



Drug trafficking in the Amazon

INITIAL FINDINGS



NATIONAL SECRETARIAT
FOR DRUG POLICIES AND
ASSET MANAGEMENT

MINISTRY OF
JUSTICE AND
PUBLIC SECURITY



Drug trafficking in the **Amazon**

INITIAL FINDINGS



© Centre for Studies on Drugs and Community Social Development

All Rights Reserved. Total or partial reproduction of this work is permitted, provided the source is mentioned and it is not for sale or any commercial purpose. The research presented reflects the views of its authors and not those of the Ministry of Justice and Public Security, the United Nations Office on Drugs and Crime, or the United Nations Development Programme.

Esplanada dos Ministérios, Bloco T, Edifício Sede. Brasília – DF. CEP: 70064-900.

Available at: www.cdesc.org.br

<https://www.gov.br/mj/pt-br/assuntos/sua-protecao/politicas-sobre-drogas>

341.151

T794

Drug trafficking in the Amazon : initial findings / elaboration Vinicius Assis Couto ... [et al.] ; coordination Gabriela Barros de Luca – Brasília : Centre for Studies on Drugs and Community Social Development, United Nations Office on Drugs and Crime (UNODC), United Nations Development Programme (UNDP), Ministry of Justice and Public Security, 2024.
66 p. : il. color.

Trabalho em parceria da Secretaria Nacional de Políticas sobre Drogas e Gestão de Ativos do Ministério da Justiça e Segurança Pública com o Escritório das Nações Unidas sobre Drogas e Crime (UNODC), Programa das Nações Unidas para o Desenvolvimento (PNUD).

ISBN 978-65-87762-49-4

1. Tráfico de drogas, Amazônia. 2. Organização criminal, Amazônia. I. Couto, Vinicius Assis. II. De Luca, Gabriela Barros (coord.). III. Centro de Estudos sobre Drogas e Desenvolvimento Social Comunitário (Cdesc). IV. Escritório das Nações Unidas sobre Drogas e Crime (UNODC). V. Brasil. Ministério da Justiça e Segurança Pública. VI. Programa das Nações Unidas para o Desenvolvimento (PNUD). VII. Título.

CDD

Elaborada por Luciene Maria Sousa CRB1-1655

Idealization

National Secretariat for Drug Policies and Assets Management of the Ministry of Justice and Public Security (Senad/MJSP)

United Nations Office on Drugs and Crime (UNODC)

United Nations Development Programme (UNDP)

RESPONSIBLE TEAM**Coordination**

Gabriela Barros de Luca

Elaboration

Vinicius Assis Couto, Jairo Jesús Pinto Hidalgo, Claudio Dantas Monteiro, Bárbara Diniz Caldeira, Ana Carolina Fleury Nogueira, Pedro Maziero, Luisa Oliveira and Rafaella Naves.

Spelling review

Rafael Rosa

Layout and Editing

Alveti Communication

Translation

Arthur Döhler Machado Fernandes and Ana Maria Daniel

President: Luiz Inácio Lula da Silva

Ministry of Justice and Public Security (MJSP)

Minister of Justice and Public Security: Flávio Dino

National Secretary for Drug Policies and Assets Management: Marta Rodriguez de Assis Machado

National Director of the BRA/15/009 Project: Gustavo Camilo Baptista

BRA/15/009 Project Coordinator: Solange Pereira Leal

United Nations Development Programme (UNDP)

Resident Representative: Cláudio Providas

Assistant Resident Representative and Program Area Coordinator: Maristela Baioni

Coordinator of the Governance and Justice for Development Unit: Moema Freire

Project Manager: Rosana Tomazini

Project Assistant: Aline Santana

United Nations Office on Drugs and Crime (UNODC)

Director of the Liaison and Partnership Office of UNODC Brazil: Elena Abbati

Centre for Studies on Drugs and Community Social Development (Cdesc)

Coordinator: Gabriela Barros de Luca

Technical Advisor: Bárbara Diniz Caldeira

Communication Specialist: Ana Carolina Fleury Nogueira

Statistics Specialist: Vinicius Couto

Specialist in Assets Management and Financial Intelligence: Claudio Dantas Monteiro

Specialist in Drug and Transnational Illicit Trafficking: Jairo Jesús Pinto Hidalgo

Communication Assistant: Pedro Maziero

Project Intern: Bruna Perin, Luisa Oliveira e Rafaella Naves

Index

1. Introduction	10
2. The Contextualization of the Amazon	14
2.1. The Magnitude of the Region	15
3. Methodological Strategy	18
3.1. Quantitative Data Collection Methodology	19
3.2. Qualitative Data Collection Methodology	22
4. Amazon: the increase in violence in the region	25
4.1. Dynamics of criminal organizations	27
4.2. Drug trafficking in the region	29
4.3. Interlocutions between different types of crime	32
4.4. Institutional challenges in the region	33
5. What the initial seizure data demonstrate	37
5.1. The quantitative of seizures	38
5.2. Geospatial contextualization: the routes	42
5.2.1. Action of police forces – Drug seizures	45
6. Final considerations – the research agenda	57
Bibliography	60

Figures

Figure 1	Hydrographic Units of the Amazon Hydrographic Region	17
Figure 2	Word cloud from interviews (in Portuguese).....	24
Figure 3	Criminal dynamics in Amazonas.....	27
Figure 4	Summary of the operating structure of an illegal mine	33
Figure 5	Possible drug trafficking routes in rivers in the Amazon region	43
Figure 6	Geospatial distribution and cartographic representation of main individual drug seizures in Brazil in 2022.....	46
Figure 7	Geospatial distribution and cartographic representation of main individual marijuana seizures in the Legal Amazon in 2022.....	48
Figure 8	Geospatial distribution and cartographic representation of the main individual seizures of cocaine and base paste in the Legal Amazon in 2022.....	50
Figure 9	Geographic pattern of cocaine seizure frequencies on federal highways.....	52
Figure 10	Geographic pattern of marijuana seizure frequencies on federal highways	54

Graphs

Graph 1	Estimates of coca leaf planting in hectares	29
Graph 2	Estimated global production of cocaine hydrochloride (in tons)	30
Graph 3	Spread of the number of seizures per month.....	39

Tables

Table 1	Border of South American countries with the states of the Legal Amazon in Brazil.....	34
Table 2	Main institutional gaps in the Amazon region.....	35
Table 3	Total seizures by type of drug in Brazil in 2022.....	40
Table 4	Total seizures by type of drug in the Legal Amazon in 2022.....	41
Table 5	Frequencies of cocaine seizures on federal highways	53
Table 6	Frequencies of marijuana seizures on federal highways.....	55

1 INTRODUCTION



In the mid-1980s, Chico Mendes, a rubber tapper and one of the greatest environmentalists in Brazilian history, uttered a famous phrase that still resonates with the various actors comprising environmental protection agencies today. The phrase was: "At first, I thought I was fighting to save rubber trees, then I thought I was fighting to save the Amazon Rainforest. Now, I realize I am fighting for humanity". This statement, among other meanings, expresses one of the most essential characteristics of the Amazon region: its ability to be at the same time a unique and global territory, given its magnitude and importance to the entire planet. It is from this perspective that this publication considers the region, with one of its objectives being to understand criminality, particularly that associated with drug trafficking, in the Amazon region within a fluid context that connects the local (by understanding specific flows and routes in the region) with the global (by linking the region's activities to transnational organized groups).

The Amazon is a region of the planet that continually attracts attention due to its rich biodiversity, extensive network of rivers, valuable cultural diversity, and its role in climate regulation, as it houses the largest tropical forest in the world, spanning nine South American countries (RAISG, 2020).

Beyond its natural and environmental riches, which have always been prominent when considering the region, there has been, in recent years, a social phenomenon increasingly gaining attention: the rise of crime and violence in the territory.

As these crimes persist and grow in the Amazon, at least on the Brazilian side, the environmental impacts are direct and visible, especially in legally protected areas, transforming the ecosystems of the Amazon region into aerial, river, and land corridors for new routes and activities linked to organized crime. In recent years, changes have been observed in the landscape of illicit activities in the region, with new actors (read as transnational criminal organizations), an expansion of routes, and the spread of illegal activities. There is also significant cocaine production near this area (in countries such as Colombia, Peru, and Bolivia), which poses an additional cause for concern.

In this context, there is an imperative need for greater attention and investigation into the criminal processes experienced by the region in recent years. This study aims to provide a more in-depth perspective to promote new research actions on the activities of criminal organizations in the region. Analyzing the criminal phenomenon between the particular and the universal, this document seeks to understand the peculiarities of local criminal dynamics and how they are affected by the region's geography and characteristics. At the same time, it aims to demonstrate that local actions are interconnected and have global consequences, primarily through transnational criminal organizations.

To achieve this, the Center for Studies on Drugs and Community Social Development (Cdesc, in Portuguese acronym) – a project resulting from the partnership between the National Secretariat for Drug Policies and Asset Management of the Ministry of Justice and Public Security (Senad/MJSP), the United Nations Development Programme (UNDP), and the United Nations Office on Drugs and Crime (UNODC) – utilizes various methodologies to shed light on important themes related to the understanding of criminality in the region, especially related to drug trafficking.

It is important to note that this is an initial report addressing the subject, an introductory document for a research agenda that should be refined and deepened in the coming years by the Cdesc, in line with the priority given to the topic by the federal government and the current management agenda of Senad/MJSP. This publication is part of Senad/MJSP's actions under the National Strategy for Mitigation and Remediation of the Impacts of Drug Trafficking on Indigenous Territories and Populations, an approach designed considering that the advance of drug trafficking into indigenous areas and traditional communities has become a problem of greater gravity and complexity in recent years. Given the cross-cutting nature of the issue, the idea is to collaborate in building intersectoral actions that help strengthen these populations against the effects of trafficking. Senad promotes the Strategy in partnership with the Ministry of Indigenous Peoples (MPI), and its activities are planned with extensive input and consultation from indigenous representations, such as the National Foundation for Indigenous People (Funai) and the Indigenous Health Secretariat of the Ministry of Health, as well as consultations with academics and civil society organizations that represent indigenous populations or directly work in the territories.

In this regard, the MJSP also places its position on the international stage in drug policy, marked by principles of alternative development, an area in which the Brazilian government, through Senad, is one of the signatories of the resolution adopted at the 65th Session of the United Nations Commission on Narcotic Drugs (CND) of UNODC, titled "Promoting alternative development as a development-oriented drug control strategy, taking into account measures to protect the environment."

With the understanding that this report marks the beginning of a discussion, several key themes will be presented throughout its sections, which are considered necessary for understanding the drug trafficking phenomenon in the region. Therefore, in addition to this introduction, this document comprises four more sections.

The next section contains information about the Legal Amazon, the region chosen as object of analysis. The methodology section describes the methods employed by the Cdesc in constructing this document and, most importantly, discusses the actions taken to overcome the absence of official data. The next section, delves into the actual question of criminal dynamics. Thus, the themes are the following subsections: the increase in illegal activity in the region, the actions of organized criminal groups, drug trafficking as a highlighted criminal activity, interactions between different types of criminal activities, and finally, the institutional challenges presented.

Having outlined the main issues underpinning the proposed discussion, the fourth section aims to present the analysis of the collected data, describing the characteristics of drug seizures and outlining potential routes and flows established by criminal organizations. Finally, the last section presents the concluding remarks of this document, seeking to reaffirm the possible insights gained and the potential research agendas that can be pursued.

2

THE CONTEXTUALIZATION OF THE AMAZON



Looking at the Brazilian portion of the forest, there has been a progressive entanglement of local criminality in recent years. Within this dynamic, well-known criminal activities in the region (such as illegal extraction of precious minerals and noble woods, land grabbing, and wildlife trafficking) are combined with new forms of operation, primarily those focused on drug trafficking.

As this document is dedicated to presenting the recent debate on local crime, mainly regarding drug trafficking and its consequences for the region, this part contextualizes the region, demonstrating the territorial immensity and its sui generis characteristics that give rise to illegal dynamics typical of the region.

2.1 The Magnitude of the Region

The Brazilian state established, in 1953, the normative that defines the "Legal Amazon"¹ through Law No. 1,806. More than just a geographical concept, this classification represents a political definition that provides the state with a framework for action in this area (PÊGO, 2018).

The region comprises 722 municipalities, covering all or part of the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima, and Tocantins. The Legal Amazon has an area of 5,015,146.008 square kilometers, accounting for approximately 58.93% of the Brazilian territory (IBGE, 2023) and 61.8% of the Amazon Rainforest (RAISG, 2020).

Hydrographically, the Legal Amazon can be divided into three major regions: the Amazon Region, the Tocantins-Araguaia, and the Western Northeast. The Amazon Region covers 3,870,000 square kilometers of Brazilian territory, including Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, and Roraima. The Tocantins-Araguaia Region occupies 967,059 square kilometers in Goiás, Maranhão, Pará, Mato Grosso, and Tocantins. It is composed of the basins of the Pará, Guampa, and Capim rivers, with the Tocantins River being the principal river, stretching 1,960 kilometers, originating in the Goiás Plateau, flowing into the Marajó Bay in Pará, and receiving the Araguaia River as its main tributary, which originates in Mato Grosso and spans 2,600 kilometers. Lastly, the Western Northeast Region, covering 254,000 square kilometers, encompasses Maranhão and a portion of Pará, including the sub-basins of the Gurupi, Mearim, Itapecuru, and Munim rivers (SANTOS, 2014).

The Amazon Basin, the largest in the region, is bounded by the Andes Mountain range to the west, the Guiana

¹ According to the IBGE, the area encompasses 772 Brazilian municipalities. Source: <<https://www.ibge.gov.br/geociencias/cartas-e-mapas/mapas-regionais/15819-amazonia-legal.html>>. Accessed on May 24, 2023.

Highlands to the north, the Central Plateau to the south, and the Atlantic Ocean to the east. Its principal river is the Amazon, which originates as the Vilcanota in the Peruvian Andes' Nevado de Mismi and flows into the vicinity of Marajó Island in Pará. Upon entering Brazilian territory, which comprises 63.88% of its extension, the river is known as the Solimões (AB'SABER, 2007). It later becomes the Amazon when it receives the waters of the Rio Negro near Manaus in Amazonas (SILVA, 2013). In the Legal Amazon, the river flows through the states of Acre, Amazonas, Roraima, Rondônia, Mato Grosso, Pará, and Amapá, primarily in the low-lying and partially submerged lands of the 20 to 100-kilometer-wide alluvial plain (SANTOS, 2014). At its mouth, the accumulation of sediment from the Amazon and the Pará River forms mangroves along the coast of Amapá and Pará-Maranhão (AB'SABER, 2002).

