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Criminal ecosystems: habitats for convergence and deviant globalization

Section: MILITARY STUDIES

Scientific and technological research article

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Ecosistemas criminales: hábitats para la convergencia y la globalización desviada

Ecosistemas criminosos: habitats para convergência e globalização desviada

Écosystèmes criminels: habitats de convergence et mondialisation déviée

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Abstract. Transnational organized crime is perhaps one of the most challenging threats to government institutions. Therefore, understanding the power dynamics between actors outside the law and the population of particular urban and rural sectors is one of the most critical national security and defense concerns. This article proposes the application of a series of concepts derived from theories of the natural sciences to understand how, in some regions of Colombia, criminal activities have been perpetuated, which threaten the multidimensional security of the State, activities whose structure has, on some occasions, supplanted the State in its functions.

Keywords: convergence; deviant globalization; ecosystems; empty space; transnational organized crime.

Resumen. El crimen organizado transnacional es quizás una de las amenazas que más retos genera a la institucionalidad de los gobiernos. Por lo tanto, entender el funcionamiento de las dinámicas de poder entre los actores al margen de la ley y la población de ciertos sectores urbanos y rurales representa uno de los intereses más importantes en materia de seguridad y defensa para los Estados. Este artículo propone la aplicación de una serie de conceptos desde algunas teorías de las ciencias naturales para comprender cómo, en ciertas zonas de la geografía colombiana, se han perpetuado actividades delictivas que amenazan la seguridad multidimensional del Estado, actividades cuya estructura ha llegado en algunas ocasiones a suplantar al Estado en sus funciones.

Palabras clave: convergencia; crimen organizado transnacional; ecosistemas; espacio vacío; globalización desviada.

Resumo. O crime organizado transnacional é talvez uma das ameaças que gera mais desafios para as instituições dos governos. Portanto, compreender o funcionamento da dinâmica do poder entre os atores à margem da lei e a população de certos setores urbanos e rurais representa um dos mais importantes interesses de segurança e defesa dos Estados. Este artigo propõe a aplicação de uma série de conceitos de algumas teorias das ciências naturais para compreender como, em certas áreas da Colômbia, se perpetuaram atividades criminosas que ameaçam a segurança multidimensional do Estado, atividades cuja estrutura suplantou, em algumas ocasiões, o Estado nas suas funções.

Palavras-chave: convergência; crime organizado transnacional; ecossistemas; espaço vazio; globalização desviada.

Résumé. Le crime organisé transnational est peut-être l'une des menaces les plus difficiles pour les institutions gouvernementales. Par conséquent, la compréhension de la dynamique de pouvoir entre acteurs hors la loi et la population de certains secteurs urbains et ruraux représente l'un des intérêts de sécurité et de défense les plus importants pour les États. Cet article propose l'application d'une série de concepts tirés de certaines théories des sciences naturelles pour comprendre comment se perpétuent, dans certaines régions de la Colombie, des activités criminelles qui menacent la sécurité multidimensionnelle de l'État, activités dont la structure a parfois supplanté l'État dans ses fonctions.

Mots-clés: crime organisé transnational ; écosystèmes ; espace vide ; mondialisation déviée ; la convergence.

Introduction

There seems to be a growing concern about the harmful effects of transnational organized crime (TOC) on the national and collective security of States since the beginning of the 21st century. Although the concerns were initially limited to the police and prosecutorial authorities, now, it is a matter for all the security agencies, including the Military Forces. One of the outstanding characteristics of many of the current world conflicts is that those that originated because of political or ideological controversies have gradually assumed criminal dimensions. Moreover, the duration of the conflict and territorial fragmentation, resulting from the entrenchment of groups outside the law in the communities in which they operate, would have gradually converted them into quasi-state actors, yearning the economic resources necessary for the maintenance of territorial control of these geographical spaces that they consider strategically important.

Therefore, in a competitive and violent environment, the generation of income has become crucial for the survival of these organizations. The Colombian case is a clear example of the mutation in the nature of political conflicts towards organized crime activities, where the pursuit of illicit profits has encouraged the exercise of violence organized by a variety of criminal groups (Garzón & Olson, 2013). However, the complete understanding of this dynamic would be unattainable without considering the effects of the process of globalization on all levels of society and both licit and illicit markets.

In fact, globalization has changed the geographical scope and, implicitly, the magnitude and severity of the negative social, economic, and political impacts resulting from TOC activities. Global trends in hypermobility, the use of cyberspace, and urbanization and population growth have produced increasingly interconnected societies and economies (Organization for Economic Cooperation and Development [OECD], 2016). This connectedness has created opportunities to seize new markets and reduce potential risks for commercial, criminal portfolios, given the variegation of illicit goods and services portfolios into profitable activities with low detectability, such as counterfeiting and cybercrimes (United Nations Interregional Crime and Justice Research Institute [UNICRI], 2014).

The domain of TOC is highly diverse and complex; therefore, a systemic approach could be useful in understanding the interactions between groups outside the law and their geographical environment (which includes the environment of other political, social, and economic actors). In this sense, the concept of an *ecosystem* could provide a way of understanding the functioning of the criminal world and its interactions with the physical environment, parting from the premise that a criminal ecosystem could be the basic unit for groups outside the law operating in a globalized world.

Therefore, understanding how criminal ecosystems work and how they support the existence of outlaw groups operating on the platform of the globalization process is not only a matter of citizen or human security. The concept of “criminal ecosystem” is adequate to examine the impacts of TOC on the States’ security and defense because it provides a reference framework that reveals the interactions between groups outside the law and the geographical environment. This approach to the situation facilitates the understanding of the behavior of networked criminal systems and predicts their response to the pressure and effective action of state authorities.

To this end, this reflection paper seeks to explain the following question: How could one make sense of the complex and changing interactions between groups outside the law (with their myriad of actors and criminal activities) and the multifaceted environment and dynamics of the process of globalization?

The general theory of systems and ecosystems: contributions from functional ecology

Evolution of functional ecology and the concept of ecosystem

The study of ecosystems and modern ecological science emerge from the discipline of natural history¹, stimulated by practical concerns concerning agriculture and forestry. However, the 19th century would be the beginning of the period of major geographical and scientific explorations (often involving a scientific dimension through the collection of specimens of plants and animals),² which would increase the interest in the development of modern biology, as the classifying of recorded newly discovered species also provided some basic information on their habitats.³

However, it was not until the end of the 19th century that two general subjects were identified that would shape the study of functional ecology⁴ (Dickinson & Murphy, 1998). The first is the notion that plants and animals live together in distinctive and recognizable sets (called *communities*), in specific places or habitats that influence the

1 *The Natural History of Selborne* (1789/2013) by Gilbert White —a classic study of plant and animal life in an eighteenth-century English village— is an early example of the discipline of natural history.

2 Like the famous journey of the HMS Beagle, which took place between 1831 and 1836, during which Charles Darwin made the observations that led to his theory of evolution.

3 Like the studies developed by Alexander von Humboldt (1769-1859), German naturalist and geographer, considered the father of modern universal geography. No one would better demonstrate the dependence of man on the land where he lives, as well as the climate and vegetation that surrounds him, principle which he called “causality.” In his work, *Political Essay on the Kingdom of New Spain* (2011), he analyzes the geographical facts and their relationship with human life and the politics of States, for which he is considered the governor of modern political geography and one of the main precursors of geopolitics.

4 In general terms, functional ecology studies the structure and functioning of ecological systems by understanding processes and mechanisms.

distribution patterns of the species, which was derived from the descriptive classification of individual species. The second is the persistence of interrelations between the communities that, as a result of competition, consumption, and depredation, affected the types and numbers of species found in the community.

Towards the beginning of the 20th century, ecological sciences began to appear as recognizable academic disciplines (Bowler, 1992). In 1935, the English botanist and precursor of the theories of ecology, Sir Arthur Tansley, coined the term ecosystem, which he understood as a global and integrative ecological concept that combines living organisms and the physical environment in a system (Ayes, 2012).

In this system, a network of interactions between organisms and their environments defines the structure and function of the community; the ecosystem includes communities of organisms and their physical or abiotic environment, as well as the biotic environment produced by the other populations in the ecosystem⁵.

