UNODC
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Alluvial Gold Exploitation in Colombia

Evidence from Remote Sensing as Dated 2021

June 2022

El futuro es de todos
Minenergía

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ACKNOWLEDGEMENTS

The following organizations and persons contributed to the study *Alluvial Gold Exploitation. Evidence from Remote Sensing as Dated 2021* and to the preparation of this report:

Government of Colombia

National Mining Agency

National Police, Directorate of Carabineers and Rural Security (DICAR)

National Unit against Illegal Mining and Anti-Terrorism (UNIMIL)

National Army - Brigade against Illegal Exploitation of Mineral Deposits

International Cooperation

United States Embassy in Colombia, Narcotics and Law Enforcement Section (INL)

Other

The implementation of the study *Alluvial Gold Exploitation. Evidence from Remote Sensing as Dated 2021* has been possible thanks to the contributions of the Governments of Colombia and of the United States of America.

Unless otherwise specified, all graphs, tables and figures in this report are sourced from the Government of Colombia within the context of the UNODC-supported Monitoring System.

Photographs: UNODC/SIMCI, unless otherwise specified.

Cover image: Alluvial gold exploitation in the municipality of Magüí Payán, Nariño.

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INTRODUCTION

The increase in world gold production is primarily driven by demand and rising prices. Gold has been strengthened, in the current period of crisis due to the pandemic, because it is the preferred safe haven asset for international investors. That is so, since it has less volatility; traits which have helped to maintain prices at record levels in recent years. Although Colombia's production only represents 2% of the world's total, minerals such as copper and gold can emerge with better prospects in the international market. Notwithstanding the aforementioned, such [better prospects] require intensifying controls on illegal exploitation of gold and on increasing the levels of formality and legality. This required intensification is there to improve tax and royalty revenues, which result in economic development and in wellbeing of communities.

This document presents the results of the study on the evidence of alluvial gold exploitation (EVOA) for 2021, as obtained from implementing the monitoring model developed in coordination with the Ministry of Mines and Energy (MinEnergía) and the United Nations Office on Drugs and Crime (UNODC). It also has the support from the International Narcotics and Law Enforcement Affairs Section (INL) of the U.S. Embassy in Colombia. The study which has been carried out since 2016, using remote sensing tools, geographic information systems (GIS) and field work.

The objective is generating evidence and improving the knowledge framework of the alluvial gold exploitation activity. That goal is pursuant to dimensioning the dynamics of this highly complex sector in terms of the processes that occur in the realm of legality and illegality. Also, the goal is to identify alerts and to contribute to formulating policies and to designing intervention strategies that generate impact.

The monitoring findings performed on the national territory during 2021 conclude by reporting that 13 of the 32 provinces have EVOA on land with a total of 98,567 ha. 88% of them is concentrated in Chocó, Antioquia and Bolívar. Another way to see it is that 10 municipalities concentrate 54% of the presence of the phenomenon, from where 26% of the national gold production is extracted. It is worth noting that only a low portion of the EVOA detected is within the law arrangements: 65% corresponds to Illicit Exploitation and nearly half of the EVOA on land is located in Excluded Mining Areas.

This document begins with a review of the current policy and regulatory framework governing mining activity in the country. It contextualizes the monitoring model and the fundamental pillars, supported by geography as a tool for knowledge and analysis. It also presents the main findings related to EVOA and law arrangements from the three categories established in the model: Exploitation with Technical and/or Environmental Permits, In Transit to Legality and Illicit Exploitation; it also addresses the management framework for intervention in the territories. It presents the results of the dynamics of EVOA, its relationship with high environmental value plant covers and gold production.

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ACPM	Engine Fuel Oil
ANLA	National Authority of Environmental Licenses
ANM	National Mining Agency
ANT	National Land Agency
ARE	Special Reservation Area
DANE	National Administrative Department of Statistics
ELN	National Liberation Army
EVOA	Evidence of Alluvial Gold Exploitation
FARC	Colombian Revolutionary Armed Forces (Fuerzas Armadas Revolucionarias de Colombia)
g	Gram(s)
GDP	Gross Domestic Product
GÉNESIS	Subsistence Mining Registry
ha	Hectares
IDEAM	Institute of Hydrology, Meteorology and Environmental Studies
IGAC	Geographic Institute Agustín Codazzi
INL	The International Narcotics and Law Enforcement Affairs Section of the United States Embassy in Bogotá
km	Kilometer(s)
kg	Kilogram(s) PNIS
m	Meter(s)
MinAmbiente	Ministry of the Environment and Sustainable Development
MinComercio	Ministry of Commerce, Industry and Tourism
MinEnergía	Ministry of Mines and Energy
OAGs	Organized Armed Groups
PNN	National Natural Parks of Colombia
Ramsar	Convention on Wetlands of International Importance
RNN	National Natural Reserve
RUCOM	Sole Registry of Mineral Traders
RUNAP	Single National Registry of Protected Areas
RUT	Single Tax Registry
SAI	Information Access System
SENA	National Learning Service
SI.Minero	Integrated Mining Management System
SINAP	National System of Protected Areas
SIJIN	Criminal Investigation Sections
SIMCI	Integrated System for the Monitoring of Illicit Crops
SNPNN	National System of National Natural Parks
t	Ton(s)
IUCN	International Union for Conservation of Nature
UNODC	United Nations Office on Drugs and Crime
USD	American Dollars
ZRF	Forest Reserve Zones

EXECUTIVE SUMMARY

Gold production in the current scenario (crisis caused by the COVID-19 pandemic), has had an important impact on markets, as it is the preferred safe haven asset for world investors. Hence its price has been strengthened in international markets. Global demand drives gold production, but also illegal exploitation, which added to the presence of illicit crops in some territories, constitute warning signals for the Colombian State. They turn into threats to environmental, economic and social stability in several areas of the country. This calls for intensifying controls and increasing the levels of formality and legality, which would contribute to improving the country's and the territories' income. The EVOA monitoring system and the analysis models as law arrangements and environmental restriction, allow having an approximation of the legality character of the EVOA. The results for 2021 show the following:

Concentration of EVOA in Three Provinces and Ten Municipalities of the Country

For 2021, the monitoring shows that 13 of the country's 32 provinces have EVOA on land, with a total of 98,567 ha, 2% less than what was detected in 2020 (100,752 ha), in addition to the participation of the municipality of Dibulla, province of La Guajira. The EVOA on land is highly concentrated in three provinces: Chocó, Antioquia and Bolívar, with 88% of the national total. Chocó occupies the first place with the highest EVOA detection with 38,980 hectares [ha] (40% of the national total) and focuses the highest amount of EVOA in the category of Illicit Exploitation in Excluded Mining Areas.

The Ten Municipalities that Concentrate 54% of the EVOA Detection are Highly Complex Territories

Out of 101 municipalities with EVOA in the country (9% of the national total), 10 of them concentrate 54% of the national detection (52,859 ha): Zaragoza, Nechí, Nóvita, El Cantón de San Pablo, Cáceres, Istmina, El Bagre, Ayapel, Río Quito and Unión Panamericana. These municipalities account for 26% of national gold production and have a high level of illicit gold extraction (59%).

These territories are characterized by their ample complexity because, in addition to illicit gold exploitation, some of them have coca crops; this coincides with high levels of poverty and low development indexes. In addition, formal gold production is not reverted in these territories, making them favorable scenarios for the presence of organized criminal structures that fight for territorial control due to the high profitability of illicit economies.

Only a Small Portion of the EVOA Detected are within the Legal Framework (Mining and Environmental)

The relationship between EVOA and law arrangements shows that 65% of the figure goes to Illicit Exploitation. In this category, Chocó and Antioquia stand out; 29% have Technical and/or Environmental Permits and 6% are in the category of 'In Transit to Legality'.

It is noteworthy that in Valle del Cauca and Guainía more than 95% (provincial consolidation) of the EVOA detected are in the category of Illicit Exploitation and coincide with Excluded Mining Areas, territories for the protection and conservation of natural heritage.

Approximately Half of the EVOA on Land is Located in Excluded Mining Areas (49,469 ha)

Excluded Mining Areas correspond to territories for the protection and development of renewable natural and environmental resources, where the law stipulates that mining exploration and exploitation works may not be performed. In 2021, of 98,567 ha detected with EVOA, 37,733 ha are under the category of Illicit Exploitation located in Excluded Mining Areas (76%); these are territories where this activity is exercised without the corresponding, in force, mining title. It should be noted that in this category 24,387 ha of EVOA on land were identified in Mining Areas of Ethnic Communities Mining Areas of Ethnic Communities; in these territories the community has priority over third parties to obtain a mining title. Thirty-five percent of the area of national EVOA on land is located in the Pacific Forest Reserve, a territory recognized for harboring some of the most biodiverse forests on the planet, both in terms of variety and endemism of species.

The Other Half of the EVOA on Land is Located in Areas without Environmental Restrictions (49,098 ha)

Areas without Environmental Restrictions correspond to territories where there are no environmental restrictions for mining activity and exploration and exploitation permits can be requested. The results of the EVOA detection indicate that 50% of the national consolidation (49,098 ha) is located in these zones and 54% (26,251 ha) of the EVOA in Areas without Environmental Restrictions is carried out without the corresponding mining title. Antioquia is the province with the highest representation of EVOA in Areas without Environmental Restrictions with 83% of the consolidated within the province.

50% of the National Detection of EVOA on Land (49,351 ha) is Located in Special Management Territories

The EVOA in these territories increased by 4% compared to the previous year, the majority (89%) corresponds to the presence in ethnic territories, mainly in Black Community Lands, and Chocó concentrates the majority (85%). 11% is located in protected areas included in the National System of Protected Areas (SINAP). Only 1%, approximately, is located within Indigenous Reservations.

EVOA and Presence of Coca Crops: Two Phenomena that Converge in some Territories

In approximately 38% of the territories with presence of EVOA on land in 2021, coca cultivation was identified in 2020[1]. The area planted with coca recorded 11,102 ha and 25,462 ha of EVOA on land. Of the 101 municipalities with EVOA in 2021, 70 of them had coca cultivation. Of the 10 municipalities with more EVOA on land in 2021, 6 reported

1 EVOA and coca cultivation analyses are carried out in 25 km2 grids of the area frame, since a territorial and not a geographical coincidence is sought.

coca cultivation in 2020: 4 are located in Antioquia (Zaragoza, Nechí, Cáceres and El Bagre) and have a tendency to increase coca cultivation, and 2 in Chocó (Nóvita and Istmina) with a tendency to decrease. Although these phenomena have different production cycles and market characteristics, they are developed in vulnerable areas due to poverty, marginality, difficult access and the presence of illegal armed groups. The convergence of these two activities not only generates negative impacts on natural ecosystems but is also a determining factor in the economic dynamics of the territory. Understanding the complex interactions of the territories where these two activities coincide would facilitate the development of comprehensive public policies, focusing actions on the upper links of the chain, as well as focusing on the transformation of the affected territories. A single action or intervention tool, or several of them in a disjointed manner, cannot optimize efforts and change conditions in the territory to achieve sustainable impacts.

Territory with EVOA Presence and Area Stability

Between 2020 and 2021 the territory with presence of EVOA on land is 113,321 ha; 76% of the territory is concentrated in Antioquia and Chocó. Of the total affected territory, 76% corresponds to stable areas, a trend that persists in both study periods; 13% is found in areas with signs of pasture and grasslands (areas detected in 2020 where they are no longer active for 2021) and 11% between expanding areas and new areas. The detection of EVOA this year and the dynamic figures for the 2020-2021 period show the stability of the phenomenon, a situation that can be attributed to the important repercussions of the current gold market, which encourages the permanence and capacity of the actors to continue with gold exploitation, both in terms of legal production and illegal exploitation, due to the high profitability and low risks that this activity generates. This requires the presence of the State and a close coordination between the central and provincial levels to carry out comprehensive actions on all fronts.

Approximately Half of Colombia's Gold Production Comes from Subsistence Mining

In the 2010-2020 period, Colombian gold production represents around 2% of world production. Although it is not a representative production, the bet on key minerals such as gold, with better prospects in the international market, requires intensifying controls on illicit gold exploitation as well as increasing the levels of formality and legality, in order to improve tax and royalty revenues that impact the territories which are highly affected by illegality.

The largest gold producers in the 2017-2021 period (first semester) are Antioquia (57.4%) and Chocó (14.9%); the provinces of Bolívar, Caldas, Córdoba, Nariño and Cauca are also important producers.

The production structure in the 2016-2021 period (first half) shows concentration in two types of exploiters:" Barequeros" [i.e., artisan miners] and mining titles; around half of the gold production in Colombia comes from subsistence mining ("Barequeros" and "Chatarreros" [i.e., scrap miners], 49%), which is developed in an artisanal way and which, by its very nature, presents low levels of productivity. Therefore, it is necessary to strengthen the formalization strategy to ensure that this activity is profitable

and environmentally responsible and that it has an impact on the quality of life of mining communities, which in some territories have a tradition of artisanal and ancestral mining. In this context, it is of the utmost importance to effectively control the illegal exploitation of minerals (i.e. value chain) by dismantling and disrupting the criminal structures that fight for control of the territories for the income from illegal economies, which increase the risk factors for the civilian population.

Actions of the Colombian Government against Illegal Exploitation

The Colombian Government's control actions to combat illegal gold exploitation are aimed at reducing the extraction of minerals that is performed without complying with the technical and environmental permits stipulated by law. The results of the control actions may be summarized in seizure processes, destruction of machinery or closure of mines. In 2020, 586 gold mining intervention operations were carried executed, tallying 1,114 operational results nationwide; 56% related to seizures, 27% to gold mines intervened and the remaining percentage to destruction. Engines, motor pumps and backhoes accounted for 76% of the total results related to seizures. Mercury, on the other hand, is the chemical substance with the highest level of seizures.

Illicit gold exploitation with high levels of informality, together with the presence of illicit crops and the historical conditions of economic and social backwardness in these territories, create favorable scenarios for organized armed groups (OAGs) to obtain earnings from their direct or indirect involvement in illicit economies. The challenge is to strengthen, therefore, the comprehensive strategy being developed in these territories, focused mainly on: 1) *strengthening the formalization policy*, empowering institutional capacities to exercise accompaniment that allows reaching technical, environmental and economic standards for the communities; 2) *guaranteeing security and implementation of actions that potentiate impacts and allow striking illicit economies value networks* by focusing on high value strategic nodes, who support illicit mining and other illicit economies in the territories, so as to ensure effective and strategic actions, and 3) *social investment in line with the Sustainable Development Goals (SDGs)*, pursuant to the goal of consolidating sustainable economies for social and environmental development, which reduces the vulnerabilities of the population. This requires generating technical evidence to identify vulnerabilities, to monitor and to evaluate intervention strategies, as well as, to analyze in depth the value network systems to focus on nodes of higher strategic value.

RESULTS TABLE

NATIONAL DETECTION OF EVOA ON LAND - 2021		
98,567 ha		
EVOA on land 2021 and Law arrangements (percentage of national participation)		
Category	**EVOA on land (ha)**	**National participation (%)**
Exploitation with Technical and/or Environmental Permits[1]	28,427	29
Exploitation in Transit to Legality	6,156	6
Illicit Exploitation	63,984	65
Special management territories and EVOA on land 2021		
Category	**EVOA on land (ha)**	**National participation (%)**
Ethnic territories		
Black Community Lands	43,325	44
Indigenous Reservations	613	< 1
Total ethnic territories	***43,938***	***45***
RUNAP areas		
Integrated Management Regional Districts	5,413	5
Total RUNAP areas	***5,413***	***5***
Total special management territories	***49,351***	***50***
Excluded Mining Areas with EVOA on land 2021[2]		
Category	**EVOA on land (ha)**	**National participation (%)**
Restricted Mining Areas within Excluded Mining Areas	25,341	26
Excluded Mining Areas without Restricted Mining Areas	24,128	24
Total	**49,469**	**50**
Areas without Environmental Restrictions with EVOA on land 20213		
Category	EVOA on land (ha)	National participation (%)
Restricted Mining areas outside Excluded Mining Areas	8,365	8
Areas without Environmental Restrictions without Restricted Mining Areas	40,733	42
Areas without Environmental Restrictions	**49,098**	**50**
National Natural Parks with EVOA on land presence		
PNN	EVOA on land within PNN (ha)-2019	EVOA on land within PNN (ha)-2020	EVOA on land within PNN (ha)-2021
Puinawai	75	97	84
Los Farallones de Cali	18	15	6
Total	93	111	90
EVOA on land dynamics (2020-2021)		Area (ha)
Stable		85,998
New		3,060
Expanding		9,509
Signs of vegetable succession		14,754

Provinces with EVOA on land								
National area detected with EVOA on land	2018		2019		2020		2021	
	92,046 ha		98,028 ha		100,752 ha		98,567 ha	
Province	EVOA on land 2018 (ha)	National participation 2018 (%)	EVOA on land 2019 (ha)	National participation 2019 (%)	EVOA on land 2020 (ha)	National participation 2020 (%)	EVOA on land 2021 (ha)	National participation 2021 (%)
Chocó	35,194	38	35,105	36	36,552	36	38,980	40
Antioquia	36,447	40	40,201	41	40,890	41	37,588	38
Bolívar	8,913	10	10,642	11	10,583	11	9,472	10
Córdoba	3,982	4	4,976	5	4,975	5	4,580	5
Nariño	2,921	3	3,171	3	3,374	3	3,764	4
Cauca[4]	3,004	3	2,697	3	2,807	3	2,732	3
Valle del Cauca	889	1	608	1	765	1	575	< 1
Putumayo[4]	437	< 1	291	< 1	405	< 1	526	< 1
Guainía[4]	139	< 1	135	< 1	185	< 1	151	< 1
Caquetá[4]	50	< 1	53	< 1	78	< 1	101	< 1
Other	70	< 1	147	< 1	139	< 1	99	< 1
Amazonas[4]	0	0	0	0	0	0	0	0
Guaviare[4]	0	0	0	0	0	0	0	0
Vaupés[4]	0	0	0	0	0	0	0	0

Municipalities with the largest detection of EVOA on land 2021			
Municipality	Province	EVOA on land (ha)	National participation (%)
Zaragoza	Antioquia	7,869	8
Nechí	Antioquia	7,609	8
Nóvita	Chocó	5,676	6
El Cantón de San Pablo	Chocó	5,643	6
Cáceres	Antioquia	4,972	5

[1] The ANLA system has not been properly updated by the other entities with competence for environmental licensing.

[2] Excluded Mining Areas contain Restricted Mining Areas within them.

[3] Areas without Environmental Restrictions include Restricted Mining Areas.

[4] In these provinces, were also detected alerts due to EVOA in water.

REFERENCE FRAMEWORK

SECTION I

This section presents the current policy and regulatory framework for the mining sector. It contextualizes the monitoring model and its fundamental pillars, which are based on geography as a tool for knowledge and analysis.

POLICY AND REGULATORY FRAMEWORK

Articles 8, 79 and 80 of the 1991 Political Constitution of Colombia set forth the duty of the Republic's authorities to protect and to plan the use of natural resources, allowing for the enjoyment of a healthy environment, and of preventing and controlling environmental deterioration factors, as well as, allowing to impose legal sanctions and to demand reparation for damages caused. For this reason, since the issuance of Law 685 dated 2001, (Colombian Mining Code), it was stipulated that the minerals present in the soil and subsoil are legally presumed to be state property, and as such, in order to explore, exploit, appropriate what is exploited and impose easements, a title registered at the National Mining Registry is required; under penalty of incurring in the crime of illegal exploitation of mining deposits and other materials as stipulated in the Colombian Criminal Code.

For such reason and as of the issuance of Decree 4134 dated 2011, the National Mining Agency (ANM) performs the duties of mining authority, in such a way that it is the institution with jurisdiction that manages the State's mineral resources, being in charge of granting rights to explore and mine minerals, in addition to monitoring and controlling the mining titles granted, among other duties. The aforementioned except for Antioquia, which has the jurisdiction of being a granting and supervising authority, through the Secretary of Mines of the province.

