent of these use sodium-vapor lamps. Electrical power varies according to each technology. Approximately 45 percent of all lamps in Aracaju have power equal to or less than 70W.

Table 1: Lighting Points by Type of Technology in Aracaju [1]

Technology	Number of lighting points	Percentage of lighting points
Sodium	56,389	95.95%
LED	1,169	1.99%
Metal	1,032	1.76%
Fluorescent	88	0.15%
Mixed	63	0.11%
Halogen	22	0.04%

Source: Technical Diagnostic Report produced by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, January 2020.

The following table shows that most LED lamps are installed on arterial roads:

Table 2: LED Lamps by Street Type [2]

Street Type	Number of lighting points	Number of lighting points with LED lamps	Percentage of lighting points with LED / Total lighting point
Main roads	4,134	103	2.5%
Arterial roads	4,923	651	13.2%
Collecting routes I	2,269	132	5.8%
Collecting routes II	5,717	53	0.9%
Local roads	41,720	230	0.6%
Total	58,763	1,169	-

Source: Technical Diagnostic Report produced by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, January 2020.

[1] See Annex 2 for details on street lighting requirements in Brazil.
[2] See Annex 2 for details on street lighting requirements in Brazil.

The same report suggests that lamps with different levels of electrical power are equally distributed throughout the city. In other words, we cannot observe a concentration of a specific type of lamp in any location.

In December 2019, the Aracaju City Hall ratified a law governing a public-private partnership (PPP) for the modernization of their street lighting system. In February 2020, the local government launched a public consultation process, inviting the population to provide comments and suggestions on the contract that would replace and modernize all street lighting points in the city. During that same month, a public hearing was held with the purpose of presenting the project and giving the population an opportunity to ask questions.

According to the chairperson of the Municipal Works and Urbanization Company *(Empresa Municipal de Obras e Urbanização*—EMURB*)*, planning for the lighting project will take into account the rate of violent crime, and will start in poorly-lit areas with the highest crime rates. Expectations include:

1. Improving public security and the quality of life of an estimated 650,000 people;
2. Modernizing the accent lighting of municipal monuments;
3. Reducing greenhouse gas emissions; and
4. Raising investment levels and creating jobs.

Energisa Sergipe Distribuidora de Energia S/A is the company currently in charge of power distribution in Aracaju. According to them, street lighting energy consumption in Aracaju was approximately 4,586 MWh between 2015 and 2019. Average daily consumption was 153 MWh.

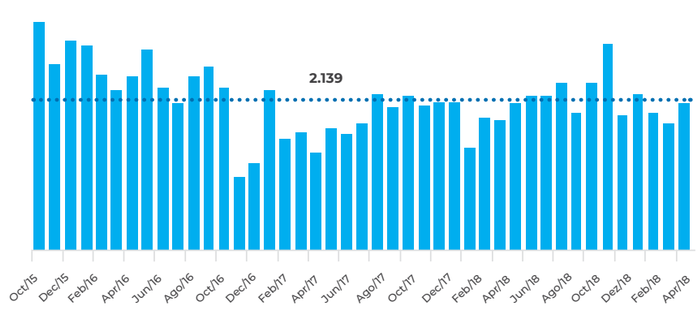
The Municipal Works and Urbanization Company is responsible for implementing and managing street lighting projects in Aracaju, while *Trajeto* Engenharia e Comércio

Eireli is in charge of managing and operating the lighting network. This includes:

- Repair and maintenance services for the street lighting network, including providing technical and operational staff, vehicles and equipment; and
- Provision of a call center, including a technological system for answering and registering calls, as well as call center staff.

According to Accenture's report, *Trajeto* performed approximately 74,000 repair and maintenance services in Aracaju between 2016 and 2018.

Figure 2: Services performed between October 2015 and April 2019



Source: Technical Diagnostic Report developed by Accenture with the support of CAIXA, the World Bank, IFC and GIF, January 2020.

The figure above shows the total services provided between October 2015 and April 2019, as well as the monthly average during that period. The report states that, considering the total amount of lighting points in Aracaju, lighting points have a failure rate of 3.6 percent. However, after the lighting network modernization resulting from the PPP, which should replace all obsolete technology with LED lamps, the failure rate is projected to remain between 1 percent and 2 percent.

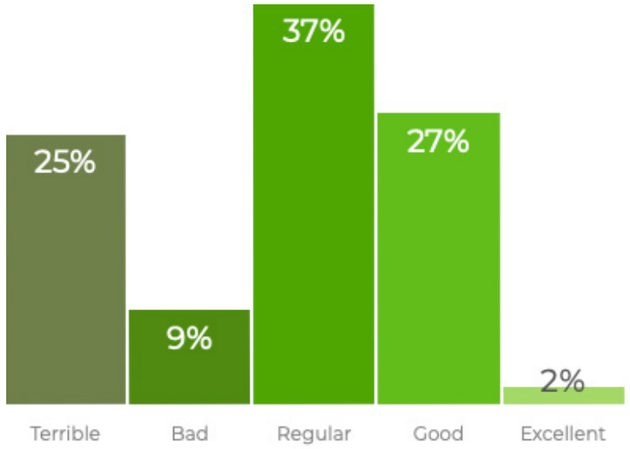
According to the reports, 96 percent of all failures resulted from faulty lamps, while the remaining 4 percent were caused by external factors, such as vandalism. Some of the failures are routinely spotted by *Trajeto* staff during maintenance rounds. However, the population can also register failures through communication channels such as the company website; its call center; or apps such as Telegram or Facebook.

On average, *Trajeto* takes 2 days and 13 hours to fix lighting failures. The district with the longest repair wait is Santa Maria, where it usually takes 5 days to respond to any reported failure.

6. STREET LIGHTING IN FEIRA DE SANTANA: CHARACTERISTICS AND PERCEPTIONS

In Feira de Santana, the quantitative data also indicate that most people rate their local street lighting as either regular or good. However, 25 percent of all interviewees rate local street lighting as terrible, and 9 percent think it is bad.

Figure 3: Street Lighting in Feira de Santana (BA)



According to the Feira de Santa Technical Diagnostic Report, produced in January 2020 by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, Feira de Santana currently has 60.500 lighting points.

The same report mapped all data available on these points, and concluded that no areas in the city are devoid of street lighting services. Nevertheless, the district of Cidade Nova was found to have a lower concentration of lighting points. This finding, however, may have resulted from poor or inaccurate data, as not all lighting points benefited from georeferencing.

Table 3 shows that the vast majority of lighting points in Feira de Santana use sodium technology.

Table 3: Lighting points by technology - Feira de Santana

Technology	Number of lighting points	Percentage of lighting points
Sodium	55,404	91.58%
Metallic vapor	2,848	4.71%
Fluorescent	1,082	1.79%
LED	702	1.16%
Mixed	377	0.62%
Mercury	44	0.07%
Incandescent	30	0.05%
Halogen	13	0.02%

Source: Technical Diagnostic Report produced by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, January 2020.

Table 4 shows the distribution of lighting points by electrical power. Approximately 60 percent of all lamps in Feira de Santana have power equal to or less than 70W.

Table 4: Lighting Points by Electrical Power

Electrical power	Number of lighting points	Percentage of lighting points
Less than or equal to 70W	36,783	60.8%
Over 70W but less than or equal to 150W	6,504	10.8%
Over 150W but less than or equal to 250W	12,490	20.6%
Over 250W	4,723	7.8%

Source: Technical Diagnostic Report produced by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, January 2020.

Based on information recorded in the 2018 Municipal Urban Mobility Plan and on available geographic information on lighting points, this report has made an estimation of the number of points by street type:

Table 5: Number of Lighting Points by Street Type

Street type	Number of lighting points	Percentage of lighting points
Expressway	755	1,2%
Arterial roads	4,047	6.7%
Collecting routes	4,939	8.2%
Local roads	50,759	83.9%
Total	60,500	100%

Source: Technical Diagnostic Report produced by Accenture with the support of CAIXA, the World Bank, IFC, and the GIF, January 2020.

The Electricity Company of the State of Bahia *(Companhia de Eletricidade do Estado da Bahia*—COELBA*)* is responsible for energy distribution in Feira de Santana, while Ghia Engineering (Empresa Ghia Engenharia LTDA) is in charge of operating and maintaining the street lighting grid, including repairs and technical services.

The Feira Iluminada project is one of the initiatives proposed by the Sustainable Urban Mobility Project and executed by the Public Services Secretariat. Under this project, Feira de Santana is currently undergoing a street lighting modernization process. According to the Urban Mobility Portal [1] LED lamps have already been installed in some areas, including Bairro Rua Nova, Bairro Queimadinha, Bairro Feira X, Bairro Tomba, Bairro Santa Mônica, Bairro Kalilândia, Bairro Conceição, Bairro Caseb, Bairro Calumbí, and in some streets in Bairro Gabriela.

At least eight interviewees had noticed the transition to LED lamps and recognized the benefit of that technology.

> **"Street lighting here in the city-at least in the city center-is being replaced with LED. The City Hall has installed LED lamps, and it has improved a lot."**
>
> (Director of the Commercial and Business Association, Feira de Santana) [2]

> **"I believe it has improved a lot. The city has invested in lighting. It seems to be more economical, and I believe it looks better."**
>
> (Teacher, Feira de Santana) [3]

[1] https://mobilidade.feira.br/publicacao/conheca-o-projeto-feira-iluminada-e-a-importancia-para-mobilidade-urbana

[2] "A iluminação aqui na cidade, pelo menos no centro, está sendo modificada para LED. A Prefeitura tem colocado LED e tem melhorado bastante."

[3] "Eu acredito que melhorou bastante. A prefeitura tem investido em iluminação. Parece que é mais econômica. Eu acredito que fica melhor."

7. IMPACTS OF LIGHTING ON CRIME AND SECURITY PERCEPTIONS

According to Kate Painter (1996), the most obvious way in which lighting helps to reduce crime and fear is by increasing visibility and recognition from greater distances. An enhanced line of sight can discourage potential offenders by raising their perceived risk from committing criminal activities. Equally, pedestrians feel safer because they are less at risk of being surprised with an attack, and therefore their fear of the dark is alleviated. In addition, street lighting encourages a more intensive use of public spaces during nighttime, thus increasing circulation. It is important to note as well that street lighting may have stronger effects on certain types of crime. Previous studies have argued that street lighting might have a stronger impact on burglary than on homicide, for instance.

Guidance material published by the U.S. Department of Justice in 2008, however, indicates that improved lighting could either reduce or increase crime. On one hand, better lighting deters potential offenders by increasing their risk of being seen or recognized when committing a crime. On the other hand, the guidance suggests that the increased visibility of potential victims might also help criminals to better assess their vulnerability and the value of any items they might be carrying. Another point to consider is that improved lighting could encourage more people to walk at night, which would increase informal surveillance. However, if lighting lures more people into going out in the evening, the number of homes unoccupied and vulnerable to burglary could increase. According to the author, evaluating the effects of improved street lighting requires researchers to look for both increases and drops in crime (Clarke, 2008).

Figure 4: Hypotheses around Improved Street Lighting and Criminal Activities

The statements collected during the study, however, relate street lighting only with positive outcomes, especially in terms of security. None of the interviewees suggested that it could have adverse effects:

> **"I realize that sometimes [rapes] occur in places with no lighting, or on back roads. It does not happen in urban areas, or paved public roads. Sometimes it happens in remote places, where there is no lighting, since these places are so secluded."** (Police Chief, Feira de Santana)[1]

[1] "Eu percebo que às vezes acontece [crimes de estupro] porque são locais sem iluminação ou porque são às vezes estradas vicinais. Não acontece no perímetro urbano, numa via pública onde há pavimentação. Às vezes acontece em lugares ermos, onde não há iluminação, porque os locais são bem afastados."

> **"It's the outskirts, or larger districts, that in fact deserve more attention from government authorities with regard to lighting. We have no doubt that poor lighting facilitates all types of crime. Crimes against both women and men are facilitated by poor lighting."**
>
> (Chairperson of the Municipal Council for Women's Rights, Aracaju) [1]

In addition to improving security by intimidating perpetrators (due to their fear of being recognized), street lighting also supports police patrolling according to one of the respondents, especially in the peripheries, where streets tend to be narrower and circulations is hampered.

The Atlas of Violence in Brazil (IPEA, 2019) indicates that Aracaju is the 8th most violent capital in Brazil, with an estimated homicide rate of 57.4 in 2017, almost twice the national average (31.6). According to the Atlas, 366 homicides were reported in Aracaju in 2017.

The Atlas of Violence (2019) shows that Feira de Santana recorded 224 homicides in 2017, with an estimated homicide rate of 71.4. Overall, in terms of homicide rates, Feira de Santana and Aracaju rank 28th and 64th, respectively, amongst Brazilian cities with over 100,000 inhabitants [2].

In our quantitative sample, 108 people from both cities together (18 percent) declared that they had been a victim of at least one crime in a public space within the previous 12 months. Five of those had been victims of two types of crime in the same period. Considering all those that declared they had been a victim of crime, 46 percent (52 people) reported a theft, and 46 percent (52 people) reported a robbery. Seven percent (eight people, all of whom were women) said they had suffered sexual harassment).

[1] "São bairros periféricos, grandes bairros, que de fato merecem toda uma atenção do poder público no sentido da iluminação mesmo. Para nós, está comprovado que uma péssima iluminação facilita todo o tipo de crime. O crime contra qualquer mulher e contra qualquer homem facilitaria com a má iluminação e penso que essa deveria ser uma das grandes preocupações do poder público."

[2] Source:https://infograficos.gazetadopovo.com.br/seguranca-publica/atlas-da-violencia-2019-por-municipios/.

Figure 5: Types of Crimes Reported by Respondents within the Last 12 months in Public Spaces (n=113) [1]

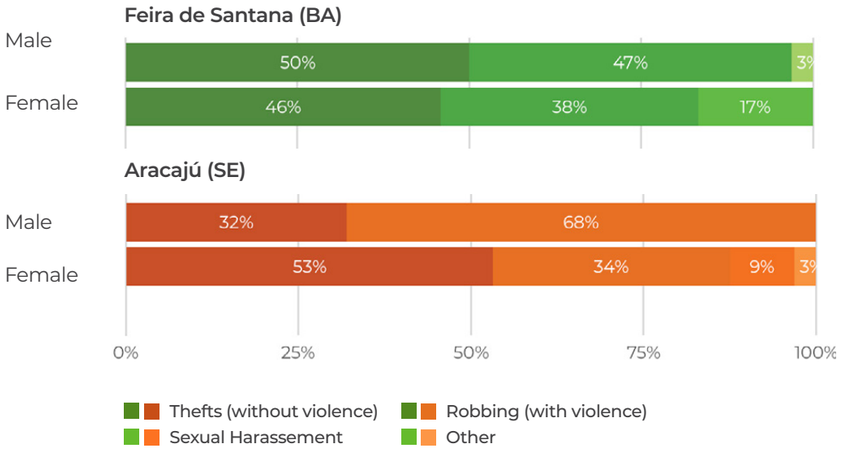
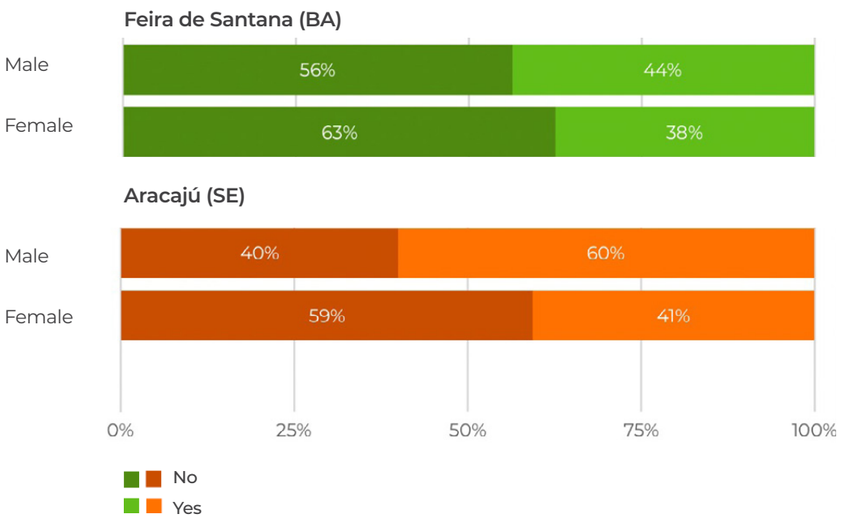


Figure 6: Reported Crimes (n=113)

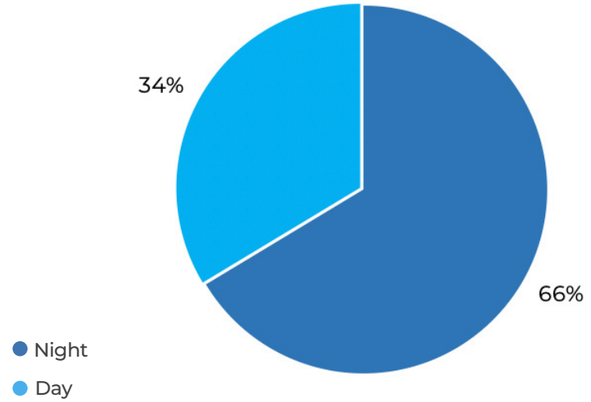


[1] One of the interviewees from Aracaju declared she had been a victim of another type of crime: "assédio". This, however, was considered as sexual harassment in the graph.

The data also show that more than half of the crimes mentioned by the respondents had not been formally reported to the police. Figure 6 also suggests that men tend to report crimes more often than women. It is also interesting to note that, among the seven victims of sexual harassment, only one mentioned that she had filed a police report.

If we consider nighttime as the period between 6 p.m. and 5 a.m., we will see that most crimes were committed during nighttime hours, suggesting that lighting could be affecting security in public spaces.

Figure 7: Crime Occurrences: Daytime vs. Nighttime (n=113)



Sixty-six percent (75 cases) of the crimes recorded in our quantitative study took place during nighttime hours (figure 7). Among those victims, almost 50 percent rated the lighting in the area as terrible or bad (figure 8), and most of them believe that poor lighting had been a contributing factor to the occurrence of those crimes (figure 9).

Figure 8: Evaluation concerning public lighting in locations where crimes occurred (n= 71)

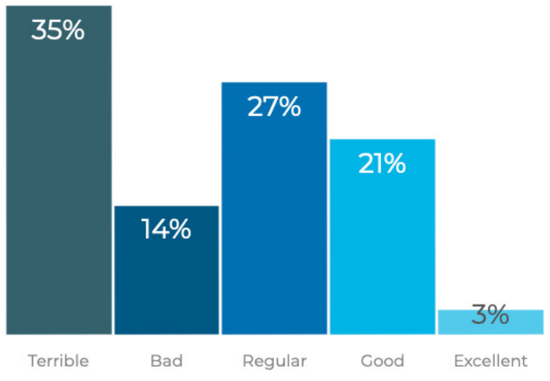
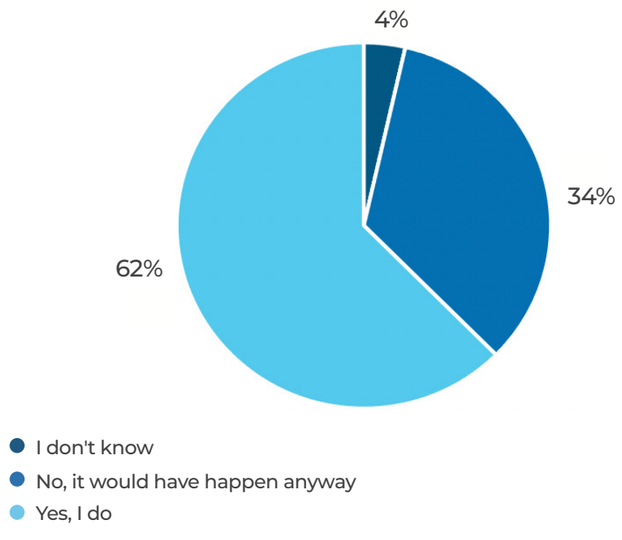


Figure 9: Perceived Link between Lighting and Crime (n=56)



Question asked: Do you think lighting (or its absence) contributed to the crime?