In the same exercise, other botanists developed variations of the concept, maintaining as a transversal axis the relationship between living beings and the territory inhabited by them. For example, Billings (1978) established that an ecosystem was a complex driven by the energy of a community of organisms and their control environment. Similarly, Pullin (2002) stated that an ecosystem was a community of living organisms together with the physical processes that occur within an environment. Jørgensen and Fath (2011) understood ecosystems as a community of living beings whose vital processes are interrelated, they also believed that they possessed several hierarchical levels of organization, which generated a series of positions and contrasts among the members of the physical environment, which, in some aspect of the chain, were directly related.

These definitions provided consistent statements regarding the key attributes of ecosystems, which were directly related to the concepts of functional ecology, particularly, to the interactions between the physical environment and organisms, as well as the way in which the latter directs the Evolutionary trends of competition, tolerance to stress and disturbances. Such interactions are fundamental to the functional processes specified in the definitions of ecosystems (Dickinson & Murphy, 1998).

Ecosystems are in the biosphere⁶ or “living envelope” that surrounds the Earth, which extends from at least 0.5 km below the seabed to the atmosphere (Figure 1). If the abiotic support systems for environmental life are included, this area is called the *ecosphe-*

5 The main element concerning ecosystems is related to biotic and abiotic elements: the former include living organisms such as plants, animals, fungi and soil microorganisms, while the latter include elements of organic and non-organic origin.

6 The biosphere is the system formed by the planet's set of living beings and their respective interrelations with the environment.

re^7 (Flanagan, 1970). Life has been detected up to 6.5 km above the surface of the Earth, near the tropopause; therefore, the biosphere would not be more than 20 km thick, 0.3% of the planetary radius. However, as far as is known, it is the home of all life.

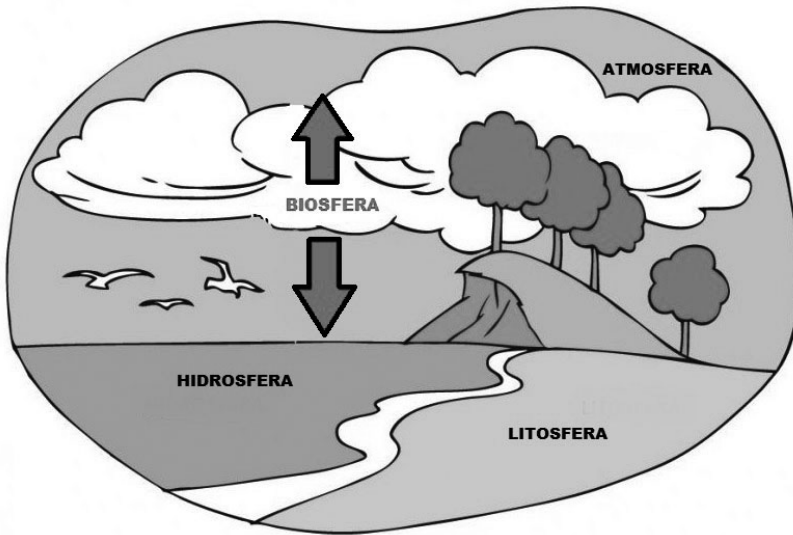


Figure 1. Biosphere.

Source: Created by author.

Sometimes, the boundaries of ecosystems coincide with natural spatial characteristics, such as an island or a forest. However, the limits of an ecosystem can be defined by human criteria, such as a national or state limit. Ecosystems can even be artificially constructed in the laboratory. Understanding the operational and sustainability functions of ecosystems (how they work and what they do) is vital in using the concept of an ecosystem for predictive purposes (for example, understanding the potential impacts of global warming). Ecosystems interact in a variety of ways through their biotic and abiotic components; a substantial part of its functioning is shaped by the response to the interactions between the diverse biological populations that comprise the structure of the community of ecosystems. In this sense, one of the most important dimensions of this interaction is the competition between individuals and populations of organisms.

According to Dickinson & Murphy (1998), an essential element of life is that species must exist in sufficient quantities, both in time and space, to support reproduction

7 Within the ecosphere, ecosystems exist at spatial scales ranging from a crack in a rock to a rain forest or ocean ecosystems (covering areas of thousands of square kilometers).

so that individuals lost because of mortality are replaced. These groups of individuals are called *populations*, which constitute the next level in the hierarchy of life, after individuals. Groups of populations together in defined places form recognizable *communities of species*. These communities adapt to similar combinations of environmental pressure types and intensities (in one or more geographically distinct places on the planet's surface) and integrate *functional groups* of species. One or more functional groups of organisms (sometimes many), together with a defined set of abiotic environmental conditions, make up an ecosystem. The groups of ecosystems that share broad environmental characteristics are called *biomes*. Finally, the entire global set of biomes constitutes the biosphere.

The general theory of systems and ecosystems

The ecosystem concept provides a convenient means to structure and understand the highly complex system of TOC. In this order of ideas, ecosystems could be analyzed using concepts from the general systems theory (GST); this approach provides definitions and general rules to understand very complex structures. Moreover, when associated with mathematical modeling techniques, the systems theory provides the framework for a highly effective general approach to the study of criminal ecosystems.

It should be noted that the GST should not be confused with systems analysis; they are different disciplines. Expressly, the GST is a body of theory in the domains of philosophical logic and mathematics, regarding the nature and properties of those structures defined as systems. The systems analysis aims to build models or mathematical representations of systems. The development of systems theories –which could be called systems sciences and include theoretical and practical perspectives– was initially related to advances in the physical sciences and engineering (Von Bertalanffy, 1972). However, since 1950, the systems science has been applied to a broad range of efforts and disciplines, including business and humanities.

As a basic science, the GST deals with (on an abstract level) the general properties of systems, regardless of their physical form or domain of application and according to their metaphysics in systemic philosophy. It is based on the assumption that all systems (concrete, conceptual, abstract, natural, or man-made) have common characteristics, regardless of their internal nature (Skyttner, 2005). Next, some of the main issues of the GST, related to the concept of ecosystem, are addressed. According to Sandquist (1985), to do this, it is necessary to provide some definitions of the key concepts of the GST.

1. *System*: is any collection, grouping, arrangement or set of elements, objects or entities that can be material or immaterial, tangible or intangible, real or abstract, for which a measurable relation of cause and effect exists or can be assigned.

2. *System limit*: is a physical or conceptual limit that contains all the essential elements of the system and effectively and thoroughly isolates the system from its external environment, except the *inputs* and *outputs* that can be moved through the system boundary.
3. *Models*: are mathematical representations of a system, generally, susceptible to be manipulated for the simulation of its behavior.⁸
4. *Input and output*: is the flux of materials, energy or information through the limits of a system.
5. *Properties*: are the attributes of the elements that make up a system.
6. *Functional forces*: are the inputs of energy or materials from outside the defined limit of the system, which influence its properties and behavior.
7. *Feedback*: are the internal control mechanisms that influence the behavior of the system.⁹
8. *Flow paths*: are the trajectories that follow the movements of materials, energy or information¹⁰
9. *Open or closed systems*: open systems are those whose operation involves *inputs* and *outputs*. Closed systems are those that work within the defined system boundary¹¹
10. *Black box systems*: are systems whose internal structure and functioning are unknown or not described (black boxes are useful in complex situations in which there is a hierarchy of systems).

The scope of these definitions from systemic science allows the ecosystem concept to be applied in many situations. Systems science is based on the principle of causality; it establishes that a measurable cause produces a measurable effect (Sandquist, 1985), generating a means for the construction of quantitative models that could be used to predict results of particular sets of circumstances.

In this order of ideas, to allow *systems* to be manageable and easily studied, a *system boundary* is defined (as well as with the system, this can also be an abstract concept). As far as ecosystems are concerned, they are real and tangible, and boundaries are often

8 Models are approximations to real situations, useful for the prediction and the development of more general theories of application.

9 Negative feedback loops tend to resist change and, therefore, give the systems self-regulatory properties.

10 Paths vary considerably and complexly in many systems. The quantities of materials, energy, and information also tend to vary over time, as the system operates.