By virtue of the above and in accordance with the provisions of Decree 0381 dated 2012, "The Ministry of Mines and Energy aims to formulate, adopt, direct and coordinate the policies, plans and programs of the Mines and Energy Sector" and, in turn, assigns to the Ministry of Mines and Energy, among others, the duty of "Articulating the formulation, adoption and implementation of the public policy of the administrative sector of mines and energy; to adopt the development plans of the mining and energy sector of the country in accordance with the national development plans and with the policy of the National Government; and to disseminate the policies, plans and programs of the sector", pointing out that based on this objective, regulatory procedures have been drafted to combat the phenomenon of illegal exploitation of minerals, which has brought among other consequences the breach of environmental, social and labor standards, as well as, tarnishing the perception [of general public] in respect of the mining sector in Colombia.

In this context, the Ministry of Mines and Energy (i.e., 'MinEnergía') has been supporting actions in respect of preventing and controlling illegal exploitation of minerals and related activities in the national territory. Its intervention actions are pursuant to facilitating initiatives to be executed by the authorities with jurisdiction, focused on controlling exclusively that exploitation of minerals that is carried out in an antitechnical manner, without a mining title duly granted and duly registered in the National Mining Registry, and without the required environmental instrument as the case may be. Therefore, and in accordance with the provisions of article 306 of Law 685 dated 2001, currently the Mining Code, it is necessary to specify that municipal mayors may suspend at any time, ex officio, by notice or complaint of any person, the extraction of minerals without a title registered in the National Mining Registry, under penalty of the corresponding disciplinary actions as stipulated by law.

Having clarified the above, emphasis is made on the vision of mining today: it is comprehensive, modern and practiced on the basis of sustainable projects. Colombia has the potential, the tradition and the mining vocation. The new mining route and the sector are the protagonists of a secure economic reactivation as an engine of opportunities, development and progress framed in order, legality and responsibility. Likewise, today the country has a more modern and innovative industry, a sector that thinks of best practices, that acts in tune with the global sustainability agenda. The path towards the new mining industry is based on legality and the coexistence of different scales that contribute to developing communities and territories.

By virtue of the above, and in closing the gaps for an exponential growth of the illegal exploitation phenomenon of minerals, a scenario has been proposed to generate conditions and instruments that encourage the entry and legal operation of miners with the vocation to formalize their work, as well as a rigorous monitoring to ensure operations that meet technical, environmental and human life protection standards. In this context, 'MinEnergía' is developing a strategy aimed at identifying small-scale miners who require support to operate within the framework of the law, raising standards with a view to achieve legal, entrepreneurial, responsible, inclusive and reliable mining activity. For this purpose, all actions taken are based on the regulatory framework presented in Table 1.

Table 1. Regulatory Framework

TYPE OF STANDARD	CONTENT OF THE STANDARD
Law 685 dated August 15th, 2001	"Whereby the Mining Code is issued and other provisions are issued".
Decree 381 dated February 16th, 2012, amended by Decree 1617 dated 2013.	"Whereby the structure of the Ministry of Mines and Energy is modified".
Law 1658 dated July 15th, 2013	"Whereby provisions are stipulated for the sale and use of mercury in the different industrial activities of the country". Through this law, provisions are mandated for the commercialization and use of mercury in the different industrial applications of the country, requirements and incentives are set for its reduction and elimination, and other provisions are issued.
Decree 480 dated March 6th, 2014	"Whereby the conditions and requirements for the conclusion and execution of mining formalization subcontracts are regulated".
Resolution 91267 dated November 18th, 2014	"Whereby the definition of small-scale exploiter or small miner, who shall be subject to the subcontracts of Mining Formalization Return of Areas and to Benefits for Formalization, is regulated (...)".

Decree 276 dated February 17th, 2015	"Whereby measures are adopted related to the Single Registry of Marketers – RUCOM [for its initials in Spanish]". Whereby Article 112 of Law 1450 dated 2011, stipulates that; "for the purposes of controlling the commercialization of minerals, the Colombian Institute of Geology and Mining INGEOMINAS, or whoever takes its place shall publish the list of mining title holders who are in the exploitation stage and who have the required environmental authorizations or licenses. This list must also include the information of the agents that are authorized to commercialize minerals. (...)
Decree 1073 dated 2015	Sole Regulatory Decree of the Administrative Sector of Mines and Energy, which compiles the norms of regulatory nature that are in force in the sector.
Law 1753 dated July 9th, 2015	Whereby the National Development Plan 2014-2018 "All for a new country" is issued. This law, in which all the state's governing bodies participated, allowed the sector to classify mining activities as subsistence mining, small, medium and large mining. Also, it sets goals for green growth that promote technological development and innovation to strengthen national competitiveness; aspects that were clearly aligned with the strategies of the Ministry of Mines and Energy in eliminating mercury use. Article 19. Means of work under the tutelage of small-scale mining titles. The following are mechanisms for work under the protection of a mining title: Subcontract for mining formalization... 2. Devolution of areas for mining formalization... Article 20. Reserve areas for mining development. The reserve areas for mining development shall be the following: Strategic Mining Reserve Areas... Reserve Areas for Formalization... Reserve areas for the mineral-energy development... Article 21. Mining classification. Pursuant to implementing a differentiated public policy, mining activities will be classified into subsistence mining, small, medium and large-scale mining. The national government will define them and stipulate the requirements in accordance with the number of hectares and/or the production of the mining units as per the type of ore. For exploration, only the hectares will be taken into account...
Decree 1886 dated September 21st, 2015	Whereby the Safety Regulations for Underground Mining Activities are established. Article 1. "Purpose. The purpose of this Regulation is to stipulate the minimum standards in preventing risks in underground mining, as well as, to adopt the procedures in performing inspections, surveillance and control of all underground mining works and those of open pit that are related to them, pursuant to preserving safety and health conditions at workplaces where such works are performed".

Decree 2504 dated December 23rd, 2015	Whereby the Sole Regulatory Decree No 1073 dated 2015 is added, which defines the technical, technological, operational and administrative aspects to exercise the work of differential mining control and other decisions are made.
Resolution 1258 dated 2015	Whereby the guidelines, environmental guide and terms of reference for traditional mining formalization activities are adopted and other provisions are issued".
Resolution 40144 dated February 15th, 2016	"Whereby the Management System of Mining Procedures, Processes and Services i.e., the 'SI.MINERO' is adopted".
Resolution 40359 dated April 8th, 2016	"Whereby the protocol is created to develop the mediation stipulated in Chapter 4 of the Sole Regulatory Decree 1073 dated 2015 "for non-regularized small-scale mining".
Resolution 0565 dated April 2016	"Whereby the requirements and procedures for the Registry of Mercury Users - RUM for the mining sector are set": From 2013 until the publication of the standard, the Ministry of Mines and Energy provided accompaniment to the Ministry of Environment and Sustainable Development in the formulation of the document regulating the registration of mercury users for the mining sector.
Decree 1421 dated September 2016	"Whereby the Sole Regulatory Decree of the Administrative Sector of Mines and Energy, 1073 dated 2015, is added and modified in respect of adopting measures related with Processing and Commercializing of minerals and the Sole Regulatory Decree of the Environment and Sustainable Development Sector, 1076 dated 2015, is added and modified in respect of environmental licensing for processing plants."
Decree 1666 dated October 21st, 2016	"Whereby the Sole Regulatory Decree of the Administrative Sector of Mines and Energy, 1073 dated 2015, related to mining classification is added".
Decree 1975 dated December 6th, 2016	"Whereby the Sole Regulatory Decree of the Administrative Sector of Mines and Energy, 1073 dated 2015, is added, related to integration of areas and extensions of concession contracts".
Decree 2133 dated December 22nd, 2016	"Whereby control measures are stipulated when importing and marketing mercury and products containing it, within the framework of the provisions of Article 5 of Law 1658 dated 2013". The Ministry of Commerce, Industry and Tourism jointly with the Ministry of Mines and Energy, Ministry of Finance and Public Credit, Ministry of Health and Social Protection and the Ministry of Environment and Sustainable Development actively participated in the construction of this regulatory document, which establishes aspects around importing and commercializing mercury, such as: National Registry of Authorized Importers and Marketers; quotas for imports and their administration; prior authorizations; commercialization and transitory provisions, among others that are of special interest to the mining sector".
Resolution 41265 dated December 27th, 2016	Whereby the parameters and conditions are established in exercising the right of preference referred to in Article 2.2.5.5.2.2.2.13 of Decree 1975 dated 2016 "Whereby the Sole Regulatory Decree of the Administrative Sector of Mines and Energy, 1073 dated 2015 is added, in respect of integrating areas and extensions of concession contracts "
Resolution 40103 dated February 9th, 2017	"Whereby maximum production volumes in subsistence mining are set".

Decree 1102 dated June 27th, 2017	"Whereby the Sole Regulatory Decree of the Administrative Sector of Mines and Energy 1073 dated 2015 is added, in respect of adopting measures related to the Marketing of Minerals". 1. Subsistence miners must have the production declaration to sell the mineral product of their activity through the format stipulated by the National Mining Agency - ANM, which is published on the page www.anm.gov.co. 2. Subsistence miners who extract precious metals, precious and semi-precious stones must provide the "Registro Único Tributario" (RUT) when registering at the respective Mayor's Office, as a requirement for publication in the RUCOM. 3. Subsistence miners that extract precious metals, precious and semi-precious stones that are already registered with the corresponding Mayor's Office and who are published in RUCOM will have a term of six (6) months, starting on June 27th, 2017, to present the RUT to the Mayor's Office where they are registered, under penalty of being eliminated from the RUCOM publication lists. 4. It is established that once the national mining authority has knowledge of the excess of the production ceilings established by the Ministry of Mines and Energy through Resolution No. 40103 dated 2017 for subsistence miners, it will proceed to remove their publication from RUCOM, after the respective execution of actions as per the terms stipulated in the Code of Administrative Procedure and Administrative Disputes.
Decree 1949 dated November 28th, 2017.	"Whereby the Sole Regulatory Decree No 1073 dated 2015 is amended and added, insofar as it regulates the means of work under the protection of a title in small mining and other decisions are made".
Law 1873 dated December 20th, 2017	"Whereby the budget of income and capital resources and appropriations' law for the fiscal period from January 1st to December 31st, 2018, is decreed." Article 111. The Ministry of Mines and Energy, in developing the National Mining Policy, may support small-scale miners and mining communities, through the acquisition and assembly of specialized mining equipment required for the improvement of the mining operation and cleaner production. Likewise, it may structure and implement productive projects for the labor reconversion of small-scale and/or subsistence miners. The Ministry of Mines and Energy shall determine the requirements and other necessary actions in developing this article, and they shall finance it with the available appropriations.
Law 1892 dated May 11st, 2018	"Whereby the "Minamata Convention on Mercury made in Kumamoto (Japan) on October 10th, 2013" is adopted".
Resolution 41052 dated October 17th, 2018	"Whereby the Mining Territorial Dialogue Table - MINA [for its initials in Spanish] is created".

Law 1955 dated 2019	National Development Plan, which includes the following articles: 22. Temporary environmental license for mining formalization. 30. Strengthening of supervision, monitoring and control of mining activities. 325. Processing of applications in formalizing traditional mining. 326. Differential requirements for mining concession contracts. 327. Subsistence Mining.
Resolution 40195 dated June 2021	"Whereby formalization guidelines for mining development are adopted".
Law 2111 dated July 29th, 2021	"Whereby Title XI of the crimes against natural resources and the environment of Law 599 dated 2000 is substituted; Law 906 dated 2004 is modified and other provisions are issued". Article 332. Illegal exploitation of mining deposits and other materials.
Law 2056 dated September 20th, 2021	"Whereby the organization and operation of the General Royalties System is regulated and stipulated within its objectives and purposes "to encourage the structuring of projects that promote the development and formalization of mining-energy production, in particular small, medium and artisanal mining".

Source: [1].

The conditions and mechanisms are designed to accompany the country's miners In Transit to Legality and to compliance with standards. On the other hand, some miners who do not have a tradition or do not work in mining, but simply work under the impulse of exploiting gold in any way they can, do not comply with legality and do not require accompaniment to comply with standards. For this reason, it was necessary to strengthen the regulatory tools to protect natural resources. This was done with the issuance of Law 2111 dated 2021 "Whereby Title XI 'crimes against natural resources and the environment' of Law 599 dated 2000 is replaced, Law 906 dated 2004 is modified and other provisions are enacted". They were included as aggravating punitive circumstances for punishable conduct when illegally mining deposits in protected areas, when using unauthorized explosives, when using heavy machinery or unauthorized mechanized means, and when using substances prohibited by law.

MONITORING MODEL

Understanding the exploitation of minerals in the country, in this case of alluvial gold, involves the analysis of different dimensions of the phenomenon such as the location and localization of areas with the presence of the activity, the incorporation of the country's regulatory component, the monitoring of actions taken by the national government in preventing and controlling exploitation and in mitigating its impact, among others. To improve this context, MinEnergía and the United Nations Office on Drugs and Crime (UNODC), with the support of the International Narcotics and Law Enforcement Affairs Section (INL) of the Embassy of the United States of America in Colombia have been concentrating their efforts and expertise for five years to implement a monitoring model that facilitates a comprehensive understanding of mining activity. This monitoring model starts with the study of the geography of the phenomenon and allows, first, to dimension it. Also, it identifies the relationships among the EVOA and the presence of other activities in the territory and, finally, to consolidate in an information framework with the results of the dimensioning and the analysis made. Therefore, it constituted a useful tool in formulating public policy and in designing and targeting intervention strategies.

The model is based on three pillars: the first pillar is based on detecting evidence of alluvial gold exploitation (EVOA) using satellite imagery and remote sensing tools. This pillar addresses two categories: EVOA with the use of machinery on land and alerts due to EVOA with use of machinery in water; the main result is a layer of EVOA on land[2] for the entire Colombian territory and a layer of alerts due to EVOA in water for the study area.[3]

The second pillar focuses on the legality of the EVOA and integrates the official information provided by the Government of Colombia, generally related to the technical and environmental permits required for the development of the mining activity, information on requests for legalization and information on proposals for the exercise of the activity. Such information was structured in three categories, established by MinEnergía: 1) With Technical and/or Environmental Permits 2) In Transit to Legality and 3) Illicit Exploitation.

Finally, the third pillar focuses on the regulatory framework for environmental restrictions on mining activities: Law 685 dated 2001 (Excluded Mining Areas, Areas without Environmental Restrictions and Restricted Mining Areas). The three pillars together constitute the nature and basis for the design of intervention actions in the territory.

The results of each of the pillars provide the Colombian government with multiple tools to address the problem of illegal mineral exploitation; however, the selection of the ideal tool also depends on the conditions of the territory. This model offers policy makers elements to improve efficiency by integrating data from each pillar, facilitating the design of the intervention.

2 In the identification of EVOA on land, methodologies are being developed to quantify the volume of land removed and subsequently the loss of mining resources; however, this variable is not yet incorporated in the analyses.

3 The study includes the detection of alerts due to EVOA in water in ten rivers located in the Amazon and Orinoco regions; it is applicable to rivers throughout the national territory with a minimum width of 45 m.

The three pillars are integrated into the area framework[4], where a historical series is available for monitoring the phenomenon[5] that allows targeting action in areas with EVOA presence, undertaking prevention actions based on spatial trends and identifying how the territories evolve after the intervention. Additionally, the EVOA monitoring framework is nourished by the geographic information that has been built in the monitoring of illicit crops and incorporates additional specialized information, both primary and secondary sources related to the mining dimension.

On the other hand, the use of spatial databases and their integration in geographic information systems (GIS) enables the possibility of incorporating other environmental variables that are useful in sampling and in characterizing the socioeconomic conditions of the populations immersed in the activity, as well as, carrying out territorial analyses of the population related to EVOA. It should be mentioned that the monitoring system conducts studies to understand the social, cultural and economic conditions and, in general, all those associated with the vulnerability of the territories with the presence of illicit activities such as the illegal exploitation of minerals and the planting of illicit crops.

Finally, the monitoring system offers the publication of research, the timely delivery of data and analysis to government entities, as well as the presentation of the most outstanding findings. To this end, a model for accessing EVOA data was designed and implemented with the use of new information technologies called the EVOA SAI[6], which facilitates the visualization, consultation and analysis of geo-referenced EVOA information by means of control panels and interactive maps.

Evidence of Alluvial Gold Exploitation (EVOA)

The first pillar of the monitoring model (detection) addresses, from remote sensing tools, the identification of EVOA, i.e., evidence of open pit mining in secondary deposits, which use heavy machinery for the initial removal of material. In this context, it is necessary to specify that the type of evidence depends on where and how the exploitation takes place. For exploitations that are developed in alluvial landscapes with the use of machinery on land (backhoes), the evidence is characterized by changes in the surrounding landscape related to alterations in water bodies, deforestation and soil upwelling due to loss of vegetation cover, among others [2]. The methodological model for the detection and monitoring of onshore EVOA was designed and implemented by UNODC since 2016.

On the other hand, for exploitations with the use of machinery in water, those that are performed directly in water currents with the use of dredges or rafts, the evidence is based on the alteration of suspended sediments in the exploitation sites and that are detected through

4 The area framework covers the entire country with a systematic arrangement of 1 km2 (100 ha) units and is part of the UNODC/SIMCI cartographic toolkit for the calculation and monitoring of indicators with a geographic approach. For more details, see previous publications.
5 As of the date of this study, there is a historical series of six moments in time: 2014, 2016, 2018, 2019, 2020 and 2021.
6 Access to the EVOA SAI application is restricted; it is necessary to request the creation of an username and password from the Ministry of Mines and Energy.

Colombia has two types of deposits, according to the geological conditions of formation: 1) primary, known as lode or vein, where underground exploitation predominates, and 2) secondary or alluvial, with open pit exploitation. In turn, these deposits present two basic modalities in terms of the material extraction model: 1) by manual means, i.e., without the use of machinery, and 2) with the use of machinery. In this sense, the type of exploitation and the machinery used generate physical evidence in the territory that, depending on its dimension, can be detectable and measurable through remote sensing, that is, with the use of satellite images [4].

spectral indexes[7], through a methodology designed by UNODC and that has been implemented since 2018. In this regard, it is necessary to specify that the model does not identify evidence of subsistence or underground exploitation.

Law Arrangements Contemplated in the Mining Regulatory Framework

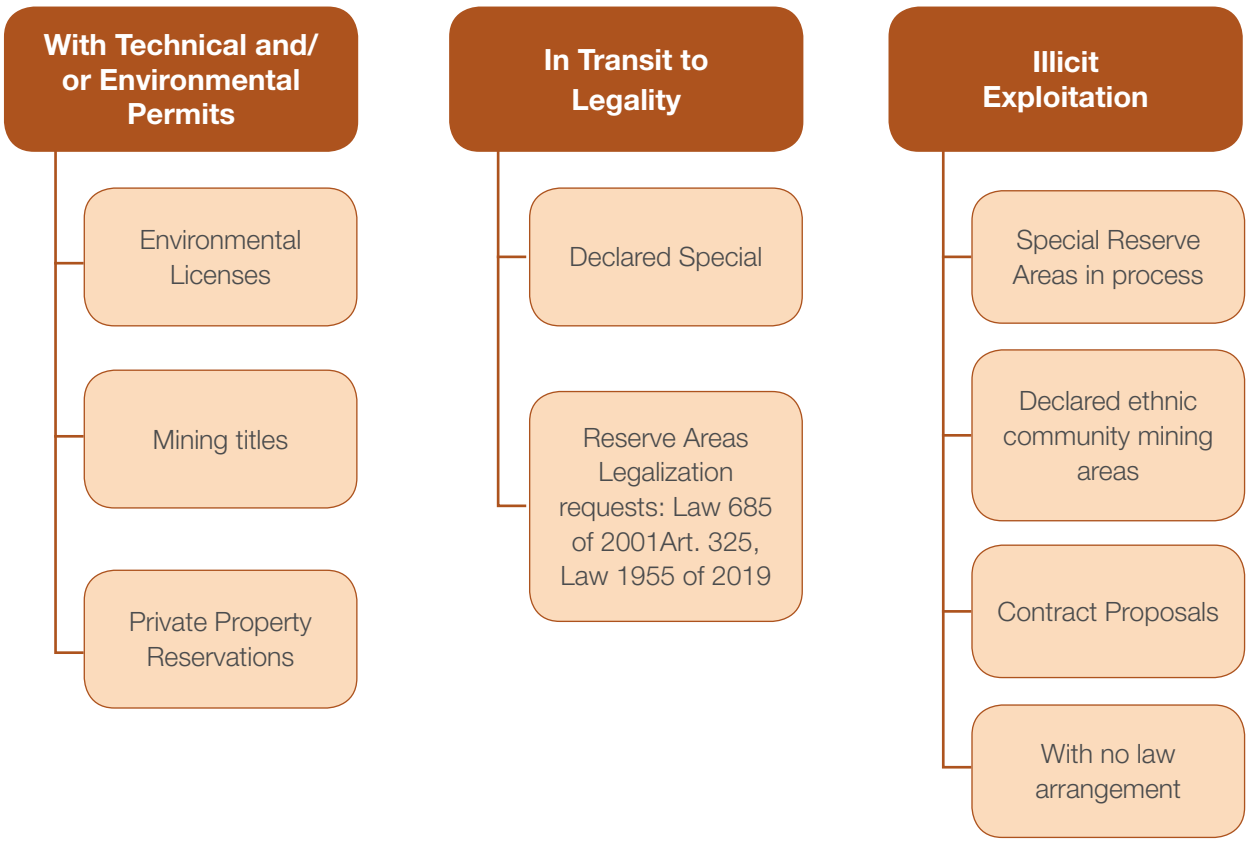
The second pillar of the model is based on the framework of technical and environmental permits that confer the character of legality or not to such exploitation, when the requirements and approvals to perform the activity within the regulatory framework have not been fulfilled. The study seeks to provide the institutions in charge of management, resource management, resource control and public policy formulation with objective information to improve the framework of knowledge of the activity with a territorial approach and, therefore, to focus on the different interventions that are technically, environmentally and normatively viable, articulated with the specificities of the territories.