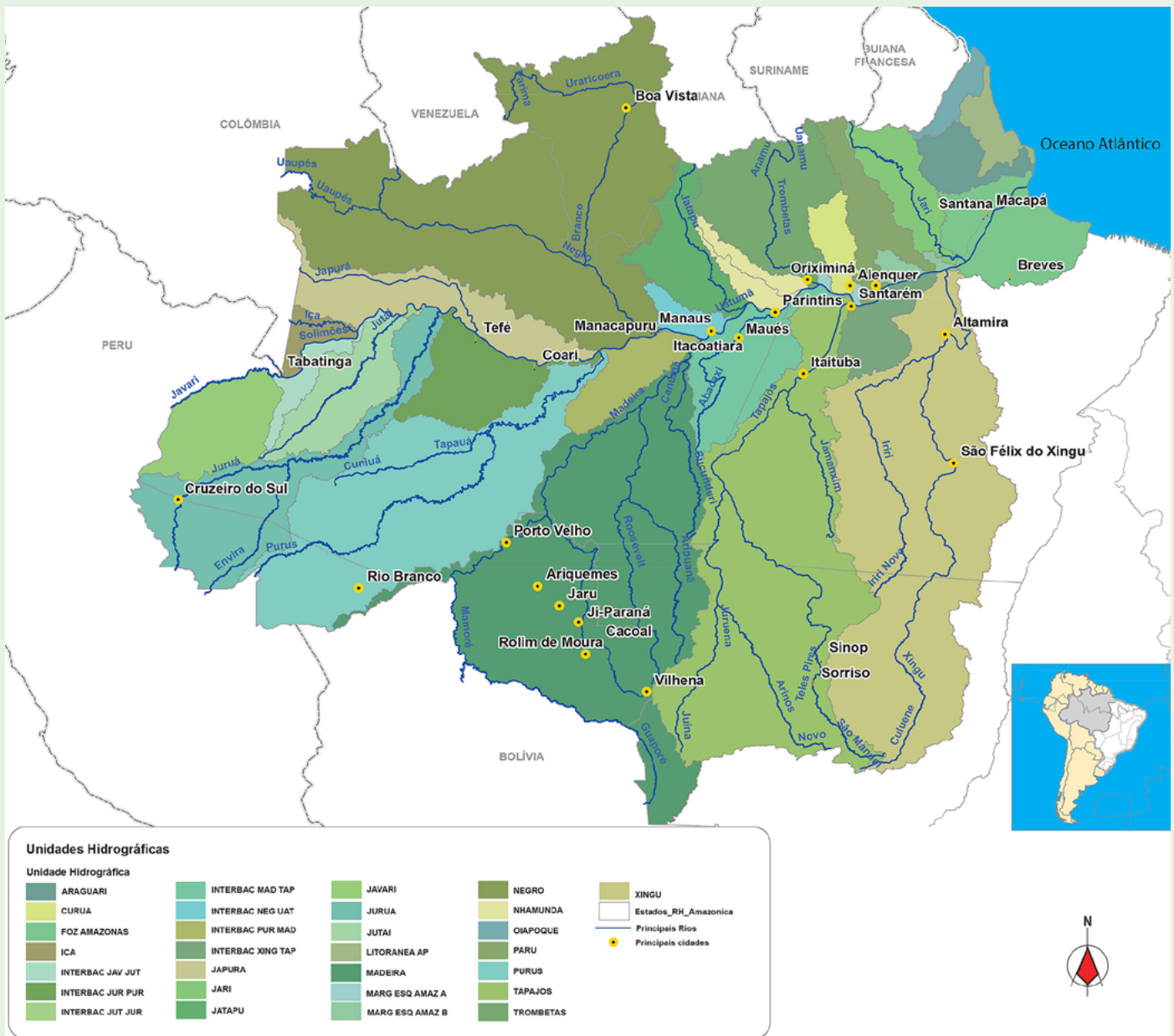
During periods of flooding, when the flow of the Amazon River exceeds 300,000 m³/s (SANTOS, 2011), the suspended sediment load it carries is deposited along its banks, forming elevated levees. Based on these flood characteristics, the lands in the Amazon Basin can be classified² as *igapós*, mostly flooded; *várzeas*, inundated by floods; or *terras firmes*, not subject to flooding at any time of the year (PANDOLFO, 1978).

Except for the source and Andean glacial meltwater received by the Amazon, a large part of the Amazon Basin's hydrographic network is maintained by the region's intense rainfall (AB'SABER, 2007). In addition to the main river, the Amazon Basin comprises tributary rivers and watercourses like *igarapés*, first or second-order watercourses that flow into larger rivers and whose mouths serve as access points to the forest. These mouths can be broad, as is the case on the left bank of the Rio Negro, where the city of Manaus is located, or narrow, depending on the river's flow. The basin also includes lateral channels called *paraná*s, whose calmer waters are commonly used for navigation (AB'SABER, 2002, 2007).

Regarding the rivers of the Amazon Basin that flow into the main river, in the upper Amazon, notable ones include the Japurá, which originates in Colombia and flows for 733 km in Brazil; the Javari, originating in Peru and extending for 1,180 km within Brazilian territory; the Jutai, which forms in Brazilian lands; and the Juruá, which originates in Peru and stretches over 3,283 km. In the middle Amazon region, you find the Purus River, which flows through the states of Acre and Amazonas, and the Madeira River, which marks the border with Bolivia and crosses the Brazilian Plateau. The main tributaries in the lower Amazon region are the Trombetas, which flows through Pará, and the Nhamundá, marking the border between Pará and Amazonas. The Rio Negro, with an extension of about 1,700 km, is the largest left-bank tributary of the Amazon River and has the Rio Branco and Uaupés as its tributaries. On the right bank, located in Pará, you find the mouth of the Xingu and the Tapajós, both originating from Mato Grosso (CUNHA, PASCOALOTO, 2009; SILVA, 2013; ANA, 2015; IBGE, 2010).

2 In the context of the Amazon Basin, the terms "*igapós*," "*várzeas*," and "*terras firmes*" refer to distinct types of land. "*Igapós*" are mostly flooded lands, characterized by their near constant state of submersion. "*Várzeas*" are areas inundated by seasonal floods, experiencing a cycle of flooding and dryness. "*Terras firmes*" are lands not subject to flooding at any time of the year, remaining consistently dry. These classifications are essential for understanding the diverse ecological and hydrological conditions within the Basin.

Figure 1 - Hydrographic Units of the Amazon Hydrographic Region



Source: Agência Nacional de Águas (ANA, 2015)

After characterizing the Legal Amazon, the text is dedicated to demonstrating the processes of increasing violent crime in the region and how it is linked to the actions of organized criminal groups. Drug trafficking per se is discussed in a specific section, followed by a brief discussion on the interplay between this type of crime and others existing in the region. However, the following section will elucidate the methods used to construct this document.

3 METHODOLOGICAL STRATEGY



To initiate an information-gathering process about Amazon (which will continue throughout 2023), the initial procedures involved collecting primary and secondary data. It is important to emphasize that, rather than attempting to exhaust all the information and data from the region, this report consists of data that brings the Cdesc closer to the subject and initiates a process of integration and understanding of local illicit dynamics. In this scenario, two primary sources of information were open sources and interviews with local stakeholders.

3.1 Quantitative Data Collection Methodology

Information related to drug seizures, prices, purity, and associated criminal activities is considered some of the critical indicators of illicit drug markets, both at the national and international levels (SINGLETON et al., 2018; EMCDDA, 2023; UNODC, 2023b). In this regard, data on individual drug seizures (IDS)³ have various applications and have been widely used in formulating public policies and strategies aimed at preventing and intercepting illicit drugs (SINGLETON et al., 2018; EMCDDA, 2019; EMCDDA, 2023; UNODC, 2023a-c; CdE, 2021; MAGLIOCCA et al., 2019; MCSWEENEY et al., 2020).

Although these data have proven to be valuable indicators for understanding the dynamics of drug trafficking, they should be interpreted cautiously and associated with other sources of information resulting from law enforcement agencies' intelligence activities and priorities (EMCDDA, 2022a). However, due to the complex spatial dynamics of interactions between drug interdiction and drug trafficking organizations, this data has been fundamental in terms of analysis, operations, and policies, allowing the identification of drug trafficking routes and trends (EMCDDA, 2016; UNODC, 2023a; PONAL, 2020; EMCDDA, 2019; PINTO, 2022), as well as establishing connections between countries and geographical regions to identify areas that require greater attention. Therefore, any strategy centered on drug trafficking analysis tends to involve the assessment of the quantity and context of seized drugs (REUTER, 2001).

Considering the existing limitations in Brazil, as there are no unified national statistics on drug seizures (BAPTISTA, NASCIMENTO, 2022), this study employed a methodological approach similar to that used in specialized studies to collect quantitative data related to drug seizures through available data from open sources (UNODC, 2023c; EMCDDA, 2019; PINTO, 2022).

³ It is the result of law enforcement operations that lead to an interception or individual drug seizure, considering the specific location and time of the occurrence. It can refer to one or more drugs seized in each case (UNODC, 2022).

Following this logic, natural language processing (NLP) methods, web scraping techniques, and information from open sources are used for "environmental scanning"⁴ to obtain information about drug trafficking activities.

NLP is a field of artificial intelligence that enables computers to use natural language (text and speech) to interact with humans and learn from what has been written (RUSSELL, NORVIG, 2020). In the field of law enforcement, it has proven helpful in various crime prevention applications (DAS et al., 2020; UNICRI, 2020; SHAH et al., 2022), facilitating the collection and extraction of information (contextual and geographical) from textual data, such as news articles from websites (INTERPOL, 2022; JANOWICZ et al., 2020).

Information from open sources is related to the discipline of Open-Source Intelligence (OSINT). This refers to publicly available information with no access restrictions, which is acquired, accessed, and analyzed to meet specific information requirements (LOWENTHAL, CLARK, 2015). This information is obtained from various sources, such as news websites, academic research, government reports, and the Internet (JOHNSON, 2010). Depending on the sources and legal and open methods, they constitute the basis for up to 90% of the material used in intelligence collection and analysis (LIM, 2016; INTERPOL, 2018).

In this context, when there are no nationally available and unified official data on individual drug seizures or when such data is difficult to access, turning to information from open sources becomes an option to overcome these limitations. In practice, organizations like UNODC, EUROPOL, OAS, INTERPOL, and DEA use data extracted from news websites as an alternative to complement the strategic analysis of drug trafficking at the national and international levels (UNODC, 2023a-c; EMCDDA, 2019; SINGLETON et al., 2018; EMCDDA, 2022b; INTERPOL, 2018; EUROPOL, 2021; REICHEL, ALBANESE, 2013). It is important to note that open-source data does not replace official statistics but supplements them⁵.

For this study, initially, a computational workflow was developed using the Python programming language. Subsequently, the exclusive source selected for information collection was the Federal Government website (<https://www.gov.br/pt-br>). The selection of this information source was based on the following criteria:

4 The collection and processing of objective and subjective information for tactical and strategic purposes about events occurring in the external environment to identify and interpret possible trends and critical factors affecting law enforcement application and to enable responses to new scenarios (UNODC, 2010; INGLE, STANIFORTH, 2017; EUROPOL, 2021; BREWSTER et al., 2014).

5 A comparison was made between the official data released and the data collected in this study regarding the quantities of seized drugs. This comparison is essential to assess the quality of the collected open data, as it allows for identifying discrepancies or consistencies in the obtained data. Concerning the seizures of cocaine and its derivatives, the official amount disclosed by the Federal Police is 96,643 kg (see: <https://noticias.r7.com/brasil/a-preensao-de-cocaina-no-pais-cresceu-mais-de-130-em-dez-anos-31012023>). In contrast, the data collected found a value of 93,125 kg, which represents a difference of 3,518 kg, i.e., 3.6%. When the comparison focuses on cannabis and its derivatives, an interesting result is observed: the data collected from open sources is higher than the official data. Thus, while the survey found 450,997 kg, the official data is 414,874 kg, a difference of 8%. However, it is worth noting that there were many cases where there were joint operations involving federal and state police, which were included in this report's survey. If only cases involving federal police were considered, the difference would drop to 0.75% (i.e., a difference of 3,140 kg). It is a hypothesis that the official data may not account for these interinstitutional actions; however, it is a methodological decision made in this study to include as many seizures as possible to reflect reality better.

- Source reliability
- Frequency of news publication
- Validity of information
- Information source history

The main objective of the source

- Possibility to confirm information from other sources
- Consistency of information
- Logical consistency of information.

Subsequently, URLs related to drug seizures were manually selected using the built-in filtering tools on the website. This practice involved filtering content using the keywords "cocaine" and "marijuana" between 01/01/2022 and 31/12/2022. In total, 1,955 news URLs related to IDS in Brazil were collected.

Next, an entity recognition algorithm (named entity recognition - NER)⁶ was developed based on regular expression rules. This process allowed the extraction of information related to IDS from the selected URLs using lists⁷ of specific words and expressions related to drug trafficking entities and place names.

Following that, a data cleaning process was executed to:

- Remove duplicate records and URLs.
- Delete records without content.
- Replace and correct place names.
- Remove white spaces, tabs, duplicates, etc.
- Standardize date formats.
- Other data cleaning processes.

⁶ NER is an NLP method for automatically extracting entities, such as keywords, place names, organizations, and others (SARAWAGI, 2008).

⁷ The lists were predefined with words of interest related to the dynamics of drug trafficking in Brazil.

The data was organized and converted into a structured format that allowed for the processing and analysis of information. Each record was reviewed manually to detect and correct inconsistencies and prevent double-counting seizures. Finally, toponym resolution methods were applied to generate the geographical coordinates of each drug seizure. The results produced a dataset with 1,937 records.

3.2 Qualitative Data Collection Methodology

The second methodology used was conducting interviews with key actors. The interviews were conducted to get closer to the topic and the local network of activities, not to seek information saturation, a common purpose of this type of information collection.

The interviews were conducted using a semi-structured script, an approach widely used in scientific research. The main idea of semi-structured interviews is to ensure a script with pre-defined questions while allowing the interviewee a certain degree of freedom to explore the topics during the interaction. In this sense, the flexibility of the method becomes one of its main advantages (MINAYO, 2014; NESTOR, SCHUTT, 2018). In addition to the flexibility as a means of collecting information, ensuring greater fluidity and diverse possibilities for collecting information, a second advantage of using semi-structured interviews is the possibility of deepening the researched topic, making the information more detailed and richer (RAHMAN, 2017).

However, studies that use semi-structured interviews to gather information also face significant challenges. For example, potential biases that the interviewer may have can influence the responses given by the participants during the interview through gestures and oral or bodily expressions of disapproval. Such biases can also influence the analyses to be performed later after the interviews (FONTANELLA et al., 2011).

A second challenge the methodology of semi-structured interviews faces is its limitation in generalizing the data gathered from the interviewees. Since it is not a methodological assumption to use population samples, generalizing findings to larger groups is often complex and risky. In this sense, the method always requires the researcher to consider and measure the data's scope (VAN ZANTEN, 2004).