11 Although some criminal ecosystems (or parts of them) can be considered closed systems, in reality, from the perspective of fifth generation wars, they should all be open because the dynamics of deviated globalization are extra-systemic.

defined by reference to a geographic feature but can be defined by some conceptual human limit, such as the boundaries of a specific geographic region.

Systems change with time, as a result of the *outputs* of their internal actions. In turn, they are the consequences of their *inputs*, caused by factors or stimuli from the external environment of the system. In the case of extensive and complex systems such as ecosystems, the *outputs* and *inputs* are complicated and difficult to identify, but the GST is flexible enough to allow systems and their behavior to be managed at a variety of levels of analysis.

The *functional forces* would be the exogenous causal forces that drive the system. In the case of criminal ecosystems, these would be driven by the economic resources derived from the criminal activity that enters the ecosystem, generally, as a product of “deviant globalization,” according to Álvarez and Zambrano (2017, p 277).

Deviant globalization could go so far as to describe the way in which terrorist, insurgent, and criminal groups could use the technical infrastructure of globalization to exploit the blind spots of the differences in the regulation and application of the law of illicit goods and services markets.

There is a series of leading actors within any system. *Properties* are the attributes of the actors and elements that make up the system. In the case of criminal ecosystems, these include the characteristics of criminal networks. Therefore, inside the system, the properties are connected by *flow paths*. The latter connect the actors and the functional forces through the transfer of resources and *know-how* within the system.

Interactions occur when the system's forces and properties control the flow paths. Therefore, in most systems, *feedback* circuits are critical because they allow an element in a lower part of a flow path to move to a higher location, making these circuits control elements. When the loop amplifies the output, these are called “positive feedback loops.” In other cases, feedback loops tend to decrease production (negative feedback loops), which are as important in ecosystems as they are in individual organisms and organism populations. Negative feedback loops act as regulatory mechanisms, which tend to resist change and remain stable or in a condition of equilibrium.

Open systems have resource flows that penetrate the boundaries of a defined system, while *closed systems* lack resource movements outside of the system. Ultimately, criminal ecosystems should be considered open systems, because to function in a transnational context, they require external resources.

While fully understanding the functionality of ecosystems and their parts would be impossible, using this theory is possible without necessarily unraveling all parts of its structure. Large systems can be divided into a series of subsystems, whose inputs and outputs can be analyzed without detailed knowledge of the internal operation of the

subsystem. In many cases, in research, this is a perfectly valid way to examine the nature and behavior of ecosystems, as most humans living in technologically advanced societies are accustomed to operating systems (control systems) whose internal functioning is not wholly understood. In this sense, a system whose internal functioning is, to some extent, unknown would be called a *black box*.

The ability to use systems at different levels of analysis can be useful in solving practical problems. In general, complex problems in rational knowledge, which require a quick solution, would be better addressed through systems science; this is one of the reasons why the concept of an ecosystem is so useful in the management of security in the case of the convergence phenomenon and deviant globalization.

Criminal ecosystems: scenarios of criminal convergence

Some intersecting elements can be retrieved from the definitions of an ecosystem presented in the previous section (Billings, 1978, Jørgensen & Fath, 2011, Pullin, 2002). For example, the interaction between living organisms and the environment that surrounds them, the close relationship of dependence between each of the elements and the resulting chains, the hierarchy of the elements, and the stimuli resulting from the interaction of organisms and the environment that impacts them. As in biological ecosystems, criminal ecosystems are the result of the interaction, in the same territory (same habitat¹²) of actors outside the law and the inhabitants of the region, which establishes a relationship based on the logic of fear or mutual benefit.

Another element withdrawn from the concept of the natural sciences concerns the characteristics of the physical environment, understood, in most cases, as the territory. According to this logic, criminal ecosystems become the scenario or territory in which a series of criminal or illegal activities are generated, either because access to them is challenging and they have geostrategic value, or because the rule of law in these territories is not fully guaranteed.

Likewise, as in biological ecosystems, in criminal ecosystems there exists a distribution of powers, conditioned by dominion abilities; in other words, there are actors (organisms¹³) of different proportions and importance that have the possibility of affecting others. In criminal ecosystems, there would be a series of positions between legal and illegal living forces (biotic factors¹⁴) and the territory (abiotic factor¹⁵), arising to enable

12 A habitat being a set of physical and geographic factors that affect the development of an individual, a population, specific species or group of species; that is, a place where some actors live and coexist, which could be rural, urban or virtual.

13 All living beings that inhabit specific spaces.

14 All living beings of an ecosystem.

15 Those that are not biotic agents.

activities outside the law. Expressly, there would be organizations that produce criminal activities and consumers of those activities.

The criminal ecosystem, then, would be the scenario in which actors outside the law, civilian population, and other actors converge in the same territory and form a series of interdependent relationships that alter the existing balance and even generate hierarchies. Therefore, to understand the logic of criminal ecosystems it is important to note some of their most outstanding characteristics.

Criminal convergence networks

According to Sullivan (2013), TOC, terrorism, and insurgency are increasingly associated threats in the network, which –in the current and future conflict environment– result in a diffuse security environment that blurs the distinctions between crime and war. A consequence of this convergence is the emergence of new political and economic actors (including bands and the TOC) that alter the internal and external security dynamics of States, as well as the relationship between States and their citizens. According to Álvarez and Zambrano (2017, p. 288), the phenomenon of convergence could be explained as

The tendency of transnational crime networks to meet at common points or nodes; it is through the interlacing of these nodes that their criminal activity is enabled, infiltrating all spheres, from the economic, social, and political spheres, in such a way that they are invigorated, making State intervention even more complex.

Therefore, one of the fundamental characteristics of criminal convergence is that the new generation of illicit, transnational, and non-state actors is structured in networks. Arquilla and Ronfeldt (2001) explain that the new generation of illicit actors acts as dispersed organisms, small groups or individuals, who communicate, coordinate, and carry out their activities in an interconnected manner, without a specific central command. In the language of networks, each criminal actor appears in a scattered associative map, in which associations between nodes can be described as *links*.

Based on the GST, the *properties* of an archetypal actor in a criminal ecosystem would be characterized by 1) a network of dispersed and interconnected nodes (or activity centers); 2) large or small nodes, narrowly or slightly coupled, and inclusive or exclusive in membership; 3) segmentation or specialization; that is, they could participate in similar activities or undertake a segment of the labor based on specialization; 4) a defined or blurred network limit in relation to the external environment; 5) the lack of a single leader or commander (the network as a whole would have no hierarchy, which allows the existence of multiple leaders); and 6) a decentralized decision-making and operations structure that depends on the concerted creation of consensus for initiative and autonomy.

In this sense, the design of a network would be both headless and polyphonic (head of Hydra). In other words, the design would be based on a *heterarchy*; the structure could

become cellular, for purposes of secrecy, easy replacement or even interoperability; however, the presence of cells would not necessarily mean the existence of a network. A hierarchy could also be cellular (for example, certain insurgent organizations such as the ELN) or the cells could be arranged in a chain, star or mesh (Arquilla & Ronfeldt, 2001). There are, in fact, three basic types of networks.

1. *Chain networks.* People, goods or information move along a line of contacts, separated from one another and communicated, end-to-end, through intermediate nodes (Figure 2).

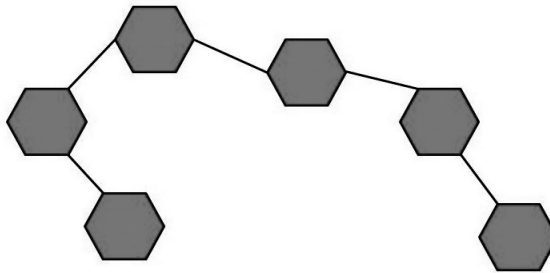


Figure 2. Chain network.
Source: Created by author.

2. *Star networks.* Function as a franchise or a cartel structure in which a set of actors is linked to a central node or actor (not hierarchical), and must pass through that node to communicate with the other actors (Figure 3).