The study has official information from the National Environmental Licensing Authority (ANLA) regarding environmental licenses or permits and from the ANM, regarding concession contracts or mining titles, Recognitions of Private Property, Concession Contract Proposals, requests for mining legalization or formalization, Mining Areas of Ethnic Communities and Special Reserve Areas (ARE) in process and declared. In this regard, Antioquia, through the Secretariat of Mines, is the only province with a mining delegation [3]. Consequently, the Secretariat of Mines of Antioquia is the entity in charge of managing the province's information related to these law arrangements.

The categorization of the figures is illustrated below (Figure 1), followed by a brief explanation of each category. For more details, see previous publications [4].

7 Spectral indexes are based on the algebraic combination of bands with radiometrically corrected and calibrated spectral values (reflectances); the objective is to group and minimize the different sensor responses into a single value per pixel, which can be successfully related to a phenomenon to be investigated [2].

Figure 1. Law arrangements contemplated in the classification scheme.



Category I: With Technical and/or Environmental Permits [4].

This category includes EVOA that spatially coincides with mining titles (concession contracts, exploitation licenses, recognition of private property, etc.) and environmental instrument (environmental licenses, environmental management plan, etc.).

Category II: In Transit to Legality [4].

This category refers to applications for mining legalization or formalization (Law 685 dated 2001 and Article 325 of Law 1955 dated 2019) and declared and delimited ARE, where the regulations grant exploitation prerogatives while the concession contract or mining title is being processed without the use of machinery. In this particular case, although the EVOA detected is not illegal in nature, the areas must be subject to follow-up, monitoring and oversight by the mining and environmental authority in charge of the territory, to ensure that the agreements established by the regulations regarding the use of machinery are abided (followed).

Category III: Illicit Exploitation [4].

This type of exploitation is considered when exploration, extraction or capture of minerals owned by the State or private property is carried out without the corresponding mining title in force or without the authorization of the owner of said property, or without any legal authorization authorizing the exploitation.

This category includes contract proposals, Mining Areas of Ethnic Communities with exploitation activity in their territories without

legal authorization for mining, "ARE" in process, as well as those areas where there is no law arrangement [5].

Model of Environmental Restriction for the Exercise of the Mining Activity

This section is based on the regulatory framework defined in articles 34 and 35 of the Mining Code, which define the limitations for mining activities, based on the particularities of environmental and/or cultural protection. The analysis of these conditions contributes to the design of strategies aimed at resource management, control and monitoring of mining activity in the country. According to the above, the framework of areas (1 km * 1 km grids) was classified according to the standard in Excluded Mining Areas, Restricted Mining Areas and Areas without Environmental Restrictions to carry out the mining activity. In this sense, the model allows obtaining an integral panorama of the EVOA and, at the same time, its location in respect of National Natural Parks (PNN), forest reserves, strategic ecosystems, human settlements, public works zones and sites of archaeological interest.

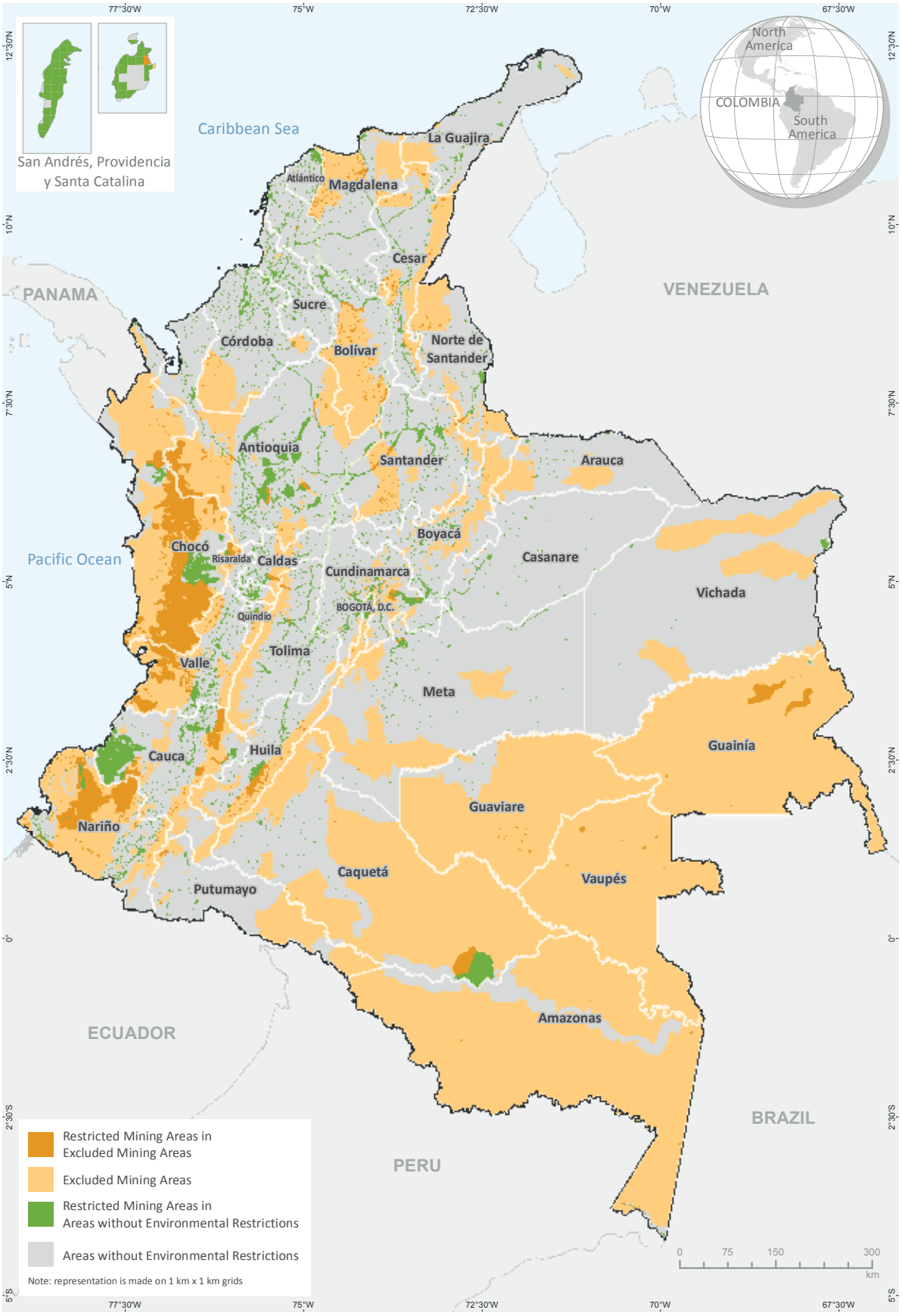
The integration of each class was done through territorial analysis and a hierarchy model for the framework of areas. Therefore, a grid has only one category, but may contain a lower order class. For example, a grid classified as PNN at the same time may belong to territories of Mining Areas of Ethnic Communities or forest reserve areas, but for the model the grid will be classified with the higher order (Figure 2). This occurs because the category is assigned by the coordinates of the center of each grid, despite the fact that more environmental, legal or jurisdictional conditions may converge in a territory of 1 km^2. Figure 2 defines the hierarchy and order of the model; as can be seen, the base classes lose territory if they are within a higher-level class. Consequently, it is recommended that the data be used with caution when initiating administrative or operational procedures, since some categories of protected areas, which are excluded from mining activities, overlap geographically and have different management characteristics before the environmental authority.

According to the data, 49% of the territory in Colombia is considered excluded from mining; in these territories there are 5% that, in addition to being excludable, have some kind of restriction. The rest is considered free of environmental restrictions, where 4% is found with restriction conditions (Table 2 and Map 1).

Table 2. Distribution in the territory of the categories of the model of environmental restrictions.

Name	Territory (km^2)	Percentage with respect of provincial total
Excluded Mining Areas include Restricted Mining Areas declared in these territories	561,062	49.17%
Areas without Environmental	530,116	46.45%
Restricted Mining Areas in Areas without Environmental Restrictions	39,968	3.50%
Areas without Areas without Environmental Restrictions already titled or with mining permits or in application for mining permits	10,028	0.88%
Total	**1,141,174**	**100%**

Map 1. Environmental restrictions on mining activities.



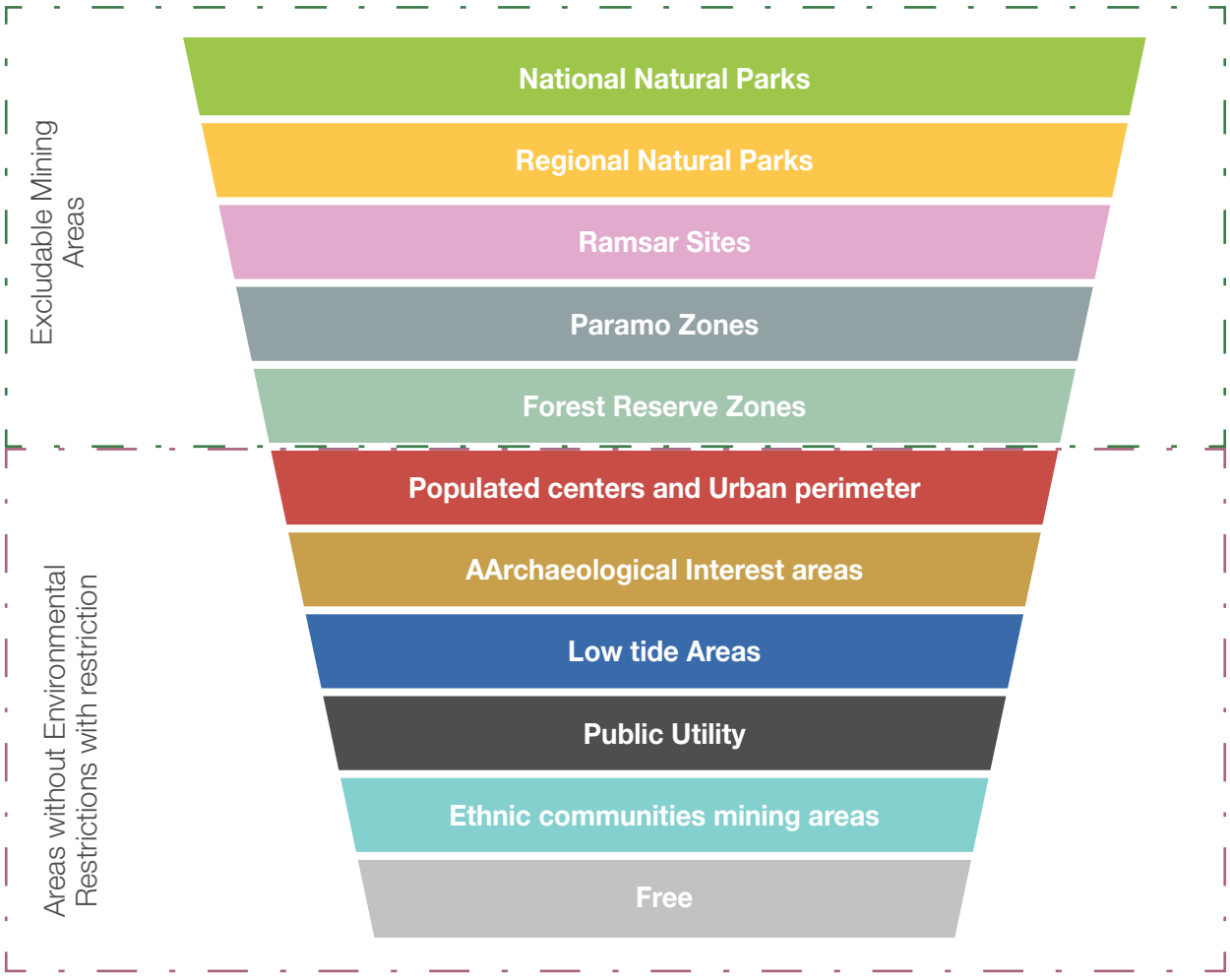
Source: Government of Colombia - Monitoring system supported by UNODC.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Excluded Mining Areas

These territories correspond to areas declared and delimited in accordance with current regulations as protection and development of renewable natural resources or the environment, areas that make up the National System of Protected Areas (SINAP)[8], the National System of National Natural Parks (SNPNN)[9], Regional Natural Parks, Forest Reserve Areas, paramo ecosystems and wetlands that are within the Ramsar Convention[10].

In the Forest Reserve Zones Law 2 dated 1959, proposals for concession contracts may be submitted and may be subject to subtraction by the Ministry of Environment and Sustainable Development (MinAmbiente) for the possible development of mining activities. In Colombia, 33% of the territory was classified as a Forest Reserve Zone (ZRF), followed by PNN zones (13%), then Ramsar sites (2%), and the remainder between paramo zones and regional parks.

Figure 2. Ranking model for integration into the UNODC grid framework.



8 The geographic coverage of SINAP corresponds to official information from the Colombian Environmental Information System (SIAC) as of October 2021.
9 The geographic coverage of PNN corresponds to official information from the Special Administrative Unit of National Natural Parks (UAESPNN) 2021.
10 These Excluded Mining Areas generate, in case of total overlap with a proposed concession contract, the rejection of the application and in case of partial overlap, the cutting of the area, in order to grant the area that does not overlap with the areas declared as Excluded Mining Areas.

This category groups the areas in which the law[11] expressly determines that mining exploration and exploitation works may not be carried out. These Excluded Mining Areas correspond to areas declared and delimited in accordance with current regulations as areas for the protection and development of renewable natural resources or the environment, areas that make up the SNPNN[12], regional natural parks, other SINAP[13] areas, protective forest reserve areas, paramo ecosystems and wetlands designated within the list of international importance of the Ramsar Convention[14].

Forest Reserve Zones

The forest reserves declared by Law 2 dated 1959 have become a reference and the main integrating element of environmental, territorial and forestry planning in Colombia. With the entry into force of this law, seven large Forest Reserve Zones were established throughout the national territory, with the purpose of encouraging the development of the forestry economy and the protection of soils, water and wildlife [6]: Cocuy, Sierra Nevada de Santa Marta, Central, Serranía de los Motilones, Río Magdalena, Pacífico and Amazonía.

In spite of being part of the Excluded Mining Areas, in the Forest Reserve Zones by Law 2 when for reasons of public utility or social interest it is necessary to develop a mining project, MinAmbiente can evaluate its pertinence, advance the administrative procedure for the subtraction of the required area and authorize that, in the mentioned zones, mining activities can be carried out under conditions that do not affect the objectives of the Excluded Mining Areas [4].

Protection and Development Zones for Renewable Natural Resources and the Environment

Through resolutions 1628 and 1814 dated 2015, MinAmbiente declared 57 Zones for the Protection and Development of Renewable Natural Resources and the Environment in sites of ecosystemic importance where conservation gaps were identified. This declaration is a strategic action within the framework of the Convention on Biological Diversity (CBD)[15] to increase the ecological representativeness of the SNPNNN; the protection measures in these zones are temporary, while the processes of declaration as protected areas are being advanced.

11 Article 34 of the Mining Code, Law 685 dated 2001.
12 The geographic coverage of PNN corresponds to official information from UAESPNN year 2017.
13 The geographic coverage of SINAP corresponds to official information from UAESPNN year 2017.
14 These Excluded Mining Areas generate, in case of total overlap with a proposed concession contract, the rejection of the request; in case of partial overlap, they cause the cutting of the area, in order to grant the area that does not overlap with the areas declared as Excluded Mining Areas.
15 Law 165 dated 1994.

Ramsar Sites

Colombia is part of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar) since January 1997, when the Congress of the Republic approved its participation; under this decision, the country is responsible for the management of wetlands in its territory, which should promote national actions and international cooperation for their conservation and wise use of their resources. Colombia currently has thirteen Ramsar sites designated as Wetlands of International Importance.

National Protected Forest Reserve Zones

In these territories, only the preservation, sustainable use, restoration, knowledge and enjoyment of forest ecosystems are allowed, even if their structure and composition has been modified. There are 57 declared National Protected Forest Reserves in the country.

National Natural Parks

The SNPNN is made up of 59 natural areas that, as a whole, represent the biological and cultural diversity of the country. These territories seek to achieve ecological self-regulation, protect natural biodiversity together with the underlying ecological structure and the environmental processes on which it rests, and promote education and recreational use through a special management regime [7].

Restricted Mining Areas

They are defined in the Colombian Mining Code[16] as those where it is possible to carry out works and works for mining exploration and exploitation, as long as certain conditions are taken into account and met. They include urban perimeter zones of cities or populated centers; areas occupied by rural constructions[17], under the consent of their owner; zones defined as of special archaeological, historical or cultural interest; beaches, low tide zones and fluvial paths served by public transportation companies; areas occupied by a public work or attached to a public service as long as they are not incompatible with the activity, as well as zones constituted as Indigenous Mining Areas, or Black Communities Mining Areas or Mixed Mining Areas.

In Colombia, approximately 6% of the territory has a restricted condition; 2.5%, in addition to having restrictions, belong to Excluded Mining Areas; the remaining is distributed as follows: 1.8% in the urban perimeter of cities or populated centers, 0.75% in Mining Areas of Ethnic Communities and 0.9% in areas occupied by a public work.

These are areas in which mining exploration and exploitation activities, although not prohibited, are limited to special regulations and requirements and, in other cases, must have the authorization or prior concept of some authorities. Table 3 shows a classification in two groups, for the subsequent analysis of results according to this category of the restriction model for mining activities, based on the classes established in the regulations.

16 Article 35, Law 685 dated 2001.
17 In the model there is no primary information on the areas occupied by rural constructions.

Table 3. Classification of Restricted Mining Areas in Colombia.

Group of analysis (UNODC/Simci)	Class (art. 35, Law 685 dated 2001)
Mining Areas of Ethnic Communities	Indigenous Mining Areas
	Black Communities Mining Areas
	Mixed Mining Areas
Other Restricted Mining Areas	Areas within the urban perimeter of cities and towns
	Areas occupied by rural constructions
	Areas defined as of archaeological, historical or cultural interest
	Beaches, low tide zones and river routes
	Areas occupied by a public work or assigned to a public service

The most significant group within this category corresponds to the Mining Areas of Ethnic Communities, since there the authorities of the respective ethnic communities (either Community Council or Indigenous Reservation) have priority over third parties to apply for Concession Contracts. However, if they are not requested within the established timeframe, by law, titles may be granted to third parties as long as there is prior consultation with the communities[18].