This report used interviews to validate and deepen the data collected from open sources through natural language scraping, as presented in the previous section. In this sense, semi-structured interviews were used as information triangulation (CARTER et al., 2014), seeking to verify the findings of the web scraping method while trying to enrich and complement the collected information.

Regarding the interviewees, it is essential to note that the actors are part of the formal structure of the state apparatus in the region. Considering the ease of contact, this profile became the most viable option to initiate the local investigation process. However, it is essential to emphasize that the lack of diversity among the interviewees can also lead to biases in the collected information. It is expected that in future productions about the region, there will be a diversification of views on the topic under discussion through interviews with individuals who are related to the investigated problem in different ways, such as residents of the region, participants in illegal groups, and civil society entities.

With these considerations in mind, it is essential to clarify that semi-structured interviews were conducted with interlocutors with different types of activities in the Amazon region, all involved in repressive and law enforcement activities. Therefore, interviews were conducted with federal police officers, labor auditors, state employees from the Department of Public Safety, and military police officers.

The interviews discussed various topics, and their main findings are presented throughout this report. The word cloud⁸ below demonstrates the diversity of themes discussed and indicates the most reported topics during the interviews.

⁸ In this figure, the emphasis on the word corresponds to the frequency with which it was mentioned in the interviews, indicating the main topics discussed.

4 AMAZON: THE INCREASE IN VIOLENCE IN THE REGION



Whether due to its strategic geographical position or its countless sources of natural wealth, in some way, the Amazon region has always been immersed in a field of tension. By recognizing the Amazon as one of Brazil's main "strategic assets" (LIMA, 2021), the region is placed in a global level debate regarding several issues in the broad field of Public Security.

According to a publication from the project "*Cartografias das violências na Região Amazônica – síntese dos dados e resultados preliminares*", published in 2021 by the Brazilian Public Security Forum (FBSP, in Portuguese acronym), important transformations are taking place in the region regarding the issue of violent crime.

The proliferation of crime in the Amazon region stands out and even more the phenomenon of geographical internalization of violence is emphasized, that is, the displacement of violence from large centers to smaller locations. Consequently, while there was a drop in the homicide rate in urban centers across the country, especially between 2018 and 2020, there was considerable growth in rural municipalities, mostly those of intermediate size.

In other words, the phenomenon of geographical internalization of crime reveals the capacity of organized illegal groups to easily reproduce illicit activities already carried out in larger cities. Mainly, given the potential of various forms of generating profits that these places offer, such as drug trafficking, illegal mining, land grabbing, among others. As a consequence, the increase in illegal activities is related to the increase in violent crime.

Taking the aforementioned FBSP study as a reference, an increase in violent deaths is observed in all forms of rural areas in the Legal Amazon (7.2% adjacent rural, 13.3% remote rural, 15.1% adjacent intermediate and 11.7% remote intermediate), while there was a decrease in the urban area (-25.7%). However, even with the considerable drop in the urban area, when thinking about the homicide rate over time, it is observed that the states of the Legal Amazon had an increase of more than 100% when compared to the beginning of the 2000s and the year 2021 (SOARES, 2021). According to the work "*Ilegalidade e Violência na Amazônia*", from the "*Amazônia 2030*" project, the growth in violent crime in the region is alarming. The region, in just over 20 years, went from having low levels of violence to becoming one of the main focus of violence in the country.

"Placing it into perspective, if it were a country, in 1999 the Amazon would rank 26th among the highest homicide rates in the world (according to the Health Metrics and Evaluation ranking). In 2017, the region would occupy 4th position in this same ranking, behind only El Salvador, Venezuela and Honduras." (Soares, 2021, p. 7)

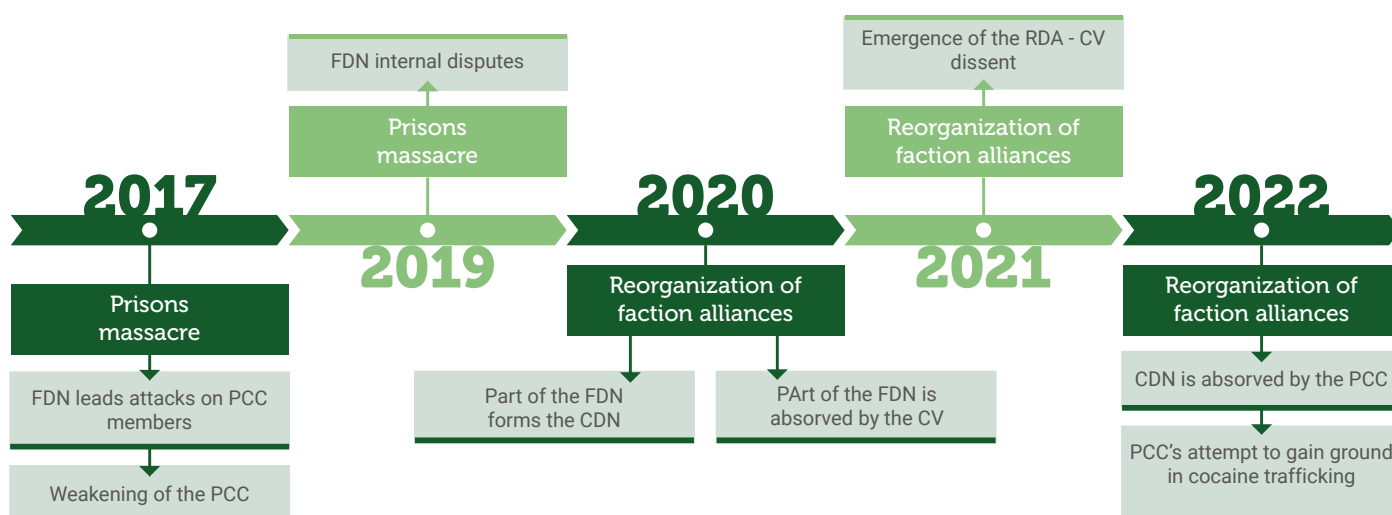
4.1 Dynamics of criminal organizations

The progressive increase in violence in the Legal Amazon largely originates from the spread of criminal organizations, along with their direction towards more forceful action in the region. The correlation expressed between increased violence and the actions of organized criminal groups is based on the understanding that there are several disputes between different groups in search of supremacy in the exploitation of a varied range of crimes in the region, with emphasis on drug trafficking.

In the essence of the discussion about organized crime in the Legal Amazon are the two main Brazilian groups, the *Primeiro Comando da Capital* (PCC), from Sao Paulo state and the *Comando Vermelho* (CV), from Rio de Janeiro state. However, there are reports of the activities of several other regional groups, which are independently or acting in partnership with this two main groups, playing important roles in the region's criminal dynamics. Taking as a reference the survey carried out by the FBSP (LIMA, 2022a), at least 13 organized illegal groups from the region are expressly mentioned. Added to this amount are the PCC and CV, which would be present in eight and seven states, respectively, of the nine that make up the Legal Amazon.

Based on the information analyzed from the interviews carried out the figure below was created, which the main objective is to list the time frames that affected the formatting of the dynamics of some of the criminal organizations operating in the state of "Amazonas" in recent years. It is important to highlight that this timeline does not account for all relevant events regarding the topic⁹ or even the region, therefore serving as an illustration of how the processes of formation and outbreak of illegal groups are fluid.

Figure 3 - Criminal dynamics in Amazonas



Source: Interviewees for this report.

⁹ One of the biggest challenges when analyzing the dynamics of crime is its dynamic characteristic. In other words, groups are always changing, and obtaining information tends to be difficult due to its clandestine nature.

According to interviewees at the federal and state levels, the criminal group known as *Família do Norte* (FDN) practically does not exist today in the state of Amazonas – a place where it had great influence and activity. The study's understanding is that part of the weakening of this organization was due to the fact that the leaders, who were imprisoned, were transferred to federal penitentiaries outside of Manaus. This measure meant that since these leaders were far from the people who act in the FDN they were not able to transmit commands, which led to internal disagreements that ended up terminating the faction.

According to one interviewee, once the FDN was dismembered part of the criminal organization was altered into a new name, known as *Cartel do Norte* (CDN), and another was absorbed by *Comando Vermelho* (CV). Afterwards, the CDN was absorbed by the PCC, as a way for the São Paulo criminal group to increase its power in the region, especially in wholesale cocaine trafficking. Also in recent years, the surfacing of the group known as *Revolucionários do Amazonas* (RDA) was reported, which would be a dissent from the CV that occurred due to conflicts between different leaders of the group.

According to an interviewed at the Amazonas state level, the profile of local groups in the state is made up of younger individuals with no experience in criminal dynamics (unlike the PCC and CV). There was a consensus among those interviewed that the dominant group in the region is currently the CV. It was also pointed out that the PCC still maintains a presence in the region and has been gaining ground.

Another important topic of analysis to be focused in order to build a better understanding of the dynamics of illegal organized groups in the region, consists of understanding their connections and activities with groups from other countries. Limited information has been reported on the topic, requiring thorough research in the future. However, in the few direct quotes on the topic it was reported that CV leaders have commercial establishments in Colombia. It was also highlighted that Brazilian groups do not engage in disputes with Colombians and Peruvians, and that the transaction of selling and purchasing drugs usually happens without conflicts¹⁰. The groups that produce and sell drugs do not make any reservations regarding the buyer, that is, they can sell to any Brazilian group, including rival organizations. Although it is reported that criminal groups can buy and sell all types of illicit drugs, the PCC's special interest in the wholesale cocaine market was emphasized, and the CV's in the commercialization of "Creepy" (cannabis type), especially to supply markets in the Brazilian Northeast.

Regarding Colombian groups, two organizations were mentioned, Sinaloa (having no connection with the Mexican cartel¹¹) and *Carolina Ramires*, which disagree over control of the routes between the *Caquetá River* and the *Putumayo River*. Regarding Peruvian criminal groups, the impression is that they are not as large as the Colombian ones, normally being a "clan" or "family" dynamic in the sale and production of illicit drugs.

10 However, it was reported that, previously, some Brazilian groups acted violently towards sellers from foreign countries. When accumulating debts, Brazilian buyers decided to murder the seller instead of paying their debts, which meant that Colombians, Peruvians and Bolivians no longer entered Brazilian territory.

11 The leaders of this Colombian criminal organization have an appreciation for the group from Sinaloa, Mexico, and ended up adopting this name.

As claimed by an interviewed at the state level, there is great precariousness in the structures of criminal organizations on the triple border between Brazil, Colombia and Peru, resulting in a type of syndicate between criminal organizations, for example, cooperation between different groups to operate in the region).

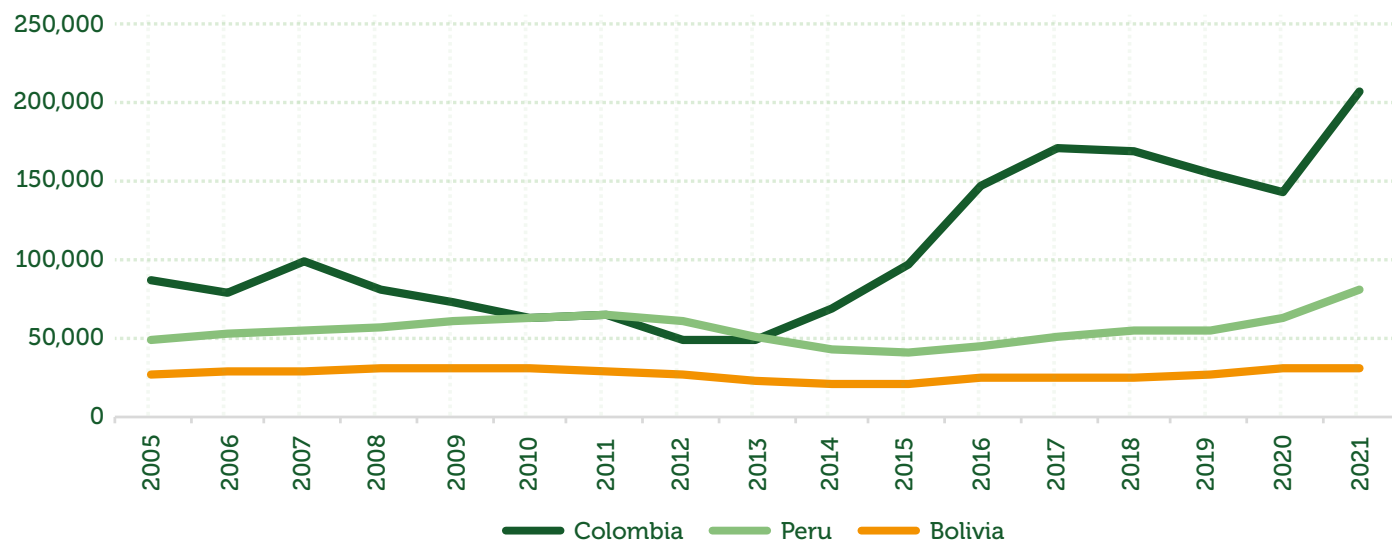
Outside the triple border, another group identified within the scope of this research, which has an international reach and presence in the state of Roraima, is the criminal group known as “El Tren de Aragua”, of Venezuelan origin. Its members are involved in drug, weapons and people trafficking (INSIGHT CRIME, 2019), in addition to activities related to illegal mining, kidnapping, homicide and robbery, which makes it a transnational criminal threat, characterized mainly by committing inhumane acts and dismembering its victims.

4.2 Drug trafficking in the region

According to UNODC's World Drug Report 2023, Brazil is one of the main countries for drug transit and consumption in South America (UNODC, 2023) and some of these paths and courses are in the Legal Amazon¹².