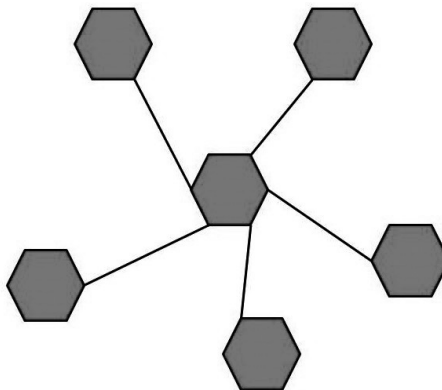


Figure 3. Star network.
Source: Created by the author

3. *Mesh networks.* A collaborative network in which all the nodes are connected to each other (Figure 4).

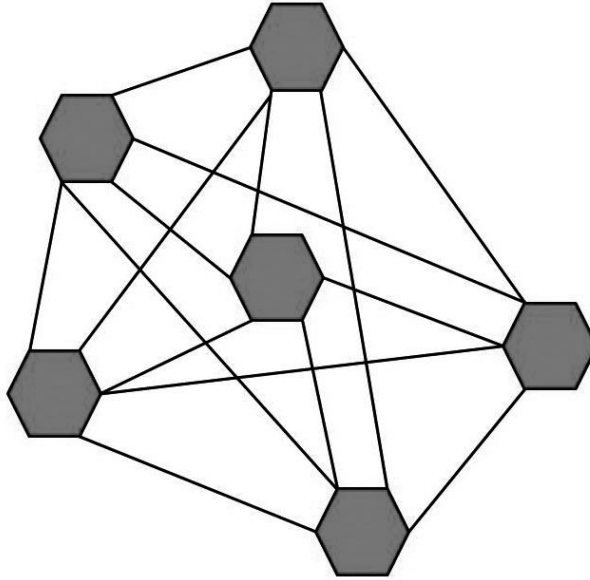


Figure 4. Mesh network.
 Source: Created by the author.

Each node in the figures could refer to an individual, a group, an institution or part of a group or an institution, and even a nation-state. Also, each design would be adapted to different conditions and purposes. Of the three types of networks, the mesh would be the most difficult to organize and maintain because of the dense communications that could be required. However, this type of network enables a high potential for collaborative ventures and the most commonly found in criminal ecosystems. Nevertheless, the three types of networks described above can be evidenced in criminal ecosystems, chain in contraband operations, star in criminal groups, and mesh type in highly decentralized militant groups.

Hybrid networks and hierarchical forms of organization could also be presented (Arquilla & Ronfeldt, 2001). For example, traditional hierarchies could exist within particular nodes in a network or some actors could have a hierarchical organization but use network designs for tactical operations. Other actors could have a mesh design, but use hierarchical devices for tactical operations. In sum, there are many possible combinations and configurations.

Lastly, some nodes serve as connection points for a disproportionate number of links. These nodes could become *hubs* of deviant globalization. Criminal actors could base a large part of their business in these geographical areas, arrange their shipments from there, obtain documentation that would otherwise be difficult to obtain, or launder the proceeds of illegal activities. In 2003, the Central Intelligence Agency of the United States identified approximately 50 “no-law areas” around the world that could provide a space for illegal activities (Radden, 2009). It is with good reason that today there is a greater concern for the *flow paths, inputs, outputs* and *systems* of logistics in which the TOC has been operating. The specific trade routes between criminal ecosystems change rapidly to avoid detection by law enforcement, increasing the need to develop more information to identify centers, routes, and access points to keep law enforcement one step ahead.

Portal regions and empty spaces

Criminal ecosystems are insecure spaces, emerging particularly in geographical areas that comply with at least two characteristics. The first is related to its geostrategic location and the second, to a lack of the effective rule of law in certain territories. Concerning the first characteristic, for decades, Colombia has become a vital conduit for licit and illicit world trade because of its location at the crossroads between the United States and South America, making it a state or regional portal. Portal regions play “an extremely important geostrategic role in uniting different parts of the world, facilitating the exchange of people, goods, and ideas, and playing positive economic and social roles. However, in some cases, because of deviant globalization, they can become more problematic” (Álvarez & Zambrano, 2017, p. 290).

The characteristics of portal regions vary in detail but not in the general context of their strategic economic locations or the adaptability of their inhabitants to economic opportunities. According to Cohen (2009), they are politically and culturally distinct and can often have different languages or religions, as well as relatively high degrees of education and favorable access to external areas by land or sea.

Small in area and population (often located on main access routes), the portal regions usually have highly specialized natural or human resources, on which export economies can be built. Lacking self-sufficiency, they depend on trade with other countries for many of their raw materials, finished products, and markets, as well as specialized manufacturing, tourism, and financial services.

Consequently, portal regions play, for the most part, positive economic or social roles. However, some could be established as commercial hubs conducive to TOC. For example, Spain’s Canary Islands are sites of departure for irregular immigrants from West Africa wishing to enter Europe through Spain. Similarly, Turkmenistan and Uzbekistan are the gateways through which a large part of Afghanistan’s heroin is exported through

various routes to Europe. Jamaica and the Cape Verde islands are gateways for the transfer of Andean cocaine to the European market. On the other hand, Honduras, Mexico, and Puerto Rico are gateways for South American cocaine destined for the US market, as well as sources of immigration to the United States.

The hubs of deviant globalization are generally classified according to their source, transit or destination status of the illicit trade (OECD, 2016). Like many goods in a global economy, the production of the illegal economy could take place in several phases along a value chain. However, the production and transit centers are the most challenging links in the supply chain of deviant globalization.

The second characteristic empowering the existence of criminal ecosystems is the lack of an effective rule of law in certain territories; the centers of illegal activity often develop in areas of overlapping or contested sovereignty. According to Álvarez and Zambrano (2017, p. 290), “transnational criminal networks are mobile, and like legitimate multinationals, they migrate their operations to places they consider attractive, from a legal or geographical point of view.” These territories suitable for criminal activity are called “empty spaces.” According to Álvarez (2017), empty spaces are physical (terrestrial, aerial, and maritime) and virtual (cybernetic) domains that are not entirely or effectively concurrent with the sovereignty of a State, in which “it would be difficult to develop human and productive activities, either because of their distance or isolation from the vital and geo-historical nucleus of the country.” (p. 310).

Therefore, the limits of criminal ecosystems obey the characteristics of *empty spaces* and *portal regions*. Regardless of whether the traffic is of narcotics, people, weapons or money, some countries function as illicit trade hubs or even as transitory bases of operations.

Another element that could facilitate the establishment of criminal ecosystems is the richness of the environment. Criminal ecosystems are usually territories with abundant natural resources and particular physical characteristics used by actors outside the law to carry out illicit activities. Frequently, some of the inhabitants of these areas find, in the exploitation of natural resources, the opportunity to generate some income, which allows them to leave the unfavorable conditions in which they live, given that poverty is often a characteristic of criminal ecosystems. According to Radden (2013), crime appears significant in indigent regions because it is often one of the few viable and available sources of income. However, while poverty is sometimes a prerequisite for TOC in a given region, it ends up being exacerbated by criminal activity, especially when it is a problem specific to the place in question.

It is believed that actors outside the law provide their members with resources (money, employment, protection, and social control) that legal institutions cannot. However, in the absence of these legal institutions, violence and the threat of violence can be attributed to the allocation of scarce resources. Some criminal groups focus on economic

benefit, others on protection. Some qualitative studies have explored how diverse criminal enterprises offer economic opportunities to the local residents of an ecosystem, therefore, becoming a part of the social and economic fabric of the region.

The physical circumstances of specific criminal ecosystems make their connection with centers of power difficult. Therefore, it is natural that the presence of State institutions in these territories is almost nil, which directly influences the damage caused to the environment, in many cases, irreversibly. Similarly, the interaction between living organisms and the physical environment in which criminal operations take place produces alterations in the natural balance of the region. In short, the richness of the natural resources of criminal ecosystems, added to other factors, could certainly make these territories scenarios where illegal activities could be undertaken.