Areas without Environmental Restrictions

These are territories that are outside of the Excluded Mining Areas. All mining permits may be requested there. When the zones are located in ethnic territories, the community must be consulted prior to environmental licensing; in this case, the community may request the declaration of a mining area with priority over any third party for the granting of the corresponding permits; if the community does not request the declaration, the permits may be granted to a third party as long as the development of the activity is not detrimental to the cultural, social and economic values of these groups.[19] This contract may include one or several minerals. Such areas may geographically coincide with Restricted Mining Areas and if this is the case, certain conditions must be met in order to access exploration and exploitation permits.

18 Chapter XIV, Law 685 dated 2001.
19 Chapter XIV, Law 685 dated 2001.

SPECIAL MANAGEMENT TERRITORIES

Although the management model for interventions in the territory allows for an approach to the special management territories, this section focuses on their various dimensions in order to have a general overview of the dynamics of exploitation in these territories, which due to their particularities must be addressed in a differential manner. In this context, the dynamics and findings within these zones are addressed from a global perspective.

Special management territories are classified into two categories: 1) ethnic territories, based on the titling of areas by the State to ethnic groups with ancestral occupation (Afro-descendant and indigenous communities) under the figure of collective property, and 2) RUNAP protected areas that are not considered Excluded Mining Areas.

Ethnic Territories

According to national legislation, minority population groups with tradition and ancestral occupation of the territories are protected in order to preserve their cultural values. It is for this reason, and by virtue of the close relationship that these communities have with the natural resources of their environment, that they have autonomy to design and to apply a land use planning model in accordance with their specificities and their experience over the centuries to define a specific use model in the jurisdiction that was titled to them as collective property, without being outside of what is allowed by the National Political Constitution [8]. One of the special mechanisms to guarantee the protection of these communities is framed in the obligatory nature of prior consultation before any intervention by third parties in these territories [9].

Although ethnic territories are a category of special management territories for the purposes of this document, these in turn are classified into two groups: 1) Black Community Lands[20] and 2) Indigenous Reservations[21].

Black Community Lands

According to Colombian legislation, any population group with ancestry and cultural heritage from Africa, settled for several generations in wastelands in the Pacific strip and some areas of the Caribbean and the south of the country, is called a Black Community and they have received as collective property the right to these territories under the name of Lands of the Black Communities [10], where the legal framework for the administration of the authority corresponds to a Community Council made up of members of this group[22].

20 Law 70 dated 1993, "whereby transitory article 55 of the Political Constitution is developed", for the recognition of the right to collective property in the areas historically inhabited by black communities in the Pacific basin, in accordance with their tradition for production.

21 Decree 2164 dated 1995, "by which Chapter XIV of Law 160 dated 1994 is partially regulated," in relation to the endowment and titling (constitution, maintenance, restructuring and/or expansion) of lands to indigenous communities for their adequate settlement and development, as well as the clean-up of those that were occupied by third parties unrelated to the respective partiality.

22 Decree 1745 dated 1995.

There are four fundamental pillars on which the planning instruments of these territories are based (Cultural Identity, Sustainable Development, Social Welfare and Autonomy), called "Ethno-Development Plans", the reciprocity among them orients the scope of the guidelines for the use of natural resources in order to guarantee that there is no deterioration of these sources or impoverishment of the communities [11].

Indigenous Reservations

The legislation in Colombia defined the guidelines in respect of the endowment and/or titling of lands to the indigenous peoples in order to recognize the collective property and the millenary settlement of these population groups in their territories and thus improve their quality of life, guaranteeing the protection of their ancestral customs[23]. Consequently, the Indigenous Reservation is defined as a socio-political legal framework integrated by an indigenous population group of one or more ethnic groups that inhabit the same territory[24].

Indigenous peoples have Mother Earth as the central axis of their cosmovision [12], which is why there must be harmony in the coexistence between people and natural resources, and thus ensure the existence of the population and the conservation of nature. In terms of the administration and management of their territories, these communities have three instruments under the law to define the roles and scope: 1) Traditional Authorities, 2) Indigenous Councils and 3) Life Plans. By virtue of this, any activity that undermines the sacred goods framed in their idiosyncrasy is prohibited.

Protected Areas Included in the National System of Protected Areas (SINAP), Registered in the RUNAP that are not Part of the Excluded Mining Areas

SINAP was established within the framework of the Convention on Biological Diversity and it includes protected areas, social actors, and the management strategies and instruments that articulate them, which together contribute to the fulfillment of the country's conservation objectives. These areas can be of public, private or community governance, and of national, regional or local management; they are geographically defined and are declared, regulated and managed by the Environmental Authorities, who register them in the RUNAP.

Although their objective is conservation, in some categories the environmental regulations establish the possibility of exploiting protected areas, when for reasons of public utility and social interest it is planned to develop uses and activities that are not permitted in these territories [13].

23 Decree 2164 dated 1995, which partially regulates the National System of Agrarian Reform and Rural Peasant Development (Law 160 dated 1994), through the constitution, expansion, restructuring or reorganization of Indigenous Reservations (reservations).
24 Article 2.14.7.5.1. of Decree 1071 dated 2015.

FINDINGS

SECTION II

This section includes findings related to EVOA on land and water and its dynamics. The relationship of EVOA and law arrangements is presented, as well as the management model for interventions in the territory.

This chapter presents the main findings corresponding to each of the pillars of the monitoring system (detection, legality character and environmental restrictions model) for the case of EVOA on land — in the entire Colombian territory — and for the alerts due to EVOA in water for the ten rivers under study (Amazonas, Apaporis, Putumayo, Cotuhé, Caquetá, Inírida, Guainía, Yarí, Puré and Atabapo).

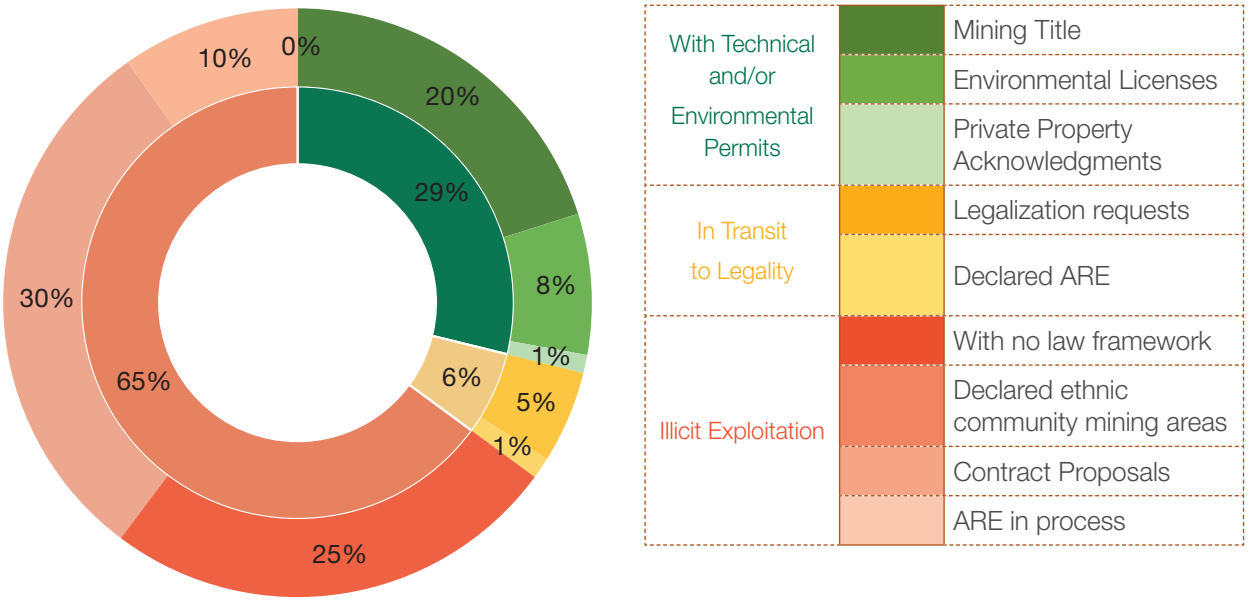
The first section addresses the findings found in the pillar of law arrangements from the three categories established in the model, which allow an approximation of the legality character of the EVOA. Subsequently, the main findings are presented, according to the model, in relation to environmental restrictions and, finally, a provincial consolidation of the presence of EVOA is presented in relation to the three pillars, with a special section focused on alerts due to EVOA with the use of machinery in water.

EVOA AND LAW ARRANGEMENTS

Although the methodology used for the detection of the EVOA (remote sensing tools) does not directly determine the legal nature of the activity, once the geographic evidence is detected, and with the integration of official geographic information through the use of spatial tools, an approximation of the legality of the EVOA can be obtained. In this sense, the findings found in this pillar offer robust and transparent information, based on technical evidence for decision making related to resource management and control of illegal exploitation of minerals. For this purpose and in order to obtain a territorial vision of the phenomenon, the spatial behavior of the EVOA and the zones under the law arrangements contemplated in the study are analyzed.

The EVOA geographically coincides with three categories that group the different law arrangements, according to their condition of legality for mining exploitation: *With Technical and/or Environmental Permits, In Transit to Legality and Illicit Exploitation*[25] (figure 3 and map 2). According to this categorization, by 2021 only a low portion of detected EVOA is within the legal framework (mining and environmental).

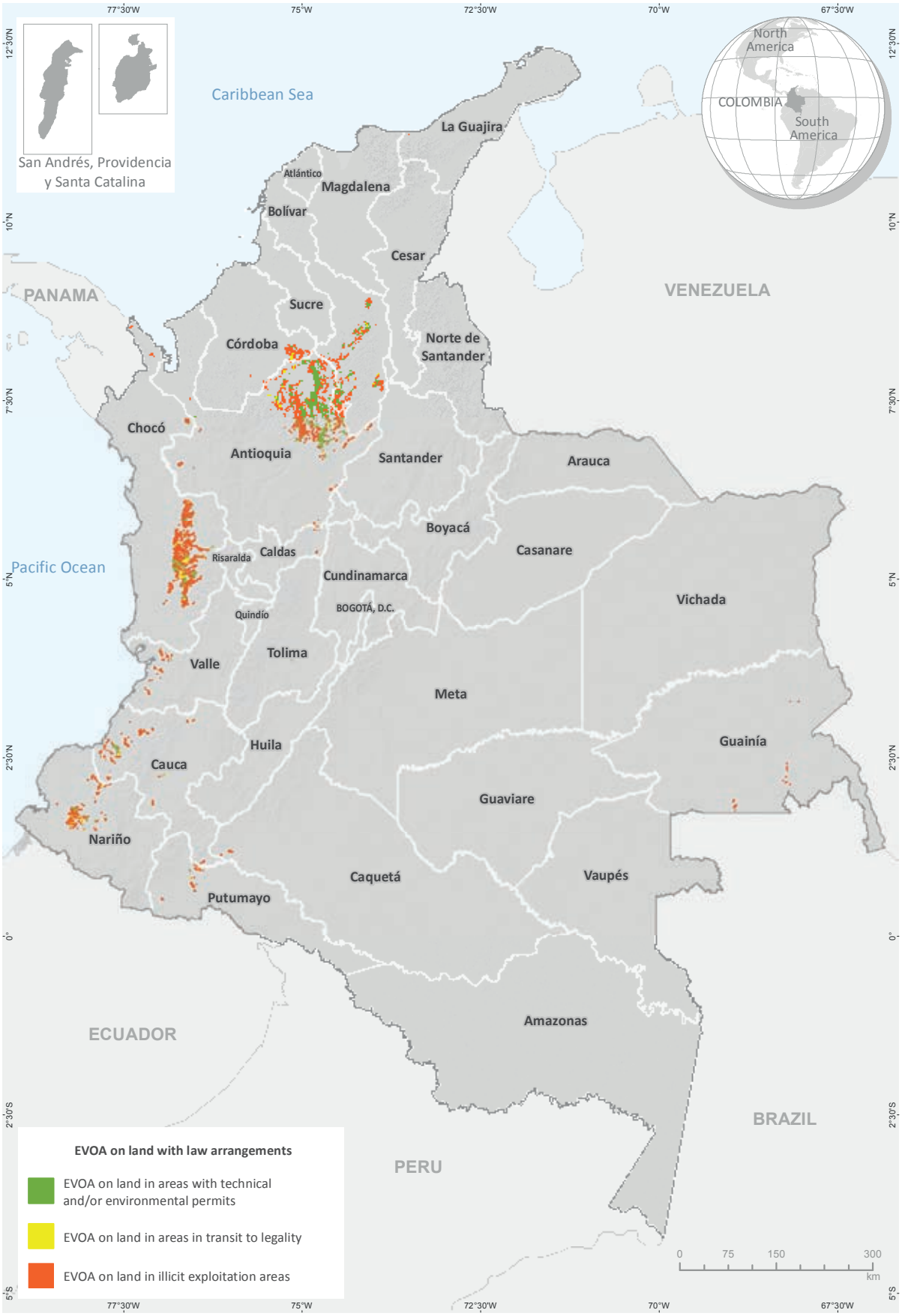
Figure 3. National percentage of EVOA on land by law arrangement, 2021.



In the national consolidated analysis for 2021, 65% (63,984 ha) of the EVOA corresponds to Illicit Exploitation, four points less than the previous year's findings, which represent approximately 5,000 ha. In this category, the evidence identified in the provinces of Chocó and Antioquia stand out, with 48% and 27% respectively of the national total for the category.

[25] The model is based on the structuring and prioritization of the information provided by the National Mining Agency (ANM) (as of October 2021) and the Secretary of Mines of Antioquia and the National Environmental Licensing Authority (ANLA) (as of October 2021); subsequently, the spatial overlapping of this information with the EVOA is performed. The data provided by the ANM does not differentiate between exploitation modalities or types of deposits, since the files represent the universe of the law arrangements for gold exploitation without differentiation by lode or alluvial.

Map 2. Provincial distribution of EVOA on land and law arrangements.



Source: Government of Colombia - Monitoring system supported by UNODC for law arrangements: Ministry of Mines and Energy. The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Twenty-nine percent (28,427 ha) of the EVOA detected has technical and/or environmental permits; Antioquia accounts for 68% in this category, followed by Chocó and Bolívar, with 16% and 11% respectively of the total for the category. Finally, the remaining 6% is In Transit to Legality (6,156 ha), concentrated mainly in Chocó and Antioquia with 60% and 21% respectively of the national total for the category.

The provinces of Córdoba, Putumayo, Valle del Cauca, Guainía, Caquetá, Caldas and La Guajira have more than 90% of their EVOA on land in the Illicit Exploitation category. On the other hand, in Tolima 92% of the detections has technical and/or environmental permits, and in Antioquia 51%. The province with more EVOA In Transit to Legality is Nariño, with 11% of its detections for the category. Figure 4 illustrates this distribution.

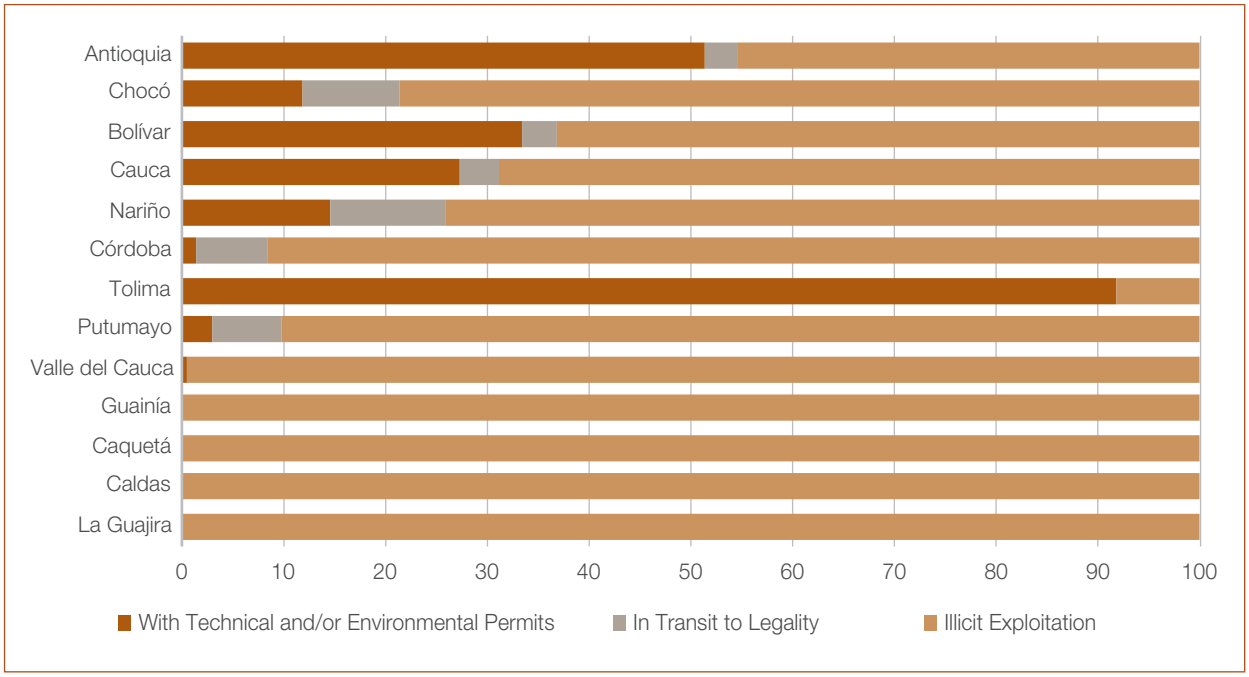
On the other hand, when disaggregating each category, it is highlighted that within Illicit Exploitation, 39% refers to EVOA in territories without any law arrangement and 46% is concentrated in Mining areas of declared ethnic communities. As for the category In Transit to Legality, 81% refer to detections in territories with legalization requests and 19% in traditional community areas.

Finally, of the EVOA identified in territories With Technical and/or Environmental permits, 70% is in the category of title protection and 27% with environmental licenses, the latter all located in the province of Antioquia (map 3).

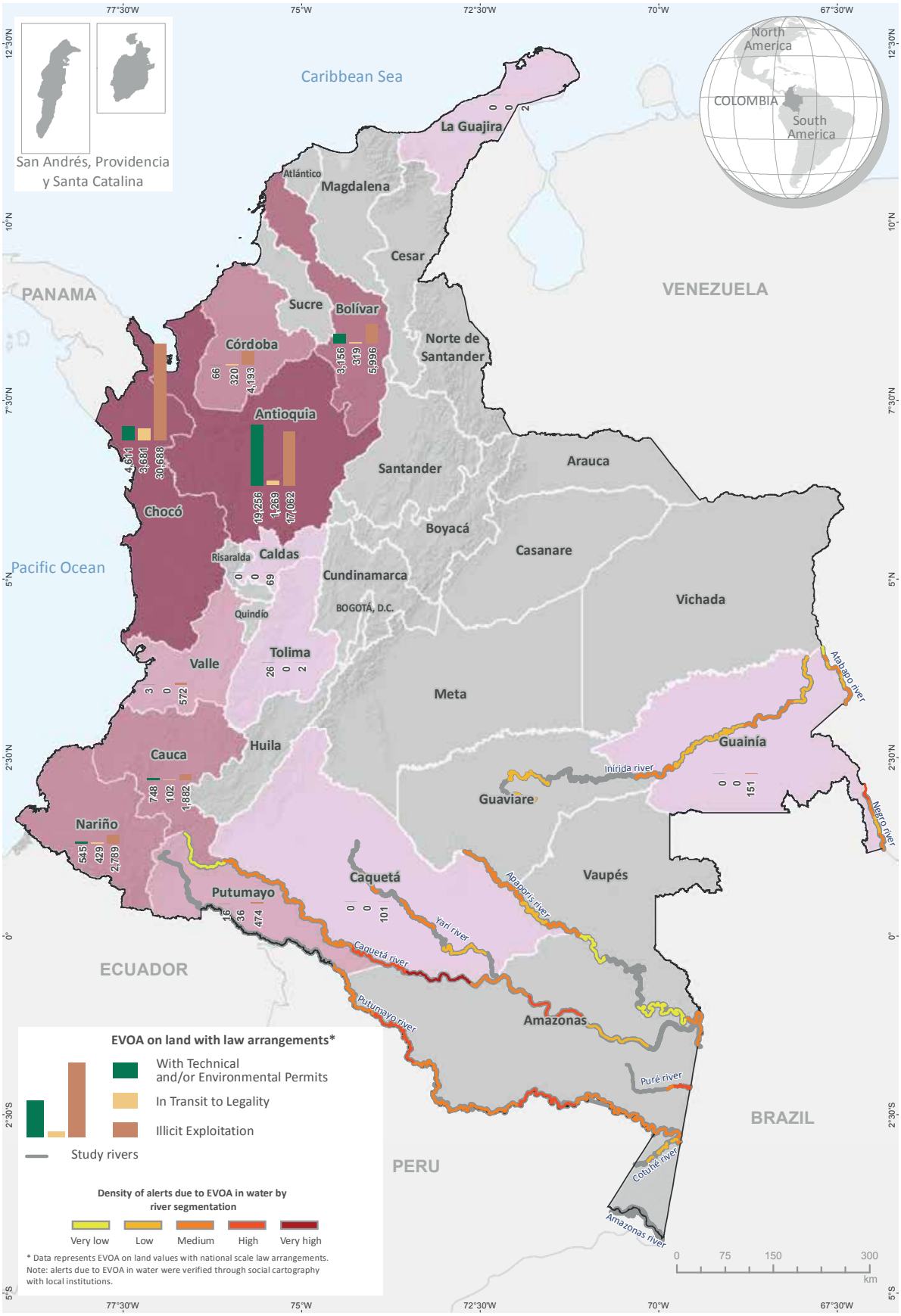
Additionally, it is important to mention that the alerts identified in the study rivers located in the Amazon and Orinoco regions are in the category of Illicit Exploitation.