The graphs below show estimates of coca leaf planting and cocaine hydrochloride production in Colombia, Peru and Bolivia, compiled by the Global Report on Cocaine (UNODC, 2023a). There has been a significant increase in recent years, especially in Colombia:

Graph 1 - Estimates of coca leaf planting in hectares



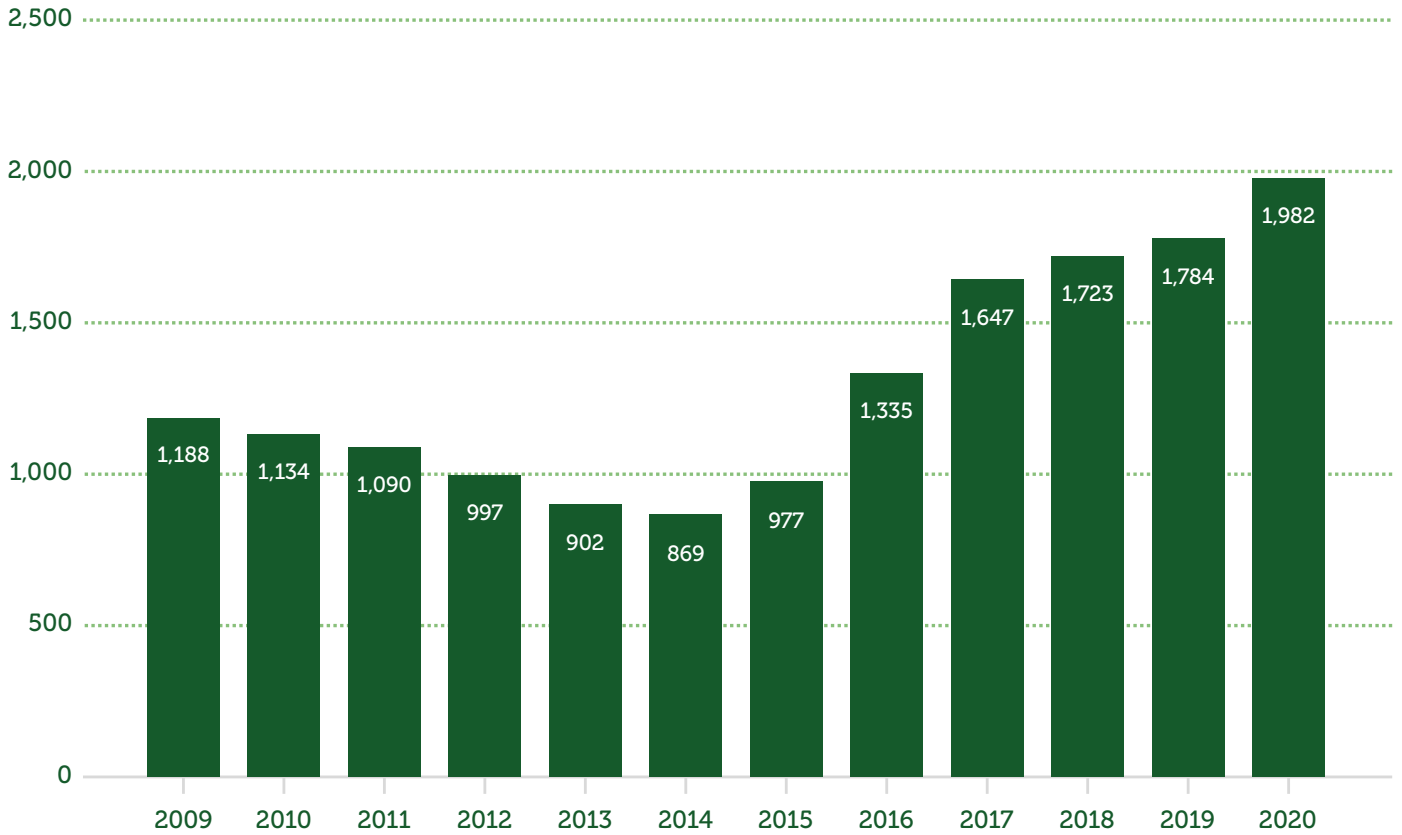
*Estimated coca cultivation in Bolivia in 2021 has not been confirmed by the Bolivian government

Source: UNODC (2023a). UNODC calculations based on UNODC data and from respective governments and coca cultivation surveys conducted in Bolivia, Colombia and Peru in 2020 and previous years.

12 The Legal Amazon corresponds to the area of activity of the Amazon Development Superintendence – SUDAM, delimited in accordance with Article 2 of Complementary Law no. 124, dated 01/03/2007. The Legal Amazon has an area of 5,015,146.008 km², corresponding to around 58.93% of the Brazilian territory.

Source: IBGE. Available at <<https://www.ibge.gov.br/geociencias/cartas-e-mapas/mapas-regionais/15819-amazonia-legal.html?=&t=o-que-e>>. Accessed on May 3rd. 2023.

Graph 2 - Estimated global production of cocaine hydrochloride (in tons)



Source: UNODC (2023a). UNODC calculations based on UNODC data and from respective governments and coca cultivation surveys conducted in Bolivia, Colombia and Peru in 2020 and previous years.

The World Drug Report 2023 presented a section on the possible connections between organized crime and environmental degradation, in an effort to survey the existing literature on the subject, as, compared to other drug-related fields, data are still limited and there are relatively few academic studies. Therefore, the chapter provides an overview of the current state of research on the direct and indirect impacts of drug cultivation and production, drug use and the strategies designed by drug policies in relation to the environment.

From these perspectives, five areas of environmental damage were mapped, which are: air pollution, deforestation, energy consumption, pollution and soil and water depletion. The various relations between drugs and the environment cannot be analyzed in isolation, they must be analyzed in a broader context of diverse actions and policies (UNODC, 2022). It is important to highlight that environmental sustainability is among the three dimensions of the 17 Sustainable Development Objectives (SDG), together with economic and social development, being a transversal element of all the Objectives.

In this context, Brazil is inserted in a dynamic of transnational crime in which the technological advances of the 21st century and the intensification of the globalization process promote global drug markets. Increasingly, the activities of criminal groups are characterized by networks, using primarily the fluidity of information and transport and the porosity of border regions.

It is important to emphasize that, generally, the dynamics according to which these organizations are structured is through interconnected networks, a factor that not only makes it possible to make the routes and means through which trafficking occurs more flexible, but also creates a complex web of “drug economy”. Currently, this integration network is also present in other areas of illegal markets, such as illegal logging, human trafficking, illegal mining and gold and diamond smuggling, among others. “There are different types of flows that circulate in the region and that cross the border, giving meaning to their use and giving the Brazilian Amazon a regional-global sense of the crime economy.” (COUTO, 2020, p. 372).

An important aspect is that drug trafficking in the Brazilian Amazon continues to have consequences not only for public security in the region, but also has a significant impact on the environment and local communities. Several studies have shown that drug trafficking is associated with deforestation, river contamination and loss of biodiversity in the region (UNODC, 2022; JONES, 2021). Furthermore, drug trafficking has a negative impact on the local economy by promoting corruption, violence, lack of economic opportunities, social instability and the presence of illegal armed groups.

An example of this is the condition of riverside populations who, already subjected to less state action, are increasingly at the mercy of illicit dynamics, in which the occurrence of a kind of “perverse integration” is evident (COUTO, 2020, p. 380). This integration is characterized by trafficking networks that operate to strengthen their relationships with vulnerable populations, in order to obtain labor and/or advantages over the territory.

“...it should be noted that immense demographic gaps accompany the Amazonian borders, especially those close to the main coca producers, where drug traffickers set up drug processing laboratories and insert the poor riverside population into the networks, presenting themselves as an opportunity, and in this sense some people start to play the role of middlemen (or mules), contributing to the articulation of networks and at the same time being part of the illegal system”. (COUTO, OLIVEIRA, 2017, p. 55).

Two ways indicate a process of complexity in criminal activity in the region. The first, as mentioned above, is the influence, insertion or even the combination between the illicit and licit market, through the abduction or incorporation of local populations. In fact, the area is increasingly marked by gray zones between legalities and illegalities that permeate local relations and that act and achieve success due to failures of state action.

The second indicator of the complexity of criminal activity in the region is the overlapping act of drug trafficking groups in other illegal activities. In this sense, drug trafficking becomes an operator and organizer of other illegalities, such as money laundering, weapons trafficking, among other activities already mentioned – which increases the amount of difficulty in the State's repressive actions, at the same time as enhances profits for criminal groups.

In this setting, it can be said that the Brazilian Amazon is one of the regions with great potential for the convergence of organized criminal activities, mainly due to its geographic location, dimensions and natu-

ral characteristics. In other words, drug trafficking organizations take advantage of these circumstances to establish drug distribution networks in the region, using the extensive rivers and forests to transport drugs from producing countries to consumer markets in Europe or to the domestic market. These particularities make the region one of the most relevant drug trafficking routes for organized crime, pointing to the need for special attention from the State to increase supervision in the area.

4.3 Interlocutions between different types of crime

The project “*Cartografia das Violências na Região Amazônica*”, coordinated by the FBSP, supported by the Climate and Society Institute (ICS, in Portuguese acronym) and in partnership with the Research Group on Emerging Territories and Resistance Networks in the Amazon (TERRA, in Portuguese acronym), already mentioned previously, prepared a document which addresses specificities of crime in the Amazon region. One of the aspects reported is deforestation which is linked to real estate speculation and land grabbing. The burning process in the forest can cause the land to increase in value up to 20 times more than the land with forest cover. The fires are of great interest to land grabbers, as “the crime of deforestation is subsequently consolidated with the receipt of the land title for the affected land”. On the other hand, land grabbing finds loopholes in the law, such as the *Programa Terra Legal*, which will accept “the record of deforestation in satellite images as proof for dating occupation” (LIMA, 2022a, p. 16).

Regarding the relationship between different activities and criminal groups, this publication was informed that illegal mining ends up creating a structure for these illegal operations. Depending on the size of the exploration, the mines use heavy machinery to extract the gold, developing a large support structure with fuel, internet, food and logistical support. According to interviewees, these illegal mining bases can be shared with drug traffickers who need these infrastructures for their operations.

Besides gold, the extraction of cassiterite was reported, which also follows the logic of illegal gold mining. It was even exposed that cassiterite could be an ore exploration option due the difficulty exploring gold, creating a logic of replacing illicit practices.

According to one interviewee, there are reports of miners operating illegally in situations involving labor exploitation similar to slavery, sexual exploitation and environmental deterioration. There are also reports that, in some cases, the “investor” in illegal mining pays part of the workers payments through illicit drugs, which would be used by the miners, with crack being mentioned as the most common substance. The figure below summarizes the dynamics reported in the interview:

Figure 4 - Summary of the operating structure of an illegal mine



Source: Interviewees for this report.

Regarding the performance of military police officers who work in the environmental area, there is an assessment that there is a social and political perception that their work would be hindering the "regional development", which causes discomfort and pressure in the work of these professionals (LIMA, 2022b).

4.4 Institutional challenges in the region

The measures of the State's operations in the Amazon region becomes challenging due to having the majority of Brazilian territory, the highest concentration of borders with neighboring countries and the lowest population density in the country. Assuming only the issue of public safety, the challenges can all variate. Low investment capacity, complications arising from geographic and climatic issues, immense territorial extension combined with low management capacity and the need for interinstitutional action, among others, are just a few examples of obstacles to be faced.

Reflecting about the borders and institutional connections necessary to resist transnational crime, an even more complex scenario emerges while analyzing the international scenario. With a length of 16,886 km, Brazil's borders with other countries¹³ has a wide range of aspects that make State action difficult. To take into

¹³ Available at: <<https://www.funag.gov.br/ipri/images/analise-e-informacao/fronteiras-terrestres-brasil-13052015.pdf>>. Accessed on May 25th. 2023.

consideration the magnitude of the extent of the borders between the states that form the legal Amazon and other countries – it represents 78% of the total border region of Brazil, 13,190.9 km, as can be seen in detail in the table below:

Table 1 - Border of South American countries with the states of the Legal Amazon in Brazil

	Country	Extent
1	Bolivia	3,423.2 km
2	Peru	2,995.3 km
3	Venezuela	2,199.0 km
4	Colombia	1,644.2 km
5	Guyana	1,605.8 km
6	French Guiana	730.4 km
7	Suriname	593.0 km

Source: CdE (2021).

For comparison purposes, Russia's border with the countries that joined the North Atlantic Treaty Organization (NATO) is 2,600 km long, which makes the Legal Amazon's border area with other countries five times larger.¹⁴

All these challenges result in a hard task for security institutions, specifically, the governance and coordination capacity between the different institutions of the Brazilian State. In the scope of public security, there is mainly the action of a multiplicity of federal and state level institutions. Coordinating different bodies, with different capabilities around a goal, is a central aspect in resisting organized crime.

A study carried out by the *Fórum Brasileiro de Segurança Pública*, Instituto Igarapé and the *Centro Soberania e Clima*, with support from the *Instituto Clima e Sociedade*, mapped the strategic institutions in public security, environmental inspection and regulation in the Amazon. The publication details the duties of each of them from a formal aspect, as well as the perception of professionals who work in them (LIMA, 2022b). The study makes important contributions to better understanding of institutional gaps in the Amazon region. Below, we list some of the main aspects brought up by the study.

¹⁴ In 2023, Finland joined NATO, doubling the organization's border with Russia. At the beginning of the war between Russia and Ukraine, which began in 2022, the area was 1,340 km, almost 10 times smaller than the Legal Amazon border with foreign countries. Available at: <https://www.dw.com/pt-br/fronteira-da-otan-com-a-r%C3%BAssia-dobra-com-ingresso-da-finl%C3%A2ndia/a-65225729>. Accessed on May 24th. 2023.

Table 2 - Main institutional gaps in the Amazon region

Question	Findings
<p>Criminal action</p>	<ul style="list-style-type: none"> ■ Consensus among those interviewed that there has been an increase in criminal activities in the region in recent years. ■ Perception that State agents are more exposed to recruitment by criminal organizations in locations further away from capitals in the Amazon region.
<p>Institutional capabilities</p>	<ul style="list-style-type: none"> ■ Low number of specialized Civil Police stations on topics related to the Environment, Organized Crime, Corruption, Money Laundering and Drugs. ■ Considering the states of Acre, Amapá, Amazonas, Pará, Rondônia and Roraima, there are only eight police stations specialized in repressing drug trafficking. ■ Very low operational capacity in terms of human resources and specialized training to deal with environmental crimes or criminal organizations in regular police stations. ■ In relation to the proportion of civil police officers per inhabitants, Pará and Amazonas have the largest gap in the Amazon region, reflecting a low investigative capacity in these states. ■ Military Police Units specialized in the environment are rare in the nine states of the Legal Amazon. ■ Low access to equipment of utmost importance for the region by civil and military police, such as boats, planes and helicopters. ■ Within the State Public Prosecutor's Office range, there are few specialized units on agrarian conflicts, environment, organized crime, drug trafficking, among others. ■ The Federal Police has only 40 physical units, including police stations, outposts and border posts, for the states of Acre, Amapá, Amazonas, Pará, Rondônia and Roraima. ■ Frequent changes among Federal Police professionals in regions far from the capitals in the Amazon region (no presence of more experienced police officers in these regions).

Source: LIMA, 2022b.

The study concludes that these gaps presented in the chart above mean that institutional responses to public security problems in the region often involve carrying out operations that bring together different federal and state organizations. However, this type of strategy has also been assessed as insufficient to deal with the complexities of regional issues. Among the problems presented, it is reported that, since the region is quite extensive the displacement of professionals ends up being noticed by criminal organizations before carrying out operations, thus impacting the effectiveness of actions (LIMA, 2022b).