Given the physical factors of the territory, the ease with which crimes modify is readily observable in criminal ecosystems; a criminal activity replaces another in a very short time. Thus, criminal groups can commit criminal actions that affect the physical environment, for example, the illegal exploitation of a natural resource. On the other hand, thanks to its geostrategic location, a series of illegal services related directly to the criminal economies can be articulated, turning the criminal ecosystems into a cluster in which each organism is directly or indirectly related to some illicit activity. The evolution of crime responds, among other reasons, to the exploitation by illegal actors operating as absorbing organisms within the ecosystem of the benefits yielded by the territory.

Changing *modus operandi* and criminal mobility

The complexity of the relationships between the multiple organisms that make up a criminal ecosystem makes the strongest nodes (organisms) within the chain (of which other organisms are dependent) have the possibility of being versatile in the way of obtaining *inputs* from the physical environment or other actors with lower capabilities. In this sense, it is remarkable how the most powerful criminal organizations within the ecosystems manage to implement a series of strategies that combine exercises in a search for legitimacy through force with services that benefit legal or illegal organizations in criminal economies.

The *modus operandi* of the most robust organisms in the ecosystem varies depending on the scenario, the physical environment, and their own needs. According to the GST, the *feedback* between the nodes, under extreme circumstances, is provided by the use of physical force, usually, violent actions against those who are antagonistic to their interests. In fact, competition is one of the pillars of social and ecological systems, and the way in which it develops is closely related to geography. In a way, geographical boundaries and territoriality can be used in the field of competition, preventing it from exploding into open conflict. Moreover, some organisms or actors could exploit existing physical barriers

as natural limits (Eason, Cobbs & Trinca, 1999); if such barriers are not available, theoretical limits can be created to self-segregate.

Another strategy implemented by these organizations concerns the pursuit of legitimacy before the populations; to this end, actors outside the law undertake a series of activities that, in many cases, succeed in supplanting the actions that should have been undertaken by State institutions. This effort would be one of the most critical threats to governance because it questions its legitimacy in the eyes of the population. According to Rabasa et al. (2007) (cited by Álvarez, 2017a, p. 308),

The State is merely an actor within an “ecosystem” in which many groups and entities interact and evolve by adapting to changes in the environment. A dynamic of “survival of the fittest” emerges in this situation, in which the health of any of the institutions present (particularly the judicial) is a determining factor in the ability of the State to influence and legitimize itself in the society.

Lastly, criminal mobility is another of the most recurring elements in criminal ecosystems; actors outside the law have the ability to mutate and affect other organisms of the ecosystem, generating a series of dependency relationships that hinder the authorities ability to control the territories. The ease with which TOC moves from one criminal ecosystem to another is a phenomenon described as the “cockroach effect” or displacement of crime, which reveals the illegal structures’ capability for renewal when they are detected or dismantled in a criminal ecosystem; they scatter and regroup in another ecosystem.

Criminal ecosystems in Colombia

In Colombia, rural criminal ecosystems are located mainly in border areas (Álvarez, Tinoco, Gómez, & Gomes, 2017), whose geography facilitates the transit of illicit actors and activities from one country to another. For example, the areas where the sovereign limits of three states converge, such as those Amazonian spaces where Colombia meets Peru and Brazil, or Brazil and Venezuela, would all be conducive to organized crime. According to Radden (2013), it is possible that geography dictates these conditions, and that any location with easy access to three different countries diminishes accountability and increases the likelihood that criminal actors will find greater willingness on the part of some public officials to accept bribes. Additionally, a disparity between neighboring countries usually encourages smuggling flows, and the conditions of overlapping authority in border areas provide appealing conditions for TOC activities.

In fact, these are areas that have historically been marked by conflict, in which illicit actors apply the strategy of convergence as a means of subsistence. Criminal organizations develop their illegal activities in areas that are neglected by the State or where there is no

institutional presence, where communities usually lack essential services, and there is a high level of poverty and informality in the workplace. When criminal groups arrive in these territories, job opportunities appear in the criminal economy and, in some cases, these groups assume the State's fiscal (through extortion, for example) and judicial functions, which together with the use of the coercive force guarantees them a certain legitimacy before the populations.

Figure 5 shows the main rural criminal ecosystems in which organized armed groups (GAO)¹⁶ are present. Among the most representative of the GAO is the Clan del Golfo¹⁷, a substratum of the paramilitarism of Casa Castaño, whose chief leader, Dairo Úsuga or "Otoniel," was the right-hand man of Daniel Rendón Herrera or "Don Mario" and Vicente Castaño. Because the group's operating radius is the south of Córdoba, north of Chocó, lower Cauca, Antioquia, and the region of Urabá, it is one of the criminal actors with the most significant geographic presence, operating in more than 200 municipalities in the country.

The concept of this organization was the creation of a criminal confederation to control the country's criminal economy, which is why other criminal bands would unite to their interests. According to Ávila (2017), the Clan del Golfo controls about 45% of the drug that leaves Colombia, as a result of their management of some ports and drug trafficking routes at the service of deviant globalization. For instance, a drug trafficker exporting narcotics to Europe, using the Clan del Golfo's routes, must pay 150 dollars per kilo of cocaine hydrochloride, 200 dollars per kilo of cocaine, and 500 dollars for the supply of a *go-fast*¹⁸-type boat (Ávila, 2017).

16 According to Permanent Directive No. 15 of April 22, 2016, of the Ministry of National Defense of Colombia, the Colombian government recognized the growth of criminal gangs (BACRIM) and reclassified them as organized criminal groups (GDO) and organized armed groups (GAO). GDOs are described as structured groups of three or more persons that exist for a specified period and act in concert with the purpose of committing one or more serious transnational crimes to directly or indirectly obtain economic or other material benefits. In this sense, the GDOs are persecuted by the National Police with the support of the Armed Forces when necessary. On the other hand, the GAOs are the military organizations that, under the direction of responsible command, exercise control over a territory that allows them to carry out military operations that are sustained and concerted outside the law.

17 From their origin, the authorities called them Urabeños. However, at the request of the inhabitants of the Urabá area, who felt that they were being stigmatized by the reference that was made between the criminal group and the Urabá area, the name given by the authorities was changed to Clan Úsuga after the last names of the founders of the criminal organization. Once again society protested, as there was stigmatization of people with the surname Úsuga. At this point, the authorities decided to name them as the Clan del Golfo. It must be mentioned that the denomination given to the group depends, in many occasions, on the area where they operate, for example, Gaitanista Autodefensas de Colombia is the denomination that the Clan del Golfo has historically had in areas such as Meta or Guaviare.

18 The service would include fuel, sailors who know the route, food, weapons, and a logistics, including protection before going out to sea; a boat of this type can transport approximately 1,200 kilos of cocaine hydrochloride.