59% of EVOA detected (37,733 ha) under the category of Illicit Exploitation is located in Excluded Mining Areas, that is, in areas that are environmentally protected by the Colombian law.

Figure 4. Percentage of EVOA in provincial land by law arrangement category, 2021.



Map 3. Distribution of EVOA in categories of law arrangements.



Source: Government of Colombia - Monitoring system supported by UNODC for law arrangements: Ministry of Mines and Energy.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

ENVIRONMENTAL RESTRICTION AREAS FOR MINING ACTIVITY

This section contains data on EVOA on land findings and alerts due to EVOA in water according to the environmental restriction model. The data are initially presented for EVOA and Excluded Mining Areas and, subsequently, for the analysis of the phenomenon in Areas without Environmental Restrictions. In both cases, there is a section on the behavior of the EVOA in Restricted Mining Areas, due to the fact that it is a special category that overlaps with one of the two mentioned above.

In general terms, the EVOA on land is distributed in two practically equal percentage parts in the two main categories of the model: 49,469 ha (50% of the national total) were detected in Excluded Mining Areas and 49,098 ha (50%) in Areas without Environmental Restrictions. In respect of Restricted Mining Areas, the total in this category is equivalent to 33,706 ha, of which 75% (25,341 ha) coincide with Excluded Mining Areas (51% of the EVOA on land in Excluded Mining Areas is also in Restricted Mining Areas) and the other 25% (8,365 ha) is in Areas without Environmental Restrictions (17% of the EVOA on land in Areas without Environmental Restrictions intersects with Restricted Mining Areas).

Regarding the alerts due to EVOA in water, of the total number of cores identified (146), 88% of them (128) are located in Excluded Mining Areas and the remaining 12% (18) are in Areas without Environmental Restrictions. As for the Restricted Mining Areas, only 7% of the cores (10) have spatial coincidence with this category; 6 intersect with Excluded Mining Areas (60% in this group) and the other 4 (40% of this group) with Areas without Environmental Restrictions.

Excluded Mining Areas

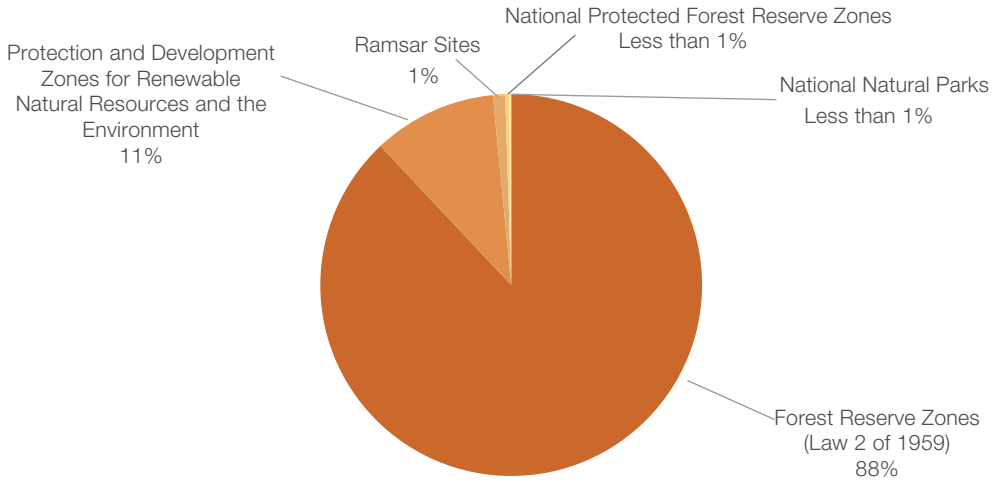
Excluded Mining Areas correspond to geographic spaces destined for the conservation and protection of the country's environmental heritage, in which mining activity is not permitted. Despite this prohibition, in 2021, 49,469 ha of EVOA were detected on land in these zones; this figure corresponds to 50% of the total identified for this period. Likewise, alerts due to EVOA in water were identified in water in rivers that are part of these protected areas.

The category with the greatest presence of EVOA on land corresponds to the Forest Reserve Zones declared by Law 2 dated 1959, where a total of 48,760 ha were identified; however, it should be noted that other protected areas coexist in the geographic space delimited for this particular category: 5,720 ha coincide with Protection and Development Zones for Renewable Natural Resources and the Environment; 134 ha belong to National Protection Reserve Zones, 90 ha correspond to National Natural Parks (PNN) and the remaining 42,817 ha are exclusively part of Forest Reserve Zones.

On the other hand, in territories that do not geographically coincide with Forest Reserve Zones by Law 2 dated 1959, 572 ha of EVOA on land were detected in Ramsar sites[26], 84 ha in Renewable Natural Resources and Environmental Protection and Development Zones and, finally, 52 ha in National Protected Forest Reserve Zones. Figure 5 shows the distribution by management category.

26 The geographic coverage of Ramsar sites corresponds to official information from the Ministry of Environment and Sustainable Development (MinAmbiente) year 2018.

Figure 5. EVOA on land in Excluded Mining Areas by management category, 2021.



Likewise, alerts due to EVOA in water were detected in the Putumayo, Caquetá, Cotuhé, Atabapo, Yarí, Negro, Puré and Inírida rivers in Forest Reserve Zones, Ramsar sites and PNN, which were validated in regional workshops. It is worth mentioning that in the Apaporis River, alterations indicating possible activity were identified; however, it was not possible to verify these alerts in the workshops with institutions.

Table 4 summarizes the participation of EVOA on land in the different categories of the Excluded Mining Areas by 2021.

Table 4. EVOA on Land in Excluded Mining Areas, 2021.

Excluded Mining Areas			EVOA on land (ha)	
Forest Reserve Zones (Law 2)*	Amazonia	National Natural Parks	Puinawai RNN	84
		Without overlapping		71
	Magdalena	Protection and Development Zones for Renewable Natural Resources and the Environment	Serranía de San Lucas	5,720
		Without overlapping		8,437
	Pacific	National Protected Forest Reserve Zones	Río Anchicayá	131
			Río Escalarete y San Cipriano	3
		National Natural Parks	Los Farallones de Cali	6
		Without overlapping		34,308
Protection and Development Zones for Renewable Natural Resources and the Environment**			Serranía de San Lucas	24
			Bosques Secos del Patía	60
National Protected Forest Reserve Zones			Darién	52
Ramsar Sites			Complejo Cenagoso de Ayapel	573
TOTAL				**49,469**

* Other protected areas coexist in the geographic space delimited for Forest Reserve Zones by Law 2nd dated 1959.

** 5,720 ha detected in these protected areas coincide with territories of Forest Reserve Zones by Law 2nd dated 1959.

Forty-nine percent (48,761 ha) of the country's total EVOA on land identified in 2021 was located in Forest Reserve Zones by Law 2 dated 1959, a percentage that remains stable with respect to the previous year [5]. Seventy-one percent of the area reported in this category was located in the Pacific Forest Reserve, within the so-called "Biogeographic Chocó"; 28% was identified in the Magdalena Forest Reserve, and the remaining 1% of the EVOA on land in these Excluded Mining Areas was detected in the Amazon Forest Reserve.

Additionally, during the analysis period, alerts due to EVOA in water were validated in eight of the ten rivers under study: Atabapo, Caquetá, Cotuhé, Yarí, Inírida, Putumayo, Puré and Negro, all in the Amazon Forest Reserve.

On the other hand, 5,804 ha of EVOA on land were identified in Zones for the Protection and Development of Renewable Natural Resources and the Environment, representing 6% of the national total; 99% of EVOA on land detected in this category is located in the Serranía de San Lucas (5,744 ha), in the province of Bolívar. In the Ramsar wetlands, 573 ha of EVOA on land were reported, 0.6% of the national total, specifically in the Complejo Cenagoso de Ayapel[27]. Likewise, alerts due to EVOA in water were identified in the Estrella Fluvial Inírida Wetland Complex (EFI)[28] along the Atabapo River.

In National Protected Forest Reserve territories, 186 ha were detected, with a participation of 0.2% of the national total for this period. 72% of the EVOA on land within these areas is found in two reserves located in the jurisdiction of Buenaventura, Valle del Cauca:

Thirty-five percent of the area of national EVOA on land is located in the Pacific Forest Reserve, a territory recognized for harboring some of the most biodiverse forests on the planet, both in terms of variety and endemism of species [2].

Reserva Forestal Protectora Nacional (RFPN) Río Anchicayá and Reserva Forestal Protectora Nacional Río Escalarete & San Cipriano, while the remaining 28% is in the municipality of Acandí, Chocó (Reserva Forestal Protectora Nacional Darién).

Finally, 90 ha of EVOA on land were identified in PNN territories, representing 0.09% of the total national area; it should be noted that these protected territories are part of the category of Forest Reserve Zones under Law 2 dated 1959. The Puinawai National Natural Reserve has the highest presence of EVOA on land with 84 ha; this protected area represents 93% of the total detected in the SNPNNN. On the other hand, in Los Farallones de Cali National Natural Park, 6 ha were recorded, which shows a decrease of 9 ha in respect of 2020 [5].

One of the most important categories in the Excluded Mining Areas are the PNNN, due to their connotation of protection and biological conservation. When analyzing the proximity of the EVOA on land to the PNN, it is evident the pressure being exerted by the advancing fronts of the phenomenon on these territories. The results reveal that four additional parks — i.e., Paramillo, Munchique, Serranía de los Churumbelos and Sierra Nevada de Santa Marta — are at risk for presenting EVOA on

27 Declared as a Ramsar site by Decree 356 dated 2018 (February 2nd).
28 Declared as Ramsar site by Decree 1275 dated 2014 (July 8th).

land less than 10 km away; to these are added Alto Fragua Indi-Wasi, Los Katíos, Acandí Playón, Plantas Medicinales Orito Ingi-Ande, Tatamá and Las Orquídeas parks by reporting presence of the phenomenon in the 10 to 20 km band (Table 5 and Map 4). With respect to the previous year, there was an increase of 28% and 14% in the EVOA on land in areas of influence of the Alto Fragua Indi-Wasi and Serranía de los Churumbelos National Parks, respectively [5].

Table 5. EVOA on land detected in PNN, 2021.

National Natural Park	EVOA on land within PNN (ha)	EVOA on land up to 10 km from PNN (ha)	EVOA on land up to 20 km from PNN (ha)
Puinawai RNN	84	84	84
Los Farallones de Cali	6	216	293
Paramillo	0	47	756
Munchique	0	65	481
Serranía de los Churumbelos	0	89	376
Alto Fragua Indi-Wasi	0	0	114
Los Katíos	0	0	62
Acandí Playón	0	0	52
Medicinal Plants Orito Ingi-Ande	0	0	26
Tatamá	0	0	10
Las Orquídeas	0	0	7
Sierra Nevada de Santa Marta	0	2	2
Total	**90**	**503**	**2,263**

Map 4. Excluded Mining Areas with presence of EVOA on land and alerts due to EVOA in water, 2021.

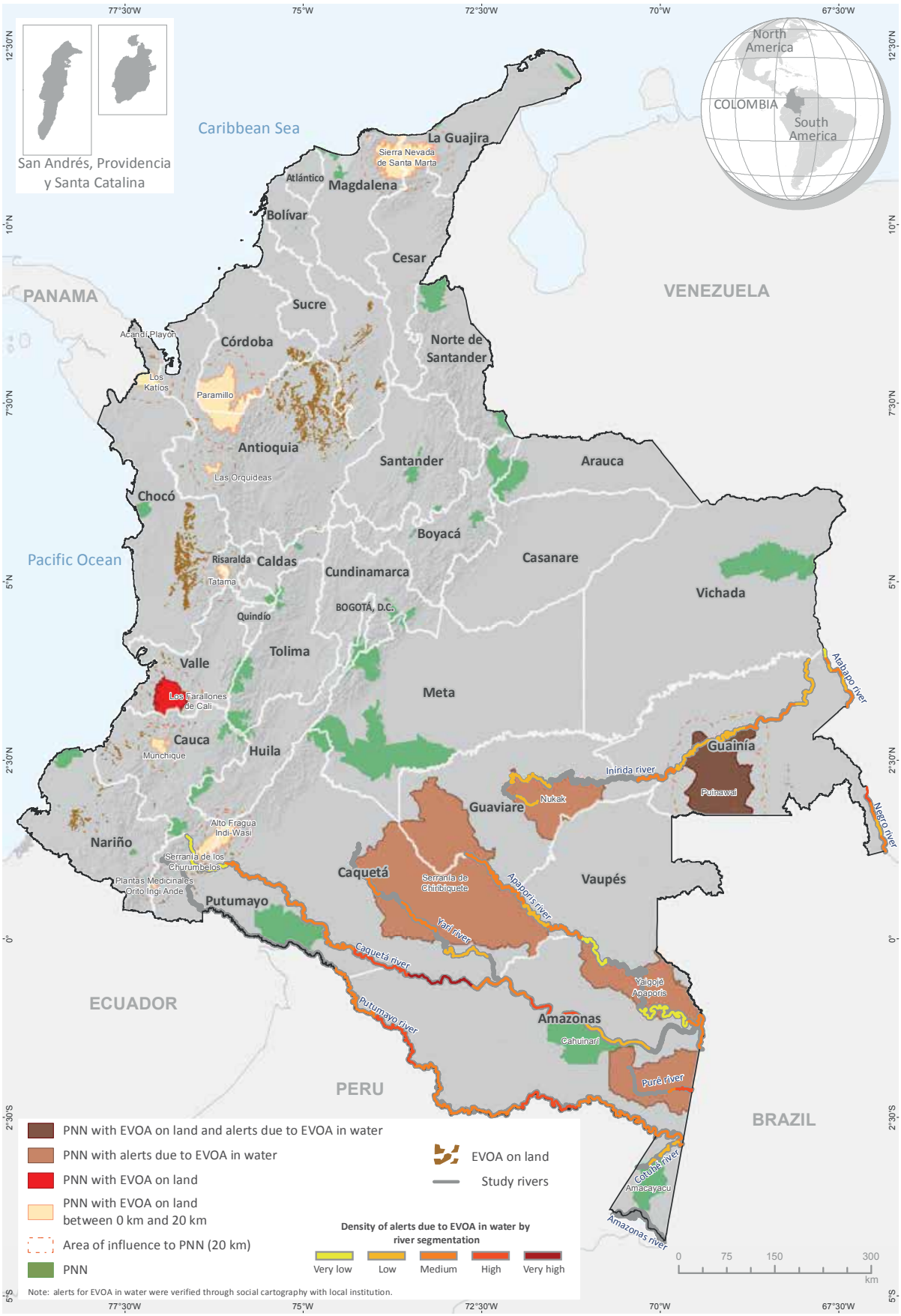
Source: Government of Colombia - Monitoring system supported by UNODC for PNN: National Natural Parks, 2021. For Forest Reserve Zones and RAMSAR Sites Ministry of the Environment and Sustainable Development 2017.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

In 2021, alerts due to EVOA in water were validated in five PNN: i.e., in Serranía de Chiribiquete in the Yarí River, Puré River in the riverbed of the same name, Cahuinarí in the Caquetá River, Amacayacu in the Cotuhé River and Puinawai in the Inírida River (Map 5).

The highest concentration of verified alerts due to EVOA in water in 2021 is in the Puré River National Natural Park, near the municipality of Tarapacá, province of Amazonas. Due to its location in a border zone with Brazil, this protected area is fundamental for the consolidation of regional conservation strategies that guarantee the connectivity of Amazonian ecosystems.

On the other hand, in respect of the 2020 findings [5], new alerts due to EVOA in water were found in the Puinawai National Nature Reserve along the Inírida River, in the municipality of Inírida, Guainía. This protected area is also affected by EVOA on land, a situation that makes it especially vulnerable to environmental damage caused by this activity.

Map 5. National Natural Parks System and EVOA, 2021.



Source: for EVOA: Government of Colombia - Monitoring system supported by UNODC for PNN: National Natural Parks, 2021. The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

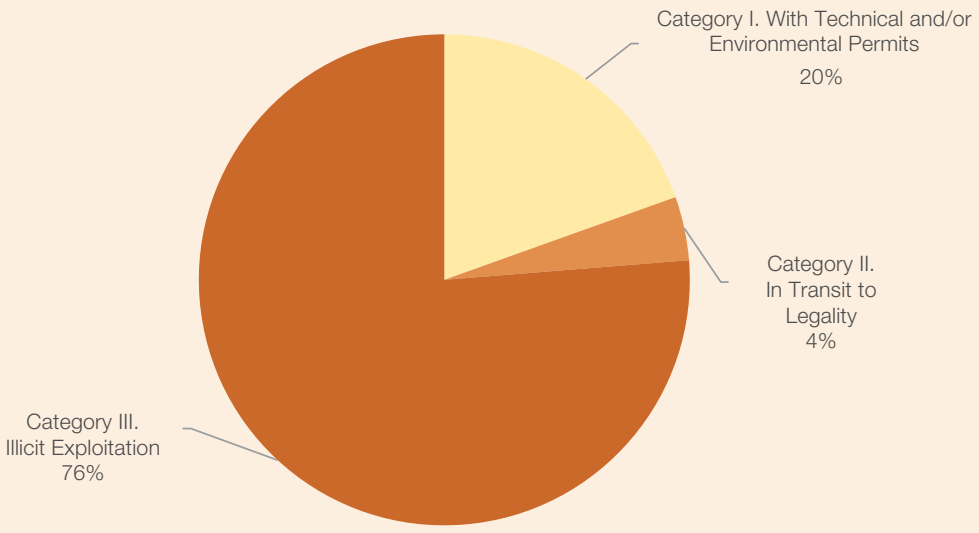
Excluded Mining Areas and Law Arrangements

The largest share of EVOA identified in the Excluded Mining Areas corresponds to Illicit Exploitation and reaches 76% of the total in this category (37,733 ha). These are territories where this activity is carried out without the corresponding Mining Title in force. It should be noted that in this category, 24,387 ha of EVOA were identified on land in Mining Areas of Ethnic Communities; in these territories the community has priority over third parties to obtain a mining title. Also, It worthwhile noting that in this category 24,387 ha of EVOA were identified on land in Mining Areas of Ethnic Communities; in these territories the community has priority over third parties to obtain a mining title.

On the other hand, 20% (9,664 ha) of the EVOA in these zones coincides with specific areas of the national territory that have a mining title granted by the mining authority and registered in the National Mining Registry, which in turn have the environmental instrument duly granted by the environmental authority with competence. However, with the information available for this study, it is not possible to establish what percentage of these titles are currently in the process of being subtracted from the reserve.