In interviews carried out for this publication, a state police interviewed mentioned that contacts with the police of other countries are made in the form of interpersonal relationships, generally starting from exchanges of experiences in courses held in other countries. According to this interviewee, this type of connection facilitates police work, especially when it comes to monitoring people linked to Brazilian criminal organizations that operate in neighboring countries. For example, there is cooperation between Colombian and Brazilian police officers. However, part of the exchanges between them occurs due to personal relationships, and not due to a policy of international cooperation between the countries. The personalized nature of established relationships becomes then an obstacle to long-term action, given their institutional fragility and fleeting nature.

There are, however, interesting interinstitutional actions. A federal police interviewed emphasized the importance of existing cooperation with the National Police of Peru, which has professionals in Manaus with the aim of producing exchanges of information, and as they know the criminal dynamics in Peru, end up producing important intelligence information. The advantage of these police officers in Brazil is the greater speed with which that information is prepared.

5

WHAT THE INITIAL SEIZURE DATA DEMONSTRATE



The data collected on drug seizures via open sources made by the Federal Police, Federal Highway Police and Federal Revenue, as described in section 2 of this report, are a valuable source of information. Such data become even more important given the difficulty in obtaining the extent of work carried out by the aforementioned institutions through official communication.

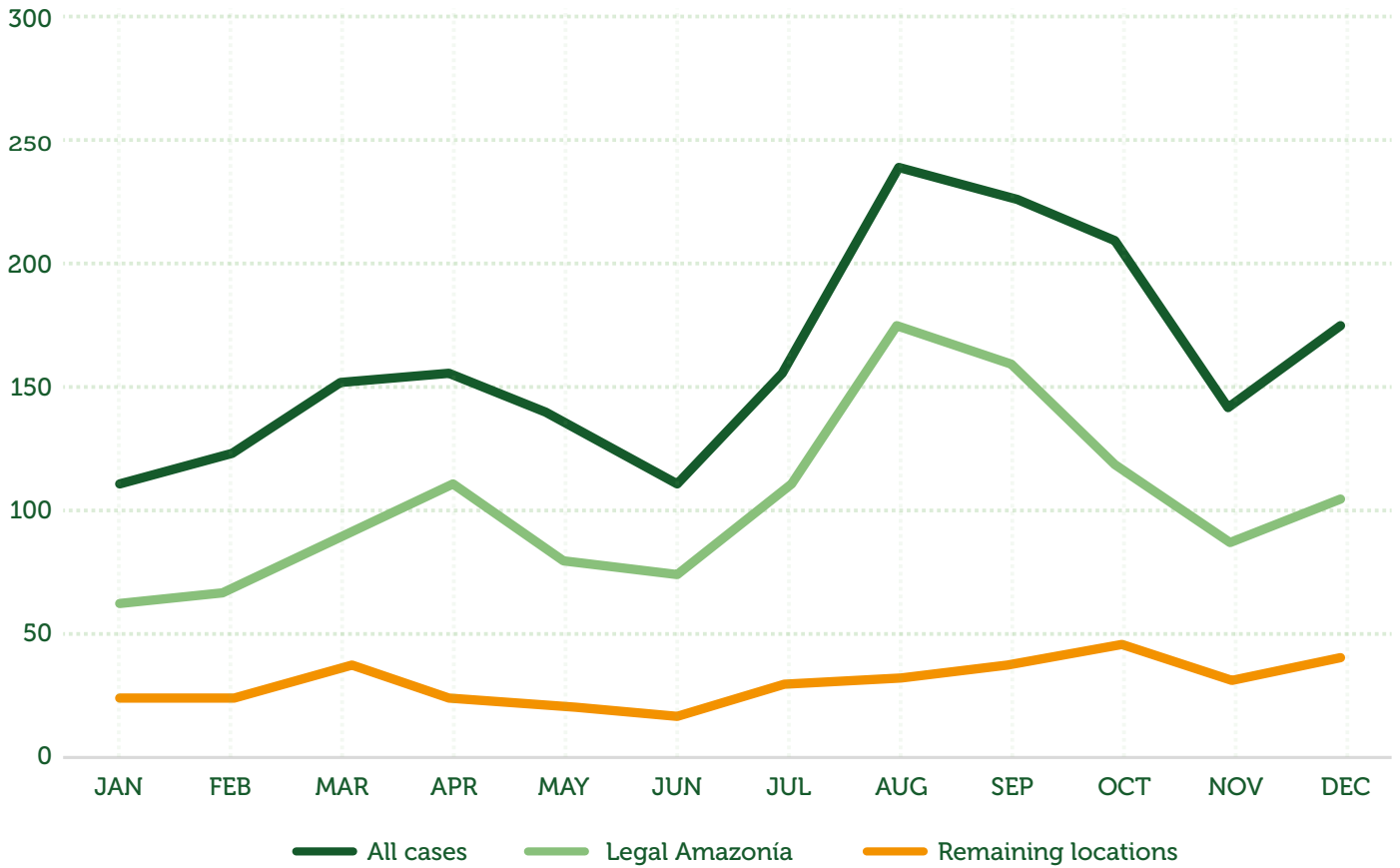
This section aims to analyze from two aspects the data collected. The first is a quantitative view of the data. Thus, discussing temporal issues, the types of drugs seized and their descriptive statistics. In the second aspect, this report seeks to understand the geospatial distribution of seizures, seeking to better outline possible flows and routes used by drug trafficking. Finally, it is worth highlighting that the two subsections contain information measured through interviews carried out as a way of checking the information.

5.1 The quantitative of seizures

The data collected from the various websites investigated has little information about seizure events. However, it is possible, based on them, to characterize the actions carried out by the aforementioned federal institutions through some areas. The first to be exposed in this report is the time-related issue of the seizures executed.

With the graph below, it is possible to see that the actions of the federal police and the Federal Revenue Service were not uniform throughout 2022. Separating seizures by month of the year, there is a considerable increase in seizures in August and September, when looking at the total data or even at activities outside the Legal Amazon. However, the spread of seizures in the Legal Amazon deviates from the pattern of total seizures, having a more equitable order between months. September was the date with the highest number of seizures. In this sense, the peak of seizures in the Legal Amazon occurs after the peak of actions carried out in other parts of the country. In conclusion, while seizures in areas other than the Legal Amazon begin to decline, in the Amazon region the increase begins, although with a smaller variation.

Graph 3 - Spread of the number of seizures per month



Source: Federal Government website (open sources)

This difference in pattern can possibly be explained by the dynamics of local crime that seeks to adapt its trade volume to the region's climatic events. According to an interviewed from the Federal Police, criminal organizations act according to the seasonality of rainfall in the region, considering that, depending on the period, the volume of water in the rivers can vary greatly. This impacts the way of navigating these routes, since "fuller" rivers form labyrinths, making the work of inspection and repression by police forces more difficult.

Thinking specifically about cocaine, according to an interviewee from the Federal Police, most of the seizures refer to the product in the form of cocaine base paste, which would most commonly be destined for Pará, for its fragmentation, for subsequent distribution to other Brazilian states. This view is not corroborated by the quantitative data obtained, perhaps due to the fact that most of the information on the websites researched is not precise regarding the type of product seized, categorizing them, in most cases, only as "cocaine".

To better understand the singularities of the seizures made in the Legal Amazon region, this document divided the seizures into two territorial categories, those that occurred in the aforementioned region and those that occurred in the rest of the country. The two Charts below demonstrate the main statistical measures of the two groups for each type of drug seized.

Table 3 - Total seizures by type of drug in Brazil in 2022

Descriptive data - All cases (kg)							
	Cocaine/ Cocaine hydrochloride	Cocaine Paste	Crack	Marijuana	Hashish	"Skunk" (cannabis type)	
Number of cases	767	208	51	934	29	110	
Mean	102	72	5	483	4	50	
Median	13	26	1	125	2	8	
Mode	2	10	1	1	1	1	
Minimum	0.004	0.335	0.009	0.005	0.050	0.120	
Maximum	4600	2200	67	17900	20	1000	
Sum	77912	14969	244	450998	102	5455	
Percentiles	25	3	10	1	22	0	3
	50	13	26	1	125	2	8
	75	64	66	4	410	4	22

Source: Federal Government website

In a comparative analysis, attention is drawn to the fact that the average per skunk/creepy seizure in the Amazon region (111 kg) is more than double the national figure (50 kg), although it is important to note a high divergence for the Legal Amazon, probably resulting from a few seizures that had relevant quantities (when analyzing 75% of the cases, ordered by the quantity of drugs seized, the national and Amazon averages are quite similar, which shows that the disparity comes from the last quartile). This may be a reflection of the type of marijuana produced in Colombia having predominated in the region, as reported by the federal police officer interviewed.

Table 4 - Total seizures by type of drug in the Legal Amazon in 2022

Descriptive data - Legal Amazon cases (kg)						
	Cocaine/ Cocaine hydrochloride	Cocaine Paste	Crack	Marijuana	Hashish	“Skunk” (cannabis type)
Number of cases	214	96	9	107	1	32
Mean	117	85	9	80	1	111
Median	25	24	1	15	1	11
Mode	2	5,000a	,021a	1	1	2,000a
Minimum	0.021	0.335	0.021	0.050	1	1
Maximum	2750	2200	67	2805	1	1000
Sum	25071	8198	79	8562	1	3540
Percentiles	25	6	11	0	5	4
	50	25	24	1	15	11
	75	59	69	4	30	23

Source: Federal Government website

Analyzing only the variables “cocaine” and “marijuana”, the national average of marijuana (483 kg) is much higher than what is seized in the Legal Amazon (80 kg). Regarding the cocaine seized, the values are similar, being 102 kg and 117 kg, respectively. The relationship between the total quantity of these two types of drugs is noteworthy. While the reported national sum of marijuana seized (almost 451,000 kg) is almost six times higher than the sum of cocaine (almost 78,000 kg), in the Legal Amazon this logic is reversed, since the sum of kilos of cocaine seized (25,071 kg) it is almost three times the sum of marijuana (8,562 kg). Such comparison indicates the prevalence of cocaine trafficking in the Amazon region when compared to the national territory.

In addition to viewing the Amazon region as a transit region, where illicit drugs are crossed to international destinations or to other Brazilian states, interviewees report high consumption of illicit drugs in municipalities in the Amazon region. A possible explanation for this is easier access, due to the high availability of drugs, since transport routes for marijuana and cocaine are quite frequent in these locations.

This fact may determine, for example, that the type of marijuana most used in the state of Amazonas is the skunk/creepy type¹⁵. According to the federal police officer interviewed, the last seizure of marijuana coming from Paraguay in *Manaus/AM* was in 2014. This can indicate that, from this period onwards, there may have been an expansion in the production and distribution of marijuana in Colombia, then leading to the predominance of this marijuana in the Amazon region.

5.2 Geospatial contextualization: the routes

Tackling drug trafficking is a global challenge that requires multidisciplinary approaches and effective strategies. In this case, geospatial intelligence (GEOINT) plays an important role in providing tools and techniques that allow identifying, collecting and manipulating data related to organized crime, including drug trafficking. (SOUTHCOM, 2017; UN-GGIM 2020; CLARK, 2020).

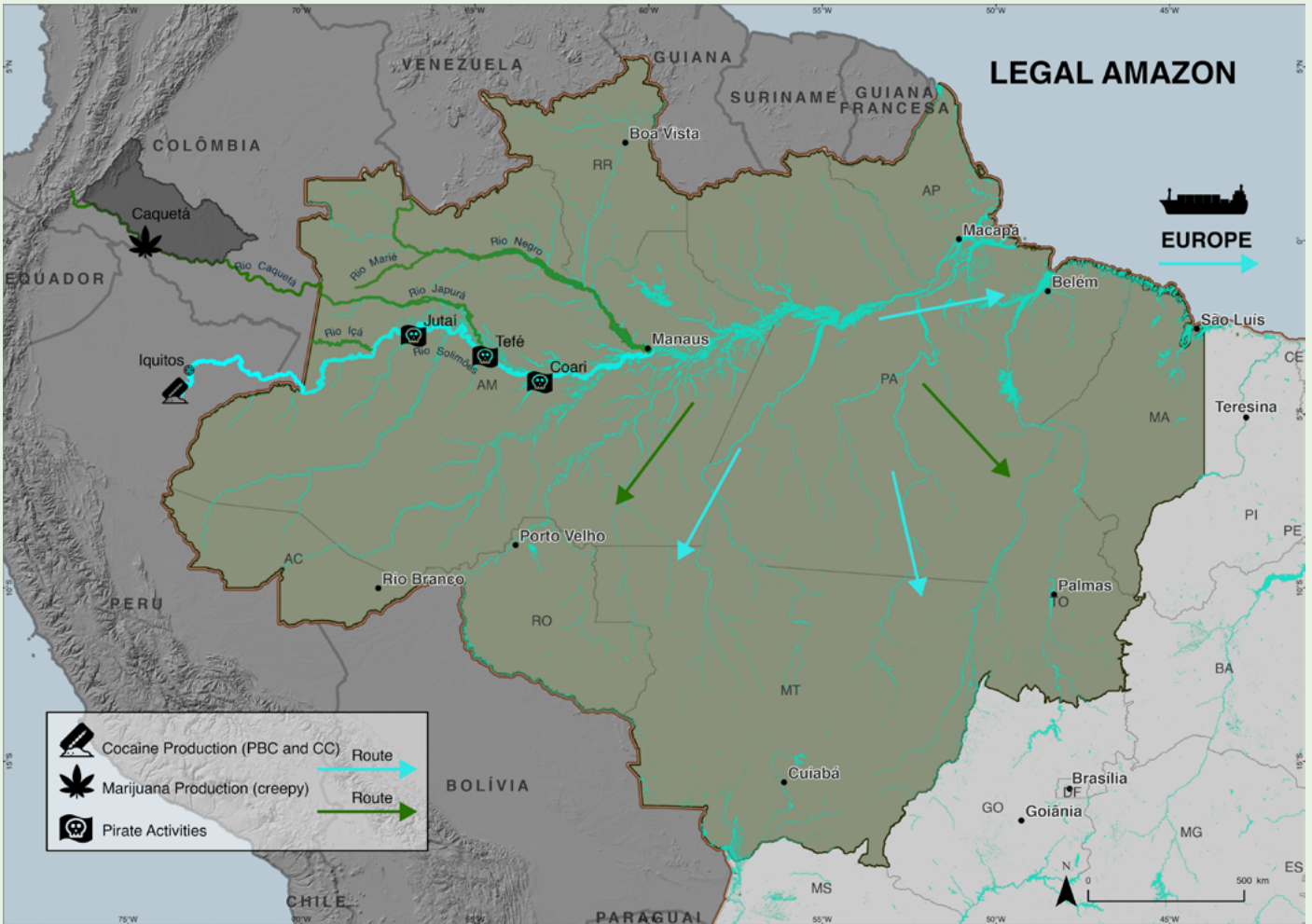
In this framework, GEOINT is the geospatial analysis and the implementation of geographic concepts and analytical methods to describe, evaluate and visually represent physical characteristics and georeferenced activities on Earth (NGA, 2018). It is distinguished by its ability to reveal patterns and trends through the use of critical thinking, geospatial reasoning and analytical techniques (PSU, 2022), standing out for its capacity to integrate information from various sources, including information from open sources and reports of interviews. In addition, it allows us to understand the dynamics of drug trafficking, as the supply chain is generally structured according to geographic and spatial factors of production and consumption (UNODC, 2023a), which influence distribution, flows and patterns of these illicit activities.