Corroborating this, some police officers participating in the study believe that crimes could actually be facilitated by poor lighting.

> **"It certainly inhibits [crime]. Without a doubt. If a criminal knows that a certain neighborhood has poor lighting, or that a given avenue has little lighting, they know that it will be a good place for them to hide and then attack a victim."**
>
> (Police Chief, Feira de Santana) [1]

> **"The lack of street lighting is a major factor for crime and violence. Among other factors that generate crime and violence, street lighting can be listed as a prevalent and expressive one, including with regard to the feeling of security, because where there is no lighting there is a sense of insecurity. Sometimes, no crime happens, but the feeling that one has is that the place is not safe due to the absence of street lighting."**
>
> (Police Chief, Aracaju) [2]

> **"Wherever there is less lighting, there is more violence; all types of violence."**
>
> (Municipal Police Officer, Aracaju) [3]

[1] Com certeza inibe [crimes]. Não há dúvida. Se o meliante sabe que um determinado bairro tem pouca iluminação, em determinada avenida tem pouca iluminação, vai ser um bom lugar para ele se esconder e surpreender uma vítima."
[2] "A falta da iluminação pública é um grande fator da criminalidade e da violência. Entre outros fatores que geram criminalidade e violência, a iluminação pública pode ser elencada como um fator preponderante e expressivo, inclusive para a sensação de segurança, porque onde não há iluminação se tem a sensação de insegurança. As vezes o crime nem acontece, mas a sensação que se passa é que é um local inseguro por ausência de iluminação pública, o que propicia a ocorrência, inclusive, de mais delitos, porque é mais difícil a fiscalização, é mais difícil prevenir, é mais difícil de visualizar se tem alguma pessoa propensa a cometer um delito."
[3] "Onde tem menos iluminação tem mais violência. E são todas as violências."

In addition, a recent experiment conducted in New York City provides strong evidence that improving street lighting in urban environments may indeed reduce crime in disadvantages areas. (Chalfin, Hansen, Lerner, and Parker, 2019). Another important study argues, however, that better street lighting may improve people's perceived security, rather than reducing crime. A study titled "The Influence of Street Lighting on Crime and Fear of Crime" (1991), for example, compared the situation before and after lighting improvement works in the Borough of Wandsworth, a London district with high crime rates. Although some areas did see a reduction in nighttime crime relative to daytime occurrences (for some types of crime), the overall dominant pattern indicated no significant change. (Atkins, Husain, and Storey, 1991). On the other hand, the authors found that the relighting scheme was extremely popular among residents. They also concluded that there was clear evidence that women's feeling of security when walking alone after dark had improved in the area (Atkins, Husain, and Storey, 1991).

Hence, although we cannot affirm with full certainty that street lighting can indeed reduce the incidence of criminal activities, our quantitative data suggest that it can alleviate people's perceptions of insecurity. In this context, it is important to highlight that perceptions are extremely important because they directly affect people's behavior and quality of life.

A good indicator of security perceptions is obtained by asking people how safe it is to walk on the streets of their own neighborhoods. The following graphs show that Feira de Santana and Aracaju residents feel much safer to walk in their neighborhoods during the day than after dark. We should also note significant gender-based differences in the responses: women feel much less safe than men, both during the day and at night.

Figure 10: Feeling Unsafe While Walking during Daytime

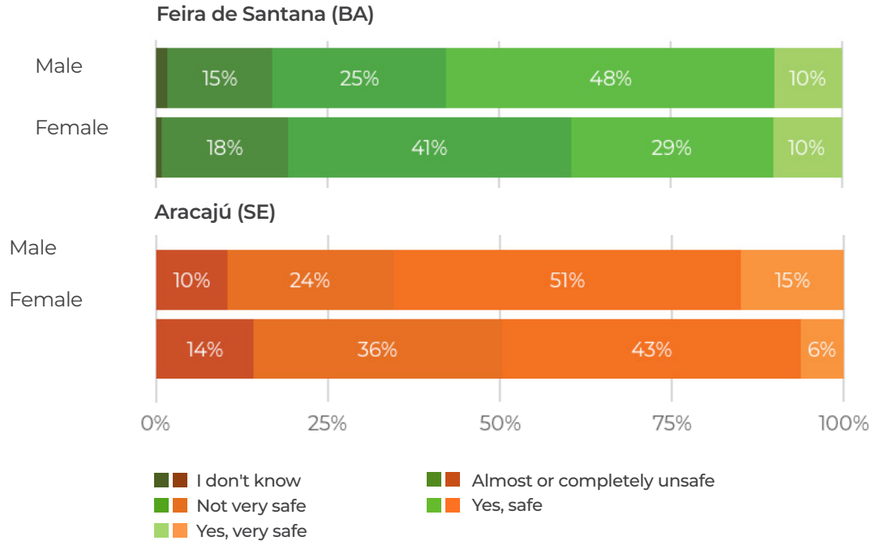
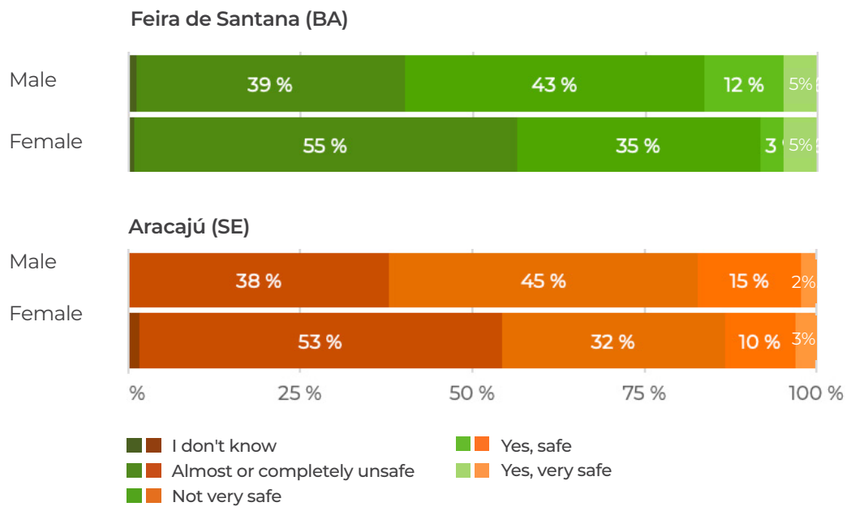
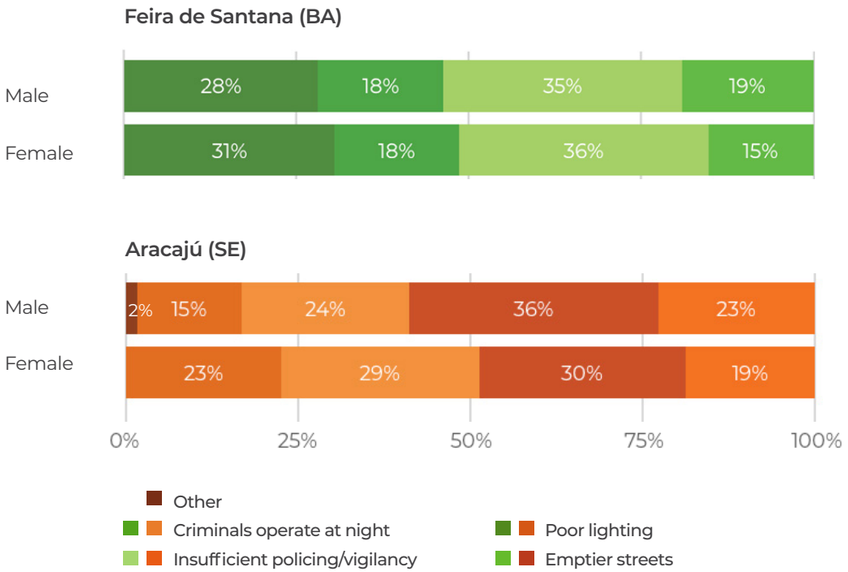


Figure 11: Feeling Unsafe While Walking during Nighttime



Amongst those declaring that they felt less safe to walk on the streets during nighttime hours, the most frequently cited reason was that streets were emptier after dark, followed by poor lighting (figure 12).

Figure 12: Main reason why people feel more insecure to walk at night than day (n=381)



Although we cannot be sure if lighting does indeed reduce criminal activity, as previously mentioned, we can relate it to more positive perceptions of security. This is, by itself, a benefit provided by street lighting.

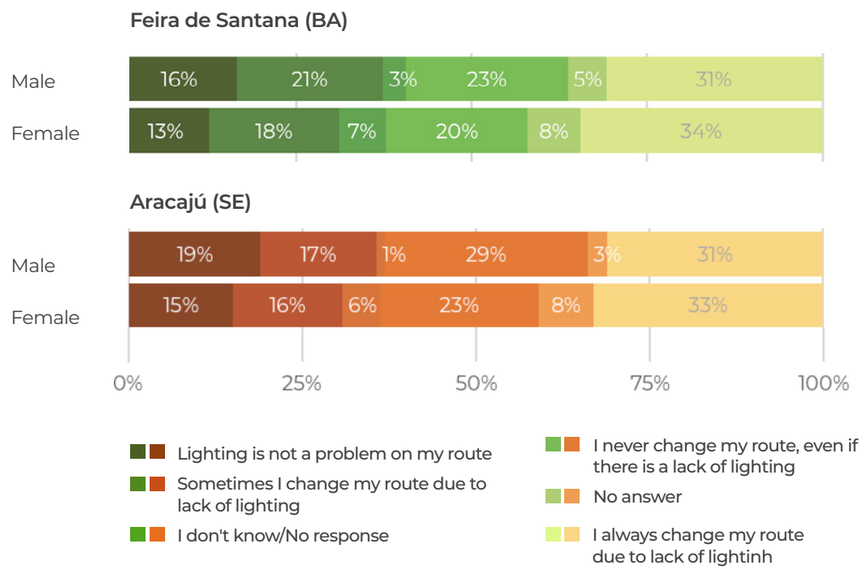
Because perceptions are very much associated with behavior, a potential outcome of poor lighting is that people may change their usual home/work/school routes after dark.

"[Cyclists] report some fear in connection with lighting, and say it is a very close link. 'I take a longer route because it is better lit' or 'if there are road maintenance works on a route, I don't use it'. This is especially true for those who ride at night."

(Environment Council for Semear Society, Aracaju) [1]

Quantitative data show that 32 percent of people in both cities change their route due to poor lighting, while 16 percent declared that lighting does not affect their route choices after dark (figure 13).

Figure 13: Changes of routes at night because of lighting (n=602)



[1] "[Ciclistas] relatam a questão do medo com a questão da iluminação. É muito próxima essa relação. 'Eu uso outro caminho que é mais longo porque o outro caminho é mais iluminado' ou 'porque aquele trecho está em manutenção, aquele trecho eu não uso'. Especialmente aqueles que pedalam à noite."

Another hypothesis involving crime and street lighting is that it may only displace criminal activities instead of reducing them. If this is the case, it is important to also examine different types of crime, instead of crime in general. Illicit drug trafficking was identified by one of the respondents as a security issue in Aracaju. The occurrence of this specific type of crime may vary according to lighting failures or lighting improvement, while shoplifting, harassment, and other crimes may not be as sensitive to street lighting.

> **"I believe so. The low quality of lighting motivates [the occurrence of crimes]. It usually takes place in areas where young people who are involved in drug trafficking meet up, and they stay there to sell drugs and commit small thefts."**
>
> (Education Secretariat Adviser, State of Sergipe) [1]

Furthermore, there is little doubt as to whether the effects of street lighting could be enhanced when applied in conjunction with other environmental improvements, such as closed-circuit television cameras (CCTV) (Farrington; Welsh, 2002). This applies both to Aracaju and Feira de Santana.

> **"What I think inhibits [crime] is the presence of the police on the street [...] If street policing is effective, the number of crimes-rape, theft or any other type-(will drop); the presence of the police on the streets will inhibit offenders."**
>
> (Police Chief, Feira de Santana) [2]

> **"The lack of lighting is an aggravating factor, but a police force is still necessary."** (Police Officer, Aracaju) [3]

[1] "Acredito que sim. Que a baixa qualidade de iluminação propicia [a ocorrência de crimes]. Geralmente são locais onde os jovens que estão envolvidos com tráfico de drogas se concentram e ali eles ficam para oferecer drogas e praticar pequenos roubos."
[2] "O que eu acho que inibe a conduta [de crimes] é a presença da polícia nas ruas [...] Se existe um policiamento efetivo nas ruas, com certeza esse número de crimes, seja estupro ou roubo ou qualquer outro tipo, a presença da polícia na rua vai inibir a conduta do meliante."
[3] "A falta de iluminação é um agravante, mas ainda assim, a força policial é necessária."

Some respondents mentioned specific initiatives, including investments in surveillance technologies in Feira de Santana. However, there still seems to be a lot of room for improvement in this area.

> **"The police could invest in a more modern and 'electronic' surveillance system. But this comes with a cost. The City Hall invested in some cameras for the city, but in addition to installation and maintenance costs, you have the problem of vandalism. [...] We have already tried to create a complaint channel through WhatsApp, and develop a reporting app that does not reveal whistleblowers' number or identity. These investments are the ones that are still lacking."**
>
> (Police Officer, Feira de Santana) [1]

Nonetheless, in addition to surveillance equipment and personnel, such as security cameras and police patrolling, other factors may also influence crime. Both Aracaju and Feira de Santana have multiple areas with high levels of economic and social vulnerability, and this may also be an important cause of criminal activity. Not only does poverty often instigate misconduct, peripheries are also usually isolated areas with difficult access, making it harder to develop and implement preventive actions.

> **"In some specific places, it can be difficult, especially during the rainy season, for the police to use their vehicles for effective patrolling due to the lack of basic sanitation infrastructure."**
>
> (Police Chief, Aracaju) [2]

[1] "Poderia a polícia investir numa segurança mais moderna, mais eletrônica. Mas isso gera um custo. A prefeitura investiu em algumas câmeras na cidade, mas além do custo de instalação e manutenção, você tem o problema do vandalismo. [...] Já tentamos fazer, através de Whatsapp uma via de denúncia. A gente já tentou fazer aplicativo voltado à denúncia que não mostrasse o número da pessoa, o nome da pessoa que estivesse denunciando. São esses investimentos que ainda faltam."
[2] "Em alguns locais específicos, existe uma certa dificuldade, especialmente nos períodos de chuva para o acesso de viatura para fazer o policiamento preventivo, por conta do saneamento básico."

“Shockingly, Feira de Santana, in addition to poor lighting, also has very few neighborhoods with basic sanitation. So, most houses in Feira have septic tanks. Open sewers lead to very serious public health problem. In fact, Feira has one of the highest rates of chikungunya and dengue fever.”

(Member of Women’s NGO, Feira de Santana) [1]

7.1. Security Perceptions and Violence against Women

Caroline Moser (2010) argues that infrastructure solutions are only one of a range of interventions that should be implemented, recognizing the importance of building partnerships among governments, civil society organizations and communities in order to reduce violence. In addition, different types of violence must be documented, made visible, and prevented in urban planning, especially gender-based violence. Falú (2011) points out that, due to real and perceived crime and violence, the concept of citizen security [2] is broadened to include women’s experiences, incorporating their right to a life without violence.

“To say that women can move freely, like men do, is untrue. Women avoid going out at night, women avoid wearing skirts, women avoid going out. And I think that, among women, those that are most affected by lighting are the ones living in the outskirts, who are, for the most part, black women.” (Member of Women’s NGO, Feira de Santana)

In addition, urban security issues do not affect all women equally. Gender inequality intersects with other forms of discrimination and disadvantage—such as age, disability, sex, ethnicity, religion, socioeconomic status and other factors—which may increase the risk, severity or frequency of sexual harassment and other forms of sexual violence against women and girls in private and public spaces (UN Women, 2020). In other words, exclusion, poverty, and some identity features are also important determining factors. If, on top of gender, we add race and social class as a factor of vulnerability, we find that poor black women living in the periphery—that, is, in areas less served by urban infrastructure, with little diversity of activities and services—are the most vulnerable group (ITDP, 2018). When we apply this to the context of Aracaju and Feira de Santana, we find that the responses collected support the idea that women from the outskirts are more strongly affected by a potential lack of street lighting than women in other areas.

The feeling of insecurity is one of the most important obstacles to women’s autonomy. The violence experienced or perceived by women in public spaces, though, is not the only dimension of violence that they face. The lack of accessible, effective and gender-sensitive public services, including street lighting, housing, public transport, policing, security, health, and violence response services (shelters and other facilities that treat and provide legal support to rape victims) contributes significantly to women’s lack of physical integrity. By not delivering these universal public services, States violate human rights principles and reinforce gender inequalities, including violence against women (ActionAid, 2017).

Harassment can take various forms, such as verbal harassment (catcalling or unwanted teasing); visual harassment (including leering, staring and indecent exposure); and groping or other

[1] “Feira, assustadoramente, além de pouca iluminação também tem pouquíssimos bairros que tem saneamento básico. Então a maioria das casas em Feira possuem fossas. Existe um problema muito grande com saúde pública, esgoto à céu aberto. Inclusive Feira tem um dos maiores índices de dengue e chikungunya.”

[2] The term citizen security emerged as a concept in Latin America when governments made the transition to democracy, as a way to distinguish the concept of security in a democracy from the notion of security under earlier authoritarian regimes (IACHR, 2009). Thus, citizen security is defined as the capacity of the State, in partnership with the private sector, individuals, academia, community associations, neighborhoods, and citizens to render and coproduce a framework for protecting the life and cultural heritage of its citizens, allowing them to live together peacefully and free from fear, in order to achieve a better quality of life (Chinchilla, and Vorndran, 2018). Thus, incorporating the perspective of women's rights into the concept of citizen security implies the responsibility to address violence and crime in both private and public spheres (Falú, 2011)

forms of touching. Harassment deeply affects women and reduces their confidence, reducing their ability to move freely in public places. In addition, it influences their decisions to take up educational opportunities, join the labor market, or pursue or accept specific types of jobs (Allen, and Vanderschuren, 2016).

Data from the 2017 Public Security Yearbook, published by the Brazilian Forum on Public Security, reveal gender inequalities in the crimes committed against men and women. Women are most vulnerable to rape, assault and robbery, while men are more exposed to robbery, murder and homicide. While the homicide rate among men is 90 per 100,000 people, the rate for women is 10 per 100,000. Homicide victims in Brazil also have an age and race profile: most victims are black youths aged 15 to 24. Men are also the main perpetrators of crime, a fact that is supported by the prison population profile, which is 93 percent male.

The maps below show gender-based crime [3] statistics registered by the Civil Police in Feira de Santana and Aracaju. All these crimes were committed during nighttime hours, and the results are expressed as crime rate per 100 inhabitants. The color schemes in the tables and maps below act as intensity indicators (red to green).