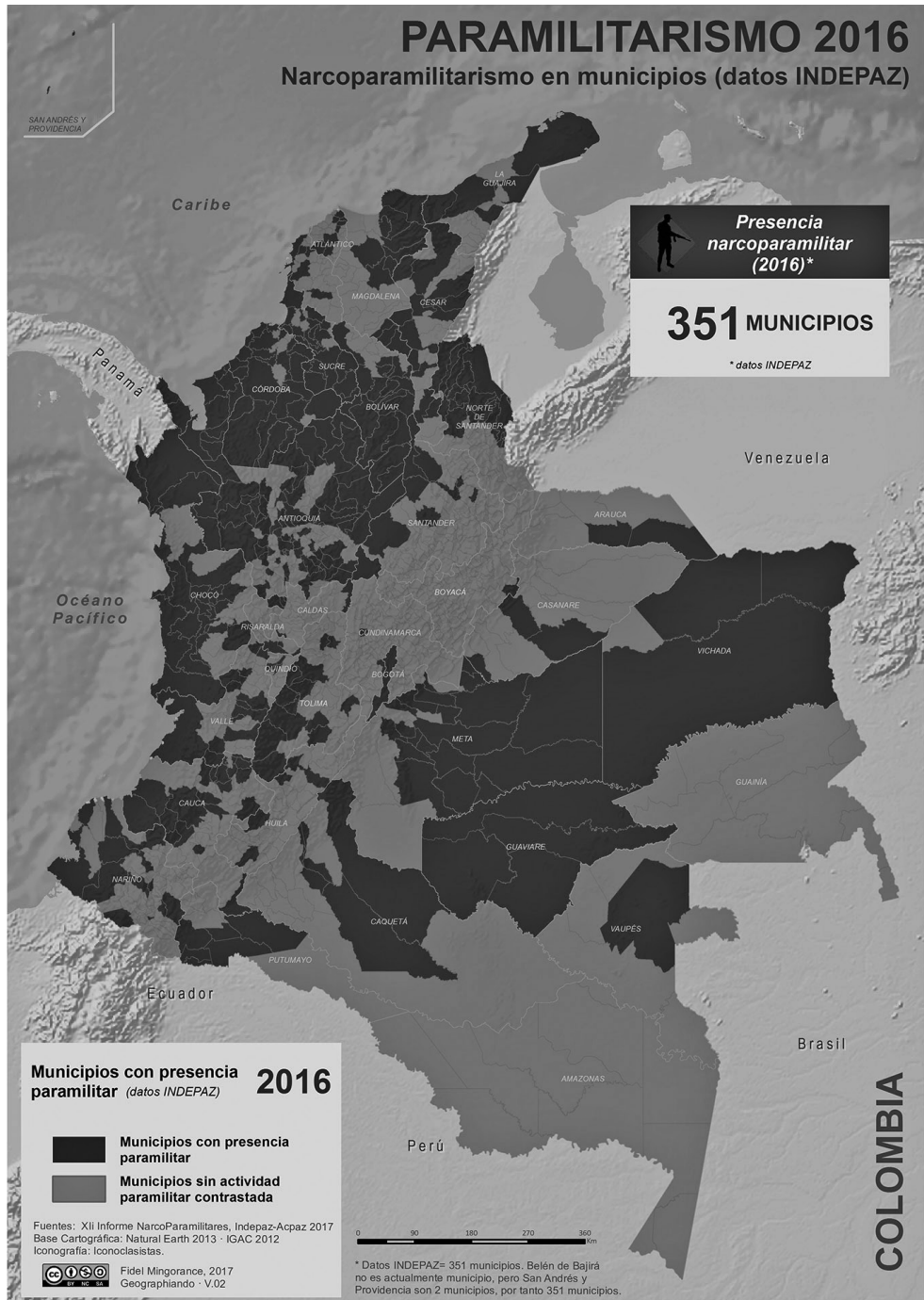


Figure 5. Rural criminal ecosystems with the presence of GAO.
Source: Paramilitarismo (2016) with data from Indepaz.

In addition to controlling 45% of drug trafficking, the Clan del Golfo manages dozens of illegal gold mines and extortion operations in cities and urban areas. The national authorities estimate that this organization has about 3,000 members, close to 60% of them part of the organization, the remaining 40% are subcontracted personnel in urban areas. In Medellín alone, a report by the newspaper, *El Colombiano*, gathered information from the National Police and the Attorney General's Office and affirmed that 247 combos (criminal organizations of small size operating in neighborhoods) operate in the city. (Los 9 departamentos donde hay plan pistola del Clan del Golfo, 2015).

Because of their mode of operation and franchise-like structure, addressing the actions of the structures, many subcontracted by the Clan del Golfo, at a local and regional level would be behooving. Urban criminal ecosystems are also constituted (Figures 6 and 7), as they are in rural areas. According to Álvarez (2017b), a lack of essential State surveillance in the communes, poverty belts or red zones of a city could lead to a black market economy run by TOC. Urban criminal ecosystems are extremely attractive habitats for criminal and terrorist activities, there, groups outside the law can hide and operate more efficiently, and –unlike in rural areas– they have easier access to technology to mobilize support and coordinate the activities of their criminal actions.

Urban criminal ecosystems have unique qualities that make the operations of the State security services difficult and dangerous. First, because they have a large number of non-combatant civilians and, second, because they are dense conurbations of disordered three-dimensional spaces that represent important logistical and navigation challenges for the persecution of criminals. In this sense, as the urbanization process continues to increase, it is also likely that the urban conflict will increase, with the generation of new urban criminal ecosystems because “when rural populations migrate to the cities, the guerrilla forces that depend on them to obtain food, information, financing, concealment, and general support must follow them; this has been the case of the FARC in Colombia.” (Álvarez, 2017b, p. 42)

Therefore,

Despite the peace process with the FARC and the current discussions with the ELN, the ability of guerrillas or criminal gangs to inflict damage in Colombian cities cannot be underestimated. A dozen militiamen, well-trained in terrorist actions, can be more dangerous than 3,000 guerrillas in some remote and rural part of the Colombian geography. Evidence of this is the 33 terrorist incidents perpetrated in Bogotá between 2015 and the end of 2017. On February 19, 2017, an explosion in the La Macarena neighborhood of Bogotá left one policeman dead and 26 injured, while on June 17 an explosion in a women's bathroom of the Centro Commercial Andino, in Bogotá, left three dead and nine injured. The first event was attributed to the ELN, and the second, to the MRP. It must be noted, however, that not all cities are equally vulnerable to more massive terrorist actions. On April 11, 2002, in Cali, twelve deputies

from the Departmental Assembly of Valle del Cauca were kidnapped by the FARC in the heart of the city. The city at the highest risk is the capital of el Valle del Cauca because of Los Farallones, a mountainous wilderness area with egress to the Pacific. Other cities like Ibagué, Neiva, Popayán, Pasto, Bucaramanga, and Valledupar are also high-risk because of the simple exit strategies they provide armed groups outside the law. (Álvarez, 2017b, pp. 35-36)

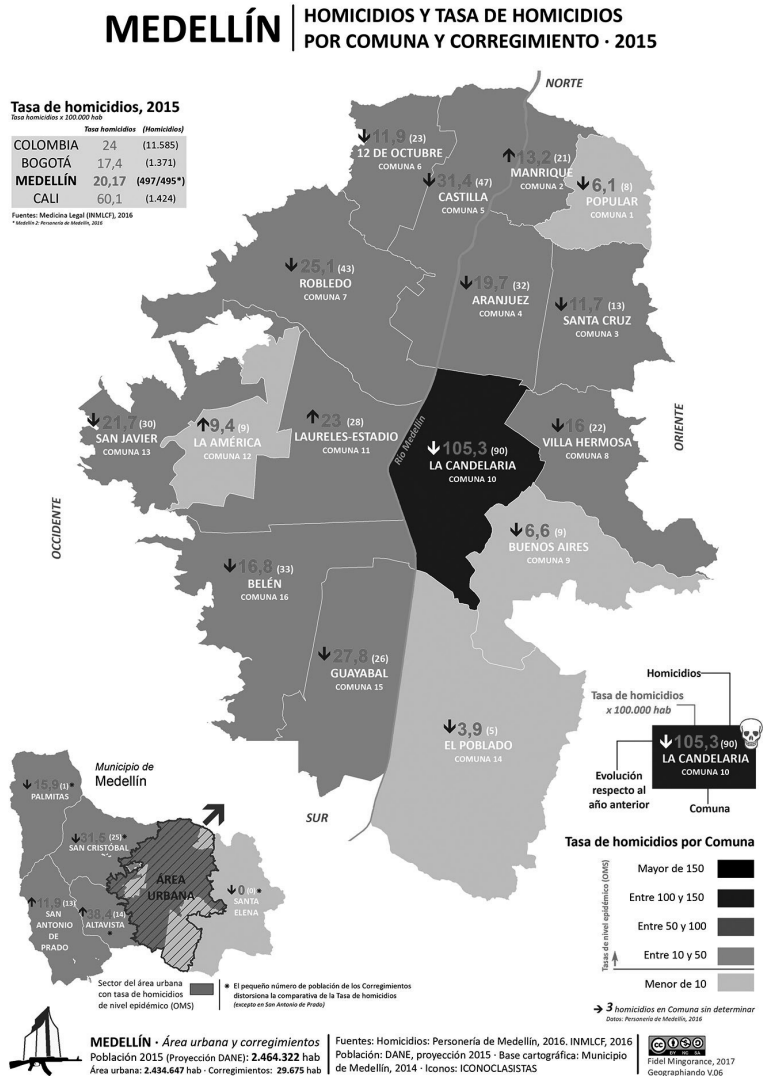


Figure 6. Urban criminal ecosystems in Medellín.
Source: Medellín, homicidios y tasa de homicidios por comuna y corregimiento (2015).