The remaining 4% (2,072 ha) of the EVOA on land corresponds to territories over which processes of legalization of the activity are underway under the provisions of laws 685 dated 2001 and 1955 dated 2019, as well as processes advanced by traditional mining communities to constitute declared Special Reserve Areas (Figure 6).

Figure 6. EVOA on land in Excluded Mining Areas and law arrangements, 2021.

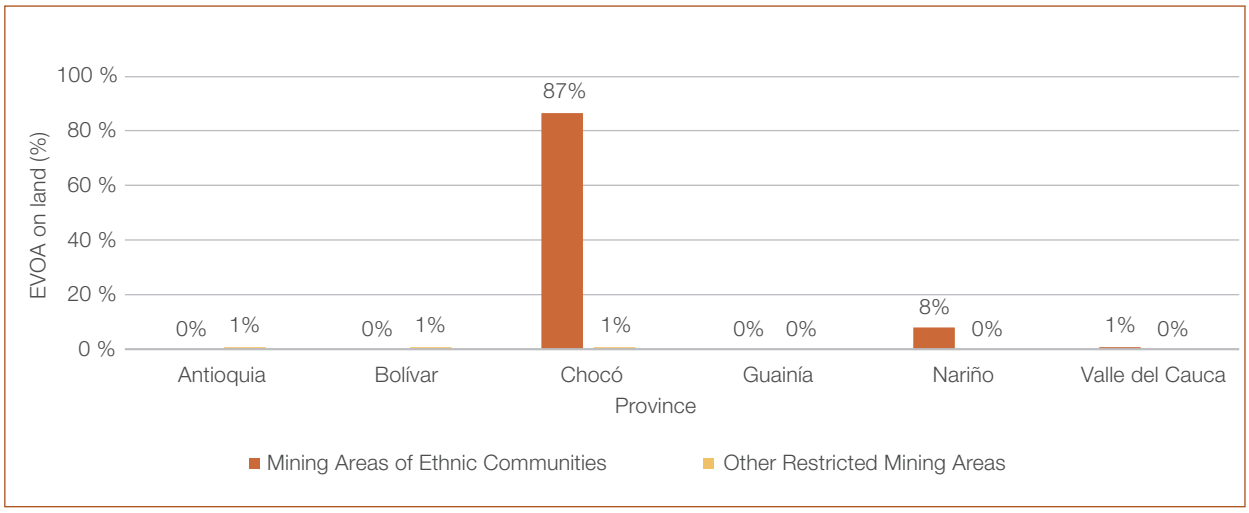


Restricted Mining Areas in Excluded Mining Areas

Of the 33,706 ha of EVOA on land detected in Restricted Mining Areas, 75% also coincide with Excluded Mining Areas (25,341 ha); this in turn represents 51% of the figure corresponding to Excluded Mining Areas and 26% of the total detection in the country. Of the total of the phenomenon found in these two categories, more than 99% (25,339 ha) is due to intersection with three Forest Reserve Zones of Law 2 dated 1959 (ZRF Amazonía, ZRF Pacífico and ZRF Río Magdalena), less than 1% (approximately 2 ha) has spatial coincidence with the PNN Los Farallones de Cali.

Ninety-six percent of the EVOA on land in Restricted Mining Areas within Excluded Mining Areas (24,387 ha) corresponds to Mining Areas of Ethnic Communities and the remaining 4% (954 ha) to Other Restricted Mining Areas. In terms of provincial distribution, Chocó concentrates 88% of the detection for this concept (22,278 ha) and Nariño presents 8% (2,137 ha); Antioquia, Bolívar, Guainía and Valle del Cauca group the remaining 4% with 926 ha (Figure 7).

Figure 7. Provincial distribution of EVOA on land according to groups of Restricted Mining Areas within Excluded Mining Areas.



Six core areas were also detected in water in areas coinciding with Restricted Mining Areas within Excluded Mining Areas (three in Mining Areas of Ethnic Communities and three in other Restricted Mining Areas), on the Atabapo, Inírida, Negro and Yarí rivers.

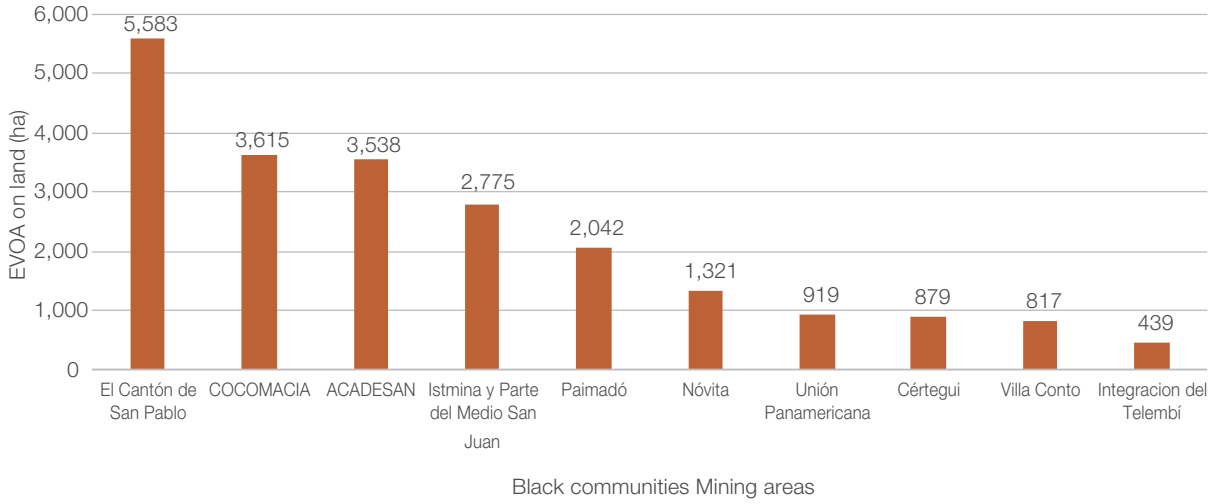
Mining Areas of Ethnic Communities in Excluded Mining Areas

Mining Areas of Ethnic Communities account for 96% of the EVOA on land detected in Restricted Mining Areas within Excluded Mining Areas, with 24,387 ha. Looking deeper into this

group, 24,238 ha (99%) correspond to Black Communities Mining Areas, 34 ha are located in Indigenous Mining Areas (less than 1%), while 116 ha (less than 1%) are considered Mixed Mining Areas[29]. Provincial analysis within this group indicates that Chocó (21,956 ha) represents 90% and Nariño (2,106 ha) 9%; Antioquia, Guainía and Valle del Cauca (325 ha) are equivalent to 1%.

In relation to the detection of EVOA on land in Black Communities Mining Areas within Excluded Mining Areas, there is evidence of the presence of the phenomenon in 30 mining areas located in the jurisdiction of 30 Community Councils; however, the top 10 of this group in terms of area detected concentrate 90%, equivalent to 21,917 ha (Figure 8).

Figure 8. Black Communities Mining Areas with the highest detection of EVOA on land in Excluded Mining Areas.



In respect of EVOA on land in Indigenous Mining Areas within Excluded Mining Areas, there are 34 ha that have a low representativeness within the group figure (less than 1%), located in the Indigenous Mining Areas of the reservations: Río Negua (19 ha), Chorrobocón (14 ha) and Chonara Huena (1 ha), in the Amazon ZRF.

As for the alerts due to EVOA in water, only 3 of the 146 reported nuclei have spatial coincidence with Restricted Mining Areas in Excluded Mining Areas (all in the Amazonian ZRFs): 2 in limits of the Indigenous Mining Area of the Monochoa Indigenous Reservation[30] on the Yarí River, and one more on the Inírida River in jurisdiction of the Remanso-Chorrobocón Indigenous Mining Area.

29 The spatial analysis by centroids of 1 km x 1 km grids does not attribute this EVOA on land to the jurisdiction of any ethnic territory (Indigenous Reservation or Community Council), so they are considered Mixed Mining Areas.

30 This Indigenous Mining Area also has an area that does not intersect with Excluded Mining Areas and has EVOA alerts in water on the Caquetá River.

Other Restricted Mining Areas in Excluded Mining Areas

The Other Restricted Mining Areas contain 4% of the EVOA detection on land in areas coinciding between Restricted Mining Areas and Excluded Mining Areas (954 ha). Within this group, 77% (733 ha) refers to the class "Areas within the urban perimeter of cities and towns" and the remaining 23% (221 ha) corresponds to "Areas occupied by a public work or attached to a public service"; the other three classes contemplated in the regulations within this group[31] did not present EVOA on land in areas with spatial coincidence with Excluded Mining Areas.

Sixty-three percent of the phenomenon in Other Restricted Mining Areas within the Excluded Mining Areas (598 ha) is located in the Magdalena River ZRF, which means that all the EVOA on land in Restricted Mining Areas within this ZRF corresponds to the category of Other Restricted Mining Areas. In provincial terms, Antioquia (34%), Chocó (34%) and Bolívar (28%) concentrate the detection in this group.

Regarding the alerts due to EVOA in water, only 1 of the 146 detected nuclei has in common the spatial coincidence between "Zones within the urban perimeter of cities and towns" and the Amazon ZRF; 2 on the Atabapo river in front of the head of the non-municipal area of Cacahual (Guainía) and the populated center of San Juan in this same jurisdiction, and another one on the Negro river in front of the head of the non-municipalized area of San Felipe (Guainía).

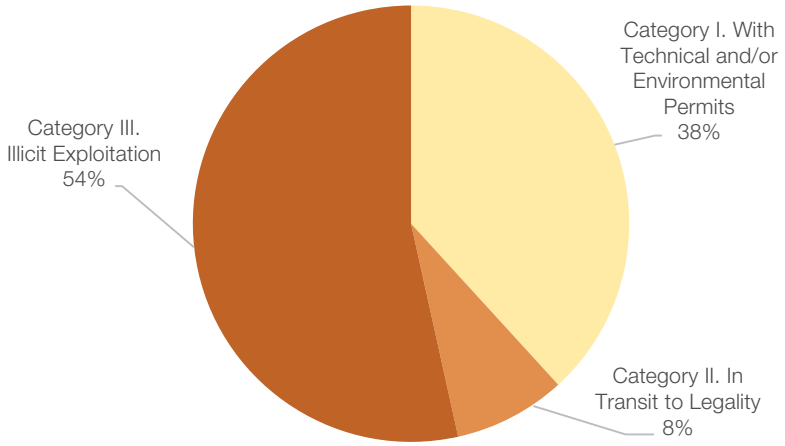
Areas without Environmental Restrictions

By 2021, 50% of the total area of EVOA on land (49,098 ha) is located in Areas without Environmental Restrictions for mining, mainly in the provinces of Antioquia and Chocó (Figure 9). Fifty-four percent (26,251 ha) of the EVOA identified in these Areas without Environmental Restrictions is considered Illicit Exploitation, given that the activity is carried out without the corresponding Mining Title.

On the other hand, 38% (18,763 ha) of the EVOA in these zones coincides with areas that have been titled, i.e., they have the technical and/or environmental permits. The remaining 8% (4,084 ha) of the EVOA corresponds to territories over which processes of legalization of the activity are being advanced under the regulatory frameworks of Law 685 dated 2001 and Law 1955 dated 2019.

31 Article 35, Law 685 dated 2001.

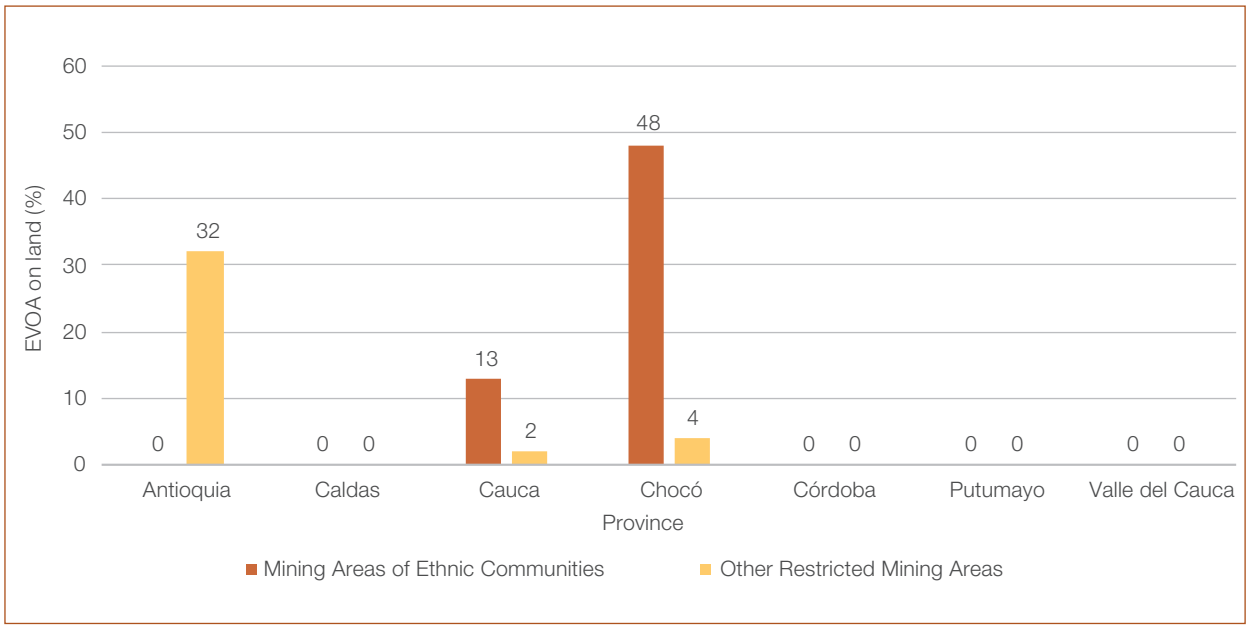
Figure 9. EVOA on land in Areas without Environmental Restrictions for mining and law arrangements, 2021.



Restricted Mining Areas in Areas without Environmental Restrictions

Of the total of EVOA on land detected in Restricted Mining Areas (33,706 ha), 25% intersect with Areas without Environmental Restrictions (8,365 ha); this represents 8% of the total national detection and, in turn, means that 17% of the phenomenon in Areas without Environmental Restrictions spatially coincides with Restricted Mining Areas. Of these 8,365 ha, 62% (5,161 ha) are concentrated in Mining Areas of Ethnic Communities and the remaining 38% (3,204 ha) in other Restricted Mining Areas. In this group, Chocó registers the highest detection of EVOA on land with 52% of the participation (4,350 ha), followed by Antioquia with 32% (2,179 ha) and Cauca with 15% (1,256 ha); Caldas, Córdoba, Putumayo and Valle del Cauca report less than 1% in each case for this concept (Figure 10).

Figure 10. Provincial distribution of EVOA on land according to groups of Restricted Mining Areas in Areas without Environmental Restrictions.



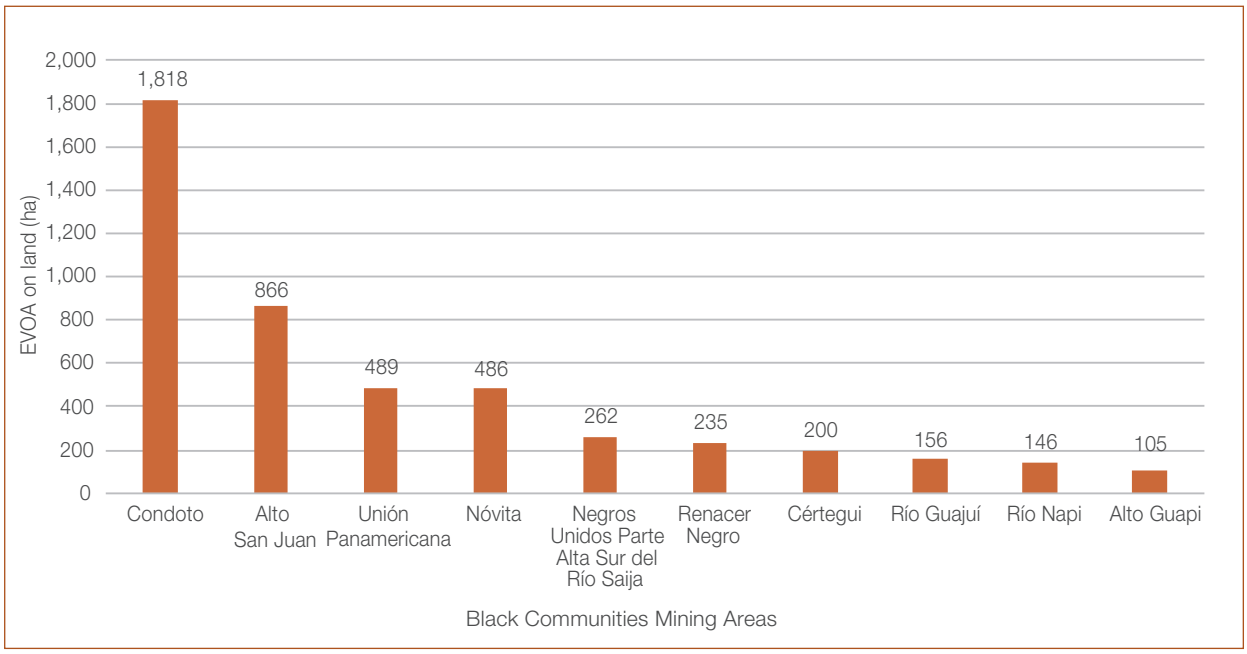
In relation to the alerts due to EVOA in water detected that converge in Restricted Mining Areas inside Areas without Environmental Restrictions, there are four nuclei detected on the Caquetá River (1 in Mining Areas of Ethnic Communities and 33 in Other Restricted Mining Areas).

Mining Areas of Ethnic Communities in Areas without Environmental Restrictions

In Areas without Environmental Restrictions, the Mining Areas of Ethnic Communities group 62% of the EVOA on land within all Restricted Mining Areas, with a detection of 5,161 ha. Within this group, 99% of the phenomenon is concentrated in Black Communities Mining Areas (5,111 ha), only 20 ha (less than 1%) correspond to Indigenous Mining Areas and another 30 ha (less than 1%) are considered Mixed Mining Areas. In provincial terms, Chocó accounts for 78% of the total (4,029 ha), followed by Cauca with 15% (1,100 ha), while Antioquia and Putumayo make up the remaining 1% (32 ha).

Regarding the phenomenon in Black Communities Mining Areas outside of Excluded Mining Areas, its presence is reported in 23 mining areas in the jurisdiction of 21 different Community Councils; the 10 with the highest detection of EVOA on land concentrate 93% of this concept in this group, equivalent to 4,763 ha (Figure 11). Regarding Indigenous Mining Areas, the 20 ha reported in this group are located in the Indigenous Mining Area of the Yaberaradó Indigenous Reservation.

Figure 11. Black Communities Mining Areas with higher detection of EVOA on land in Areas without Environmental Restrictions.



Of the ten rivers studied for alerts due to EVOA in water, all in the Amazon region, one of them has a nucleus in which Mining Areas of Ethnic Communities and Areas without Environmental Restrictions coincide: on the Caquetá River in the limits of the Indigenous Mining Area of the Monochoa Indigenous Reservation[32].

32 This Indigenous Mining Area also has alerts due to EVOA in water, on the Yarí River, in an area that is located within Excluded Mining Areas.

Other Restricted Mining Areas in Areas without Environmental Restrictions

Thirty-eight percent of the EVOA on land in Restricted Mining Areas outside Excluded Mining Areas is located in Other Restricted Mining Areas, with 3,204 ha 71% of this group (2,272 ha) corresponds to "Areas within the urban perimeter of cities and towns" and the other 29% (932 ha) refers to "Areas occupied by a public work or assigned to a public service". There is no detection in the other three classes contemplated for this group[33] that coincides with Areas without Environmental Restrictions.

The highest concentration of this phenomenon is found in Antioquia with 2,687 ha, equivalent to 84%, followed by Chocó with 321 ha (10%) and Cauca with 156 ha (5%); the remaining area (40 ha) is distributed among Caldas, Córdoba and Putumayo, with shares close to or less than 1% in each case within this group.