Table 6: Crimes Against Women in Public Spaces in Aracaju - Evening and Night (January 2019 to July 2020)

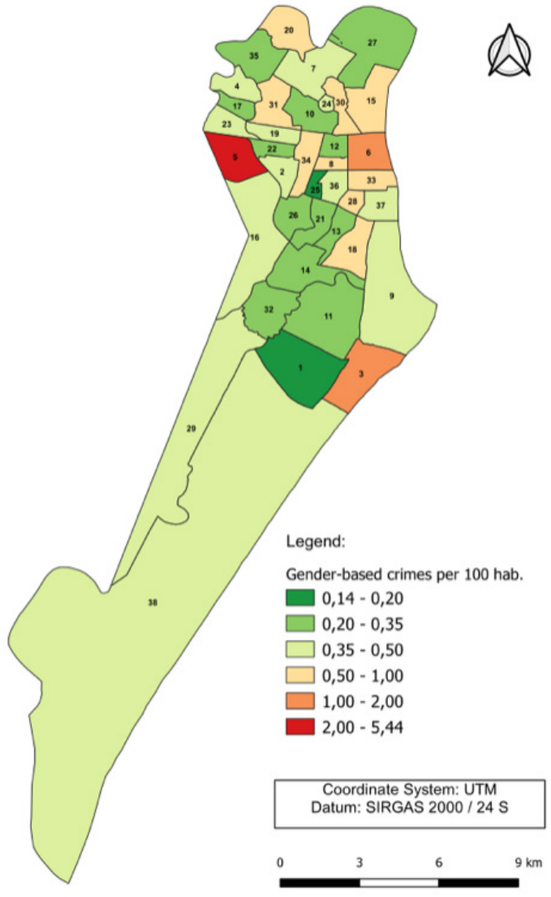
Code in the Map	Neighborhood	Gender-based Crimes that occurred during the Evening/ Night	Number of Inhabitants	Gender-Based Crimes per 100 Inhabitants
1	AEROPORTO	15	10,571	0.14
4	BUGIU	67	15,870	0.42
2	AMÉRICA	54	11,799	0.46
3	ATALAIA	184	17,773	1.04
5	CAPUCHO	52	956	5.44
6	CENTRO	125	7,571	1.65
7	CIDADE NOVA	131	29,586	0.44
8	CIRURGIA	33	5,349	0.62
9	COROA DO MEIO	77	18,871	0.41
10	DEZOITO DO FORTE	69	22,251	0.31
11	FAROLÂNDIA	92	38,257	0.24
12	GETÚLIO VARGAS	19	6,587	0.29
13	GRAGERÚ	38	17,413	0.22
14	INÁCIO BARBOSA	34	13,887	0.24
15	INDUSTRIAL	95	18,007	0.53
16	JABOTIANA	69	17,157	0.40
17	JARDIM CENTENÁRIO	43	14,214	0.30
18	JARDINS	47	7,126	0.66
19	JOSÉ CONRADO DE ARAÚJO	51	12,983	0.39
20	LAMARÃO	56	8,983	0.62
21	LUZIA	52	20,430	0.25
22	NOVO PARAÍSO	25	11,134	0.22
23	OLARIA	71	17,188	0.41
24	PALESTINA	21	4,340	0.48
25	PEREIRA LOBO	11	5,942	0.19
26	PONTO NOVO	54	22,762	0.24
27	PORTO DANTAS	36	10,858	0.33
28	SALGADO FILHO	31	3,992	0.78
29	SANTA MARIA	170	34,485	0.49
30	SANTO ANTÔNIO	66	12,459	0.53
31	SANTOS DUMONT	172	25,808	0.67
32	SÃO CONRADO	72	30,675	0.23
33	SÃO JOSÉ	35	5,587	0.63
34	SIQUEIRA CAMPOS	79	14,525	0.54
35	SOLEDADE	23	9,484	0.24
36	SUÍÇA	51	11,051	0.46
37	TREZE DE JULHO	36	8,328	0.43
38	ZONA DE EXPANSÃO	93	26,015	0.36
		2,449	571,173	0.43

Source: Secretaria de Estado de Segurança Pública do Estado de Sergipe – Superintendência da Polícia Civil – Coordenadoria de Estatística e Análise Criminal – CEACrim.

[3] See Annex 6 for types of crimes classified as usual crimes committed against women.

Based on police statistics, we can identify Capucho as the most dangerous area for women in Aracaju, followed by the City Center and Atalaia. Geographically, we can see from the map that all these areas are located on the edges of the city, which, in Brazil, tend to be less safe.

Figure 14: Aracaju Heat Map. Crimes Against Women in Public Spaces in Aracaju, Evening and Night (January 2019 to July 2020)



In Feira de Santana, the districts with the most crimes against women, taking population into account, are Distrito de Humildes, Lagoa Grande and Limoeiro.

Table 7: Crimes Against Women in Public Spaces in Feira de Santana, Evening and Night

Code in the Map	Neighborhood	Gender-based Reported Crimes that occurred during the Evening/ Night	Number of Inhabitants	Gender-Based Reported Crime per 100 Inhabitants
20	DISTRITO DE HUMILDES	11	13,462	0.08
29	LAGOA GRANDE	3	4,393	0.07
31	LIMOEIRO	2	3,393	0.06
35	NOVO HORIZONTE	2	3,333	0.06
42	PONTO CENTRAL	4	7,221	0.06
46	SANTO ANTÔNIO DOS PRAZERES	3	5,566	0.05
3	ASA BRANCA	2	5,354	0.04
6	BRASÍLIA	8	21,168	0.04
8	CAMPO DO GADO NOVO	1	2,471	0.04
12	CENTRO	4	11,382	0.04
36	OLHOS D'ÁGUA	2	5,559	0.04
49	SIM	1	2,700	0.04
50	SOBRADINHO	2	4,579	0.04
18	DISTRITO DE BONFIM DA FEIRA	1	3,433	0.03
52	TOMBA	16	55,007	0.03
4	AVIÁRIO	2	11,912	0.02
5	BARAÚNA	2	8,093	0.02
24	DISTRITO DE MATINHA	2	8,855	0.02
27	JARDIM ACÁCIA	2	9,009	0.02
30	LAGOA SALGADA	1	5,624	0.02
37	PAMPALONA	1	6,002	0.02
38	PAPAGAIO	1	6,657	0.02

Code in the Map	Neighborhood	Gender-based Reported Crimes that occurred during the Evening/ Night	Number of Inhabitants	Gender-Based Reported Crime per 100 Inhabitants
11	CASEB	1	10,982	0.01
14	CIDADE NOVA	1	9,974	0.01
16	CONCEIÇÃO	2	21,694	0.01
26	GABRIELA	1	17,618	0.01
28	JARDIM CRUZEIRO	1	14,694	0.01
32	MANGABEIRA	2	20,819	0.01
41	PEDRA DO DESCANSO	1	11,156	0.01
43	QUEIMADINHA	1	19,203	0.01
44	RUA NOVA	1	13,078	0.01
45	SANTA MONICA	1	11,617	0.01
47	SÃO JOÃO (old Campo do Gado Velho)	1	10,239	0.01
1	35° BI	0	5,746	0
2	AEROPORTO	0	648	0
10	CAPUCHINHOS	0	3,216	0
13	CHÁCARA SÃO COSME	0	4,283	0
15	CIS	0	7,887	0
17	CRUZEIRO	0	3,104	0
19	DISTRITO DE GOVERNADOR DR. JOÃO DURVAL CARNEIRO	0	3,804	0
21	DISTRITO DE JAGUARA	0	5,051	0
22	DISTRITO DE JAÍBA	0	4,539	0
23	DISTRITO DE MARIA QUITÉRIA	0	13,903	0
25	DISTRITO DE TIQUARUÇU	0	3,923	0
33	MUCHILA	0	22,496	0
34	NOVA ESPERANÇA	0	1,797	0
39	PARQUE GETÚLIO VARGAS	0	3,023	0
40	PARQUE IPÊ	0	16,469	0
48	SERRARIA BRASIL	0	8,368	0
51	SUBAE	0	3,677	0

Figure 15: Feira de Santana Heat Map. Crimes Against Women in Public Spaces in Feira de Santana, Evening and Night

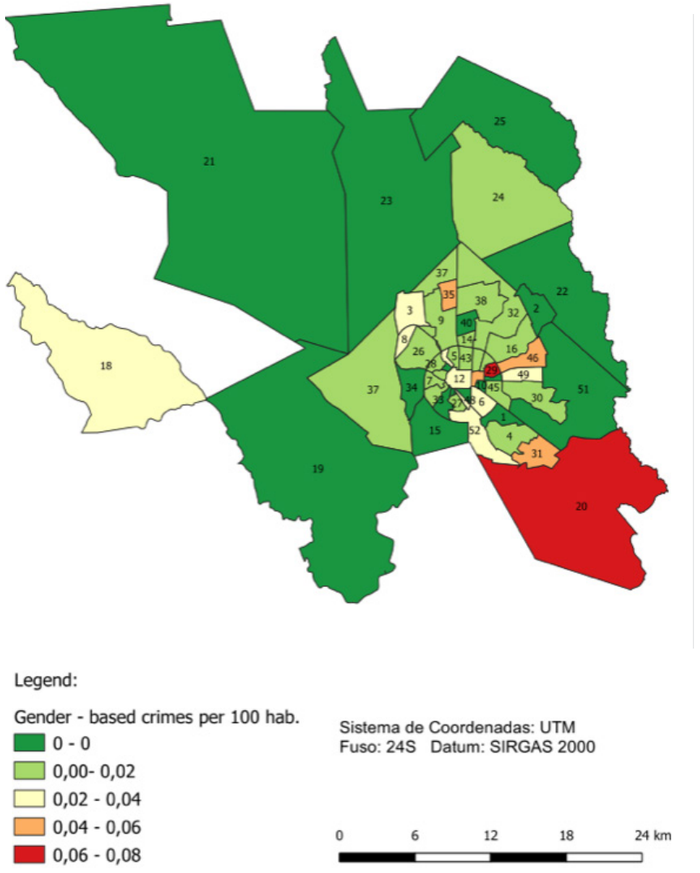
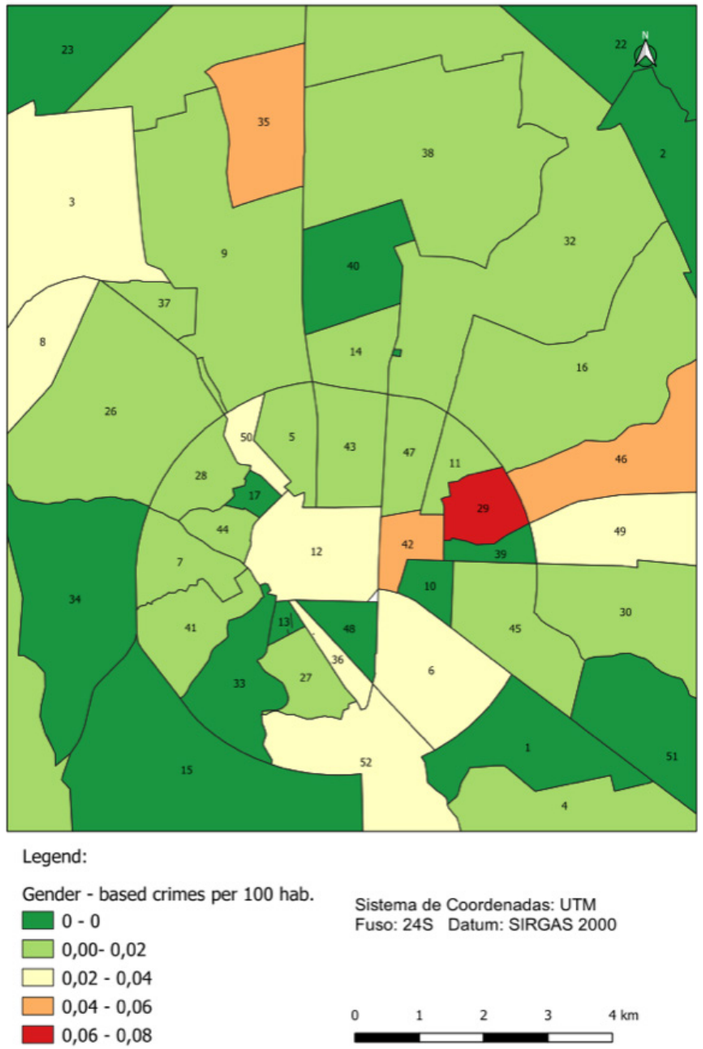


Figure 16: Central Feira de Santana Heat Map. Crimes Against Women in Public Spaces in Feira de Santana, Evening and Night



7.2. Context in the Outskirts

Cities have been systematically built in a way that reinforces inequalities linked to social class, race, gender, age and disability. As such, they limit the coexistence and circulation of some groups, and even more so when these inequalities intersect. Brazilian cities are spaces of extreme inequality, and public investment and urban infrastructure often prioritize high-income districts. Poor-quality public services, such as street lighting, transportation and housing, directly affect the lives of millions of people—poor women, in particular (ActionAid, 2017).

Many Brazilian cities have a high concentration of opportunities in their central areas—jobs, services, health, education, leisure, and culture. However, public transportation systems are inadequate or precarious, and poorer people live in peripheral neighborhoods (ITDP, 2018).

Considering Feira de Santana and Aracaju, the statements collected during this study and other available data show that both municipalities suffer from socioeconomic inequality, which is also reflected in local differences in crime incidence. Concerning lighting, in particular, even though the diagnostic study developed by Accenture (see section 4) shows that lighting points are fairly well distributed throughout both cities, some responses suggest that street lighting is worse in peripheries than in wealthier areas.

> **"I think that the entire periphery today is in need of street lighting."** (Municipal Police Officer, Aracaju)[1]

> **"When you talk about street lighting, public safety, health and education, you are looking at class division. There is no way to escape it. In some neighborhoods in the outskirts, in the periphery,**

[1] "Eu acho que toda a região da periferia, hoje, se você for ver, tem necessidade e iluminação pública."

maintenance is not the same as in the South Zone, or in higher-class neighborhoods.[...] Santa Maria, Soledade, Santos Dumont, Bugio, Coqueiral, Bairro América: in these peripheral areas, we know that if public authorities had a more 'sensitive' approach, some things might not happen."

(Member of the Women's Rights Commission, Aracaju) [2]

"I teach in a very peripheral neighborhood here in Feira de Santana, in a district that is known as Aviário. It has very high violence rates, and drug trafficking too, run by two very strong criminal groups. The area is in great need of street lighting, and support from public authorities."

(Teacher, Feira de Santana) [3]

Lighting differences between neighborhoods seem to go beyond street lighting—they also affect bus stops.

"Bus stops are well lit downtown, in neighborhoods with tourist attractions, along the beachfront. They meet people's expectations. [...] In the outskirts, we find a similar situation in some places, on the main roads, or the most accessed roads. But some places are not even reached by public transportation as they have no street lighting."

(Police Chief, Aracaju) [4]

[2] "Quando você fala em iluminação pública, em segurança pública, quando você fala em saúde e educação você vai para o recorte de classe. Não tem como fugir. Nos bairros, nos subúrbios, nas periferias, o zelo não é o mesmo, como na Zona Sul, nos bairros de classe mais alta. [...] Santa Maria, Soledade, Santos Dummont, Bugio, Coqueiral, o Bairro América. São bairros de periferia que a gente sabe se houvesse um olhar mais 'delicado' da gestão, algumas coisas poderiam não acontecer.

[3] "Eu ensino num bairro bem periférico aqui de Feira de Santana, um bairro que é conhecido como Aviário. O bairro tem um problema de violência muito alta. Lá existe tráfico de drogas, existe duas facções fortes. É um bairro que tem uma carência muito grande na questão da iluminação pública, que necessita de um apoio do poder público."

[4] "Os pontos são bem iluminados no centro, nos bairros com pontos turísticos, na orla da praia. Eles estão correspondendo a expectativa da população. [...] Na periferia é aquela situação, em alguns locais. Nas vias principais, nas vias mais acessadas. Mas quando chega naqueles locais, talvez o coletivo nem chegue nos pontos onde não tem iluminação pública."

Recent police data (from January 2019 to July 2020) show that Capucho is by far the district with the highest crime incidence in Aracaju, followed by the City Center and Atalaia[5]. As mentioned in the previous section, when looking exclusively at crimes committed against women (table 6), Capucho was also the worst area.

Table 8: Crimes in Public Spaces in Aracaju - Evening and Night

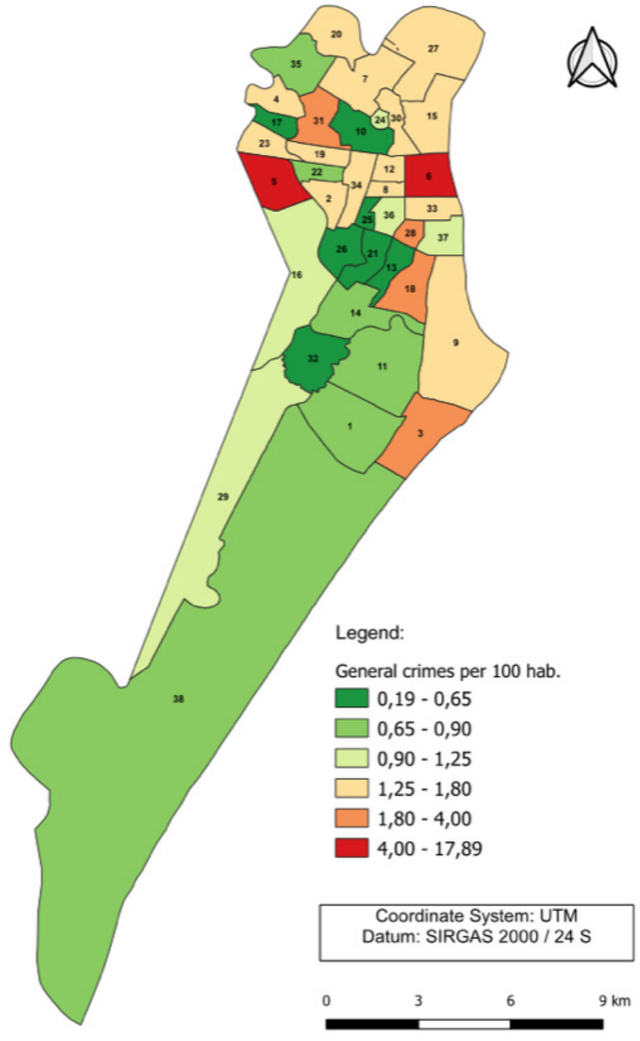
Code in the Map	Neighborhood	Crimes that occurred during the Evening/ Night	Number of Inhabitants	Crimes per 100 Inhabitants
5	CAPUCHO	171	956	17.89
6	CENTRO	440	7,571	5.81
3	ATALAIA	537	17,773	3.02
31	SANTOS DUMONT	604	25,808	2.34
28	SALGADO FILHO	79	3,992	1.98
18	JARDINS	140	7,126	1.96
34	SIQUEIRA CAMPOS	255	14,525	1.76
33	SÃO JOSÉ	96	5,587	1.72
20	LAMARÃO	150	8,983	1.67
15	INDUSTRIAL	273	18,007	1.52
8	CIRURGIA	79	5,349	1.48
4	BUGIU	226	15,870	1.42
23	OLARIA	244	17,188	1.42
12	GETÚLIO VARGAS	91	6,587	1.38
19	JOSÉ CONRADO DE ARAÚJO	177	12,983	1.36
2	AMÉRICA	156	11,799	1.32
7	CIDADE NOVA	388	29,586	1.31
30	SANTO ANTÔNIO	160	12,459	1.28
9	COROA DO MEIO	238	18,871	1.26

[5] See Annex 6 for a list of the crimes included in these tables.