Based on the set of data generated through open sources and interviews carried out in the context of this research, GEOINT methods were applied to identify some patterns and trends related to the agents involved in the dynamics of drug trafficking in the country, mainly in Brazil's Legal Amazon.

According to the police interviewer of this survey (both federal and state level), the most common destination for transportation of illicit drugs by river is the state of Pará, along with Amazonas as a transitory state. In both states there is a diversity in the methods of transport and types of drug trafficking. In Pará: 1) cannabis and cocaine (mainly in freebase form) will be fractionated and distributed to several states in Brazil, by land transport; or 2) the cocaine in hydrochloride form (powder) will be distributed in seaports, and then sent in containers on ships to Europe. The figure below represents this dynamic, focusing on drug trafficking through the Amazon River.

¹⁵ To give you an idea, the percentage of THC under normal conditions varies between 0.5 and 5%. Potentiated marijuana, such as the creepy type, is around 24% (MOSQUERA, s/a).

Figure 5 - Possible drug trafficking routes in rivers in the Amazon region



Source: Reports from interviewees

The borders and names shown and the designations used on this map do not imply official approval or acceptance by the United Nations.

In general terms, the figure above highlights the rivers used by criminal organizations that traffic cocaine and marijuana in the region, with it being emphasized by those interviewed that both drugs can be found in all rivers. However, a federal police officer commented that for the most part the drug that comes from Colombia tends to be “creepy” marijuana (known for its high potency resulting from its concentration of THC – also called “skunk” by the police). On the other hand, cocaine, both in the form of hydrochloride and base paste, which would mainly originate in Peru, enters Brazilian territory through the triple border between Brazil, Colombia and Peru, mainly through the city of Tabatinga (AM)¹⁶. This is considered an important trafficking route, although it is far from being the only one.

Thus, the dark green line represents the predominance of the use of rivers for marijuana trafficking indicated in figure 5, while the blue line refers to the rivers in which cocaine is mainly transported. In addition to the previously mentioned route, drug seizure data also suggests that cocaine enters the country through the states of Acre, *Rondônia* and *Mato Grosso*, which can be observed by the strong interdiction carried out in the border municipalities of these states.

It was informed by interviewees that the region in which creepy marijuana is produced corresponds, above all, to the Colombian state of *Caquetá*. From there, the drug is transported down the *Caquetá* River, in Colombia, and then the *Japurá* River, in Brazil. On the other hand, cocaine is produced near the city of *Iquitos*, in Peru, and is transported by the Amazon River, which has the same name in Peru and Brazil – although, on the Brazilian side, the path that runs to the city of Manaus is known as the *Solimões* River.

Regarding cocaine trafficking, criminal organizations mainly travel along the Amazon/*Solimões* river, sailing from Peru, entering Brazil through *Tabatinga* and passing through several municipalities in the state of Amazonas and Pará, with different destinations and forms of trafficking. The presence of cocaine in hydrochloride and base paste format was also reported. The drug reaches the Atlantic Ocean via the Amazon River. Pirates were also reported to have acted in the municipalities of *Jutaí*, *Tefé* and *Coari*, groups specialized in stealing goods from criminal organizations to resell them.

Considering the transport of creepy marijuana, there would be a substantial diversity of rivers used, always starting from Colombia. As an alternative, the drug would enter Brazil via the *Içá* River, heading to the *Solimões* River, followed by the Amazon River, towards Pará. Another alternative is the entry of marijuana via the *Caquetá* River, which becomes the *Japurá* River, on the Brazilian side. The route would flow further into the *Solimões* River, following, from then on, the same route described previously, towards Pará.

Another route used by criminal organizations recently identified by the Federal Police is navigation along the *Japurá* River, disembarking at a point in the forest from which traffickers walk towards the *Marié* River, a route in which

16 A unique event to be flagged is evidence suggesting that river routes are also used for cocaine trafficking using semi-submersibles as a means of transport. This *modus operandi* was confirmed in November 2019, when a semi-submersible was detected off the Spanish coast. The vessel would have sailed along the Amazon River, from the triple border with Colombia and Peru, to the Atlantic coast, and then crossed the Atlantic Ocean to Europe (UNODC, 2023a).

they carry all the product inside the forest by tens of kilometers. Arriving at the *Marié* River, they sail towards the *Negro* River, which will flow further, in Manaus, into the Amazon River, from there its headed towards the state of Pará. According to the interviewee, the route that uses the *Negro* River is traveled due to the fact that police actions on it are difficult due to its length, navigability and communication issues. Furthermore, it is a route with a lower population density, which would also contribute to the transport of illicit drugs with less visibility.

However, routes like this one, on the *Negro* River, also bring challenges for criminal organizations, such as greater difficulty in supplying their vessels, as well as obstacles in communicating. According to one interviewee, the strategy adopted by criminal organizations is to transport gallons of gasoline, to guarantee fuel throughout the journey. The use of satellite phones for communication is also reported.

As can be seen, the interviewees reports favored the descriptions of the river routes, as these were the ones that appeared most in the interviews. It is important to highlight that the reports above do not exhaust the possibilities of river routes used by organized crime. It is also worth highlighting that there are air and land routes that were not discussed in the first interviews. However, there is evidence of the use of the country's land infrastructure (highways and roads) to establish routes that connect the trafficking of different types and quantities of drugs to consumer markets (CDE, 2021).

In addition, clandestine airstrips and small aircraft are commonly used for cocaine trafficking in the Legal Amazon, since the geographic characteristics of the region favor criminal organizations to avoid interdiction activities (UNODC, 2023a; LIMA, 2022a). Some episodes were mentioned in which the police even arrested drug traffickers when they were refueling their aircraft in the cities of *Carauari/AM* and *Coari/AM*.

In this context, it is possible to infer that the dynamics of drug trafficking in the Legal Amazon is the result of a series of geographic and socioeconomic factors.

5.2.1 Action of police forces – Drug seizures

Understanding illicit markets is a challenging task, given the clandestine nature of their activities, which provides little information to support this comprehension. Part of the specialized literature estimates that the amount of cocaine seized is no more than 20% of what is sold in the world (CDE, 2022). Although the available information never corresponds to its totality, the seizures made by police forces end up representing possibilities for the developing of trends regarding this illicit market. In figure 6, each marked icon represents a location where some type of illicit drug was reported to be seized in open source data.

Figure 6 - Geospatial distribution and cartographic representation of main individual drug seizures in Brazil in 2022.



Source: Federal Government website (open sources).

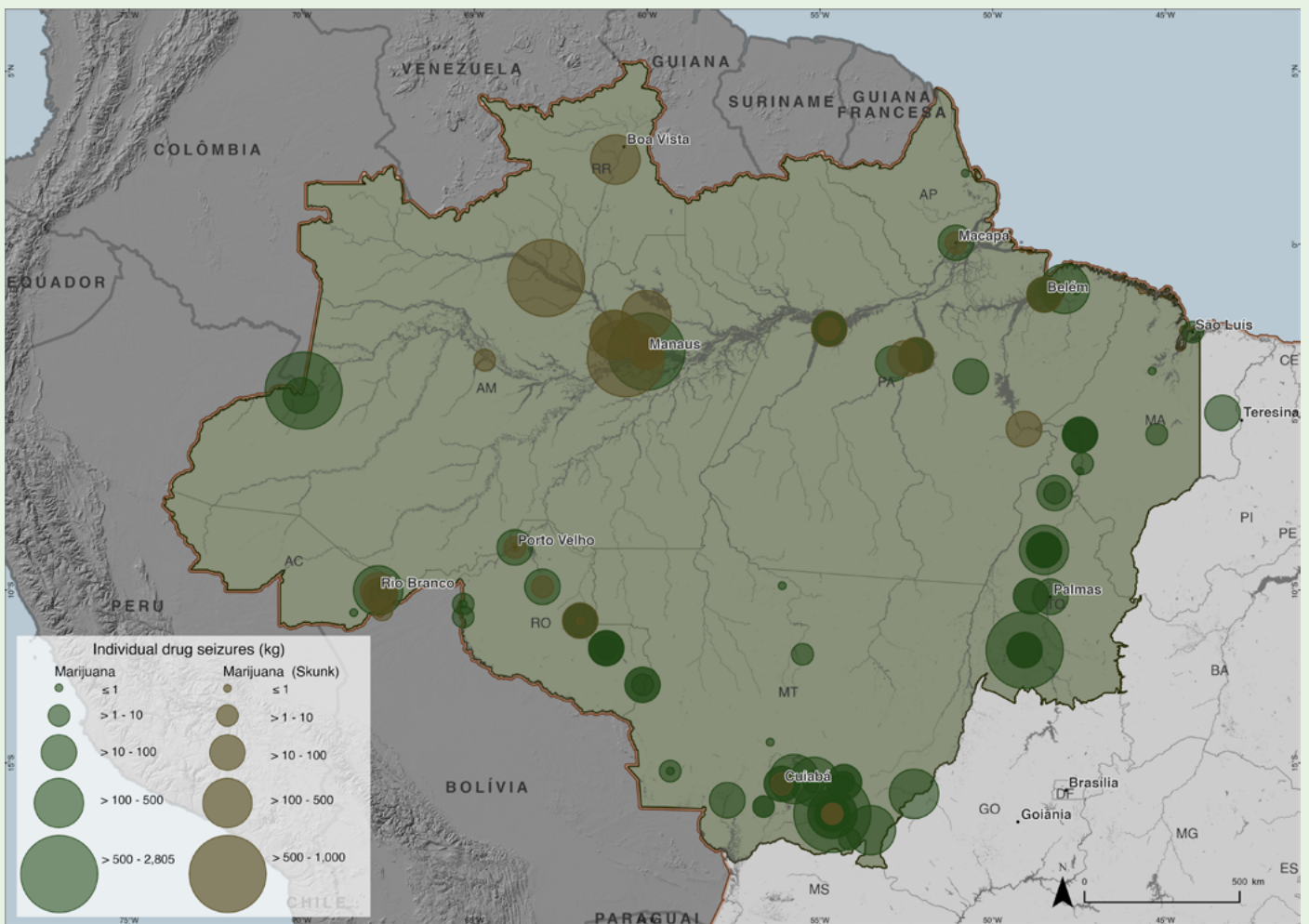
The boundaries and names shown and the designations used on this map do not imply official approval or acceptance by the United Nations.

Regarding the locations (municipalities) in the database generated from open sources, there is a connection with the interviewees speech, as it is possible to notice the mention of seizures along the Amazon and Negro Rivers, in Amazonas, and, heading to Pará, also on the Amazon River and on the highways. It is possible to check on the map the seizure of more than 2,372 kg of skunk-type marijuana in municipalities on the banks of the Negro River (such as *Barcelos/AM*, *Novo Airã/AM* and *Manacapuru/AM*)^{17,18}. It is also possible to identify several seizures of marijuana along federal highways, which reveals a geospatial pattern that suggests the movement of marijuana in the border municipalities of *Acre*, *Rondônia*, *Mato Grosso* and *Tocantins*, highlighting the seizure of 720 kg in *Rondonópolis/MT*, 921 kg in *Gurupi/TO* and 2,200 kg in *Tabatinga/AM*; in addition to several other seizures of marijuana that range mainly between 10 kg and 100 kg, as seen in the previous section.

17 <https://www.gov.br/mj/pt-br/assuntos/noticias/mais-de-uma-tonelada-de-droga-e-apreendida-durante-operacao-horus-no-amazonas>

18 <https://www.gov.br/pf/pt-br/assuntos/noticias/2022/11/policia-federal-apreende-mais-de-1-tonelada-de-drogas-no-interior-do-amazonas>

Figure 7 - Geospatial distribution and cartographic representation of main individual marijuana seizures in the Legal Amazon in 2022



Source: Federal Government website (open sources).

The borders and names shown and the designations used on this map do not imply official approval or acceptance by the United Nations.

As for the dynamics of cocaine trafficking, large seizures of the drug can be identified in municipalities on the banks of the *Solimões* River (*Codajás/AM* and *Santo Antônio do Içá/AM*). Furthermore, the spatial behavior of individual cocaine seizures allows us to observe two very different geographic patterns. Firstly, it is possible to identify the group of cocaine seizures that range between 10 kg and 1,000 kg in the municipalities that border Peru and Bolivia, two countries considered coca and cocaine producers (UNODC, 2022), with emphasis on two seizures with more than 2,000 kg in *Tabatinga/AM*, and the seizure of 1,500 kg of cocaine in *Alto Alegre dos Parecis/RO*, a city close to the border with Bolivia.

On the other hand, it is also possible to verify a concentration of drug seizures in the northeast of the state of Pará, indicating the possibility of criminal organizations using local infrastructure to export cocaine hydrochloride to Europe. An example of this is the seizure of almost three tons at the port in the municipality of *Barcarena/PA*¹⁹, and almost half a ton in *Castanhal/PA*²⁰ (a municipality close to the port, information that may corroborate the interviewees' impression).