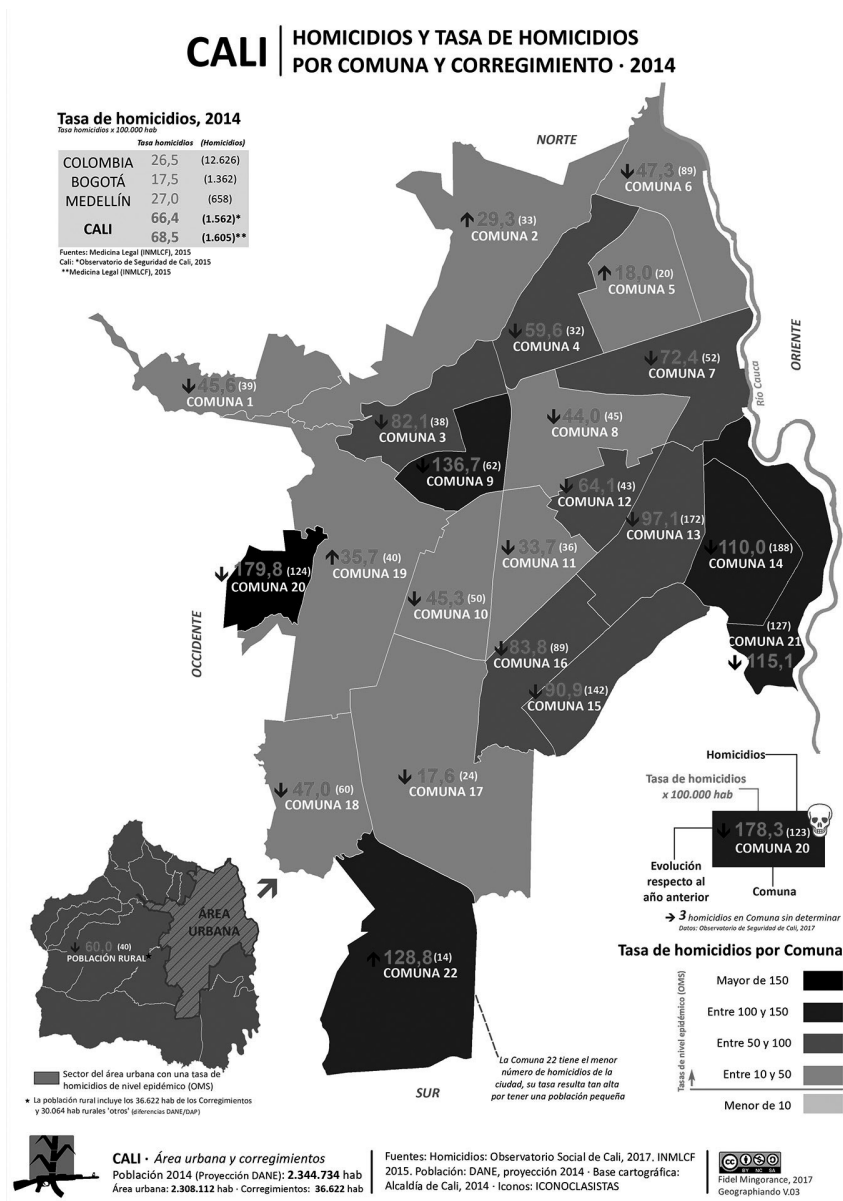


Figure 7. Urban criminal ecosystems in Cali.
Source: Cali, homicidios y tasa de homicidios por comuna y corregimiento (2014).

The rural and urban criminal ecosystems such as those of Tumaco, Cauca, Chocó, Arauca, Urabá Antioqueño, and Buenaventura (driven by illicit crops and the drug trafficking business) generate the most significant impact on the public order situation faced

by the Colombian State. In these criminal ecosystems, given the physical settings of the territory and the complex relationship of interdependence of actors outside the law, a significant increase in the cultivation of illicit crops has been fostered. According to the White House Office of National Drug Control Policy of the (ONDCP), coca cultivation in Colombia increased by 11% in 2017, reaching 209,000 hectares (Figure 8) and the potential production of pure cocaine rose 19%, to 921 metric tons (ONDCP, 2018).

Figure 8 clearly illustrates how, in areas that respond to the characterization of criminal ecosystems, the sowing of illicit crops has increased sharply. In Tumaco¹⁹ alone it is estimated that the total of illicit crops reaches almost 19,000 hectares (UNODC, 2017). However, it is noteworthy that in this criminal ecosystem there is a struggle between different actors, such as the Clan del Golfo, the National Liberation Army (ELN), and dissident groups of the Revolutionary Forces of Colombia (FARC).

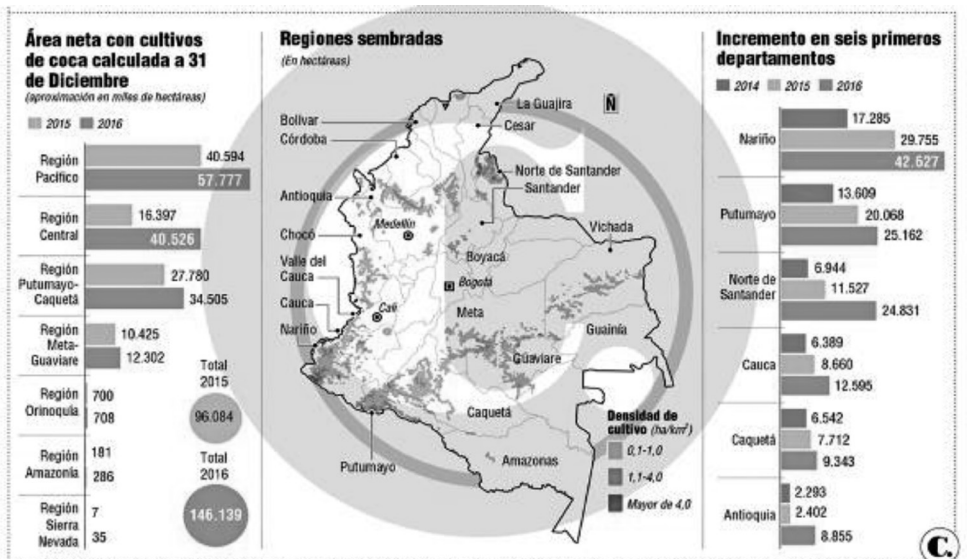


Figure 8. The pattern of illicit crop sowing in 2017.

Source: Los 9 departamentos donde hay plan pistola del Clan del Golfo (2017).

Within any system, actors inevitably compete for resources and with competition conflict ensues (although, to minimize such effects, actors often divide the system into geographical territories). The idea of organizations like the ELN to enter into a confron-