Code in the Map	Neighborhood	Crimes that occurred during the Evening/ Night	Number of Inhabitants	Crimes per 100 Inhabitants
27	PORTO DANTAS	137	10,858	1.26
29	SANTA MARIA	427	34,485	1.24
24	PALESTINA	47	4,340	1.08
16	JABOTIANA	173	17,157	1.01
37	TREZE DE JULHO	83	8,328	1
36	SUÍÇA	106	11,051	0.96
14	INÁCIO BARBOSA	123	13,887	0.89
38	ZONA DE EXPANSÃO	226	26,015	0.87
11	FAROLÂNDIA	293	38,257	0.77
22	NOVO PARAÍSO	85	11,134	0.76
1	AEROPORTO	74	10,571	0.7
35	SOLEDADE	63	9,484	0.66
17	JARDIM CENTENÁRIO	93	14,214	0.65
13	GRAGERÚ	110	17,413	0.63
32	SÃO CONRADO	182	30,675	0.59
26	PONTO NOVO	132	22,762	0.58
21	LUZIA	114	20,430	0.56
25	PEREIRA LOBO	27	5,942	0.45
10	DEZOITO DO FORTE	43	22,251	0.19

Source: Secretaria de Estado de Segurança Pública do Estado de Sergipe – Superintendência da Polícia Civil – Coordenadoria de Estatística e Análise Criminal - CEACrim

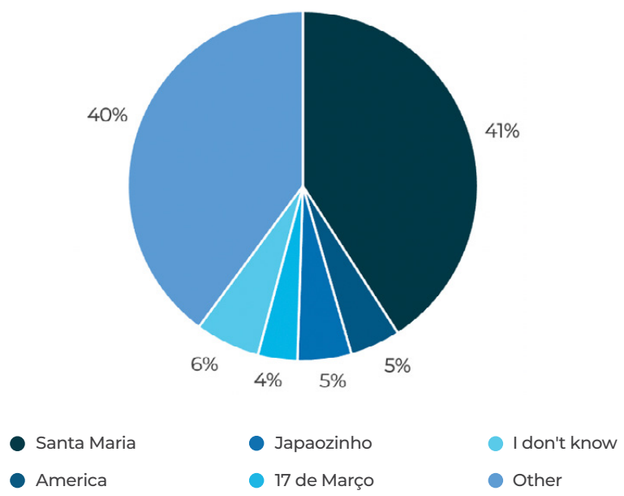
Figure 17: Aracaju Heat Map. Crimes in Public Spaces in Aracaju, Evening and Night



The table above shows that crime is deeply concentrated in specific parts of the city, while other areas, such as Pereira Lobo and Dezoito do Forte, can be considered relatively safe, since crime rates are a lot lower.

Respondents in the quantitative study, on the other hand, perceive Santa Maria as the worst neighborhood in terms of security. This significant difference between perceptions and real crime occurrence might be due to the fact that Santa Maria historically had high crime rates, and has only managed to improve them in recent years. After reviewing data from the State Secretariat for Public Security and the Coordination Unit of Criminal Statistics and Analysis (CEACRIM), Fonseca da Silva (2019) calculated homicide rates in Aracaju between 2010 and 2015, distributed by neighborhoods. Through a georeferencing process, he found that the districts of Santa Maria, City Center and Capucho had the highest incidence of homicides in that period.

Figure 18: Perception of Unsafe Neighborhoods in Aracaju (percentage of respondents; n=301)



We cannot be fully certain of which neighborhoods are the worst in terms of crime, since not all crime occurrences are recorded by the police due to undernotification. However, we can draw a clear conclusion from these discrepancies between police statistics and perceptions: the latter can be affected by an area's track record of violence, as might be the case for Aracaju.

Concerning Feira de Santana, table 10 below also lists the crimes registered by the police divided by districts.

Table 9: Crimes in Public Spaces in Feira de Santana, Evening and Night

Code in the Map	Neighborhood	Crimes that occurred during the Evening/Night	Number of Inhabitants	Crimes per 100 Inhabitants
12	CENTRO	116	11,382	1.019
49	SIM	25	2,700	0.926
51	SUBAE	18	3,677	0.49
10	CAPUCHINHOS	11	3,216	0.342
50	SOBRADINHO	15	4,579	0.328
2	AEROPORTO	2	648	0.309
20	DISTRITO DE HUMILDES	40	13,462	0.297
47	SÃO JOÃO (old Campo do Gado Velho)	30	10,239	0.293
38	PAPAGAIO	18	6,657	0.27
15	CIS	20	7,887	0.254
46	SANTO ANTÔNIO DOS PRAZERES	14	5,566	0.252
3	ASA BRANCA	13	5,354	0.243
52	TOMBA	131	55,007	0.238
45	SANTA MONICA	27	11,617	0.232
42	PONTO CENTRAL	15	7,221	0.208
31	LIMOEIRO	7	3,393	0.206
8	CAMPO DO GADO NOVO	5	2,471	0.202

Code in the Map	Neighborhood	Crimes that occurred during the Evening/Night	Number of Inhabitants	Crimes per 100 Inhabitants
32	MANGABEIRA	40	20,819	0.192
26	GABRIELA	32	17,618	0.182
14	CIDADE NOVA	17	9,974	0.17
33	MUCHILA	38	22,496	0.169
16	CONCEIÇÃO	36	21,694	0.166
11	CASEB	18	10,982	0.164
4	AVIÁRIO	18	11,912	0.151
5	BARAÚNA	12	8,093	0.148
18	DISTRITO DE BONFIM DA FEIRA	5	3,433	0.146
6	BRASÍLIA	29	21,168	0.137
24	DISTRITO DE MATINHA	12	8,855	0.136
37	PAMPALONA	8	6,002	0.133
39	PARQUE GETÚLIO VARGAS	4	3,023	0.132
19	DISTRITO DE GOVERNADOR DR. JOÃO DURVAL CARNEIRO	5	3,804	0.131
1	35° BI	7	5,746	0.122
35	NOVO HORIZONTE	4	3,333	0.12
29	LAGOA GRANDE	5	4,393	0.114
34	NOVA ESPERANÇA	2	1,797	0.111
36	OLHOS D'ÁGUA	6	5,559	0.108
28	JARDIM CRUZEIRO	15	14,694	0.102
17	CRUZEIRO	3	3,104	0.097
40	PARQUE IPÊ	16	16,469	0.097
7	CALUMBI	19	19,858	0.096
48	SERRARIA BRASIL	8	8,368	0.096
43	QUEIMADINHA	18	19,203	0.094
27	JARDIM ACÁCIA	8	9,009	0.089
30	LAGOA SALGADA	5	5,624	0.089

Code in the Map	Neighborhood	Crimes that occurred during the Evening/Night	Number of Inhabitants	Crimes per 100 Inhabitants
30	LAGOA SALGADA	5	5,624	0.089
22	DISTRITO DE JAÍBA	4	4,539	0.088
25	DISTRITO DE TIQUARUÇU	3	3,923	0.076
41	PEDRA DO DESCANSO	7	11,156	0.063
23	DISTRITO DE MARIA QUITÉRIA	7	13,903	0.05
44	RUA NOVA	6	13,078	0.046
9	CAMPO LIMPO	21	47,060	0.045
13	CHÁCARA SAO COSME	1	4,283	0.023
21	DISTRITO DE JAGUARA	0	5,051	0

Figure 19: Feira de Santana Heat Map. Crimes in Public Spaces in Feira de Santana, Evening and Night

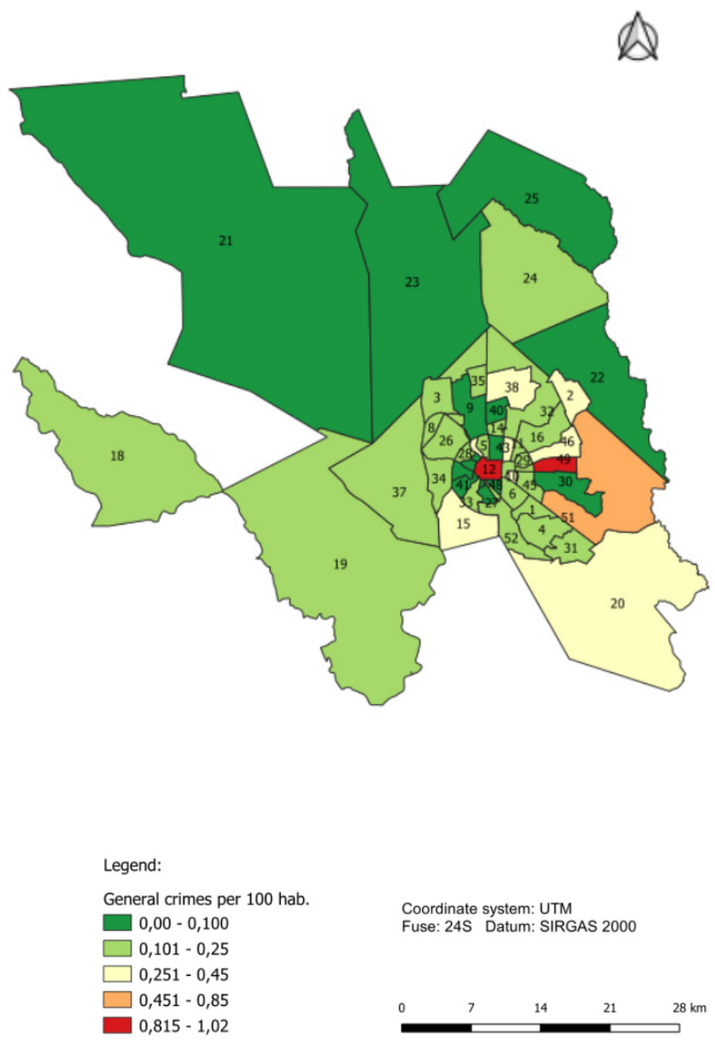
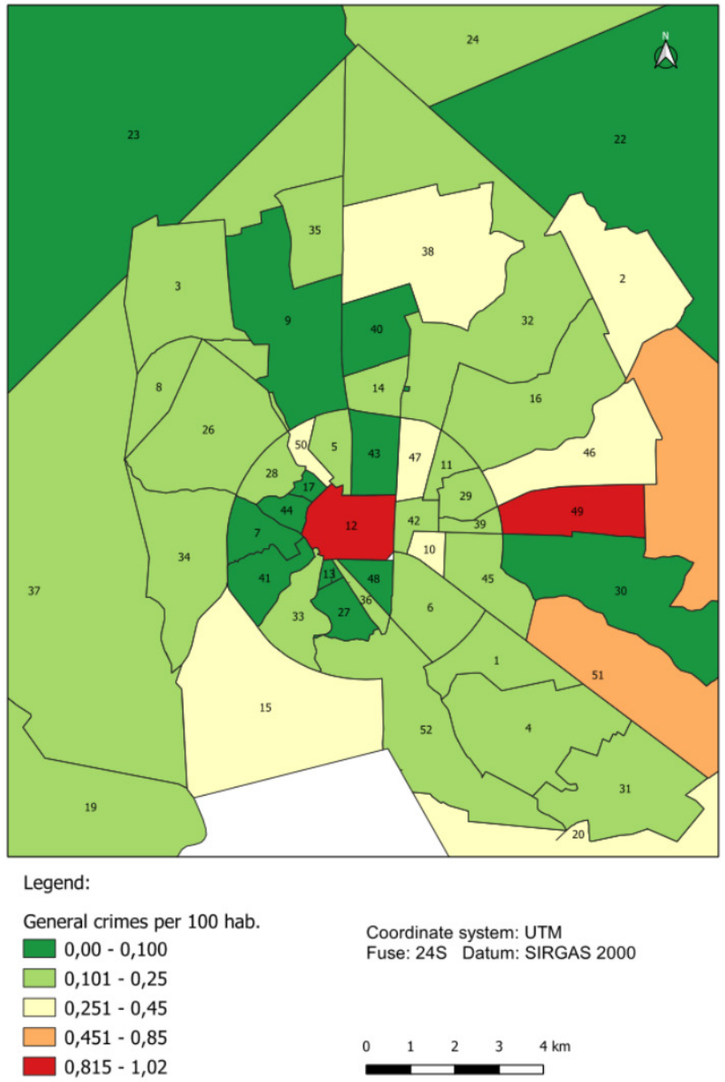
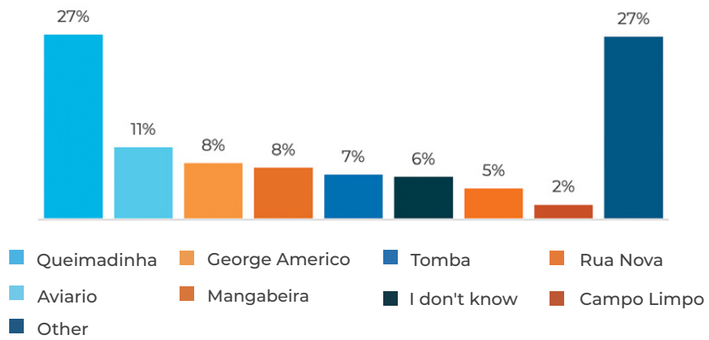


Figure 20: Central Feira de Santana Heat Map. Crimes in Public Spaces in Feira de Santana, Evening and Night



Based on police data, we can rank the City Center and SIM as the two worst areas in Feira de Santana in terms of crime. Perceptions gathered during our quantitative and qualitative studies rated Queimadinha, Aviário and George Américo as the three worst neighborhoods in terms of security.

Figura 21: 1st Neighborhood Mentioned (Feira de Santana) n=301



"[The situation in peripheral neighborhoods is] extremely precarious. We have entire streets without lighting in Feira de Santana. [...] In George Américo, which is the [neighborhood] where we used to go very frequently, at least once a week, the street of the association where we serve women only has one lamp to illuminate the entire street. And this pattern repeats itself throughout the entire neighborhood. It is very common to go to some areas in Feira de Santana that only have streetlights on the main street, and not on the other streets."

(Member of Women's NGO, Feira de Santana) [1]

1 "Extremamente precária [a situação de bairros periféricos]. A gente tem ruas inteiras sem iluminação em Feira de Santana. [...] O Jorge Américo, que é o [bairro] que nós íamos muito, pelo menos uma vez por semana, a rua da associação onde a gente atende as mulheres só tem uma única lâmpada para iluminar a rua inteira. E isso se repete por todo o bairro. É

8. MOBILITY

Such is the importance of urban mobility that it was included in the United Nations' 2030 Agenda for Sustainable Development. Target 11.2 of the Sustainable Development Goals (SDGs) states that, by 2030, countries "should be able to provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons." Goal 11 has the ambition to make cities and human settlements inclusive, safe, resilient and sustainable.

In addition to the availability of financial resources, several other factors may influence peoples' choice of transportation, including the fear of becoming a victim of theft, for instance. For women, choosing a mode of transportation is more complex, since they also fear sexual harassment or rape.

> **"Everything that is dangerous on public streets, for men or for women, has a much more serious meaning for women, because any type of violence against women: robbery, forcible confinement, kidnapping [...] everything carries the additional threat of rape. [...] Rape is a pendulum that swings over every being that is born female."**
>
> (Member of the Women's Rights Commission, Aracaju) [1]

As a result of this, mobility patterns are usually different for men and women. A study titled "Why does she move? A Study of Women's Mobility in Latin American Cities" showed that in the cities of Rio de Janeiro, Buenos Aires and Lima, women chose specifics times of the day to circulate. Unlike men, women preferred traveling during off-peak hours if they had

[1] "Tudo que é perigoso na via pública, para todos e para todas, para a mulher tem um recorte muito mais grave porque qualquer tipo de violência contra mulher: um assalto, um cárcere privado, um sequestro, tudo tem o recorte do estupro. [...] O estupro é um pêndulo que balança sobre todo o ser que nasce mulher."

the opportunity to do so, particularly during mid-morning. This provided a higher sense of security because of daylight and the fact that there were fewer passengers (that is, a smaller chance of harassment and robbery). Very early mornings and late evenings were perceived as unsafe due to poor street lighting and the need to walk through deserted areas, especially parts of the city that were far from the city center and had low accessibility (Dominguez Gonzalez et.al., 2020).

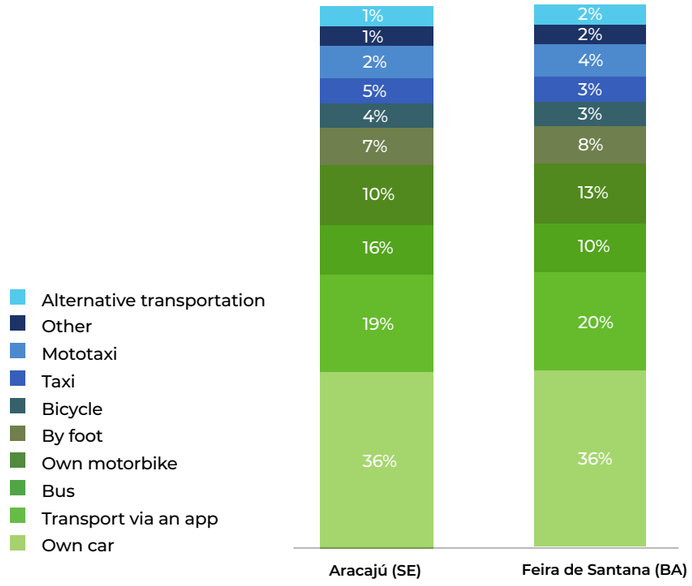
When discussing the use of public transportation, feelings of insecurity may involve not only a fear of what might happen inside a vehicle (be it a bus, train, taxi or something else), but also the fear of waiting at a bus stop or station, or walking to and from such places. The three latter situations are directly linked to street lighting.

> **"Buses take a long time to arrive, increasing physical, psychological and emotional stress. Fear above all. [...] Women leave their homes very early and leave in distress, worried, frightened, afraid due to the lack of safety both on the streets-due to poor lighting-and at the bus stops because of the lack of security, [which sometimes are located] in remote places."** (Member of Women's NGO, Feira de Santana) [2]

2 "O ônibus demora muito a passar, aumentando o desgaste físico, psíquico e emocional. O medo sobretudo. [...] As mulheres saem de casa muito cedo e saem aflitas, preocupadas, amedrontadas, com medo em razão da falta de segurança tanto nas ruas pela precária iluminação quanto pela falta de segurança nos pontos de ônibus, em lugares ermos."

As we can see in figure 21, the preferred transportation mode for evening rides is private vehicles—both in Aracaju and Feira de Santana. The pattern is very similar for both cities, with buses as the third most widely used means of transportation. It is worth noting that the question allowed respondents to choose more than one answer, which is why we have a large number of responses (n=945).

Figure 22: Transportation Modes Used after Dark (n=945)



The same study also found that bus stops, often located in unprotected and poorly lit areas, are especially unsafe for women. Late at night, these stops are usually deserted, and women become more vulnerable targets. In some locations, buses were regarded as unsafe due to a higher risk of traffic accidents, reckless driving, muggings, and the threat of sexual harassment. These safety and security considerations applied

to bus stops, the ride itself, and the “last mile.” Other issues affecting women were low bus frequency (that is, long waits), poor lighting and limited security at bus stops, exposure to road traffic, and difficulties related to traveling with small children or carrying heavy bags (Dominguez Gonzalez et.al., 2020).

Our quantitative data show that the average waiting time for public transportation in both cities is 39 minutes (ranging from 5 minutes to 2 hours). People may adopt different measures to deal with security concerns while moving after dark. In this regard, an interesting difference between male and female respondents is that there is a particularly high proportion of women who selected "I always walk accompanied by someone" as a method of feeling safer on the street (30 percent compared to 13 percent). On the other hand, there is a higher proportion of male respondents who selected “I avoid places with little lighting” (21 percent compared to 15 percent among women).

“We end up creating support networks. 'Let's go together'. 'Let's meet in front of a mall'. Something that can offer at least some security.”