In terms of EVOA in water, three alert nuclei indicating this type of exploitation were found in Other Restricted Mining Areas within Excluded Mining Areas, located on the Caquetá River, in front of the Mononguete Inspection (Solano, Caquetá), Palizadas town center (Curillo, Caquetá) and José María town center (Puerto Guzmán, Putumayo), which indicates that they are located in an area under the denomination of "Zones within the urban perimeter of cities and towns".

33 Article 35, Law 685 dated 2001.

EVOA AND SPECIAL MANAGEMENT TERRITORIES

This section presents the results of the detection of EVOA on land and alerts due to EVOA in water according to the territories that, due to their own specificities, require a differentiated approach for the analysis of the phenomenon, because they enjoy special protection in the regulations that go beyond the mining area. In this sense, the EVOA is analyzed according to the classification of these areas, independent of the environmental restriction model for mining activity, according to two categories and their respective subcategories: 1) Ethnic territories (Black Community Lands and Indigenous Reservations), and 2) Protected areas included in the National System of Protected Areas (SINAP), included in the National Registry of Protected Areas (RUNAP), which are not part of the Excluded Mining Areas.

Fifty percent of the national detection of EVOA on land (49,351 ha) is located in special management territories; this means an approximate increase of 4% in respect of the area detected in 2020 for this concept. Of this figure, 89% (43,938 ha) corresponds to the presence of the phenomenon in ethnic territories (Black Community Lands and Indigenous Reservations); the remaining 11% (5,413 ha) refers to protected areas included in the SINAP, included in the RUNAP, which are not part of the Excluded Mining Areas.

In respect of EVOA in water, there is coincidence between the dense sections of alerts identified in the rivers and the category of ethnic territories only, in particular with Indigenous Reservations, from which we have that 21 of these special management territories present the phenomenon under this modality of exploitation. Of the ten rivers studied, eight present this condition; only the Puré and Amazonas rivers do not have dense stretches of alerts due to EVOA in water coinciding with special management territories (in the former there are alerts outside these areas and in the latter no alerts were detected).

In 2020, the presence of EVOA on land in special management territories represented 47% of the total national detection (41% in ethnic territories and 6% in RUNAP Areas); the increase in this proportion in 2021 is due to the increase in the degree of participation of the phenomenon in ethnic territories compared to the total figure (45%), since in RUNAP Areas there was 5%.

Ethnic Territories

The EVOA on land registers 45% of its national total in ethnic territories (43,938 ha), which means an increase of approximately 6% compared to the data reported in 2020 for these areas. Almost the entire phenomenon is concentrated in the Black Community Lands (99%), while the remaining 1% of this category of special management territories is located in the Indigenous Reservations. The area detected for this concept is located in six provinces, of which Chocó concentrates the great majority (Table 6).

Table 6. Provincial distribution of EVOA on land in ethnic territories, 2021.

Province	Black Community Lands (ha)	Indigenous Reservations (ha)	Total ethnic territories (ha)	Participation (%)
Antioquia	250	145	395	1
Cauca	2,403	3	2,407	5
Chocó	36,697	261	36,957	84
Guainía	-	151	151	< 1
Nariño	3,415	44	3,459	8
Valle del Cauca	561	9	570	1
Total	**43,325**	**613**	**43,938**	**100**

The dense stretches of alerts due to EVOA in water where there is coincidence with ethnic territories are located only in the category of Indigenous Reservations; 21 of these territories present the phenomenon under this type of exploitation, which are inhabited mainly by people of the Puinave, Witoto, Curripako and Yucuna ethnic groups. The Caquetá River is the one with the highest number of Indigenous Reservations that coincide with alerts due to EVOA in water, with five in total, and the Predio Putumayo reserve has the highest density of alerts for this concept.

Black Community Lands

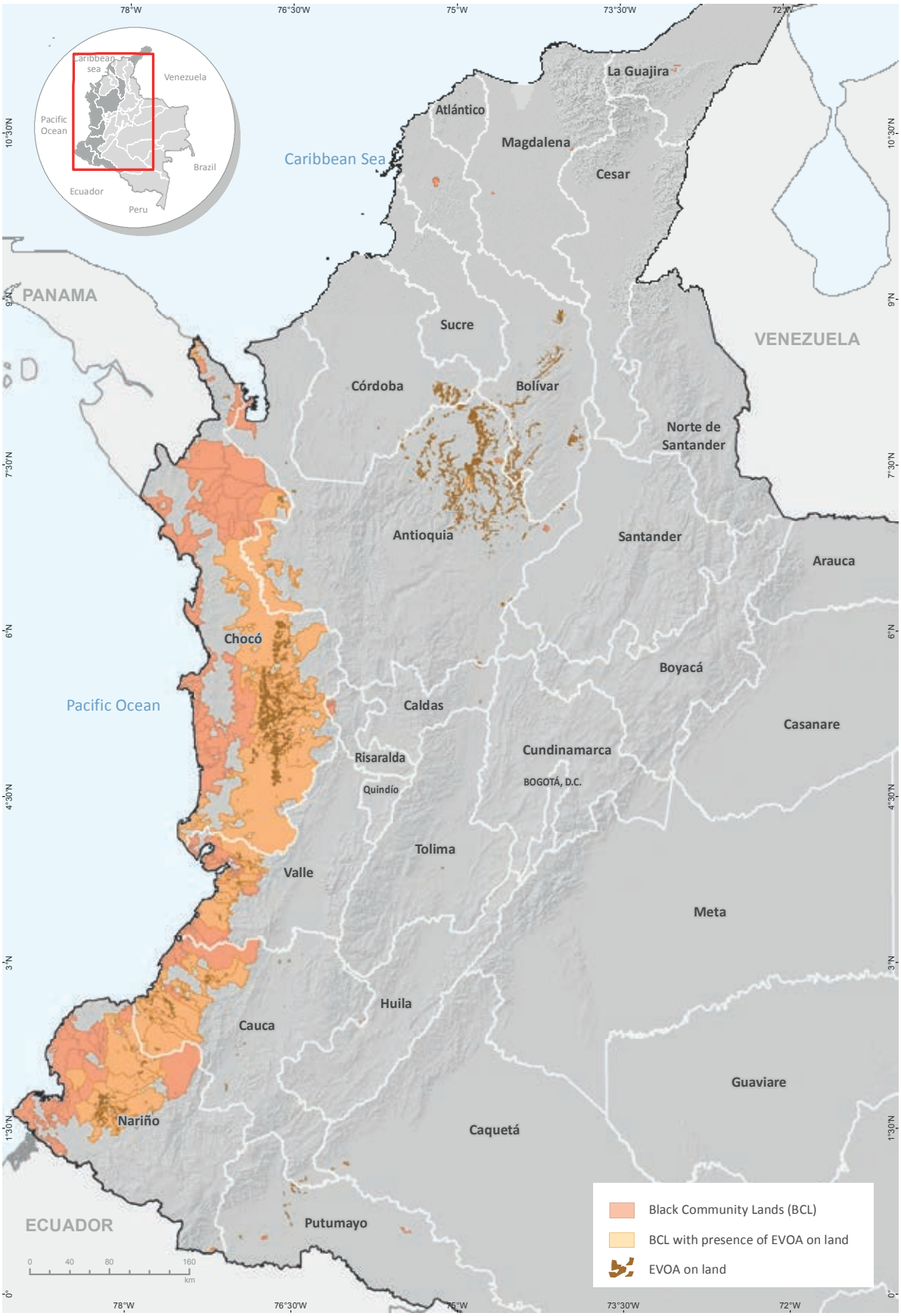
The EVOA in land has 43,325 ha in the jurisdiction of Community Councils (44% of the national total), which represents an increase of 6% compared to the figure reported in Lands of Black Communities for 2020. The provinces that register this condition are Chocó (36,697 ha - 85% within the group), Nariño (3,415 ha - 8%), Cauca (2,403 ha - 6%), Valle del Cauca (561 ha - 1%) and Antioquia (250 ha - less than 1%). Map 6 shows the distribution of the phenomenon in this category of ethnic territories.

Seventy-seven percent of the phenomenon in these territories is found in 10 of the 79 Community Councils with presence of EVOA on land (33,454 ha), within which it is noteworthy that in the last three years the trend has been maintained in respect of the four Community Councils with the highest detection of the phenomenon (Figure 12): Mayor del Cantón de San Pablo "ACISANP", Istmina y parte del Medio San Juan, Mayor del Medio Atrato "ACIA" and ACADESAN. It is worth noting that two of these Councils, Mayor del Cantón de San Pablo "ACISANP" and ACADESAN, show an increase in the detection of EVOA in their interior of 9% and 12%, respectively, with respect to the previous year, an increase of approximately 1,000 ha between them.

In terms of EVOA in water, due to the fact that the rivers studied are located in the Amazon region and the vast majority of the Community Councils are located in the Pacific strip, where EVOA on land predominates, no nuclei of alerts due to exploitation with the use of machinery in water were identified coinciding with Black Community Lands[34]; however, this does not mean that this type of exploitation cannot occur within that category of ethnic territories.

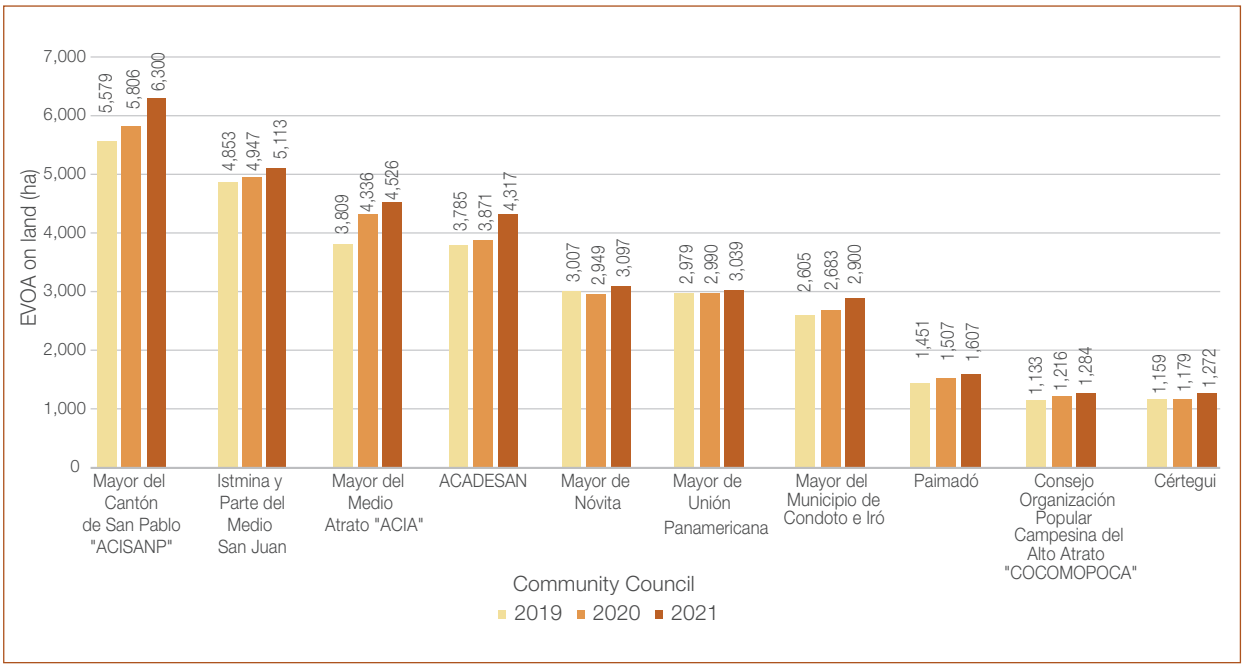
34 Three of the 210 Community Councils in the country are located in Putumayo; however, the closest of these territories to an alert nucleus is more than 20 km perpendicular to the Caquetá River.

Map 6. Presence of EVOA on Black Community Lands, 2021.



Source: Government of Colombia - Monitoring system supported by UNODC for Black Community Lands: National Land Agency (ANT), 2021. The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Figure 12. Community Councils with the highest detection of EVOA on land (2019, 2020, 2021).



Indigenous Reservations

Of the total area detected with EVOA on land in 2021, less than 1% is located within Indigenous Reservations (613 ha); this indicates a decrease of 2% compared to the data recorded in this category of ethnic territories the previous year. The phenomenon in these territories is located in six provinces, of which Chocó reports 43% (261 ha), followed by Guainía (25% - 151 ha), Antioquia (24% - 145 ha) and Nariño (7% - 44 ha); Valle del Cauca (9 ha) and Cauca (3 ha) have shares close to 1% in each case.

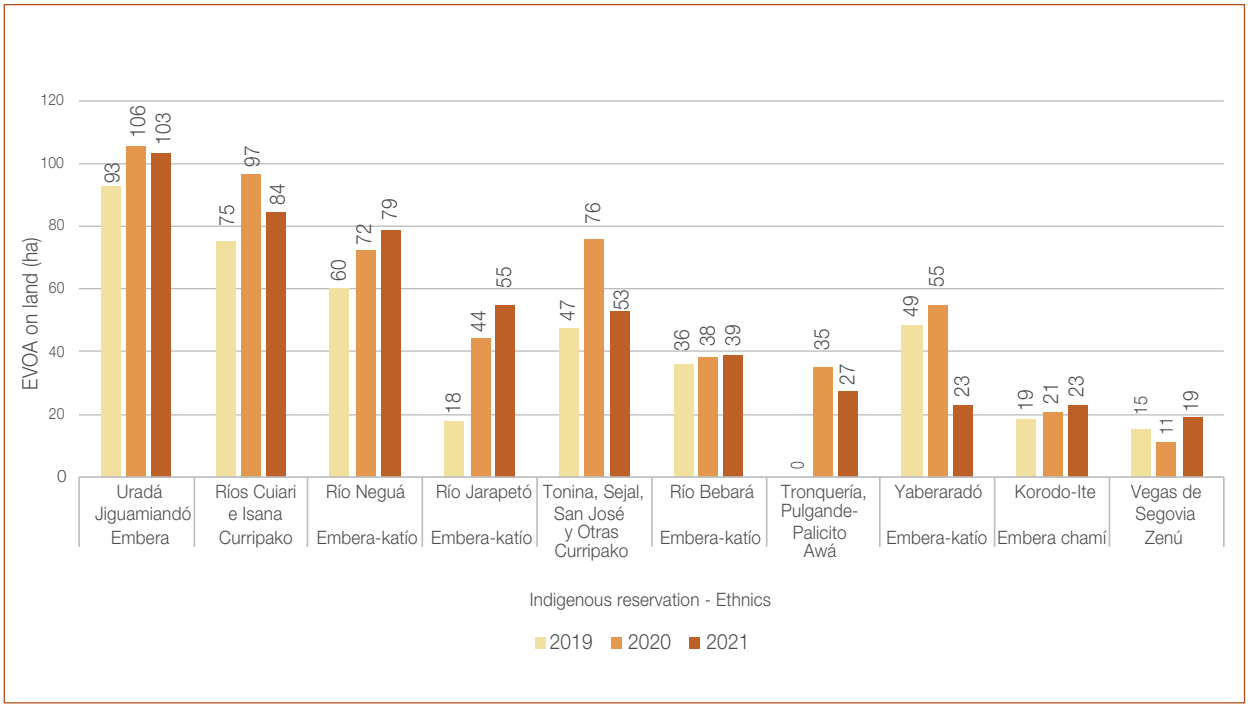
The phenomenon is located in 22 Indigenous Reservations, of which 82% of the detection is focused on 10 of these territories (505 ha). It should be noted that there is a marked trend in the behavior of the three reservations with the largest area detected in the last three years (Uradá Jiguamiandó, Ríos Cuiari and Isana and Río Neguá), as shown in Figure 13. In relation to the ethnic groups that inhabit these territories, 51% of the area with EVOA with the use of machinery on land in reservations is located in the territories of the Embera and Embera-Katío peoples (312 ha), followed by the Curripako people with 23% (144 ha).

Although EVOA on land has a very low representativeness in Indigenous Reservations, the findings of evidence of exploitation with the use of machinery in water indicate that there is a high degree of presence of this modality in eight of the ten rivers studied (Apaporis, Atabapo, Caquetá, Cotuhé, Inírida, Negro, Putumayo and Yarí), in which there are dense stretches of identified alerts that are located within or adjacent to 21 reservations. The ethnic groups that inhabit these reservations are mainly composed of the Puinave, Witoto, Curripako and Yucuna peoples, and to a lesser extent there are Cubeo, Inga, Muinane and Tinimuka communities.

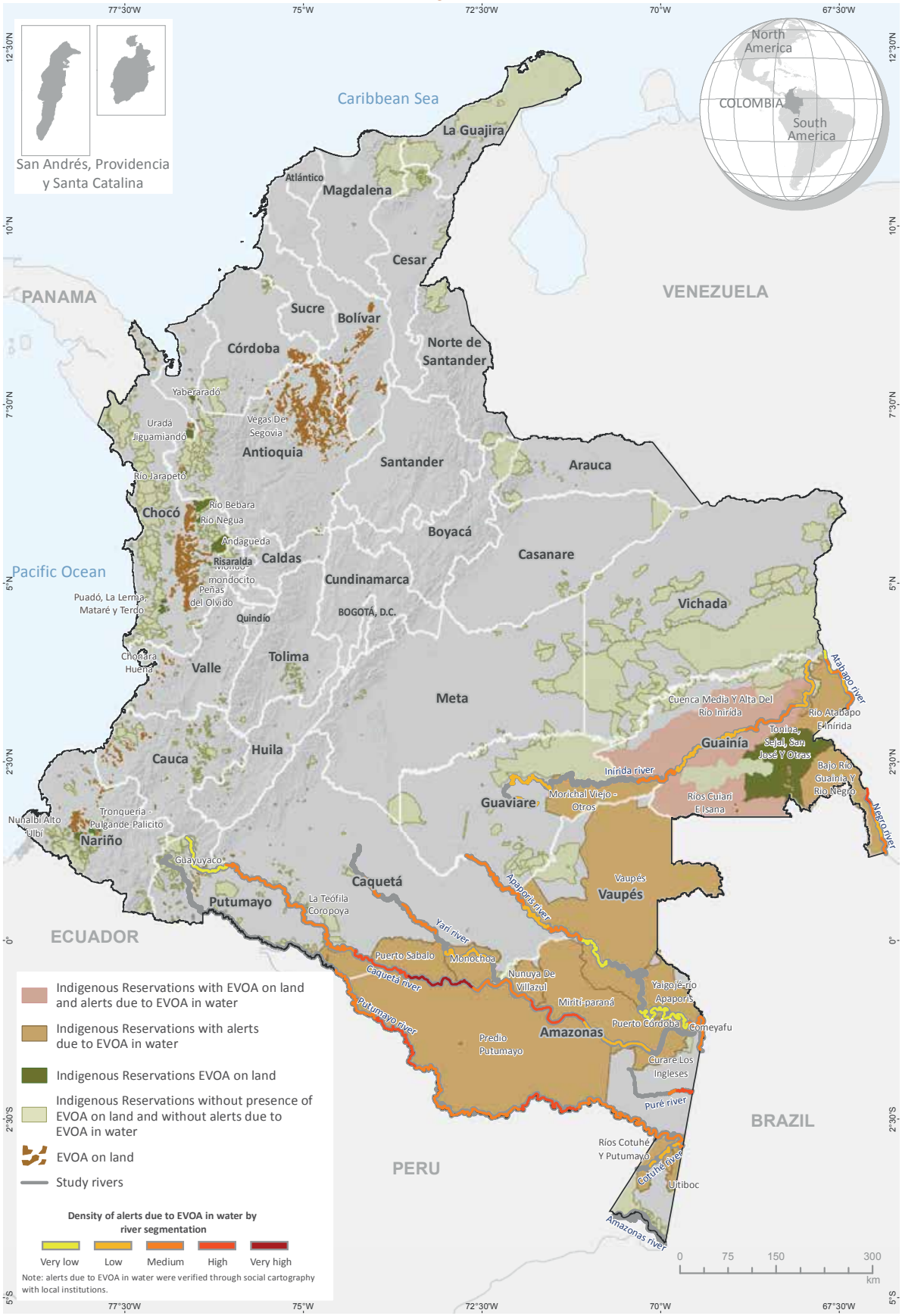
Most of the high and very high density sections of the alerts due to EVOA in water that were detected in coincidence with Indigenous Reservations are located mainly on the Caquetá river, and to a lesser extent on the Putumayo

and Negro rivers: 1) on the Caquetá River, high and very high density of alerts in the Predio Putumayo, Puerto Sabalo, Monochoa and Miritíi-Paraná reservations; 2) on the Putumayo River, high density of alerts in the Predio Putumayo reservation, and 3) on the Negro River, high density of alerts at the height of the Bajo Río Guainía and Río Negro reservation. Map 7 shows the distribution of the EVOA under the two modalities identified in this study (with the use of machinery in water and on land), in areas coinciding with Indigenous Reservations.