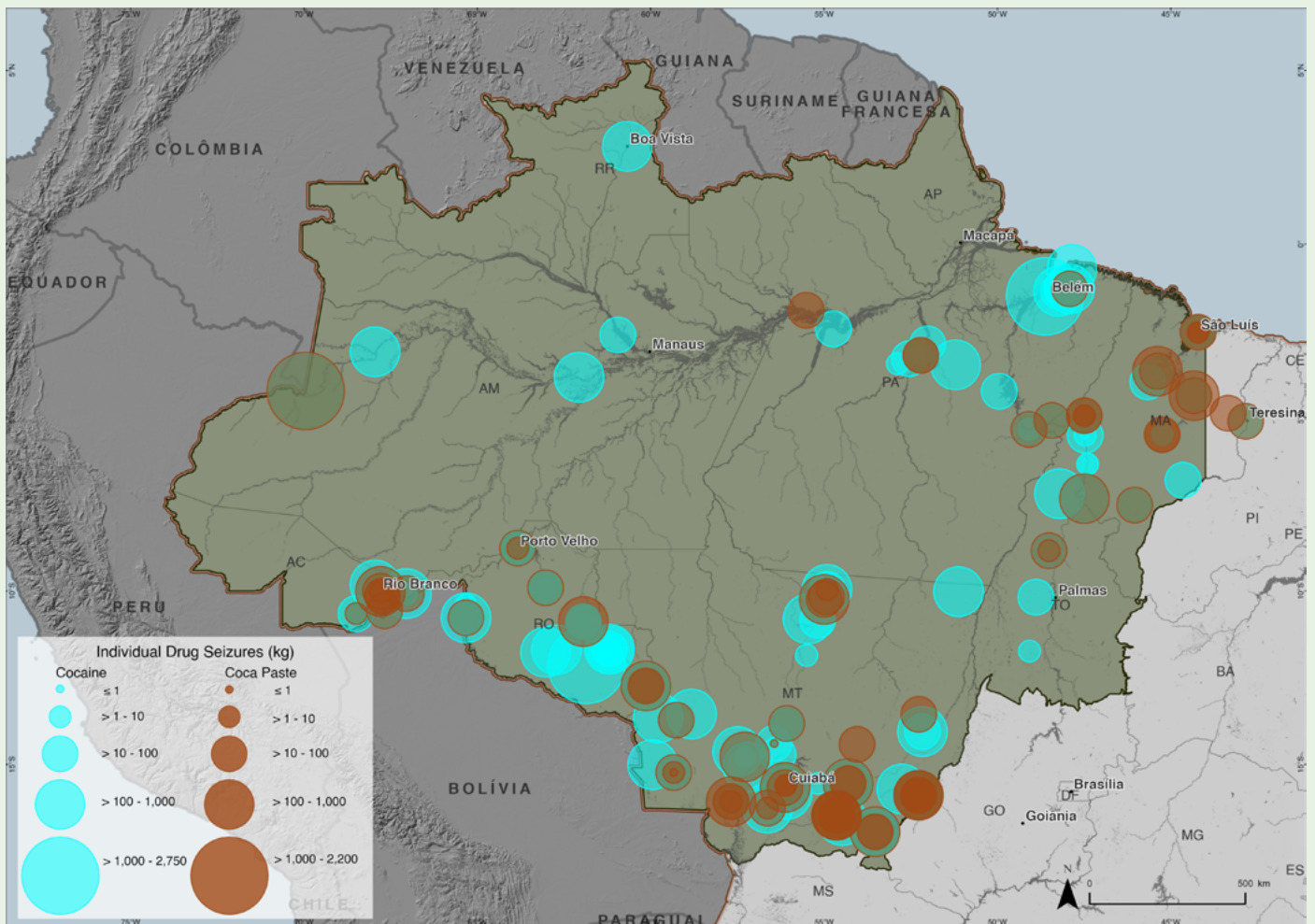
Regarding base paste cocaine seizures, it is possible to identify the same geographic pattern as cocaine (powder) seizures, however the highest concentrations are found in the southern region of Mato Grosso, mainly in the municipalities of *Cáceres*, *Cuiabá*, *Barra do Garças* and *Rondonópolis*, with emphasis on a seizure of 807 kg in the latter²¹.

19 <https://www.gov.br/pf/pt-br/assuntos/noticias/2022/11/policia-federal-e-receita-federal-apreendem-quase-3-toneladas-cocaina-em-barcarena-pa>

20 <https://www.gov.br/prf/pt-br/noticias/estaduais/para/2022/setembro/prf-apreende-438kg-de-cocaina-em-castanhal-pa>

21 https://www.gov.br/prf/pt-br/noticias_anteriores/estaduais/mato-grosso/prf-realiza-grande-apreensao-de-pasta-base-de-cocaina-em-rondonopolis-mt

Figure 8 - Geospatial distribution and cartographic representation of the main individual seizures of cocaine and base paste in the Legal Amazon in 2022



Source: Federal Government website (open sources).

The borders and names shown and the designations used on this map do not imply official approval or acceptance by the United Nations.

As described in the section on the methodology for generating the data set used in this research, with the aim of scanning the environment regarding the dynamics of drug trafficking on federal highways the case records that were selected had information that allowed identifying whether the seizure was made on a federal highway and, in this case, which highway it would have been on. This ensured that the geospatial information generated on the maps about this dynamic referred only to seizures carried out on federal highways.

In this sense, it is possible to point up how the extensive system of federal highways represents significant challenges in tackling drug trafficking. As can be seen in figures 9 and 10, federal highways are often used as key routes to transport illicit drugs to numerous destinations, mainly to the country's urban centers or for subsequent shipment to international markets. In this way, they are able to connect the long land border strip and the extensive sea coast.

Therefore, when evaluating the frequency of cocaine seizures²², it is possible to clearly observe a strong geographic pattern on the federal highways that extend along the borders with Peru, Bolivia and Paraguay, countries heavily affected by drug trafficking organizations which use their territories for the production and trafficking of cocaine. The “BR-364” in *Rondonia*, the “BR-163” and “BR-070” in *Mato Grosso* (all within the Legal Amazon) and the “BR-262” in *Mato Grosso do Sul* (outside the analysis region) stand out as the highways with the largest concentrations of cocaine seizures at national level. This suggests the existence of an important interaction between interdiction activities and the actors involved in cocaine trafficking, showing that the geographic proximity to producing countries and the porosity of borders make these routes attractive to drug traffickers.

22 For this analysis, “cocaine” refers to all seizures of cocaine hydrochloride, paste base and crack.

Figure 9 - Geographic pattern of cocaine seizure frequencies on federal highways



Source: Federal Government website (open sources).

The borders and names shown and the designations used on this map do not imply official approval or acceptance by the United Nations.

It is also possible to observe a similar pattern on highways “BR-421” in *Rondônia*, “BR-010” in *Pará*, “BR-364” in *Mato Grosso* and “BR-364” in *Acre*, infrastructures that face the challenge of drug trafficking and play a fundamental role in transportation of cocaine and in interconnection with other states in the national territory. As seen in chart 4, of the ten main federal highways used for cocaine trafficking, seven are located in the Legal Amazon. Other geographic patterns can also be identified in other regions of the country: in the Northeast, “BR-116” and “BR-324” in Bahia; in the Southeast, “BR-116” in São Paulo and “BR-262” in Minas Gerais; and, in the South, “BR-101” and “BR-282” in Santa Catarina and “BR-473” in Rio Grande do Sul.

Table 5 - Frequencies of cocaine seizures on federal highways

TOP 10	Federal Highway	State	Frequency
1	BR-364	Rondônia	43
2	BR-262	Mato Grosso do Sul	33
3	BR-163	Mato Grosso	27
4	BR-070	Mato Grosso	25
5	BR-421	Rondônia	19
6	BR-010	Pará	11
7	BR-364	Mato Grosso	9
8	BR-381	São Paulo	9
9	BR-116	Bahia-São Paulo	8
10	BR-364	Acre	7

Source: Federal Government website (open sources).

Regarding the frequency of marijuana seizures, the geographic pattern suggests relevant changes compared to cocaine seizures. “BR-277”, in Paraná, and “BR-163”, in Mato Grosso do Sul, stand out as important road fixers for marijuana trafficking in the country. This is likely due to its proximity to the border with Paraguay, the main source of marijuana in the region. However, it is interesting to note that “BR-101” in Santa Catarina, despite being more than 600 km in a straight line from the border with Paraguay, is the highway with the highest frequency of marijuana seizures at a national level, suggesting that this It is probably one of the main routes used to transport marijuana of Paraguayan origin to other parts of the country.

Figure 10 - Geographic pattern of marijuana seizure frequencies on federal highways



Source: Federal Government website (open sources).

The borders and names shown and the designations used on this map do not imply official approval or acceptance by the United Nations.

Subsequently, “BR-116” in Bahia stands out with a geographic pattern that suggests marijuana trafficking between the northeast and southeast of Brazil, followed by “BR-153” in Goiás, “BR-262” in Mato Grosso do Sul and “BR-364” in Rondônia, indicating the strategic importance of these highways as routes that offer logistical advantages for drug trafficking organizations seeking to transport marijuana across several states in the country.

Table 6 - Frequencies of marijuana seizures on federal highways

TOP 10	Federal Highway	State	Frequency
1	BR-101	Santa Catarina	38
2	BR-277	Paraná	35
3	BR-163	Mato grosso do Sul	23
4	BR-116	Bahia	20
5	BR-153	Goiás	20
6	BR-262	Mato Grosso do Sul	19
7	BR-364	Rondônia	18
8	BR-324	Bahia	17
9	BR-060	Mato Grosso do Sul	13
10	BR-116	São Paulo	13

Source: Federal Government website (open sources).

The application of geospatial intelligence methods made it possible to identify some routes and geographic patterns associated with seizure events. The results suggest that, in a classification that considers the ten federal highways with the highest frequency of drug seizures when the substance trafficked is cocaine, seven are in the Legal Amazon, as mentioned above. In turn, using the same metric, only one federal highway within the Legal Amazon appears when the drug trafficked is marijuana. Such results reinforce the idea that there is a prevalence of cocaine trafficking compared to other drugs in the Legal Amazon.

These results must be interpreted taking into account that they refer to seizures carried out on the country's road infrastructure. However, as described in the interviews carried out, the region's river routes are often used to traffic cocaine and marijuana from neighboring countries.

Given this circumstance, it is necessary to obtain more specific information about the events that occurred in the Legal Amazon rivers. In this regard, it was possible to identify that, despite the region representing approximately 58.93% of the Brazilian territory (IBGE, 2023), data collected through open sources in the Brazilian Amazon region are significantly smaller compared to other regions of the country, which suggests a possible lack of representation and the existence of difficulties in communicating facts related to drug trafficking in the Legal Amazon.

6 FINAL CONSIDERATIONS – THE RESEARCH AGENDA



This publication aimed to carry out an initial survey regarding drug trafficking in the Amazon region. The increase in violent crime, especially outside urban centers, the significant frequency of organized crime groups, as well as the spread of different types of illegal activities carried out by them, would create a complex scenario that leads to an increase in trafficking in the north region.

That said, many institutions, governmental or not, are turning their attention to the region, seeking to better understand and measure the criminal phenomena committed there. The Cdesc joins these efforts, initiating a research and evaluation program that aims to contribute to the discussion. To this end, this report sought to demonstrate, at least in part, how the dynamics of drug trafficking work in the region using interviews with local parts and searching information from official websites to explain possible routes and flows used, the activities of illegal groups, convergences between types of crimes and the actions of federal police, via seizure information.

Some interesting results are presented in the text, such as, the large quantity of cocaine and its derivatives seized in the Legal Amazon, in a much greater proportion than the national quantity. In addition to the strong impact that federal highways close to the border region with cocaine-producing countries have on the creation of land routes, as well as important reports of the use of the region's river basins as relevant routes for drug trafficking.

The data used was a methodological choice to make up for the lack of official information on the topic (which does not replace official statistics, but rather complements them). However, there is a need for further deepening and validation of the research findings. In other words, although the study reached interesting findings, such as those mentioned above, it is seen as the beginning of a discussion, which will be deepened over time.

In this sense, the document as well as the work carried out was also constructed under the banner of pointing to a research agenda to be continued by the Cdesc, which will combine with actions to implement an alternative development agenda to drug trafficking in the region. Having this hybrid character, between presenting important results and, at the same time, opening up avenues for future research, the process of creating this document uncovered interesting themes that will be objects of investigation.

There is a need to deepen the flows and routes. Although seizure data is important, making it possible to draw a very enlightening scenario about possible local, national and international routes, it is important to further triangulate information, mainly measuring its potential.

The identification of routes and some geographic patterns associated with the dynamics of drug trafficking in the Legal Amazon are critical aspects that, despite existing limitations, could be analyzed through the integration of information from open sources, interviews and geospatial intelligence methods. By mapping these elements, the analytical results allow decision makers to provide relevant information to identify some of the trends in the manifestations of drug trafficking and their connections with the geospatial context. On the other hand, for actions planned by the Cdesc, the identification of flow and routes helps to better measure locations that may suffer more directly from drug trafficking, thus listing action priorities in search of alternative development options.

Finally, still in the subject of routes and flows of action by illegal groups, an issue that becomes important, although it was not discussed in this work, due to lack of information, is how traditional communities are affected by the emergence or increase in the practice of trafficking drugs. In this regard, as a research and action agenda, the Cdesc will seek to better understand the harmful effects of drug trafficking in these communities, mainly those constituting of native peoples and traditional communities.

Therefore, the construction of a research agenda regarding the issue of crime, especially organized crime, in the Amazon region, is extremely important to encourage evidence-based government actions. This text also contributes with some fragments of knowledge, which add to the set of analysis developed by other studies that focus on the region. Studying the illicit market is a challenge for the field of knowledge due to the clandestine nature of its operations. Therefore, each piece of the puzzle that is produced can contribute to a more robust understanding of the phenomenon.

BIBLIOGRAPHY



AB'SABER, Aziz. **Amazônia Brasileira, Estudos Avançados**, 16 (45), aug 2002. Available in: <<https://www.scielo.br/j/ea/a/JRPb4CLSfJP5pBgmZpRJLf/?lang=pt>>.

AB'SABER, Aziz. **Os Domínios de Natureza no Brasil: Potencialidades Paisagísticas**. São Paulo: Ateliê Editorial, 4 ed., 2007.

ANA - AGÊNCIA NACIONAL DE ÁGUAS. **Conjuntura dos Recursos Hídricos no Brasil: Regiões Hidrográficas Brasileiras**. Brasília, 2015. Available in: <<http://www.snirh.gov.br/portal/snirh/centrais-de-conteudos/conjuntura-dos-recursos-hidricos/regioeshidrograficas2014.pdf>>.

BAPTISTA, Gustavo; NASCIMENTO, Nívio. **O que é possível saber sobre o tráfico de drogas ilícitas: intersecções entre estatísticas para as políticas de segurança pública e sobre Drogas**. In: LIMA, R.; BARROS, B. Estatísticas de segurança pública. São Paulo: Fórum Brasileiro de Segurança Pública, 2022.

BERENGUER, Erika; CARVALHO, Nathália; ANDERSON, Liana O.; ARAGÃO, Luiz E. O. C.; FRANÇA, Filipe; BARLOW, Jos. **Improving the spatial-temporal analysis of Amazonian fires**. *Global Change Biology*, vol. 27, issue 3, 2021. Available in: <<https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15425#>>.

BRASIL. Lei nº 5.173, de 27 de outubro de 1966. **Dispõe sobre o Plano de Valorização Econômica**.

BREWSTER, B.; ANDREWS, S.; POLOVINA, S.; HIRSCH, L.; AKHGAR, B. **Environmental Scanning and Knowledge Representation for the Detection of Organised Crime Threats**. In N. Hernandez, R. Jäschke, & M. Croitoru (Eds.). Springer International Publishing Graph-Based Representation and Reasoning pp. 275–280, 2014.

CARTER, N.; BRYANT-LUKOSIUS, D.; DICENSO, A.; BLYTHE, J.; NEVILLE, J. TRIANGULATION, Data Source. **The use of triangulation in qualitative research**. *Oncol Nurs Forum*, pp. 545-7, 2014.