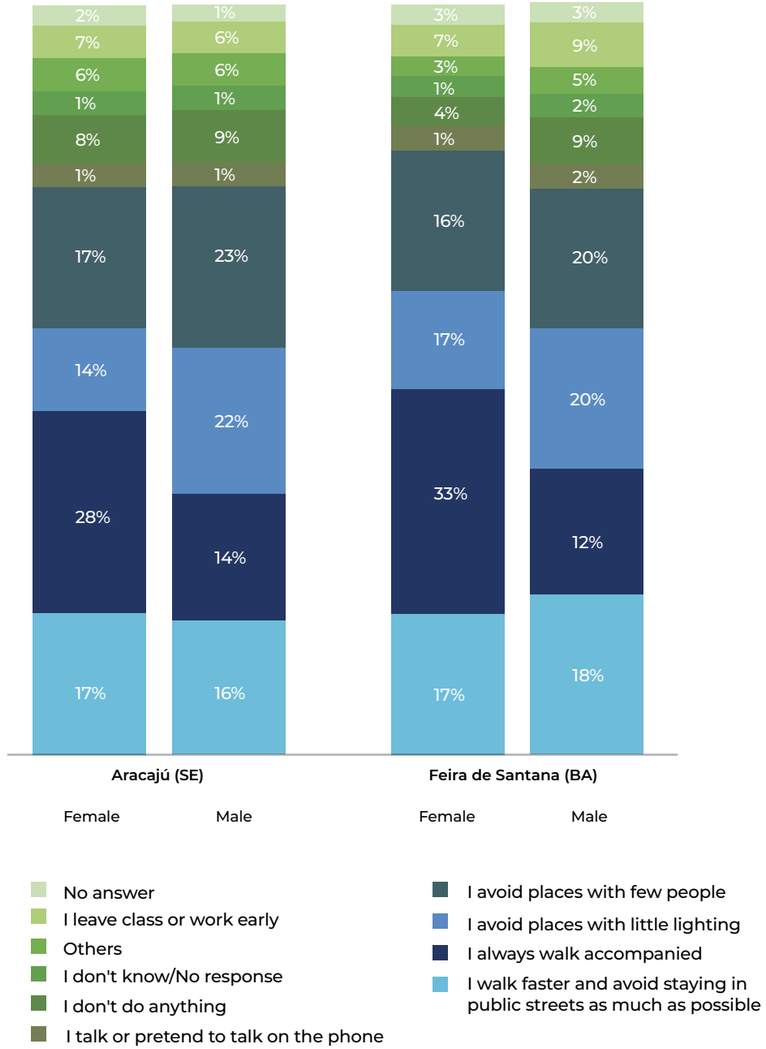
(Member of Women’s NGO, Feira de Santana) [3]

“I have students who are concerned about returning home—those from rural areas. These are students who, after being dropped by the school bus, take another hour to walk home! And, being in a rural zone, they have no lighting. So, they have to walk in groups.”

(School Director, Feira de Santana) [4]

[3] “A gente acaba criando redes de apoio mesmo. ‘Vamos juntas’. ‘Vamos marcar horário na frente de um shopping’. De alguma coisa que possa oferecer minimamente uma segurança.”
[4] “Tenho estudantes que se preocupam com o retorno para casa. Esses que são da zona rural. Tem estudantes que, de onde o transporte escolar deixa eles, eles levam mais uma hora para chegar em casa andando! E, por ser na zona rural, aí eles não têm iluminação. Aí, eles têm que andar em bando.”

Figure 23: People's Attitudes to Feeling Safer



Respondents from both Feira de Santana and Aracaju talked about lighting at bus stops. Many complained about bus stop conditions, especially the ones located on secondary streets.

> **"[Lighting at bus stops] is not adequate. For example, there are bus stops here on Getúlio Vargas Avenue that—thank God—are near a drugstore. We wait at that spot [by the drugstore], where there is light and, when we see the bus, we run to catch it."**
>
> (Member of Women's NGO, Feira de Santana) [5]

> **"On the main avenues such as Getúlio Vargas and João Durval, bus stops are lit. But when we get to bus stops in other neighborhoods, there is almost no lighting."**
>
> (Member of Women's NGO, Feira de Santana)[6]

> **"People don't wait at bus stops at night. They stand one or two meters away from the bus stop, waiting. Then, when their bus approaches, they rush to the bus stop. This is very common here in the capital. [...] As bus stops are sheltered, it gets dark [under them] and you become a target."**
>
> (Member of the State Council for Women's Rights, Aracaju) [7]

[5] "Não é adequada [a iluminação em pontos de ônibus]. [...]. Por exemplo, tem uns pontos aqui na Getúlio Vargas, que graças a deus a gente tem uma farmácia próxima. Aí a gente vai para esse local de iluminação e quando a gente avista o ônibus a gente vem correndo para o ponto."

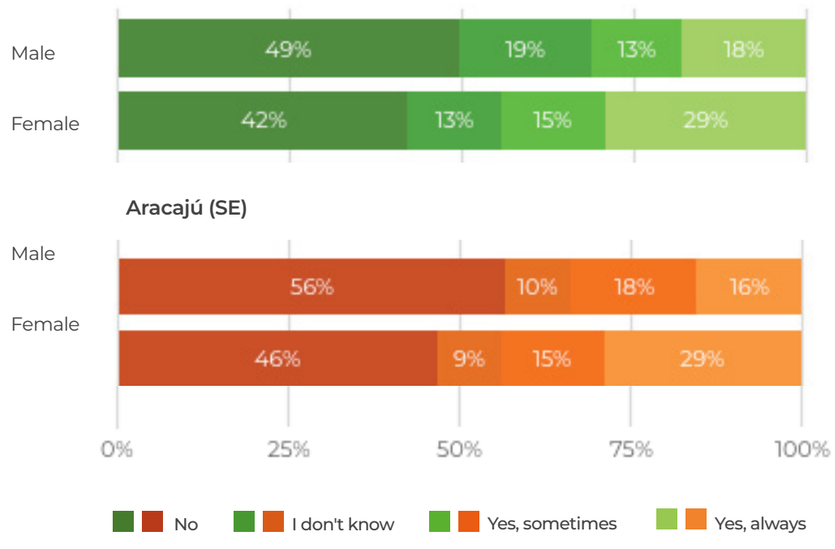
[6] "On the main avenues such as Getúlio Vargas and João Durval, bus stops are lit. But when we get to bus stops in other neighborhoods, there is almost no lighting." (Member of Women's NGO, Feira de Santana)

[7] "As pessoas não ficam no ponto de ônibus à noite. Elas ficam a dois metros de distância, a um metro de distância do ponto de ônibus, esperando. Aí, quando o ônibus se aproxima aí elas se aproximam do ponto de ônibus. Isso é muito comum aqui na capital. [...] Como o ponto de ônibus tem uma cobertura, ele se torna escuro e você se torna um alvo."

> **"[The bus stops] are not well lit. We sometimes observe broken or burnt-out lamps, and that's where robberies happen. So, I think that investment in lamps and maintenance need to be more agile."**
>
> (NGO Coordinator for the State of Sergipe, Aracaju) [8]

We can see from our quantitative data that women are more afraid of waiting alone for their bus even during the day in both cities (figure 24).

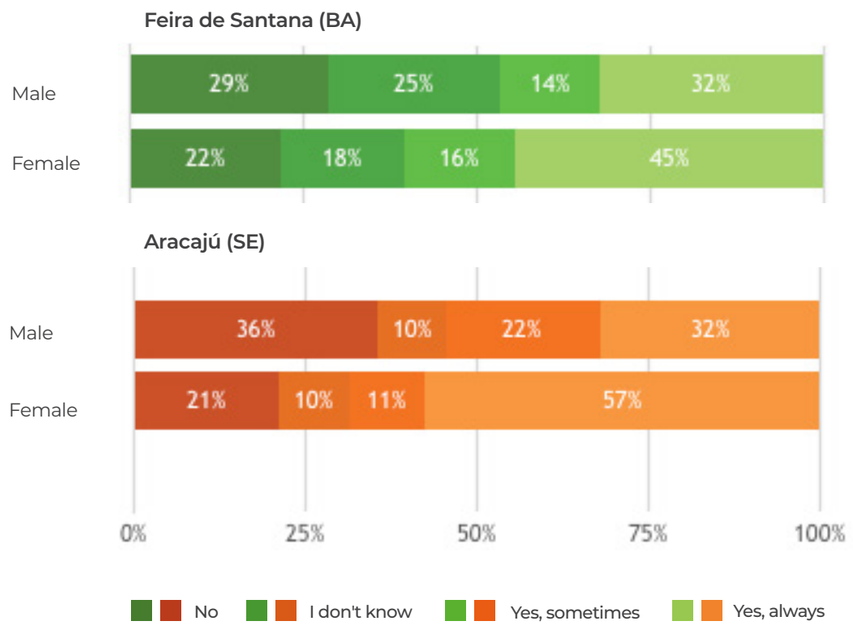
Figure 24: Fear of Waiting at Bus Stops during the Day



[8] "Não são bem iluminados [os pontos de ônibus]. Geralmente aparecem essas lâmpadas quebradas ou queimadas e é lá que acontece os assaltos. Então eu acho que o gasto com lâmpadas e essa manutenção precisam ser mais ágeis."

Security perceptions change dramatically after dark Figure 24 shows that more than half of all female respondents fear waiting for the bus in Aracaju, and 45 percent feel the same way in Feira de Santana. We can also note a wider gender-based gap during nighttime as opposed to daytime.

Figure 25: Fear of waiting at the bus stop during the evening



In Feira de Santana, some respondents mentioned *"Ligeirinho",* an alternative clandestine mode of transportation. These are common vehicles that circulate in some neighborhoods and are sometimes preferred by men and women from those areas. *"Ligeirinhos"* appear to be more expensive than city buses.

Mototaxis and Uber rides were also identified as alternative modes of transportation. Feira de Santana is currently investing in a Bus Rapid Transit (BRT) system, which may improve public transportation as well as bus stop infrastructure.

In 2019, Feira de Santana launched their Urban Mobility Portal *(Portal de Mobilidade Urbana de Feira de Santana)*, a digital and interactive platform created to disseminate dynamic, informative and relevant content on urban mobility. This initiative resulted from urban mobility research carried out by the World Business Council for Sustainable Development (WBCSD), with the support of the Feira de Santana City Hall.

The platform was initially created to serve as a data-collection tool for WBCSD's research. After identifying the potential of this digital tool, the local government transformed it into an interactive channel to support information management, thus creating a dynamic and modern communication channel with the population. The survey obtained 1,128 responses, with 57.9 percent of respondents being male, and 42.1 percent female. Among the results, the study found that:

- 6.7 percent of all respondents feel unsafe or very unsafe while walking during nighttime hours;
- Personal safety, quality and availability of sidewalks are identified as the most important aspects to walking in urban areas (70 percent, 57.8 percent and 54.8 percent, respectively);
- Although most respondents like to walk, they do it less often because of their fear of being a victim of physical violence (62 percent);
- 79.4 percent limit their use of public spaces because they feel unsafe, while 58.4 percent also mention that such spaces are unattractive. 16.9 percent use public spaces every day, or a few times a week;

- 58.8 percent like or like very much to use public spaces in the city. 64.6 percent consider security to be the most important aspect of a public space, and 49.1 percent reinforce the importance of having spaces that are open to everyone (such as squares and parks);

- 50.2 percent do not like to ride in buses/vans. Among the reasons for this, 48.1 percent rate insecurity as the most important aspect affecting using public transport;

In Aracaju, one of the respondents mentioned a mobility and cycling study developed in the city. Apparently, this is also an important mode of transportation, especially for those living in the periphery.

> **"The profile of cyclists in Aracaju showed us that the main drivers of mobility on two wheels in Aracaju live in the outskirts of the city. In the outskirts, the economic sector that generates this mobility comprises self-employed and construction workers who live in these areas. What we found is that the use of bicycles in this context is 'exaggerated'. We understand that mobility by bicycle is efficient for round trips of up to 15 km, but these people cycle more than 30 km per day. From the moment you go over 15km, it is interesting that you establish an intermodal type of transportation."**
>
> (Member of the Municipal Environment Council through NGO Ciclo Urbano) [9]

[9] "O perfil do ciclista de Aracaju mostrou para a gente que o grande gerador de mobilidade por bicicleta em Aracaju são as periferias. E, das periferias, o setor econômico produtivo que gera essa mobilidade são os autônomos e os trabalhadores da construção civil que moram na periferia. O que a gente constatou é que o uso da bicicleta neste contexto é 'exagerado'. A gente entende que a mobilidade por bicicleta se torna eficiente quando você estabelece uma distância de ida e volta até 15km e essas pessoas pedalam mais de 30km por dia. A partir do momento que você ultrapassa 15km é interessante que você estabeleça uma intermodalidade."

Cycling is also affected by street lighting. Lighting can influence cyclists' perceptions of safety and security, and most importantly, reduce the risk of traffic accidents. This study registered Santa Maria and the North Zone of Aracaju, which includes neighborhoods such as Lamarão and Bugio, as the main cycling areas. It also noted that the number of women cyclists is currently rising in the city. These women claim, however, that they as constantly harassed while cycling.

9. ECONOMIC AND EDUCATIONAL ACTIVITIES

From a business perspective, a representative of the Feira de Santana Trade Association believes that lighting does not affect commercial activities directly, clarifying that most robberies targeting stores take place during the day. He noted that most businesses are located downtown, and are usually closed at night.

> **“There have been worse times in terms of break-ins. Today, it has decreased a lot because the police have an exclusive battalion to look after the city center. Many cameras were installed in the city. There is a surveillance center, which is able to surveil almost the entire city center. This has inhibited store break-ins a little. Today, most thefts downtown take place when shops are open during the day.”**
>
> (Director of the Feira de Santana Trade and Business Association) [1]

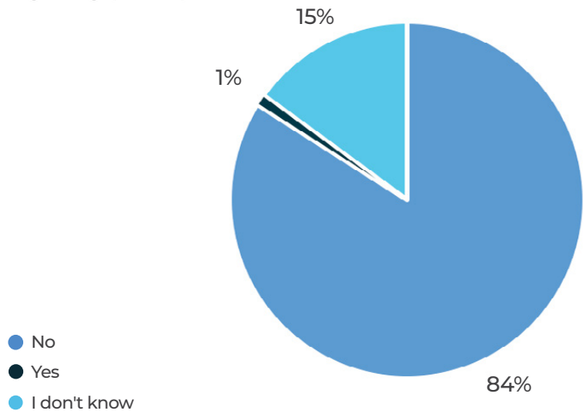
In Aracaju, however, the representative of the Chamber of Shopkeepers did mention stores located in the periphery, saying that those are usually more affected by lack of lighting and infrastructure.

> **“Today we have several shopping streets scattered throughout central and peripheral neighborhoods. Naturally, the further away and the less urbanized and well-lit a region is, the more shop owners may suffer vandalism, violence, thefts and burglary.”**
>
> (Superintendent of the Aracaju Chamber of Shopkeepers)

[1] “Já houve tempos piores de arrombamento. Hoje diminuiu muito porque a polícia tem um batalhão exclusivo para cuidar do centro da cidade. Muitas câmeras foram instaladas na cidade. Tem uma central de câmeras, inclusive, que praticamente todo o Centro. Então inibiu um pouco o arrombamento de lojas. O que existe mesmo no Centro da cidade de roubo é quando as lojas estão abertas durante o dia.”

Neither the Aracaju nor the Feira de Santana business representatives associated street lighting issues with a potential lack of job opportunities, including specific opportunities for women.

Figure 26: Lost or Refused Job Opportunity Because of Poor Lighting (n=593)



One hypothesis on the links between poor street lighting and business activity is that the first is only likely to have an indirect impact on job prospects. Establishments may lose revenue, and consequently not employ as many people as they might if they had better infrastructure.

It is also important to note that all forms of harassment may affect women's access to opportunities and their quality of life. In view of that, violence against women may potentially become an obstacle for them to study or find new employment.

Feira de Santana and Aracaju are apparently and unfortunately no exception to this reality. In view of existing limitations, local women and institutions try to find alternatives to improve their access to education.

"It is very common [for students] to leave early at the end of class. Our evening classes end around 10:15 p.m. In addition to the fear of leaving, there is the fear of not being able to catch public transportation. There are [public transportation] lines that may not run as frequently at night as they do during the day. Instead of waiting for, say, 30 minutes, you might have to wait for an hour, or 90 minutes."

(Human Rights Director at the Aracaju Family and Social Assistance Secretariat) [2]

"Last year, there was a great deal of discussions among UEFS students, urging the Dean's Office to take action against rapists. The UEFS has a very large campus. [Collectives asked] for increased security and more lighting because there were reports of serial rapists. What the UEFS did was to transfer classes to the morning, which creates other difficulties, as many women work."

(Member of Women's NGO, Feira de Santana) [3]

[2] "É muito comum as saídas mais cedo [de alunos], no final da aula. As aulas daqui nas universidades terminam por volta das 22h15. Além do medo de sair, tem o medo de não ter o transporte público. Tem linhas que a partir de determinado horário, elas acabam não funcionando com a regularidade que normalmente durante o dia tem. Se era 30 minutos [de espera], passa a ser 1 hora ou 1 hora e meia."

[3] "Ano passado, houve uma articulação muito grande entre os coletivos da UEFS para que a reitoria tomasse medidas contra estupradores. A UEFS tem um campus muito grande. [Coletivos pediam] para que houvesse mais segurança, mais iluminação porque já havia, inclusive, relatos de estupradores em série. O que a UEFs fez foi passar as aulas para manhã, o que dificulta porque muitas trabalham."

In total, 602 people were interviewed for the quantitative study. The results related to education are the following:

Aracaju (SE)	57 people (19 %) Are currently studying	33 people (58%) Are studying during the evening
Feira de Santana (BA)	54 people (18 %) Are currently studying	38 people (70%) Are studying during the evening

Amongst the seventy-one people that study in the evening, 24 have considered dropping out (figure 26), but only one mentioned that poor lighting might be a reason for quitting school (figure 26).

Figure 27: Thinking about leaving the course (n=71, results in absolute numbers)

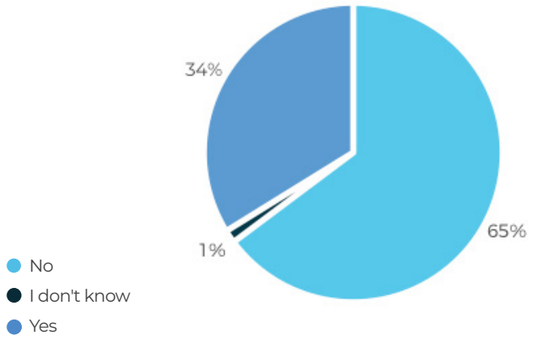
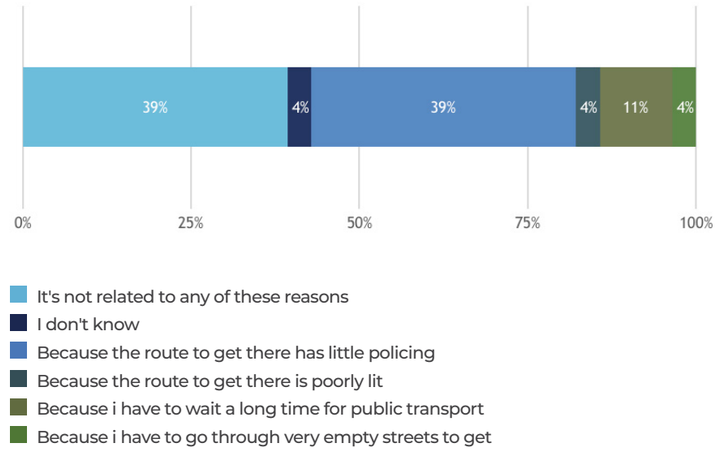


Figure 28: Reasons for Thinking about Dropping Out (n=28)



10. COVID-19

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic. Among the actions to mitigate the spread of the virus, most governments declared a state of emergency, adopting social distancing measures and other mobility restrictions.

In Brazil, the federal government issued a Provisional Measure (similar to an Executive Order) and a Decree on March 21 regulating essential services that could not be interrupted during the state of emergency. In many major Brazilian cities, authorities decreed a state of public calamity, and started restricting urban mobility. While the general guidance is to maintain social isolation, mayors and governors agree that public transportation should continue operating because of its importance to workers in areas such as health, supermarkets. and other indispensable services.

On March 16, 2020, the Aracaju government issued Municipal Decree no. 6097, the first official document containing measures to mitigate the effects of COVID-19 in the city. On the same day, the state government issued Decree no. 50560 addressing the public health emergency in Sergipe, and regulating measures to address the crisis. The government suspended public events, group activities, visits to prisons and detention centers, and all educational activities in public and private schools, universities and colleges. Through Decree no. 40563, published on March 20, 2020, the state government recognized the need to control the emergency, and established new stricter measures, including restrictions on public transportation, and business and industrial activities in all Sergipe municipalities.