19 Municipality belonging to the department of Nariño, located in the Colombian Pacific.

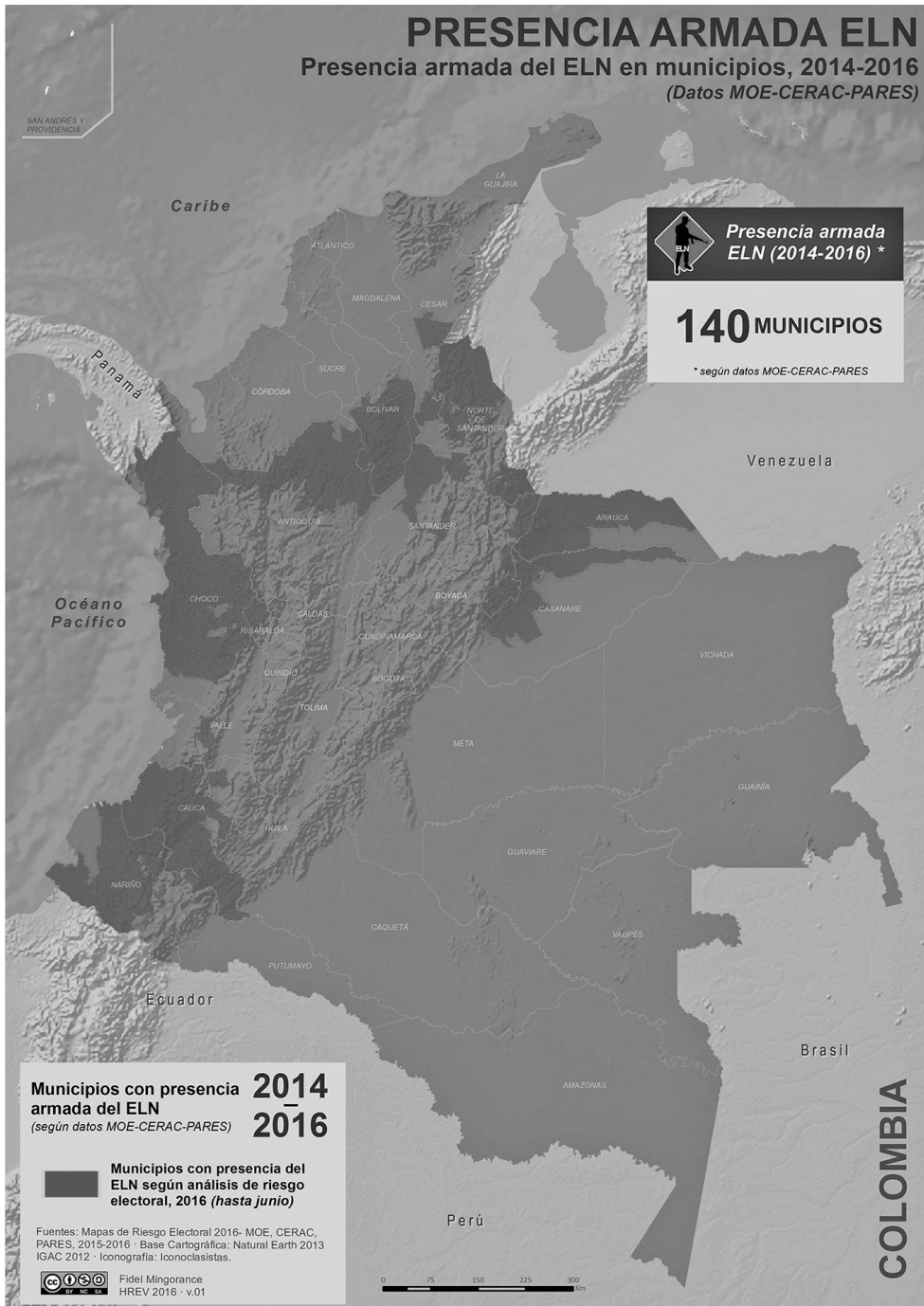


Figure 9. Rural criminal ecosystems with the presence of the ELN.
Source: Presencia armada ELN (2016).

tation with others already established in specific criminal ecosystems (Figure 9) is the understanding that these spaces are conducive to illegal activities because of the ecosystem's characteristics and the close relationships they form with all living organisms. The main strategic corridors²⁰ that allow the criminal networks the mobility of troops, food, medicines, weapons, and other essential elements for the continuity of the war, as well as drugs, species trafficking, illegal mining, and trafficking of migrants, among others are present in these rural criminal ecosystems. (Álvarez, 2017). Consequently, the control of these corridors guarantees an actor in the regional armed conflict a hegemonic continuity.

The confrontation produced by the struggle between the criminal actors to control the criminal ecosystem in Tumaco and its strategic corridors has resulted in 152 murders in 2016, and 222 homicides in 2017 (Defensoría del Pueblo, 2018). Certainly, Tumaco is not the only case. The convergence of drug trafficking, the ELN, GAO, Mexican cartels, and FARC dissidents is evident in other regions, such as Chocó, Catatumbo, Cauca, Antioquia, Guaviare, and Caquetá, among others. Concerning the dissidents of the FARC, alias "Gentil Duarte" (head of the dissidence of fronts 1, 7, 27, 16, 47, and 53) controls the region of Guaviare and has approximately 500 men in its criminal circle. According to intelligence reports, he smuggles cocaine with cartels from Brazil and Mexico. Currently, he is in dispute with Rodrigo Cadete, another dissident of the seventh front of the FARC, who operates in the Putumayo, commanding 400 men. It is remarkable that Rodrigo Cadete exports his cocaine to the United States directly, without intermediaries, making him the leading competitor of the Clan del Golfo.

On the other hand, alias "Cabuyo," dissident of the 36th Front is the commander of FARC dissidents in Antioquia, commanding 100 men and operations centers in the municipalities of Briceño and Yarumal (north of the Department of Antioquia), and controls all of the drug trafficking and cultivation of coca leaf in the region. Because of the need to transport cocaine through the port of Urabá, this outlaw has declared war on the Clan del Golfo. Another dissident who has been increasing his operations is John 40, the leader in Vichada, who moves freely between criminal ecosystems on either side of the Colombian-Venezuelan border. In addition to drug trafficking and extortion activities, he also controls, in association with the ELN, illegal mining areas both in Vichada and the Venezuelan Guyana.

Finally, alias "Guacho," a dissident of the FARC, operating on the border with Ecuador, and commanding an army of 600 men, is currently one of the most dangerous drug traffickers. According to intelligence assessments, Guacho sells the Mexican cartels 30% of the drug arriving in that market. This standing has caused hostility with David, a criminal who

20 High mountain, highways, and fluvial, maritime, air and borderline corridors.

operates in the south of Nariño; his band of 300 port gang members has granted him the central control of the Pacific coast, which facilitates the transport of the drug.

Conclusions

When speaking of criminality, some phenomena are not explicable under conventional logic; understanding the interaction between their actors and the space that surrounds produces multiple challenges. In fact, models to explain certain criminal actions can sometimes disregard the logic of the very essence of nature. In this order ideas, the concept of *criminal ecosystems* arises, abstracting a term from the natural sciences that enable understanding of the behavior of actors outside the law in a given territory.

In trying to understand the complexity of the world of transnational organized crime, it is necessary to make abstractions to simplify the realm of VUCA (volatility, uncertainty, complexity, and ambiguity). The concepts of the GST and ecosystems are strategies to integrate the environment with the actors (organisms) in a scientific framework. The concept of the ecosystem, in its purest sense, provides a convenient descriptive model for the functioning of organisms and their environment. In its most refined form, it can be used to explain the quantitative patterns of the materials and energy cycle between life and the environment. If the applications of the ecosystem to particular efforts have not always been entirely successful, this does not invalidate the concept. Instead, it is a statement on the ability of scientists to apply the concept of the ecosystem to particular issues, given the current knowledge. In particular, it is shown to be a more useful approach to understanding the nature and consequences of human impacts on the biosphere.

The intellectual study of TOC currently experiences at least four main distractions: a) mixing the general analysis with the requirements of prosecution, b) underestimating the diversity of criminal cooperation, c) underestimating how criminal cooperation interacts with legitimate activities, and d) overestimating the degree of planning and sophistication produced by the symbiosis of the offender with his environment. Therefore, the concept of the criminal ecosystem becomes an excellent tool to try to describe the behavior of some organizations outside the law in some regions of the territory.

Criminal ecosystems would then be geographic zones located in some areas of the country that, given their physical, geographic, and climatic particularities, become an appropriate scenario for illegal actors to carry out a series of criminal activities for profit, that feature, among other things, an ambiguous relationship with the local populations of legitimacy and supplanting of the State. These territories are usually empty spaces where convergence, as defined in this article, is one of its most significant characteristics. Consequently, they are habitats in which illegal and legal actors interrelate,

and whose interdependence facilitates the production and consumption of activities outside the law.

For the Colombian case, some areas have historically been abandoned by the institutions, where there is no active presence of the State, an element that has allowed criminal organizations to achieve an “institutional” interaction with the inhabitants of these territories. Under the premise of understanding specific behaviors as ecosystems of particular areas, it is necessary that the Colombian State act as an agency capable of absorbing all the demands of the population and try to break the chains of relationship that exist today between illegality, population, and territory.

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