CDE – CENTRO DE EXCELÊNCIA PARA A REDUÇÃO DA OFERTA DE DROGAS ILÍCITAS. **Covid-19 e tráfico de drogas no Brasil: a adaptação do crime organizado e a atuação das forças policiais na pandemia**. Brasília: SENAD/MJSP, PNUD, UNODC, 2021.

CDE - CENTRO DE EXCELÊNCIA PARA REDUÇÃO DA OFERTA DE DROGAS ILÍCITAS. **Dinâmicas do mercado de drogas ilícitas no Brasil: Análise comparativa dos preços de maconha, cocaína e outras drogas em quatro estados**. Brasília: MJSP; PNUD; UNODC, 2022.

CLARK, R. **Geospatial Intelligence: Origins and Evolution**. Georgetown University Press, 2020.

COUTO, Aiala Colares; OLIVEIRA, Isabela de Souza. **A Geografia do Narcotráfico na Amazônia**. Geographia Opportuno Tempore, v. 03, n. 01. Londrina, 2017. Available in: <<https://ojs.uel.br/revistas/uel/index.php/Geographia/article/view/31774>>. Access in April 29, 2023.

COUTO, Aiala. **FRONTEIRAS E ESTRUTURA ESPACIAL DO NARCOTRÁFICO NA AMAZÔNIA**. Boletim Gaúcho de Geografia, [S. l.], ano 2020, v. 47, n. 1, pp. 365-388. Available in: <<https://seer.ufrgs.br/index.php/bgg/article/view/102677>>. Access in May 1, 2023.

CUNHA, Hillândia Brandão; PASCOALOTO, Domitila. **Hidroquímica dos rios da Amazônia. Manaus: Governo do Estado do Amazonas**; Secretaria de Estado da Cultura; CCPA. 2009.

DAS, P.; DAS, A.; NAYAK, J.; PELUSI, D. **A framework for crime data analysis using relationship among named entities**. Neural Computing and Applications, 32(12), 7671–7689, 2020.

DEMATTÊ, J.L.I.; DEMATTÊ, J.A.M. **Manejo de solos e produtividade agrícola**. In: CONGRESSO LATINO-AMERICANO DE CIÊNCIAS DO SOLO, 13., 1996. Anais Embrapa: Águas de Lindóia, 1996.

EMCDDA - EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION. **An overview of recent changes in cocaine trafficking routes into Europe**. Lisboa: EMCDDA, 2016. Available in: <https://www.emcdda.europa.eu/system/files/attachments/12066/EDMR2016%20Background%20paper_Eventon%20and%20Bewley-Taylor_Cocaine%20trafficking%20to%20Europe.pdf>.

EMCDDA - EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION. **Using open-source information to improve the European drug monitoring system. European Monitoring Centre for Drugs and Drug Addiction**. Lisboa: EMCDDA, 2019. Available in: <https://www.emcdda.europa.eu/publications/emcdda-papers/using-open-source-information_en>.

EMCDDA - EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION. **Drug trafficking**. Lisboa, EMCDDA, 2022. Available in: <https://www.emcdda.europa.eu/topics/drug-trafficking_en>.

EMCDDA - EUROPEAN MONITORING CENTRE FOR DRUGS AND DRUG ADDICTION. **European Drug Report 2023: Trends and Development, 2023**. Available in: https://www.emcdda.europa.eu/publications/european-drug-report/2023_en

EUROPOL. European Union Serious and Organised Crime Threat Assessment (SOCTA) 2021. **A corrupting influence: the infiltration and undermining of Europe's economy and society by organised crime**. Publications Office of the European Union, 2021. Available in: <<https://www.europol.europa.eu/publication-events/main-reports/european-union-serious-and-organised-crime-threat-assessment-socta-2021#downloads>>.

FONTANELLA, Bruno Jose Barcellos *et al.* **Amostragem em pesquisas qualitativas: proposta de procedimentos para constatar saturação teórica.** Cadernos de saúde pública, v. 27, n. 2, pp. 388-394, 2011.

IBGE. **Amazônia Legal.** 2023. Available in: <<https://www.ibge.gov.br/geociencias/cartas-e-mapas/mapas-regionais/15819-amazonia-legal.html>>.

IBGE. **Atlas Nacional do Brasil.** Rio de Janeiro, 2010. Available in: <https://www.ibge.gov.br/apps/atlas_nacional/>.

IBGE. **Manual Técnico da Vegetação Brasileira.** Manuais Técnicos em Geociências, número 1. Rio de Janeiro, 2012. Available in: <<https://www.terrabrasil.org.br/ecotecadigital/pdf/manual-tecnico-da-vegetacao-brasileira.pdf>>.

INGLE, T.; STANIFORTH, A. Horizon scanning for law enforcement agencies: **identifying factors driving the future of organized crime.** Springer, In Using Open Data to Detect Organized Crime Threats, pp. 119–136, 2017.

INSIGHT CRIME. **“El Tren de Aragua”, la megabanda de Venezuela que llegó a las prisiones de Brasil.** 2019. Available in: <<https://es.insightcrime.org/noticias/noticias-del-dia/el-tren-de-aragua-la-megabanda-de-venezuela-que-llego-a-las-prisiones-de-brasil/>>.

INTERPOL. **Artificial Intelligence and Policing: Threat, Tool and Source of Evidence.** In International Criminal Police Organization, 2022.

INTERPOL. **Open-Source Intelligence in investigations (EN-2-932).** In INTERPOL e-learning Course. International Criminal Police Organization, 2018.

JANOWICZ, K.; GAO, S.; MCKENZIE, G.; HU, Y.; BHADURI, B. **GeoAI: spatially explicit artificial intelligence techniques for geographic knowledge discovery and beyond.** International Journal of Geographical Information Science, 34(4), 625-636, 2020.

JOHNSON, L. **The Oxford handbook of national security intelligence.** Oxford University Press, 2010.

JONES, Katie. **Organized Crime and the Environment in Latin America: A Fatal Encounter,** 2021. Available in: <<https://insightcrime.org/news/organized-crime-environment-latin-america-fatal-encounter/>>.

JÚNIOR, Geraldo B.; CONTINI Elisio; NAVARRO, Zander. **Caracterização da Amazônia Legal e Macrotendências do Ambiente Externo.** Embrapa Estudos e Capacitação. Brasília, DF, 2011. Available in: <<https://www.infoteca.cnptia.embrapa.br/bitstream/doc/907075/1/GBMJEstudoAMZDA1vISSN.pdf>>.

JÚNIOR, José Frutuoso do Vale; SOUZA, Maria Ivonilde Leitão de; NASCIMENTO, Pedro Paulo Ramos Ribeiro do; CRUZ, Diego Lima de Souza. **Solos da Amazônia**: etnopedologia e desenvolvimento sustentável. Boa Vista, Revista Agro@ambiente On-line, v. 5, n. 2, pp.158-165, may-august, 2011.

LIM, K. **Big Data and Strategic Intelligence**. Intelligence and National Security, 31(4), 619–635, 2016.

LIMA, Renato Sérgio de (coord). **Cartografias das Violências na Região Amazônica**: Relatório final. São Paulo: Fórum Brasileiro de Segurança Pública, 2022a.

LIMA, Renato Sérgio de (coord). **Cartografias das Violências na Região Amazônica**: Síntese dos dados e resultados preliminares. São Paulo: Fórum Brasileiro de Segurança Pública, 2021.

LIMA, Renato Sérgio de (coord). **Governança e Capacidades Institucionais da Segurança Pública na Amazônia**. São Paulo: Instituto Igarapé; Soberania & Clima; Fórum Brasileiro de Segurança Pública, 2022b.

LOWENTHAL, M.; CLARK, R. **The five disciplines of intelligence collection**. Sage, 2015.

MAGLIOCCA, N. R., MCSWEENEY, K., SESNIE, S. E., TELLMAN, E., DEVINE, J. A., NIELSEN, E. A., WRATHALL, D. J. **Modeling cocaine traffickers and counterdrug interdiction forces as a complex adaptive system**. Proceedings of the National Academy of Sciences, 116(16), pp. 7784-7792, 2019.

MCSWEENEY, K. **Reliable drug war data**: The Consolidated Counterdrug Database and cocaine interdiction in the “Transit Zone”. International Journal of Drug Policy, 80, 2020. Available in: <<https://doi.org/https://doi.org/10.1016/j.drugpo.2020.102719>>.

MINAYO, Maria Cecília de Souza. **O desafio do conhecimento**: pesquisa qualitativa em saúde. Hucitec, 2014.

MOSQUERA, Jairo. **Marihuana Cannabis**: Aspectos Toxicológicos, Clínicos, Sociales y Potenciales Usos Terapéuticos. Bogotá: Ministerio de Justicia y del Derecho, s/a. Available in: <<https://www.minjusticia.gov.co/programas-co/ODC/Publicaciones/Publicaciones/CO03132015-marihuana-cannabis-aspectos-toxologicos-sociales-terapeuticos.pdf>>. Access in January 18, 2023.

NESTOR, Paul G.; SCHUTT, Russell K. **Research Methods in Psychology**: Investigating Human Behavior. Sage Publications, 2018.

NGA, **Geospatial Intelligence (GEOINT) Basic Doctrine, National Geospatial-Intelligence Agency, 2018**. https://www.nga.mil/resources/GEOINT_Basic_Doctrine_Publication_10_.html.

PANDOLFO, C. **A floresta amazônica brasileira**: enfoque econômico-ecológico. Belém: SUDAM, Departamento de Recursos Naturais, 1978.

PÊGO, Bolívar (coord). **Fronteiras do Brasil**: uma avaliação do arco norte. Rio de Janeiro: Ipea; Ministério da Integração Nacional, 2018.

PINTO, J. **Detection of geospatial objects linked to Drug Trafficking Organizations**: an approach based on Geospatial Intelligence and Artificial Intelligence. [Doctoral Thesis]. Universidade Federal do Paraná, 2022. Available in: <<https://acervodigital.ufpr.br/handle/1884/81059>>.

PONAL. **Sistema de las Drogas Ilícitas (SDI)**. Policía Nacional de Colombia. Dirección de Antinarcóticos, 2020.

PSU. **Geographic Foundations of Geospatial Intelligence**. Pennsylvania State University, 2022. Available in: <<https://www.e-education.psu.edu/geog882/node/1952>>.

RAHMAN, Md Shidur. **The advantages and disadvantages of using qualitative and quantitative approaches and methods in language “testing and assessment” research**: A literature review. Journal of Education and Learning; Vol. 6, No. 1; 2017.

RAISG, 2020. **Amazônia Sob Pressão**, 68 págs. Available in: www.amazoniasocioambiental.org

REICHEL, P.; ALBANESE, J. **Handbook of transnational crime and justice**. SAGE publications, 2013.

REUTER, P. **Why does research have so little impact on American drug policy?**. Addiction, 96(3), pp. 373-376, 2001.

RUSSELL, S.; NORVIG, P. **Artificial Intelligence**: A Modern Approach (4th Edition). Pearson, 2020.

SANTOS, Odete Cardoso de Oliveira. **A Geografia Física e as Bacias Hidrográficas na Amazônia**. Revista GeoAmazônia. Belém, n. 2, v. 01, pp. 17 - 27, 2014.

SARAWAGI, S. **Information extraction**. Foundations and Trends® in Databases, 1(3), pp. 261–377, 2008. Available in: <<https://www.cin.ufpe.br/~rbcp/artigos/Sarawagi.ieSurvey-information-extraction.pdf>>.

SHAH, N.; LI, J.; MACKAY, T. **An unsupervised machine learning approach for the detection and characterization of illicit drug-dealing comments and interactions on Instagram**. Substance Abuse, 43(1), 273–277, 2022.

SILVA, Maria do Socorro Rocha da. **Bacia Hidrográfica do Rio Amazonas**: Contribuição para o Enquadramento e Preservação. Manaus: Universidade Federal do Amazonas, 2013. Available in: <<https://tede.ufam.edu.br/bitstream/tede/3152/4/Tese%20-%20Maria%20do%20Socorro%20Rocha%20da%20Silva.pdf>>.

SINGLETON, N.; CUNNINGHAM, A.; GROSHKOVA, T.; ROYUELA, L.; SEDEFOV, R. **Drug supply indicators**: Pitfalls and possibilities for improvements to assist comparative analysis. International Journal of Drug Policy, 56, pp. 131–136, 2018.

SOARES, Rodrigo R. **Ilegalidade e Violência na Amazônia**. Centro de Empreendedorismo da Amazônia. Amazônia2030, 2021.

SOUTHCOM. Adm. **Tidd prepared remarks**: GEOINT 2017 Keynote Address. U.S. Southern Command, 2017. Available in: <<https://www.southcom.mil/Media/Speeches-Transcripts/Article/1205833/adm-tidd-prepared-remarks-geoint-2017-keynote-address/>>.

UN-GGIM. **Future trends in geospatial information management**: the five to ten year vision (Third Edition). United Nations Committee of Experts on Global Geospatial Information Management, 2020. Available in: <https://ggim.un.org/meetings/GGIM-committee/10th-Session/documents/Future_Trends_Report_THIRD_EDITION_digital_accessible.pdf>.

UNICRI. **Towards Responsible Artificial Intelligence Innovation**. Centre for Artificial Intelligence and Robotics of the United Nations Interregional Crime and Justice Research Institute, 2020. Available in: <<https://unicri.it/index.php/towards-responsible-artificial-intelligence-innovation>>.

UNODC – UNITED NATIONS OFFICE ON DRUGS AND CRIME. **Global Report on Cocaine 2023** - Local dynamics, global challenges. Viena: UNODC, 2023a.

UNODC – UNITED NATIONS OFFICE ON DRUGS AND CRIME. **World Drug Report 2023**. Viena: UNODC, 2023b.

UNODC – UNITED NATIONS OFFICE ON DRUGS AND CRIME. **Drugs Monitoring Platform**. Viena: UNODC, 2023c. Available in: <<https://dmp.unodc.org/>>.

UNODC – UNITED NATIONS OFFICE ON DRUGS AND CRIME. **World Drug Report 2022**. Viena: UNODC, 2022.

UNODC. **Guidance on the preparation and use of serious and organized crime threat assessments**. The SOCTA Handbook, 2010. Available in: <https://www.unodc.org/documents/organized-crime/SOCTA_Handbook.pdf>.

UNODC. **Individual Drug Seizures (IDS) data collection**. Viena: UNDOC, 2022. Available in: <https://www.unodc.org/unodc/en/data-and-analysis/statistics/drugs/seizures_cases.html>.

VAN ZANTEN, Agnès. **Pesquisa qualitativa em educação**: pertinência, validade e generalização. Perspectiva, v. 22, n. 1, pp. 25-45, 2004.



NATIONAL SECRETARIAT
FOR DRUG POLICIES AND
ASSET MANAGEMENT

MINISTRY OF
JUSTICE AND
PUBLIC SECURITY