In the state of Bahia, Decree no. 19529 of March 16, 2020 declared a state of emergency, and authorized the adoption of lockdown and quarantine measures, as well as the suspension of certain activities in all municipalities in Bahia. In Feira de Santana, the state of emergency was, in fact, declared a few

days earlier through Decree no. 11484 of March 13, 2020, which also established the first measures to deal with COVID-19 at local level.

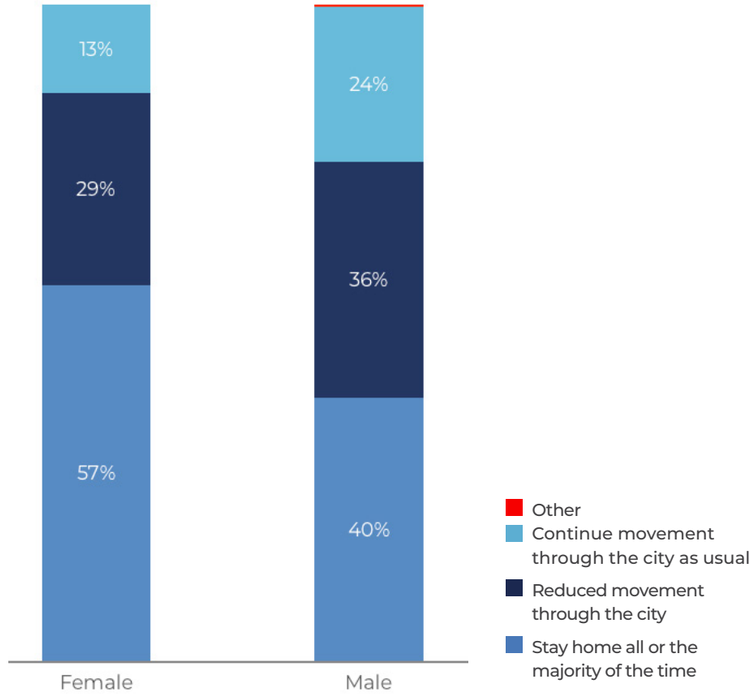
Due to the lockdown, people's access to public spaces and services was reduced, together with job opportunities. In addition to the fear of contagion, there was an increased feeling of insecurity while circulating in empty public spaces. According to a UN Policy Brief (2020), women's fear and experience of violence in public spaces is likely to escalate due to COVID-19 as the virus takes a foothold in urban and rural areas, where social distancing requirements have emptied streets and public transportation. In Feira de Santana and Aracaju, the main urban violence issue raised by respondents was that streets are now more deserted and, therefore, less safe.

> **"Now, in this pandemic, we see that the streets are becoming deserted, and that some cases of rape took place exactly because of that. Sometimes, a victim is walking in a place that has street lighting, but is deserted."**
>
> (Police Chief, Feira de Santana) [1]

Violence victims may face additional obstacles because of poor access to protection services and mobility restrictions. With COVID-19, it may be more difficult for some people to find qualified public shelters; seek shelter in the homes of neighbors, friends or family; or access protection or essential services. Even where basic essential services are maintained, coordinated responses involving different sectors such as health, police, justice, and social services have collapsed. This may hamper their ability to provide meaningful and relevant support to women who are experiencing violence (UN, 2020).

[1] "Agora nesse momento de pandemia a gente vê que as ruas estão ficando desertas e alguns casos de estupro que aconteceram exatamente por conta disso. As vezes a vítima se deslocando de algum lugar iluminado, mas deserto."

Figure 29: People's Behavior during the COVID-19 Crisis



> **"Now we are at the peak of the feeling of insecurity. Because the number of people on the streets has decreased, [and] the number of cars on the streets decreased. Imagine if you end up [in a place] without lighting. The lamps here on my street were blinking."**
>
> (Member of Women's Organization, Feira de Santana)[2]

Most health and security services in both cities seem to be working relatively well during the pandemic according to some interviewees, however. One of the respondents mentioned that the Maria da Penha Patrol, for instance, has a business-as-usual operation.

> **"We kept our service going. The only change was to avoid in-person visits, or preventive visits."**
>
> (Municipal Police, Feira de Santana) [3]

Although security services may be working in a relatively normal way, some statements suggest that reporting crime has become harder, especially for female victims of domestic violence. Even though domestic violence is not directly related to street lighting, it is probably one of the main sources of concern during this pandemic.

> **"Everything that was bad got worse. Seeking help became more difficult. Reporting became more difficult."** (Member of the Women's Rights Commission, Aracaju) [4]

> **"I felt that the women were more afraid. From a numerical point of view, there was a big drop in requests for protective measures."**
>
> (Municipal Police, Feira de Santana) [5]

> **"There is a difficulty in reporting crimes in person because of restriction measures, because of security measures. [...] So we are facing a reduction in the number of reports of threats, or psychological violence."**
>
> (Municipal Police, Feira de Santana)

[3] "A gente manteve o nosso serviço. A única alteração foi evitar as visitas presenciais. As visitas preventivas."
[4] " Tudo que era ruim ficou pior. Buscar ajuda ficou mais difícil. Denunciar ficou mais difícil.
[5] Eu senti que existe um medo maior das mulheres. Do ponto de vista numérico houve uma queda grande nas solicitações de medidas protetivas."

There is no consensus on how exactly the pandemic is affecting women. Although the number of reported crimes against women has apparently decreased in Aracaju, we cannot conclude that there has been a reduction in violence. While the Aracaju Police Chief does not believe that crimes are being underreported, and claims that there are many different reporting channels available, domestic violence experts believe that women are suffering even more due to COVID-19.

> **"We noticed that crime has decreased, statistically, due to the quarantine. The governor here was very strict."**
>
> (Police Chief, Aracaju)[6]

> **"Women are experiencing more violence during this period. And talking to someone from the Public Defender's Office, there is an investigation trying to find out why women stopped making complaints to local authorities. And they began to realize that the men [perpetrators of violent crimes] were at home, and that women could not go out. These numbers are going down. Instead of increasing, they are decreasing."**
>
> (Chairperson of the Municipal Council for Women's Rights, Aracaju) [7]

In a country where 41.1 percent of the population are informal workers (IBGE, 2019), self-isolation is not always an option. Without a stable income, many people take the risk of going out to work and being exposed to the virus. The situation is even more serious for women, who are particularly affected by higher levels of poverty and unemployment. In addition,

[6] "A gente percebeu que diminuiu a criminalidade, estatisticamente, por conta da quarentena. O governador aqui foi bastante rigoroso."
[7] "As mulheres estão sofrendo mais violência nesse período. E, conversando com alguém da Defensoria Pública, há uma investigação buscando saber por que as mulheres deixaram de fazer a denúncia. E começaram a perceber que este homem está em casa e que ela não tinha como sair. Porque esses números foram baixando. Ao invés de aumentar, eles foram diminuindo."

Brazilian women form the majority of workers in the informal economy. The highest rates of informality are found in the domestic service segment: 71.2 percent (IBGE, 2019).

The risk of violence against women adds another layer of vulnerability to a group who, as a consequence of COVID-19, will probably suffer with less work opportunities than men. As a result of mobility constraints, social distancing measures, higher economic vulnerability, and disruptions in legal and social services, it has become more challenging for women to find temporary escape from abusive partners (O'Donnell et al., 2020).

> **"We have a lot of job insecurity [due to COVID-19]. [...] It is absurd that, during a pandemic, people have to take a bus at 10 pm. [...] These are usually women who have precarious jobs. Unfortunately, it is women from the periphery-black women-that are the most affected by this lack of infrastructure."**
>
> (Member of Women's NGO, Feira de Santana) [8]

COVID-19 has forced society to adapt in different ways, changing innumerable social paradigms. In the coming months (or perhaps years), the processes of formulating, implementing and evaluating projects, programs and policies in general, in particular those addressing violence and improving safety, will need to consider COVID-19's long-lasting impacts.

[8] "A gente tem uma grande precarização no trabalho [durante a Covid-19] [...]. É absurdo que, num período de pandemia, tenham que pegar ônibus às 10 horas da noite. [...] Normalmente são mulheres que tem esse trabalho precarizado. Infelizmente, são as mulheres da periferia, mulheres negras, as mais atingidas por essa falta de estrutura."

11. FINAL REMARKS

This study's main goal was to explore the links between street lighting and people's security perceptions, as well as their impact on human behavior. A recent experiment conducted in New York City (with in-depth interviews) suggests that street lighting can indeed reduce crime. In addition, results from our quantitative study show that poor lighting is strongly associated with perceptions of insecurity while walking at night, as opposed to walking during the day, although empty streets were registered as the main reason for these feelings.

Women's security perceptions are worse than men's, including when moving around cities or waiting at bus stops. Because of that, many female respondents said that they avoid walking alone in an attempt to escape crime.

The results of this study therefore suggest what existing evidence already shows: investment in street lighting can have an important impact on urban security perceptions, especially among women. Is important to note, however, that these efforts should be accompanied by other policies that could also contribute to improving security, including additional changes to the built environment (for example, urban interventions, effective police patrolling, security cameras), and a stronger focus on the structural causes of criminal behavior (for example, through social interventions).

While the present study gathered interesting data concerning street lighting, with a special focus on gender differences in security perceptions, its main goal is to serve as a baseline for a future assessment of the situation in Feira de Santana and Aracaju—after all investments in street lighting have been made. Such endline survey should be able to compare findings from this study with those observed once all infrastructure interventions have been completed. We suggest that the evaluation study gathers both quantitative and qualitative data, following the same methods used in this study, so as to reflect the results of lighting investments.

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Annex 1: Recommendations for the Endline Research

Since this is a baseline study developed to support the evaluation of the future impacts of lighting investments, we can provide some guidance for an endline study, or evaluation study, to be conducted after such interventions.

As the possibility of conducting an experiment or quasi-experiment to measure the impacts of the interventions mentioned herein seems remote, the evaluation or endline study could follow the same or similar research quantitative and qualitative methods used in the present one.

For the quantitative part, the same questions asked in the present research wave should be reapplied at the endline study (see research tool in Annex 1). If this is done, most of the questions could be analyzed by calculating differences between the two samples. In addition, because quantitative data collection is based on a stratified sample, the analyses may be weight-adjusted based on region sizes.

We also recommend that the endline study should collect qualitative in addition to quantitative data, including in-person semistructured interviews as well as focus groups—which were not viable options for the present study due to COVID-19. This would enable a future evaluation study to gather evidence on improved perceptions resulting from street lighting investment.

Annex 2: Feira de Santana's and Aracaju's Socioeconomic Characteristics

Feira de Santana is the second largest city in the state of Bahia, with approximatively 600,000 people, while Aracaju is the state capital of Sergipe, with approximatively 640,000 inhabitants. Both municipalities are located in the Northeast region of Brazil. According to the Atlas of Violence (2019), the 11 most violent state capitals in Brazil in 2017 were in the North and Northeast regions.

Figure 30: Map of Brazil – Location of the States (Bahia and Sergipe)

Aracaju

Aracaju's population density is 3,140.65 inhabitants/km² (IBGE, 2010). Between 2000 and 2010, the average population growth rate of Aracaju was 2.15 percent, above the national average of 1.17 percent over the same period. The city has high migration rates from rural areas and has undergone a fast urbanization process, being therefore very representative of middle-size cities in the Brazilian Northeast.

Figure 31: Map of Sergipe Indicating the Location of Aracaju

Table 10: Total Municipal Population by Gender and Rural/ Urban in Aracaju (SE)

Population	Population (1991)	% of the Total (1991)	Population (2000)	% of the Total (2000)	Population (2010)	% of the Total (2010)
Total population	402.341	100,00	461.534	100,00	571.149	100,00
Men	188.478	46,85	215.887	46,78	265.484	46,48
Woman	213.863	53,15	245.647	53,22	305.665	53,52
Urban	402.341	100,00	461.534	100,00	571.149	100,00
Rural		0,00		0,00		0,00

Source: PNUD, Ipea and FJP; The Human Development Atlas in Brazil website – http://www.atlasbrasil.org.br/

The Municipal Human Development Index (MHDI) for Aracaju in 2010 was 0.770, placing this municipality in the Very High Human Development range (MHDI between 0.700 and 0.799). Longevity was the dimension that contributed the most to the MHDI score (0.823), followed by income (0.784), and education (0.708) (Atlas Brasil)

Feira de Santana

With an estimated population of 556,642 people, Feira de Santana is the second most populous city in the state of Bahia. The city is also the most important city in inland Bahia, and one of the main urban centers in the Northeast, with a strong influence on hundreds of other municipalities in the state.

Figure 32: Map of Bahia Indicating the Location of Feira de Santana

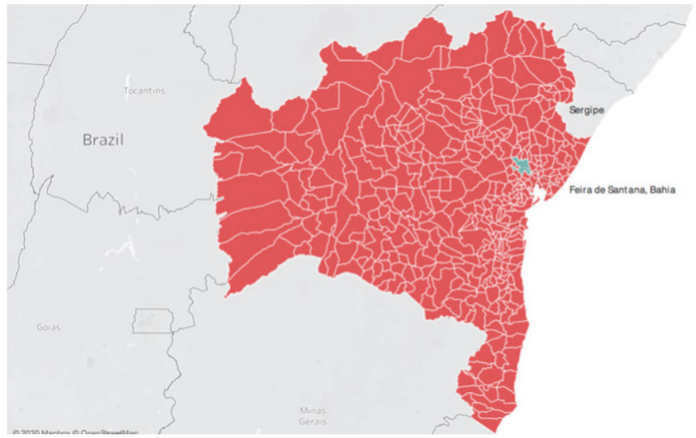

Table 11: Total Population by Gender, Rural/Urban - Municipality - Feira de Santana - BA

Population	Population (1991)	% of the Total (1991)	Population (2000)	% of the Total (2000)	Population (2010)	% of the Total (2010)
Total population	406.523	100,00	481.368	100,00	556.642	100,00
Men	193.935	47,71	229.867	47,75	263.999	47,43
Woman	212.588	52,29	251.501	52,25	292.643	52,57
Urban	349.557	85,99	431.730	89,69	510.635	91,73
Rural	56.966	14,01	49.638	10,31	46.007	8,27

Feira de Santana's population density is 406.78 inhabitants/km². The Municipal Human Development Index (MHDI) in 2010 was 0.712, placing Feira de Santana in the Very High Human Development range (MHDI between 0.700 and 0.799).

Annex 3: Street Lighting Standards in Brazil: ABNT NBR 5101

According to Article 30 of the Brazilian Federal Constitution, municipalities are responsible for street lighting. Until 2014, in general, electric utilities were responsible for managing and investing in these assets. However, a constitutional amendment approved in 2002 allowed municipalities and the Federal District to start charging for street lighting through a fee known as COSIP. In general, power distribution companies provide the service, and add COSIP charges to consumers' energy bills.

In 2015, the National Electric Energy Agency (ANEEL) published a rule requiring distribution companies to transfer street lighting assets to local administrations by a certain date. Initially, municipalities were against this measure, although they recognized its benefits over time.

At the same time, at the international level, new and much more efficient lighting technologies hit the market. An LED system, for example, can now save up to 60 percent of the energy required by a system that uses metal vapor lamps. Other associated technologies, such as dimming and remote management, could also increase this savings potential, in addition to allowing the use of other services, such as Wi-Fi, monitoring cameras, telemetry, and so forth. Street lighting has therefore become the gateway to smart city technologies.

The option of adopting much more efficient technologies brought a new paradox to municipal public administration: despite considering the short turnaround time of projects and their economic, environmental and social benefits, local governments in general lacked the financial means to invest in it. Often, the absence of technical skills was also an obstacle for launching such projects.

As a consequence, some municipalities began to design projects in partnership with the private sector (through public-private partnerships, or PPPs). The most famous and perhaps most successful case took place in Belo Horizonte. Currently, hundreds of street lighting PPP projects are under study or in their bidding stages, while nearly two dozen are already being executed.

Street lighting has some specificities in relation to other public services. On the one hand, the Federal Constitution ensures the legal certainty of street lighting contracts with the private sector. On the other, unlike water supply, sewage systems and solid waste management, there is no federal law regulating street lighting services. It should be noted that, both formally and objectively, no federal agency is responsible for regulating the sector.

The main norm adopted in the sector is ABNT Standard NBR 5101, with its latest edition dated April 2012. It establishes lighting requirements for public thoroughfares with the aim of ensuring the safety of pedestrians and vehicles. According to this standard, street lighting is "the service that aims at providing lighting, or artificial light, to public places at night or during occasional daytime blackouts, including those that require permanent lighting during the daytime".

The main objective of street lighting is “to provide visibility for the safety of vehicles and pedestrian traffic in a rapid, accurate and comfortable manner”. Street lighting projects must meet specific user requirements and provide economic and social benefits to citizens, including:

- Reducing nighttime accidents;
- Improving living conditions, especially in vulnerable communities;
- Supporting police work, with an emphasis on the safety and security of individuals and properties;
- Easing traffic flow;
- Highlighting buildings and public works at night; and
- Ensuring energy efficiency.

Figure 33: Comparison between zebra effect and uniform lighting

The ABNT rule provides traffic recommendations for roads and pedestrian lanes. In general, this standard considers two variables for the definition of lighting class: the minimum average illuminance, and the minimum uniformity factor, that is, light intensity and uniformity, thus avoiding a “zebra effect”.

6.1.1. Road Recommendations

Overall, NBR 5101 recommends that the intensity and quality of street lighting should depend on the characteristics of each road. Urban roads are classified as expressways, arterial roads, collector roads, and local roads, according to a number of variables. Each city is responsible for classifying its own roads, according to the table below:

Table 12: Classification of urban roads, according to NBR 5101

Urban Roads	Characterized by the existence of buildings along its margins, with presence of motorized and pedestrian traffic on a greater or lesser scale. Streets, avenues, alleys or paths and similar roads open to public circulation, located in urban areas and characterized mainly by having buildings built alongside.
Expressway	Avenues and paved streets exclusively for motorized vehicles, where there is no predominance of buildings. Low pedestrian traffic and high vehicle traffic. Characterized by multiple access points, these roads do not have intersections or pedestrian crossings nor direct access to residential areas. The maximum speed is 80 km/h.
Arterial routes	Exclusive road for motorized traffic, which is characterized by high volume traffic, few access points, several lanes, intersections, continuous flow, high operating speed and a prohibition on parking alongside the road. Generally, the road is one-way only and separated from oncoming traffic if any. The road also tends to be free of buildings along its margin. The arterial system serves more specifically for large traffic and long-distance trips, but it is also occasionally used for local traffic.
Collector roads	Exclusively for motorized traffic, which is characterized by lower traffic volume and higher access than arterial roads. This road collects and distributes the traffic entering or exiting the fast or arterial traffic routes. The maximum speed is 40 km/h.
Local routes	Road that allows access to buildings and other urban roads, with many access points and only a small volume of traffic. Characterized by being intended only for local access or particular areas, and by having a maximum speed of 30 km/h.

The ABNT Standard classifies motor vehicle traffic on public roads according to the table below:

Table 13: Lighting Class Standards

Classification	Volume of overnight vehicle traffic[a] per hour, in both directions[b], each in a single lane
Light (L)	150 to 500
Medium (M)	501 to 1,200
Intense (I)	Above 1,200

[a] Maximum value of the hourly averages obtained between 18:00 and 21:00.
[b] Speeding levels regulated by law.

Note: For roads that bear less than 150 vehicles per hour, the minimum requirements of the light group (L) are considered, while for roads with very intense traffic, that being more than 2,400 vehicles per hour, the maximum requirements of the intense (I) group are considered.

NBR 5101 also defines five lighting classes (V1 to V5), considering the two following technical criteria: (i) minimum average illuminance, and (ii) minimum uniformity factor. V1 represents the lighting systems with the highest minimum illuminance and uniformity, while V5 has the most flexible requirements, as shown in the table below.

Table 14: Lighting Class Standards

Lighting class	Minimum average illuminance *E med, min, lux*	Minimum uniformity factor *U = Emin/Emed*
V1	30	0,4
V2	20	0,3
V3	15	0,2
V4	10	0,2
V5	5	0,2

Finally, the standard crosses road characteristics and street lighting classes, as shown in the table below:

Table 15: Relationship between road characteristics and class of public lighting

Road description	Lighting class
Expressways; high-speed traffic routes with lane separation, controlled access and absence of pedestrian crossings; fast transit routes in general; highways	
Heavy traffic volume	V1
Average traffic volume	V2
Arterial roads; high-speed traffic routes with lane separation; two-way roads, with occasional pedestrian crossings and crossings at well-defined points; two-way rural roads	
Heavy traffic volume	V1
Average traffic volume	

Road description	Lighting class
	V2
Collecting routes; major traffic routes; radial and urban interconnection roads between neighborhoods, with high pedestrian traffic	
Heavy traffic volume	V2
Average traffic volume	V3
Light traffic volume	V4
Local roads; less important connection routes; residential access roads	
Average traffic volume	V4
Light traffic volume	V5

Following the same logic, the standard addresses the relationship between pedestrian traffic and specific lighting classes.

Table 16: Relationship between Pedestrian Paths and Lighting Class

Road description	Lighting class
Roads with intensive pedestrian use (for example sidewalks, shopping areas)	P1
Roads with high pedestrian use (i.e. sidewalks of avenues, squares, leisure areas)	P2
Roads with moderate pedestrian use (for example, sidewalks, shoulders)	P3
Pedestrian-only roads (for example, residential neighborhood sidewalks)	P4

Finally, the minimum recommendations for each lighting class are presented, as shown in the table below:

Table 17: Average Illuminance and Minimum Uniformity Factor for Each Lighting Class

Road description	Medium horizontal illuminance *E med, min, lux*	Minimum uniformity factor *U = Emin/Emed*
P1	20	0,3
P2	10	0,25
P3	5	0,2
P4	3	0,2

It is important to note that the ABNT Standard is rarely adopted by municipalities. Although it is very difficult to estimate the level of compliance with the standard, some estimates point to something between 5 percent and 10 percent. When delegating street lighting services through public-private partnerships, a higher level of compliance is generally required—above 90 percent. Therefore, this is exactly the type of social impact that this study aims to identify.

Annex 4: Quantitative Research Tooll

PESQUISA DE OPINIÃO - ILUMINAÇÃO PÚBLICA

Setembro/2020 - PLAN Eval

APRESENTAÇÃO: Bom dia! Meu nome é...(DIGA SEU NOME). Estou realizando uma pesquisa para o Banco Mundial a respeito de iluminação e segurança pública da sua cidade.

Posso contar com sua participação nesta pesquisa? Ela dura apenas alguns minutos.

1. Em qual cidade reside?
❑ 1. Aracajú (SE) ❑ 2. Feira de Santana (BA)
PESQUISADOR: CASO A PESSOA NÃO RESIDA EM UMA DAS DUAS CIDADES, AGRADEÇA E ENCERRE.

2. Qual a sua idade?
Pesquisador(a): Somente pessoas com idade entre 18 e 70 anos.

3. Qual o seu gênero?
❑ 1. Masculino ❑ 2. Feminino ❑ 3. Não-binário ❑ 4. Outros
A resposta é obrigatória.

4. Como o(a) sr(a) definiria sua cor ou raça? (LER AS ALTERNATIVAS)
❑ 1. Amarela ❑ 2. Branca ❑ 3. Indígena
❑ 4. Parda ❑ 5. Preta ❑ 6. Não sei
❑ 7. Sem resposta
A resposta é obrigatória.

SITUAÇÃO DA ILUMINAÇÃO PÚBLICA NO MUNICÍPIO

5. Como avalia a iluminação pública próximo a sua residência? (LER AS ALTERNATIVAS - ESTIMULADA E ÚNICA)
❑ 1. Péssima ❑ 2. Ruim ❑ 3. Regular
❑ 4. Boa ❑ 5. Excelente
A resposta é obrigatória.

6. Pelo que sabe ou ouviu falar, quais os bairros são mais inseguros e perigosos da cidade? (ESPONTÂNEA, MÚLTIPLA E ORDENADA - ATÉ 3 BAIRROS)
❑ 1. Bairro 1:_____
❑ 2. Bairro 2:_____
❑ 3. Bairro 3:_____
Você pode marcar diversas casas.

7. Por quais motivos o(a) sr(a) considera esse(s) bairro(s) tão inseguro(s)? (ESPONTÂNEA E MÚLTIPLA)
❑ 1. Constantes assaltos
❑ 2. Tráfico e consumo de drogas
❑ 3. Precariedade ou inexistência de iluminação pública
❑ 4. Falta de policiamento e rondas
❑ 5. Abandono do poder público
❑ 6. Gangues e galeras
❑ 7. Outros:_____
Você pode marcar diversas casas (4 no máximo).

8. O(a) sr(a) se sente seguro(a) para caminhar pelas ruas do bairro onde reside durante O DIA? (ESPONTÂNEA E ÚNICA)
❑ 1. Sim, muito seguro
❑ 2. Sim, seguro
❑ 3. Não muito seguro
❑ 4. Não sinto nenhuma ou quase nenhuma segurança
❑ 5. Não sei

9. O(a) sr(a) se sente seguro(a) para caminhar pelas ruas do bairro onde reside durante A NOITE? (ESPONTÂNEA E ÚNICA)
❑ 1. Sim, muito seguro
❑ 2. Sim, seguro
❑ 3. Não muito seguro
❑ 4. Não sinto nenhuma ou quase nenhuma segurança
❑ 5. Não sei

10. (SE NA Q.9 A RESPOSTA FOR UM GRAU DE INSEGURANÇA "MAIOR" QUE NA Q.8) Por quais motivos você se sente menos seguro para caminhar pelas ruas durante à noite do que de dia? (ESPONTÂNEA E ORDENADA)
1. Porque as ruas ficam mais vazias
2. Por causa da pouca iluminação
3. Porque não há policiamento/vigilância suficiente
4. Porque a noite os bandidos agem
5. Outros
☐ ☐ ☐ ☐
Ordenar 4 respostas.

11. Se "Outro", defina:

12. O(a) sr(a) costuma sair à noite (para trabalhar, estudar, lazer etc...? (ESPONTÂNEA E ÚNICA)
❑ 1. Sim, saio 4 vezes por semana ou mais
❑ 2. Sim, saio entre 2 ou 3 vezes por semana
❑ 3. Saio aproximadamente 1 vez por semana
❑ 4. Quase nunca ou nunca saio à noite
❑ 5. Sem resposta

13. Ao sair à noite, é comum o(a) sr(a) mudar de rota devido à pouca iluminação? (ESPONTÂNEA E ÚNICA)
❑ 1. Sim, sempre mudo a rota por causa da pouca iluminação
❑ 2. Às vezes mudo a rota por causa da pouca iluminação
❑ 3. Nunca mudo a rota, mesmo com a pouca iluminação
❑ 4. A iluminação não é um problema ao longo do percurso
❑ 5. Outro:_____
❑ 6. Não sei
❑ 7. Sem resposta

CRIMINALIDADE E ILUMINAÇÃO

14. Pensando nos últimos 12 meses, o(a) sr(a) foi vítima de algum desses crimes em via pública na sua cidade? (LER AS ALTERNATIVAS - ESTIMULADA E MÚLTIPLA)
❑ 1. Furto (sem violência)
❑ 2. Roubo (com violência)
❑ 3. Lesão corporal
❑ 4. Importunação sexual
❑ 5. Estupro
❑ 6. Outros:_____
❑ 7. Não foi vítima de nenhum crime em via pública(Pular p/P.19)

15. O(a) sr(a) chegou a registrar essa(s) ocorrência(s) em alguma delegacia? (SE SIM NA Q.14, APLICAR QUANTAS VEZES FOREM NECESSÁRIAS)
❑ 1. Sim ❑ 2. Não

16. A que horas, aproximadamente, este crime ocorreu? (SE SIM NA Q.14, APLICAR QUANTAS VEZES FOREM NECESSÁRIAS - PESQUISADOR REGISTRAR A HORA USANDO 24H)

17. (SE DELITO OCORREU ENTRE 18H E 5H DA MANHÃ). Como avalia a iluminação pública do local onde ocorreu o crime? (LEIA AS ALTERNATIVAS - ESTIMULADA E ÚNICA)
❑ 1. Péssima ❑ 2. Ruim
❑ 3. Regular ❑ 4. Boa (Pular p/P.19)
❑ 5. Excelente (Pular p/P.19)

18. (SE A RESPOSTA TENHA SIDO OPÇÃO 1, 2 OU 3 NA Q.17). O(a) sr(a) acredita que a iluminação contribuiu para que esse crime ocorresse? (ESPONTÂNEA E ÚNICA)
❑ 1. Sim, acredito ❑ 2. Não, teria acontecido de qualquer forma
❑ 3. Não sei

MOBILIDADE

19. Durante à noite, quais meios de transporte o(a) sr(a) normalmente utiliza? (LER AS ALTERNATIVAS E ANOTAR OS 3 MEIOS DE TRANSPORTE MAIS USADOS)

1. Ônibus (transporte público)
2. Táxi
3. Transporte por aplicativo
4. Mototáxi
5. Carro particular
6. Moto particular
7. Transporte alternativo/Ligeirinho/Executivo (transporte público)
8. Bicicleta
9. A pé
10. Outros

☐ ☐ ☐

Ordenar 3 respostas.

20. (PARA QUEM UTILIZA TRANSPORTE PÚBLICO). Como avalia a iluminação dos pontos de ônibus próximos à sua residência? (LEIA AS ALTERNATIVAS - ESTIMULADA E ÚNICA)

❑ 1. Péssima ❑ 2. Ruim ❑ 3. Regular
❑ 4. Boa ❑ 5. Excelente

Você pode marcar diversas casas (2 no máximo).

21. (PARA QUEM UTILIZA TRANSPORTE PÚBLICO). Quanto tempo, em média, o(a) sr(a) espera pelo transporte público nos pontos de ônibus próximos a sua residência? (ESPONTÂNEA E ÚNICA - ANOTAR OS MINUTOS EM NÚMEROS)

22. Para se sentir mais seguro(a) ao se locomover à noite, o(a) sr(a): (LER AS ALTERNATIVAS - ESTIMULADA E MÚLTIPLA)

❑ 1. Circula sempre acompanhado(a)
❑ 2. Fala ao telefone ou finge que fala para evitar que alguém se aproxime
❑ 3. Evito locais com pouca luminosidade
❑ 4. Evito locais com poucas pessoas
❑ 5. Ando mais rápido e evito ficar nas vias públicas o menor tempo possível
❑ 6. Saio mais cedo da aula ou do trabalho
❑ 7. Não faço nada
❑ 8. Outros
❑ 9. Não sei
❑ 10. Sem resposta

Você pode marcar diversas casas (5 no máximo).

23. Durante o dia, o(a) sr(a) tem medo de esperar sozinho(a) transporte público nos pontos de ônibus próximos a sua residência? (ESPONTÂNEA E ÚNICA)

❑ 1. Sim, sempre ❑ 2. Sim, as vezes ❑ 3. Não ❑ 4. Não sei

24. Durante à noite, o(a) sr(a) tem medo de esperar sozinho(a) transporte público nos pontos de ônibus próximos a sua residência? (ESPONTÂNEA E ÚNICA)

❑ 1. Sim, sempre ❑ 2. Sim, as vezes ❑ 3. Não ❑ 4. Não sei

25. O(a) sr(a) já perdeu alguma oportunidade de trabalho ou recusou um emprego porque o trajeto ou parte do trajeto até o local de trabalho era pouco iluminado? (ESPONTÂNEA E ÚNICA)

❑ 1. Sim ❑ 2. Não ❑ 3. Não sei

ATIVIDADES EDUCACIONAIS

26. O(a) sr(a) está estudando no momento? (ESPONTÂNEA E ÚNICA)

❑ 1. Sim ❑ 2. Não (Pular p/P.30)

27. (SE "SIM" NA Q.26). Estuda no período noturno? (ESPONTÂNEA E ÚNICA)

❑ 1. Sim ❑ 2. Não (Pular p/P.30)

28. (SE "SIM" NA Q.27). O(a) sr(a) já pensou em desistir do curso que está realizando no momento? (ESPONTÂNEA E ÚNICA)

❑ 1. Sim ❑ 2. Não (Pular p/P.30) ❑ 3. Não sei (Pular p/P.30)

29. (SE "SIM" NA Q.28). Algumas das seguintes frases é um dos motivos que o(a) sr(a) considerou ao pensar em desistir do curso? (LEIA AS FRASES - ESTIMULADA E MÚLTIPLA)

❑ 1. Porque o trajeto para chegar até a escola tem pouca vigilância
❑ 2. Porque o trajeto para chegar até a escola é mal iluminado
❑ 3. Porque tenho que passar por vias muito vazias para chegar até a escola
❑ 4. Porque tenho que esperar muito tempo pelo transporte público
❑ 5. A minha desistência do curso não tem relação com nenhum desses motivos
❑ 6. Não sei

COVID - 19

30. Com a pandemia, depois que seu município restringiu atividades comerciais, educacionais etc., o(a) sr(a): (LER AS ALTERNATIVAS - ESTIMULADA E ÚNICA)

❑ 1. Continua circulando pela cidade normalmente
❑ 2. Reduziu a circulação pela cidade
❑ 3. Permanece o tempo todo ou grande parte do tempo em casa
❑ 4. Outro:_____

31. (SE A RESPOSTA TENHA SIDO OPÇÃO 2 OU 3 NA Q.30). Com a Covid-19, o(a) sr(a) acha que...(LEIA AS ALTERNATIVAS - ESTIMULADA E MÚLTIPLA)

❑ 1. As ruas e transportes públicos estão muito mais vazios, deixando-os mais inseguros
❑ 2. O patrulhamento reduziu
❑ 3. As ruas e transportes estão com a mesma ou quase a mesma quantidade de pessoas circulando
❑ 4. Outros:_____
❑ 5. Não sei

Você pode marcar diversas casas (4 no máximo).

PESQUISA QUALITATIVA

Esta pesquisa tem interesse em ouvir alguns depoimentos sobre a iluminação e criminalidade no seu município.

32. O(a) sr(a) estaria disposto(a) a realizar uma entrevista aberta via telefone, de aproximadamente 30 minutos, para falar do assunto? Se sim, a equipe de pesquisa pode entrar em contato com o(a) sr(a) nas próximas semanas.

❑ 1. Não ❑ 2. Sim

DADOS DE CONTROLE

33. Nome e sobrenome:

34. Bairro onde reside atualmente?

35. Telefones para contato:

ENCERRAMENTO

Em nome do Banco Mundial, agradecemos pela sua participação e colaboração! Tenha um excelente dia!

36. Pesquisador(a):

37. Data da entrevista:

A resposta é obrigatória.

Annex 5: Sample for Quantitative Data Collection

Sample: ARACAJÚ (SE)	População residente entre 18 e 70 anos, por situação do domicílio, sexo e idade, segundo a condição no domicílio e compartilhamento da responsabilidade pelo domicílio.

The margin of error for a 95% confidence interval is plus or minus 4.7%

Neighborhood	Absolute numbers	Freq.	Total = 301	Gender		Age			
				Men	Women	18 - 24	25 - 34	35 - 49	50 or more
América	10530	2.8%	4	3	1	1	3	0	0
Capucho	594	0.2%	2	2	0	1	0	1	0
São José	3909	1.0%	4	3	1	1	0	3	0
Novo Paraíso	7665	2.0%	1	0	1	0	0	0	1
Centro	5350	1.4%	10	6	4	1	2	4	3
Cirurgia	3858	1.0%	2	2	0	0	0	1	1
Getúlio Vargas	4632	1.2%	3	1	2	0	2	0	1
José Conrado de Araújo	9010	2.4%	1	0	1	0	1	0	0
Olaria	11113	3.0%	9	5	4	0	5	2	2
Jardim Centenário	9161	2.4%	4	2	2	0	1	2	1
Bugio	11952	3.2%	18	8	10	2	3	7	6
Santos Dumont	17029	4.5%	7	3	4	1	0	1	5
Dezoito do Forte	14940	4.0%	8	4	4	0	3	2	3
Palestina	3004	0.8%	7	6	1	1	1	3	2
Santo Antônio	8456	2.3%	11	6	5	0	2	4	5
Industrial	11926	3.2%	11	5	6	2	2	1	6
Porto Dantas	6443	1.7%	5	2	3	1	1	1	2
Lamarão	5784	1.5%	7	4	3	0	2	3	2
Cidade Nova	14067	3.7%	7	3	4	2	0	4	1
Soledade	6029	1.6%	4	1	3	0	0	2	2
Jardins	5235	1.4%	8	5	3	1	0	6	1
Santa Maria	19687	5.2%	10	3	7	1	3	3	3
Japãozinho	5103	1.4%	3	1	2	0	1	1	1
Outros ou Não informado	-	-	38	23	15	9	8	9	12

F.SANTANA (BA)	População residente entre 18 e 70 anos, por situação do domicílio, sexo e idade, segundo a condição no domicílio e compartilhamento da responsabilidade pelo domicílio.							
The margin of error for a 95% confidence interval is plus or minus 4.7%								
Neighborhood	Absolute numbers	Freq.	Gender		Age			
			Men	Women	18 - 24	25 - 34	35 - 49	50 or more
Calumbi	13132	3.9%	12	8	1	3	8	8
Rua Nova	8466	2.5%	1	1	0	0	1	1
Jardim Cruzeiro	10272	3.1%	6	1	0	1	3	3
Cruzeiro	2160	0.6%	1	1	2	0	0	0
Sobradinho	3247	1.0%	3	3	0	2	2	2
Baraúna	5569	1.7%	2	1	0	0	2	1
Cidade Nova	6978	2.1%	5	5	0	2	3	5
Mangabeira	14020	4.2%	8	9	1	4	12	0
Conceição	14180	4.2%	6	6	1	3	5	3
Santo Antônio dos Prazeres	3576	1.1%	1	2	0	2	1	0
Sim	1824	0.5%	6	2	0	1	6	1
Lagoa Salgada	3711	1.1%	3	0	0	0	2	1
Calumbi	13132	3.9%	12	8	1	3	8	8
Rua Nova	8466	2.5%	1	1	0	0	1	1
Jardim Cruzeiro	10272	3.1%	6	1	0	1	3	3
Cruzeiro	2160	0.6%	1	1	2	0	0	0
Sobradinho	3247	1.0%	3	3	0	2	2	2
Baraúna	5569	1.7%	2	1	0	0	2	1
Cidade Nova	6978	2.1%	5	5	0	2	3	5
Mangabeira	14020	4.2%	8	9	1	4	12	0

F.SANTANA (BA)	População residente entre 18 e 70 anos, por situação do domicílio, sexo e idade, segundo a condição no domicílio e compartilhamento da responsabilidade pelo domicílio.							
The margin of error for a 95% confidence interval is plus or minus 4.7%								
Neighborhood	Absolute numbers	Freq.	Gender		Age			
			Men	Women	18 - 24	25 - 34	35 - 49	50 or more
Conceição	14180	4.2%	6	6	1	3	5	3
Santo Antônio dos Prazeres	3576	1.1%	1	2	0	2	1	0
Sim	1824	0.5%	6	2	0	1	6	1
Lagoa Salgada	3711	1.1%	3	0	0	0	2	1
35º BI	3882	1.2%	3	1	2	0	2	0
CIS	4751	1.4%	4	0	0	1	1	2
Nova Esperança	1056	0.3%	1	0	0	0	1	0
Gabriela	11591	3.5%	5	3	0	3	4	1
Pampalona	4036	1.2%	2	2	1	0	3	0
Campo Limpo	31213	9.3%	12	5	2	1	9	5
Parque Ipê	11304	3.4%	6	4	1	1	6	2
Aviário	7633	2.3%	1	1	0	1	0	1
Campo do Gado Novo	1468	0.4%	0	1	0	0	1	0
Asa Branca	3508	1.0%	1	1	0	0	1	1
Novo Horizonte	2000	0.6%	4	0	0	1	1	2
Papagaio	4217	1.3%	7	6	2	1	6	4
Limoeiro	2217	0.7%	3	0	1	0	1	1
Subaé	2282	0.7%	1	0	0	0	1	0
Aeroporto	402	0.1%	0	0	0	0	0	0
Outros ou Não informado	-	-	11	8	0	7	5	7

Annex 6: Heat Map Development Details

The sources of the crime statistics reported herein are: in Sergipe, Secretaria de Segurança Pública/PC/SE – Instituto Médico Legal (IML) – Procedimentos Policiais Eletrônicos (PPE); and in Bahia, Secretaria de Segurança Pública – Coordenação de Documentação e Estatística Policial (CDEP).

In this study, since we are discussing the relationship between crime and street lighting, the data used to build the heat maps refer specifically to evenings and nights.

In Aracaju, the time periods (morning, afternoon, evening and late night) of each observation are included in the database provided by the police. In Feira de Santana, the specific time of each crime is registered in the database. The statistics reported here consider, therefore, crimes committed between 6 p.m. and 6 a.m.

In addition to the time or period, street names were also available for each observation. Considering that some streets are very long, however, it was often not possible to pinpoint the exact location for each crime. In view of this, data were aggregated per neighborhood. Consequently, heat maps show the results for each wider neighborhood.

In Aracaju, the limits of each district were based on information from Instituto Brasileiro de Geografia e Estatística (IBGE); in Feira de Santana, the same information was provided by the City Hall. Because some of the neighborhoods mentioned in the data were inconsistent with IBGE and Feira de Santana's City Hall district lists, the research team adapted the maps as follows:

Aracaju

Police Database	Changes based on IBGE source
Dom Luciano neighborhood	Considered as a part of Cidade Nova
Dezessete de Março neighborhood	Considered as a part of Santa Maria
Japãozinho neighborhood	Considered as a part of Cidade Nova

Feira de Santana

Police Database	Changes based on IBGE source
Estação Nova neighborhood	Corresponds to Lagoa Grande at IBGE
CIS, CIS Norte Leste and CIS Norte Oeste	Changed to CIS
Pedra do Descanso Jussara and Pedra do Descanso Vila Olímpia	Changed to Pedra do Descanso
Pedra Ferrada (64 general crimes and 4 crimes against women)	Included in Maria Quitéria neighborhood
Mantiba (27 general crimes and 2 crimes against women)	Neighborhood shape does not exist in City Hall data or IBGE data -> observations removed from calculations
Chaparral (2 general crimes and 1 crime against women)	Neighborhood shape does not exist in City Hall data or IBGE data -> observations removed from calculations
34 crimes did not inform the neighborhood	Observations removed from calculations

In Feira de Santana, urban population details were obtained from Plano Diretor 2018, while rural population data came from IBGE records. For Aracaju, Empresa Municipal de Urbanismo (EMURB) provided details on the Population.

The Aracaju database only includes crimes that took place in public spaces. For Feira de Santana, the data includes crimes in public spaces and public transportation.

Finally, since this study is sensitive to gender issues, the research team divided crimes into two different groups: general crimes, which are usually committed against both men and women; and crimes against women (or gender-based crimes). The way to record these types of crimes may vary between the cities. Hence, the crimes considered for each category are:

Aracaju

General Crimes	Crimes Against Women
Theft	Rape
Robbery	Rape of children under 14 years of age
Homicide	Theft
	Intentional homicide
	Sexual harassment
	Bodily Injury
	Robbery
	Insulting

Feira de Santana

General Crimes	Crimes Against Women
Threat	Threat
Pedestrian Theft	Rape
Cargo Theft	Rape of children under 14 years of age
Vehicle Theft	Intentional homicide
Qualified Theft	Sexual harassment
Simple Theft	Insulting
Intentional homicide	Bodily Injury
Bodily Injury	Robbery followed by homicide
Intentional Bodily Injury	Homicide attempt
Bodily Injury followed by Homicide	Feminicide
Pedestrian Robbery	
Vehicle Robbery	
Qualified Robbery	
Simple Robbery	
Homicide attempt	

Annex 7: Qualitative Research Tools

	Police (Semi structured interview)	
Theme	**Questions**	**Time (min)**
Introdução e apresentação da pesquisa	Olá! Meu nome é _____, sou pesquisador(a) e estou colaborando com um estudo solicitado pelo Banco Mundial. Esta pesquisa está focada na iluminação e segurança públicas e as informações que discutiremos aqui serão muito valiosas para apoiar os projetos do Banco Mundial, bem como os investimentos em iluminação em (Aracaju / Feira de Santana). Como pesquisador profissional, garanto a confidencialidade de tudo o que falaremos aqui. Com o seu consentimento, gostaria de gravar esta conversa, que mais tarde apoiará a análise dos dados. Se você não se sentir confortável, podemos continuar a entrevista sem gravá-la. Você é livre para interromper esta entrevista a qualquer momento, sem qualquer prejuízo.	0:01
Informações gerais	• Você pode falar um pouco sobre o seu trabalho? Há quanto tempo trabalha como policial?	0:02
Iluminação pública e criminalidade	• Como você descreveria a ocorrência de crimes e violência no seu município? Em geral, quais são os crimes mais comuns? Quais são as principais fontes de preocupação? • Quais bairros de Feira de Santana/Aracaju são os mais violentos? Quais crimes são mais comuns nessas regiões? • Você acredita que melhorar a iluminação pública pode reduzir a criminalidade? Se sim, quais (assédio, furtos, roubo de prosperidade etc.) • É possível que, ao contrário do esperado, a iluminação possa aumentar a incidência de crimes ou a ocorrência de alguns crimes específicos? Se sim, quais são? • Existem casos em que a iluminação pode não ter efeito? Se sim, quais são? • Para melhorar a segurança e o uso do espaço público, quais são os principais investimentos urbanos que devem acompanhar as melhorias na iluminação? (patrulhamento, câmeras etc.)? Por quê? • Como é monitorada a ocorrência de violência contra mulheres em Feira de Santana / Aracaju? • O planejamento urbano e os investimentos levam em consideração as estatísticas de violência contra as mulheres? Se sim, como? • O planejamento urbano considera as demandas levantadas pelas mulheres que vivem no município? • Existem canais de comunicação dedicados às mulheres?	0:12

	Police (Semi structured interview)	
Theme	**Questions**	**Time (min)**
Situação atual de iluminação	• Quais regiões / áreas têm a pior iluminação pública disponível, na sua opinião?	0:05
Percepção da segurança	• Como a população percebe a segurança pública na cidade? Quais são as suas principais reclamações? • Existe alguma diferença na percepção das pessoas sobre segurança entre as horas do dia e da noite? • Você acredita que a percepção das pessoas sobre segurança / medo do crime muda de acordo com a iluminação pública boa / ruim? Que tipos de comportamento as pessoas têm devido à pouca iluminação? • E as mulheres? Quais são as suas principais reclamações? Do que eles têm medo em termos de segurança? É diferente dos homens?	0:10
Atividades econômicas e oportunidades de emprego	• Existe um alto número de ocorrências de assalto ou outros crimes envolvendo estabelecimentos comerciais na cidade? Em caso afirmativo, em que regiões? Que tipos de atividades e estabelecimentos criminosos? • Qual a relação entre iluminação pública e operação de estabelecimentos comerciais?	0:10
Covid-19	• Com a chegada do Covid-19, houve alguma mudança na percepção de segurança por parte da população? • Quais são as principais preocupações levantadas pelos homens? E as principais preocupações levantadas pelas mulheres? • A prestação de serviços foi prejudicada pelo Covid-19? Houve um "afogamento" dos serviços de segurança pública?	0:05
Recomendações	• Considerando que esta pesquisa está focada em iluminação e segurança, você tem alguma recomendação ao Banco Mundial ou às autoridades locais para melhorar essas questões?	0:05
	Total time	0:50

	Local Authorities (Semi structured interview)	
Theme	**Questions**	**Time (min)**
Introdução e apresentação da pesquisa	Olá! Meu nome é _____, sou pesquisador(a) e estou colaborando com um estudo solicitado pelo Banco Mundial. Esta pesquisa está focada na iluminação e segurança públicas e as informações que discutiremos aqui serão muito valiosas para apoiar os projetos do Banco Mundial, bem como os investimentos em iluminação em (Aracaju / Feira de Santana). Como pesquisador profissional, garanto a confidencialidade de tudo o que falaremos aqui. Com o seu consentimento, gostaria de gravar esta conversa, que mais tarde apoiará a análise dos dados. Se você não se sentir confortável, podemos continuar a entrevista sem gravá-la. Você é livre para interromper esta entrevista a qualquer momento, sem qualquer prejuízo.	0:01
Informações gerais	• Você pode falar um pouco sobre seu trabalho e os principais projetos de sua instituição?	0:02
Iluminação pública e criminalidade	• Como você descreveria a ocorrência de crimes e violência no seu município? Em geral, quais são os crimes mais comuns? Quais são as principais fontes de preocupação? • Quais bairros de Feira de Santana/Aracaju são os mais violentos? Quais crimes são mais comuns nessas regiões? • Você acredita que melhorar a iluminação pública pode reduzir a criminalidade? Se sim, quais (assédio, furtos, roubo de prosperidade etc.) • É possível que, ao contrário do esperado, a iluminação possa aumentar a incidência de crimes ou a ocorrência de alguns crimes específicos? Se sim, quais são? • Existem casos em que a iluminação pode não ter efeito? Se sim, quais são? • Para melhorar a segurança e o uso do espaço público, quais são os principais investimentos urbanos que devem acompanhar as melhorias na iluminação? (patrulhamento, câmeras etc.)? Por quê? • Como é monitorada a ocorrência de violência contra mulheres em Feira de Santana / Aracaju? • O planejamento urbano e os investimentos levam em consideração as estatísticas de violência contra as mulheres? Se sim, como? • O planejamento urbano considera as demandas levantadas pelas mulheres que vivem no município? • Existem canais de comunicação dedicados às mulheres?	0:12
Situação atual de iluminação	• Quais regiões / áreas têm a pior iluminação pública disponível, na sua opinião? • O planejamento da iluminação procura atender às demandas das mulheres?	0:10

	Local Authorities (Semi structured interview)	
Theme	**Questions**	**Time (min)**
Percepção da segurança	• Como a população percebe a segurança pública na cidade? Quais são as suas principais reclamações? • Existe alguma diferença na percepção das pessoas sobre segurança entre as horas do dia e da noite? • Você acredita que a percepção das pessoas sobre segurança / medo do crime muda de acordo com a iluminação pública boa / ruim? Que tipos de comportamento as pessoas têm devido à pouca iluminação? • E as mulheres? Quais são as suas principais reclamações? Do que eles têm medo em termos de segurança? É diferente dos homens?	0:10
Mobilidade	• Em geral, quais são os principais obstáculos percebidos pela população que afetam sua mobilidade? • Quais são os tipos de transporte mais importantes usados pela população? • Você acredita que as pessoas fazem escolhas de transporte pensando em problemas de segurança pública? • Essas opções dependem de alguma forma da iluminação pública, mais especificamente? • Você acha que os pontos de ônibus têm iluminação adequada? Por favor, esclareça. • Que tipos de transporte são usados pelas mulheres? E os homens? Existe alguma diferença? • As mulheres escolhem ou evitam qualquer tipo de transporte devido a problemas de segurança? Quais são esses problemas? • Essas opções dependem de alguma forma da iluminação pública, mais especificamente?	0:12
Atividades econômicas e oportunidades de emprego	• Existe um alto número de ocorrências de assalto ou outros crimes envolvendo estabelecimentos comerciais na cidade? Em caso afirmativo, em que regiões? Que tipos de atividades e estabelecimentos criminosos? • Qual a relação entre iluminação pública e operação de estabelecimentos comerciais? • Você acha que as oportunidades de emprego podem ser diferentes para homens e mulheres devido a problemas de iluminação pública? Se sim, quais são as diferenças?	0:10

	Local Authorities (Semi structured interview)	
Theme	**Questions**	**Time (min)**
Atividades Educacionais	• Na sua opinião, o acesso às instituições de ensino pode sofrer limitações devido à baixa iluminação pública? • É possível que algumas instituições tenham taxas de evasão mais altas devido à baixa iluminação da região? Você conhece algum exemplo? • É possível que as mulheres sejam mais afetadas que os homens devido à insegurança gerada pela falta de iluminação?	0:05
Covid-19	• Com a chegada do Covid-19, houve alguma mudança na percepção de segurança por parte da população? • Quais são as principais preocupações levantadas pelos homens? E as principais preocupações levantadas pelas mulheres? • A prestação de serviços foi prejudicada pelo Covid-19? Houve um "afogamento" dos serviços de segurança pública?	0:05
Recomendações	• Considerando que esta pesquisa está focada em iluminação e segurança, você tem alguma recomendação ao Banco Mundial ou às autoridades locais para melhorar essas questões?	0:03
	Total time	1:10

Theme	Questions	Time (min)
	Local Leaders (Semi structured interview)	
Introdução e apresentação da pesquisa	Olá! Meu nome é _____, sou pesquisador(a) e estou colaborando com um estudo solicitado pelo Banco Mundial. Esta pesquisa está focada na iluminação e segurança públicas e as informações que discutiremos aqui serão muito valiosas para apoiar os projetos do Banco Mundial, bem como os investimentos em iluminação em (Aracaju / Feira de Santana). Como pesquisador profissional, garanto a confidencialidade de tudo o que falaremos aqui. Com o seu consentimento, gostaria de gravar esta conversa, que mais tarde apoiará a análise dos dados. Se você não se sentir confortável, podemos continuar a entrevista sem gravá-la. Você é livre para interromper esta entrevista a qualquer momento, sem qualquer prejuízo.	0:01
Informações gerais	• Você pode falar um pouco sobre o seu trabalho? Que tipo de trabalho você faz para ajudar sua comunidade?	0:03
Iluminação pública e criminalidade	• Como você descreveria a ocorrência de crimes e violência no seu município? Em geral, quais são os crimes mais comuns? Quais são as principais fontes de preocupação? • Quais bairros de Feira de Santana/Aracaju são os mais violentos? Quais crimes são mais comuns nessas regiões? • Você acredita que melhorar a iluminação pública pode reduzir a criminalidade? Se sim, quais (assédio, furtos, roubo de prosperidade etc.) • É possível que, ao contrário do esperado, a iluminação possa aumentar a incidência de crimes ou a ocorrência de alguns crimes específicos? Se sim, quais são? • Existem casos em que a iluminação pode não ter efeito? Se sim, quais são? • Para melhorar a segurança e o uso do espaço público, quais são os principais investimentos urbanos que devem acompanhar as melhorias na iluminação? (patrulhamento, câmeras etc.)? Por quê?	0:10
Percepção da segurança	• Como a população percebe a segurança pública na cidade? Quais são as suas principais reclamações? • Existe alguma diferença na percepção das pessoas sobre segurança entre as horas do dia e da noite? • Você acredita que a percepção das pessoas sobre segurança / medo do crime muda de acordo com a iluminação pública boa / ruim? Que tipos de comportamento as pessoas têm devido à pouca iluminação? • E as mulheres? Quais são as suas principais reclamações? Do que eles têm medo em termos de segurança? É diferente dos homens?	0:08
Mobilidade	• Que tipos de transporte são usados pelas mulheres? E os homens? Existe alguma diferença? • As mulheres escolhem ou evitam qualquer tipo de transporte devido a problemas de segurança? Quais são esses problemas?	0:05

Theme	Questions	Time (min)
	Local Leaders (Semi structured interview)	
Atividades econômicas e oportunidades de emprego	• Você acha que as oportunidades de emprego podem ser diferentes para homens e mulheres devido a problemas de iluminação pública? Se sim, quais são as diferenças?	0:05
Atividades educacionais	• Na sua opinião, o acesso às instituições de ensino pode sofrer limitações devido à baixa iluminação pública? • É possível que algumas instituições tenham taxas de evasão mais altas devido à baixa iluminação da região? Você conhece algum exemplo? • É possível que as mulheres sejam mais afetadas que os homens devido à insegurança gerada pela falta de iluminação?	0:05
Covid-19	• Com a chegada do Covid-19, houve alguma mudança na percepção de segurança por parte da população? • Quais são as principais preocupações levantadas pelos homens? E as principais preocupações levantadas pelas mulheres? • A prestação de serviços foi prejudicada pelo Covid-19? Houve um "afogamento" dos serviços de segurança pública?	0:05
Recomendações	• Considerando que esta pesquisa está focada em iluminação e segurança, você tem alguma recomendação ao Banco Mundial ou às autoridades locais para melhorar essas questões?	0:03
	Total time	0:45

Theme	Educational institutions (Semi structured interview) Questions	Time (min)
Introdução e apresentação da pesquisa	Olá! Meu nome é _____, sou pesquisador(a) e estou colaborando com um estudo solicitado pelo Banco Mundial. Esta pesquisa está focada na iluminação e segurança públicas e as informações que discutiremos aqui serão muito valiosas para apoiar os projetos do Banco Mundial, bem como os investimentos em iluminação em (Aracaju / Feira de Santana). Como pesquisador profissional, garanto a confidencialidade de tudo o que falaremos aqui. Com o seu consentimento, gostaria de gravar esta conversa, que mais tarde apoiará a análise dos dados. Se você não se sentir confortável, podemos continuar a entrevista sem gravá-la. Você é livre para interromper esta entrevista a qualquer momento, sem qualquer prejuízo.	0:01
Informações gerais	• Você pode falar um pouco sobre seu trabalho e os principais projetos da sua instituição?	0:04
Iluminação pública e criminalidade	• Como você descreveria a ocorrência de crimes e violência no seu município? Em geral, quais são os crimes mais comuns? Quais são as principais fontes de preocupação? • Quais bairros de Feira de Santana/Aracaju são os mais violentos? Quais crimes são mais comuns nessas regiões? • Você acredita que melhorar a iluminação pública pode reduzir a criminalidade? Se sim, quais (assédio, furtos, roubo de prosperidade etc.) • É possível que, ao contrário do esperado, a iluminação possa aumentar a incidência de crimes ou a ocorrência de alguns crimes específicos? Se sim, quais são? • Existem casos em que a iluminação pode não ter efeito? Se sim, quais são? • Para melhorar a segurança e o uso do espaço público, quais são os principais investimentos urbanos que devem acompanhar as melhorias na iluminação? (patrulhamento, câmeras etc.)? Por quê? • Como é monitorada a ocorrência de violência contra mulheres em Feira de Santana / Aracaju? • O planejamento urbano e os investimentos levam em consideração as estatísticas de violência contra as mulheres? Se sim, como? • O planejamento urbano considera as demandas levantadas pelas mulheres que vivem no município? • Existem canais de comunicação dedicados às mulheres?	0:15
Mobilidade	• Você acha que os pontos de ônibus têm iluminação adequada? Por favor, esclareça. • Que tipos de transporte são usados pelas mulheres? E os homens? Existe alguma diferença? • As mulheres escolhem ou evitam qualquer tipo de transporte devido a problemas de segurança? Quais são esses problemas?	0:05

Theme	Educational institutions (Semi structured interview) Questions	Time (min)
Atividades educacionais	• Na sua opinião, o acesso às instituições de ensino pode sofrer limitações devido à baixa iluminação pública? • É possível que algumas instituições tenham taxas de evasão mais altas devido à baixa iluminação da região? Você conhece algum exemplo? • É possível que as mulheres sejam mais afetadas que os homens devido à insegurança gerada pela falta de iluminação?	0:05
Recomendações	• Considerando que esta pesquisa está focada em iluminação e segurança, você tem alguma recomendação ao Banco Mundial ou às autoridades locais para melhorar essas questões?	0:10
	Total time	0:40

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