Figure 13. Indigenous Reservations with the highest detection of EVOA on land (2019, 2020, 2021).



Map 7. Presence of EVOA on land and alerts due to EVOA in water in Indigenous Reservations, 2021.



Source: Government of Colombia - Monitoring system supported by UNODC for Indigenous Reservations: National Land Agency (ANT), 2021. The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Protected Areas Included in the SINAP, Registered in the RUNAP that are not Part of the Excluded Mining Areas

In 2021, 5,413 ha of EVOA on land were identified in the Regional Integrated Management Districts[35] category that are part of the SINAP, representing a decrease of 8% from the previous year (Table 7).

Table 7. EVOA on land identified in other SINAP categories, 2021.

Protected Area Name	EVOA on land (ha)
Ayapel Wetlands Complex Integrated Natural Resources Management District	3,774
El Sapo and Hoyo Grande Swamps Regional Integrated Management District*	1,246
Corrales and El Ocho Swamps Regional Integrated Management District**	383
Regional Integrated Management District Cacica Noría***	10
Total	**5,413**

* Declared as a protected area on October 26th, 2017 by Resolution 508 of the Board of Directors of Corporación Autónoma Regional del Centro de Antioquia (CORANTIOQUIA).
** Declared as a protected area on December 10th, 2019 by means of Agreement 576 of the Board of Directors of CORANTIOQUIA.
*** Declared as a protected area on November 29th, 2016 by Agreement 480 of the Board of Directors of CORANTIOQUIA.

The Ayapel Wetlands Complex Integrated Natural Resources Management District contains 70% of the total EVOA on land detected in these protected areas, which corresponds to 3,774 ha This District, located in the province of Córdoba, is part of the macro-system of wetlands and floodable areas of the Momposina Depression [14]. In respect of 2020, the trend in this territory is to reduction: a variation of about 10% between the two periods is observed.

On the other hand, 1,246 ha (23% of the total) of EVOA on land were detected in the Regional District of Integrated Management Ciénagas El Sapo and Hoyo Grande, in Bajo Cauca Antioqueño, a wetland of great ecological importance due to its high diversity of fish species. This swamp complex is also known as "water land" because it is a source of food for the neighboring communities and riparian populations of the Nechí River [15].

In the Regional District of Integrated Management Ciénagas Corrales and El Ocho, a protected area located in the northeastern sector of Bajo Cauca Antioqueño, 383 ha of EVOA on land were identified, representing 7% of the total; in this territory there was an increase of 6% in EVOA on land with respect to the previous year.

Finally, in the Regional District of Integrated Management Cacica Noría, a strategic ecosystem for the protection of water resources, located in the municipality of Anorí, Antioquia, 10 ha were detected with a difference of 2 ha compared to 2020.

35 Geographic space in which landscapes and ecosystems maintain their composition and function, even if their structure has been modified, whose natural and associated cultural values are made available to the human population for sustainable use, preservation, restoration, knowledge and enjoyment (Article 14 of Decree 2372 dated 2010).

PROVINCES WITH PRESENCE OF EVOA

The findings for 2021 indicate that 13 of the 32 provinces of the country present EVOA on land, with a total of 98,567 ha, 2% less than in 2020 was detected (Table 8) and with a new province, La Guajira, with the municipality of Dibulla.

Seventy-eight percent of the EVOA on land is concentrated in the provinces of Chocó and Antioquia, Chocó occupies the first place for this period with 38,980 ha representing 40% of the national figure.

Putumayo recorded the largest increase (30%), mainly in Mocoa, Puerto Guzmán, Villa Garzón and Puerto Caicedo. In second place is the province of Nariño (12%), with a concentration in the municipality of Magüí Payán. On the other hand, Valle del Cauca recorded a 25% decrease, in the municipality of Buenaventura.

Concepts

Municipality with presence of EVOA: *municipality with detection, through remote sensing, of EVOA on land or EVOA in water.*

EVOA on land: *footprint or signal identified through interpretation and digital processing of satellite images, characterized by landscape alteration in alluvial lands.*

EVOA in water: *footprint or signal detected by means of spectral indexes in satellite images, characterized by alteration of suspended sediments in the water body [5].*

Table 8. EVOA on land by province.

Province	2020	2021	% of the Total National	% of change 2020-2021
Chocó	36,552	38,980	40	7
Antioquia	40,890	37,588	38	-8
Bolívar	10,583	9,472	10	-10
Córdoba	4,975	4,580	5	-8
Nariño	3,374	3,764	4	12
Cauca	2,807	2,732	3	-3
Valle del Cauca	765	575	1	-25
Putumayo	405	526	1	30
Other	401	351	0	-12
Total	**100,752**	**98,567**	**100**	**-2**

For this period, 101 municipalities (9%) of the total of 1,122 in the country[36], presented EVOA on land. Antioquia and Chocó accounted for 46% of these municipalities, with 24 and 22 respectively. In Chocó, the findings maintain their focus: Nóvita, El Cantón de San Pablo, Istmina, Río Quito, Unión Panamericana and Condoto, municipalities that contribute 67% of the EVOA on land in this province. Similarly, in Antioquia, the area detected is mainly focused on five municipalities that represent 72% of the province's EVOA on land (Figure 14).

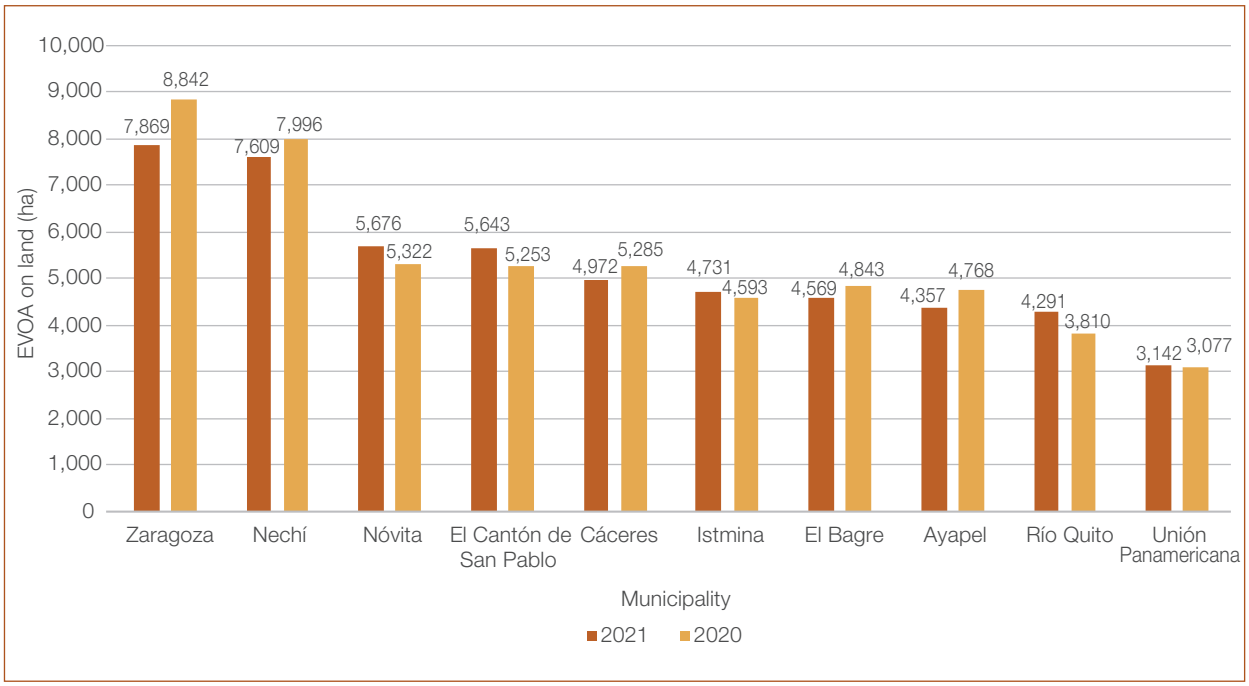
Figure 14. EVOA on land, Central Region (south of Bolívar, Antioquia).

At the national level, 10 municipalities concentrate 54% of the national detection (Figure 15): Zaragoza, Nechí and Nóvita top the list with 21,154 ha, representing 21% of the national data; 5 of these municipalities showed an increase in the presence of EVOA on land, being for the second consecutive year the one reporting the highest increase with 13%, while Zaragoza evidenced a reduction of approximately 11%.

Finally, in Excluded Mining Areas, a comprehensive focus of the findings by province shows that 50% of the national total is in this category, where 76% corresponds to Illicit Exploitation, i.e., 38% of the national data; 4% in the category In Transit to Legality and 20% With Technical and/or Environmental Permits. This last finding highlights the fact that it coincides with specific areas of the national territory that have a mining title granted by the mining

36 The spatial archives of municipalities and other administrative units were updated during 2017. According to this, the data on the dynamics of some municipalities may differ from those published in previous studies.

Figure 15. Top 10 municipalities with the highest presence of EVOA on land, 2020-2021.



authority and registered in the National Mining Registry and in turn have the environmental instrument duly granted by the environmental authority with competence. However, with the information available for this study, it is not possible to establish what percentage of these titles are currently in the process of being subtracted from the reserve. The remaining 50% of the national figure is found in Areas without Environmental Restrictions, where 54% corresponds to Illicit Exploitation, a finding that contrasts with the previous study which in this same category registered 28%, showing a significant increase in Illicit Exploitation in Areas without Environmental Restrictions for the exercise of the activity. For the category with technical and/or environmental permits, 38% and 8% were found in areas under the category In Transit to Legality, respectively.

In this context, and in accordance with the previous findings, it is noteworthy that half of the detected EVOA is located in territories where, in terms of the protection and conservation of the national environmental heritage protected by the current regulatory framework, exploitation is not allowed (Table 9).

At the national level, Chocó ranks first in the detection of EVOA with 38,980 ha, followed by Antioquia in second place with 37,588 ha and Bolívar in third place with 9,472 ha, corresponding to 40%, 38% and 10% respectively of the national total. However, Chocó is the province with the highest number of EVOA in the category Illicit Exploitation in Excluded Mining Areas (24,891 ha), which represents 25% of the national consolidated total and corresponds to 64% of the detection

Table 9. Territory and EVOA on land, 2021. Percentage distribution by province.

Province	EVOA 2021 ha	Excluded Mining Areas			Areas without Environmental Restrictions		
		With Technical and/or Environmental Permits	In Transit to Legality	Illicit Exploitation	With Technical and/or Environmental Permits	In Transit to Legality	Illicit Exploitation
Chocó	38,980	9	4	64	2	6	15
Antioquia	37,588	8	0	9	43	3	37
Bolívar	9,472	26	2	56	7	2	7
Córdoba	4,580	0	0	0	1	7	92
Nariño	3,764	14	11	74	0	0	0
Cauca	2,732	0	0	0	27	4	69
Valle del Cauca	575	0	0	99	0	0	0
Putumayo	526	0	0	1	3	7	89
Guainía	151	0	0	100	0	0	0
Other	200	0	0	0	13	0	87

in the province. When integrating the data obtained for this category in the whole province, i.e., Illicit Exploitation in Excluded Mining Areas and Areas without Environmental Restrictions, Chocó reaches 78% at the provincial level and represents 31% of the national consolidation (98,567 ha) and 48% of all detected in the category of Illicit Exploitation (63,984 ha).

For their part, Antioquia and Bolívar contribute respectively 17% and 6% of the national consolidated Illicit Exploitation category, which in turn represents 27% and 7% of the total detected for each province in this category. In this context, it is noteworthy that in Valle del Cauca and Guainía the detected EVOA reports more than 95% (provincial consolidation) in Illicit Exploitation and coincide with Excluded Mining Areas, territories of protection and conservation of natural heritage.

In respect of Areas without Environmental Restrictions, Antioquia is the province with the highest representation in these territories with 83% of the consolidated within the province, followed by Chocó with 8% of the national consolidated and 23% of the detection within the province. In these territories, the provinces of Cauca, Putumayo and Caquetá account for almost all of the EVOA in Areas without Environmental Restrictions.

Alerts due to EVOA in Water

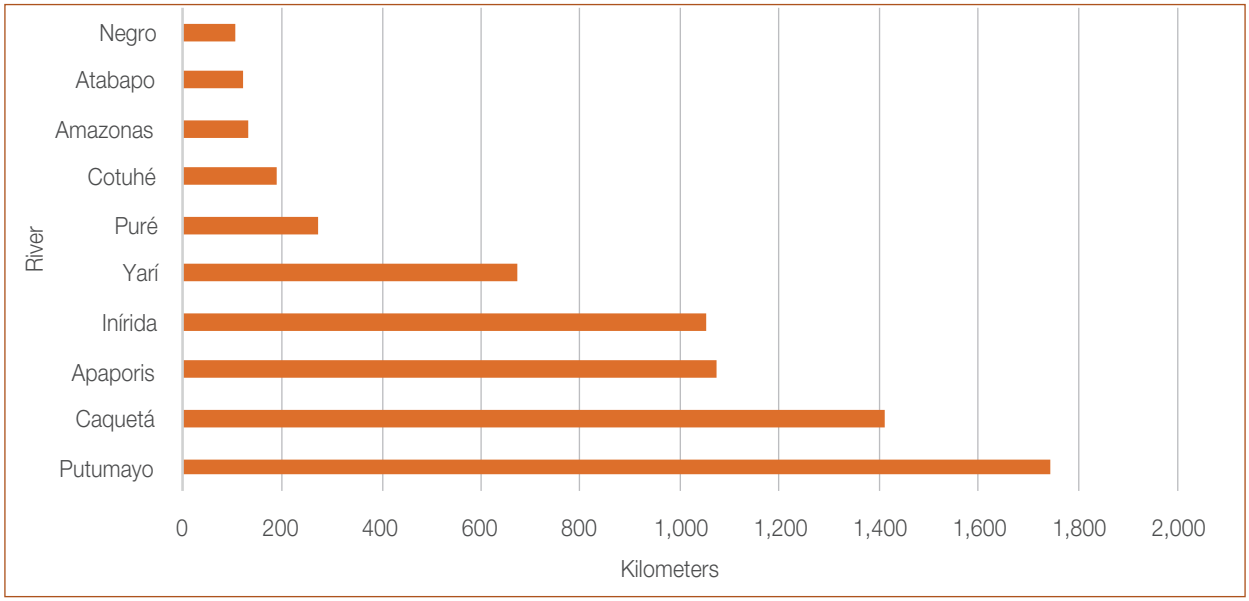
The study addressed, according to the methodology based on the alteration of suspended sediments presented in previous works, the detection of alerts due to EVOA in water in ten rivers of the Amazon and Orinoco regions (Guainía, Negro, Atabapo, Inírida, Apaporis, Yarí, Caquetá, Puré, Putumayo, Cotuhé and Amazonas) (map 8, table 10).

Figure 16. Exploitation on land and water, Pacific region.

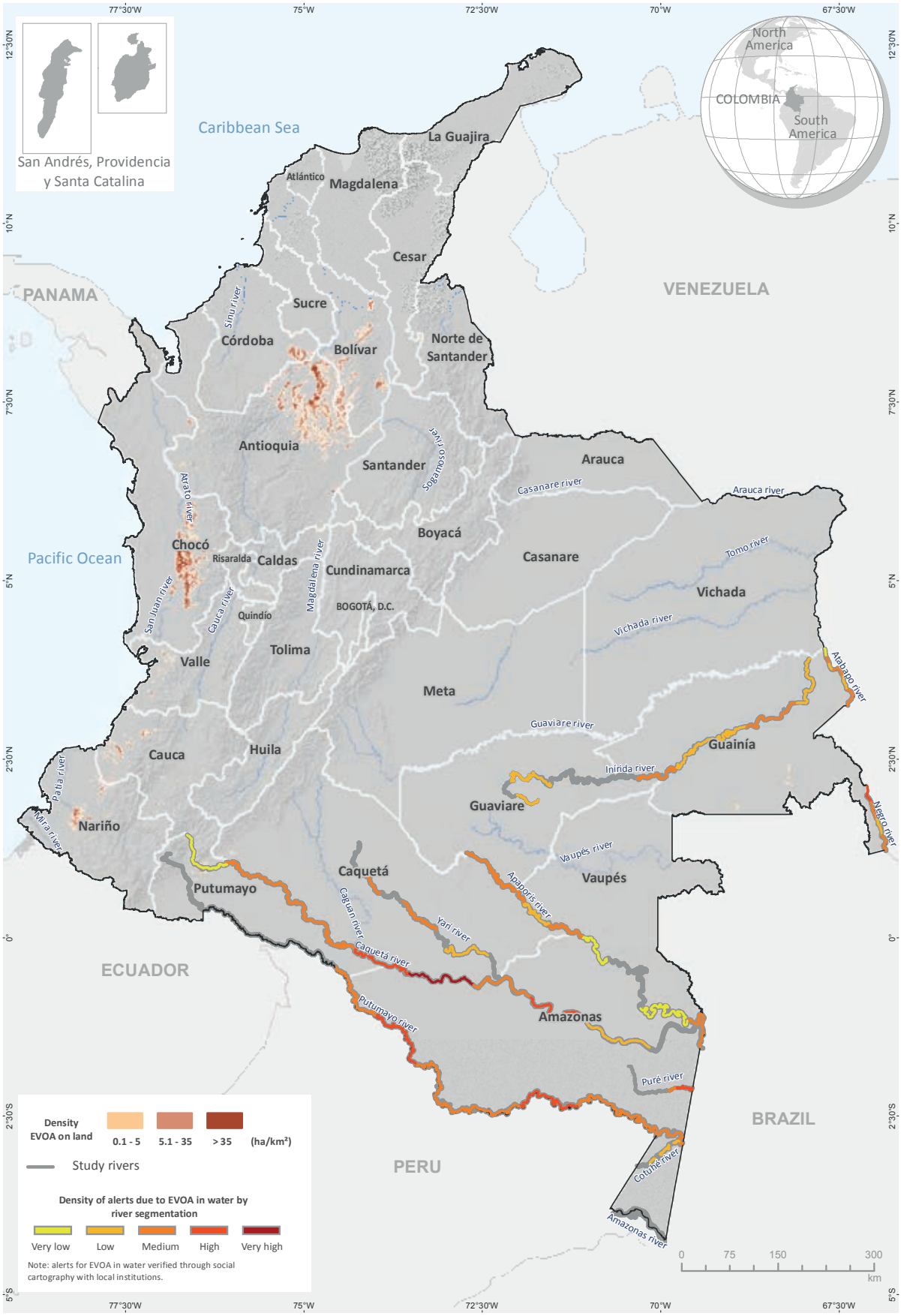
For 2021, the study contemplates the categorization of alerts into "verified alerts" and "unverified alerts". Verified alerts are understood as those that have been validated in the territory by local entities and authorities that know about the subject, are present in the region and participated in the workshops held for the socialization of results; on the other hand, "unverified alerts" correspond to those in which the lack of knowledge, due to distance or autonomy, could not have references of the activity in these areas. However, for the purposes of the study, these alerts are maintained, reclassified and should be analyzed with caution under this principle. In this sense, all alerts on the Apaporis River correspond to "unverified alerts".

The detection of alerts due to EVOA in water was based on the spectral dynamics of ten rivers measuring approximately 7,000 km in the Colombian territory.

Figure 17. Alerts due to EVOA in water.



Map 8. EVOA detection in Colombia, 2021.



Source: Government of Colombia - Monitoring system supported by UNODC.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Table 10. Presence of EVOA in water by province.

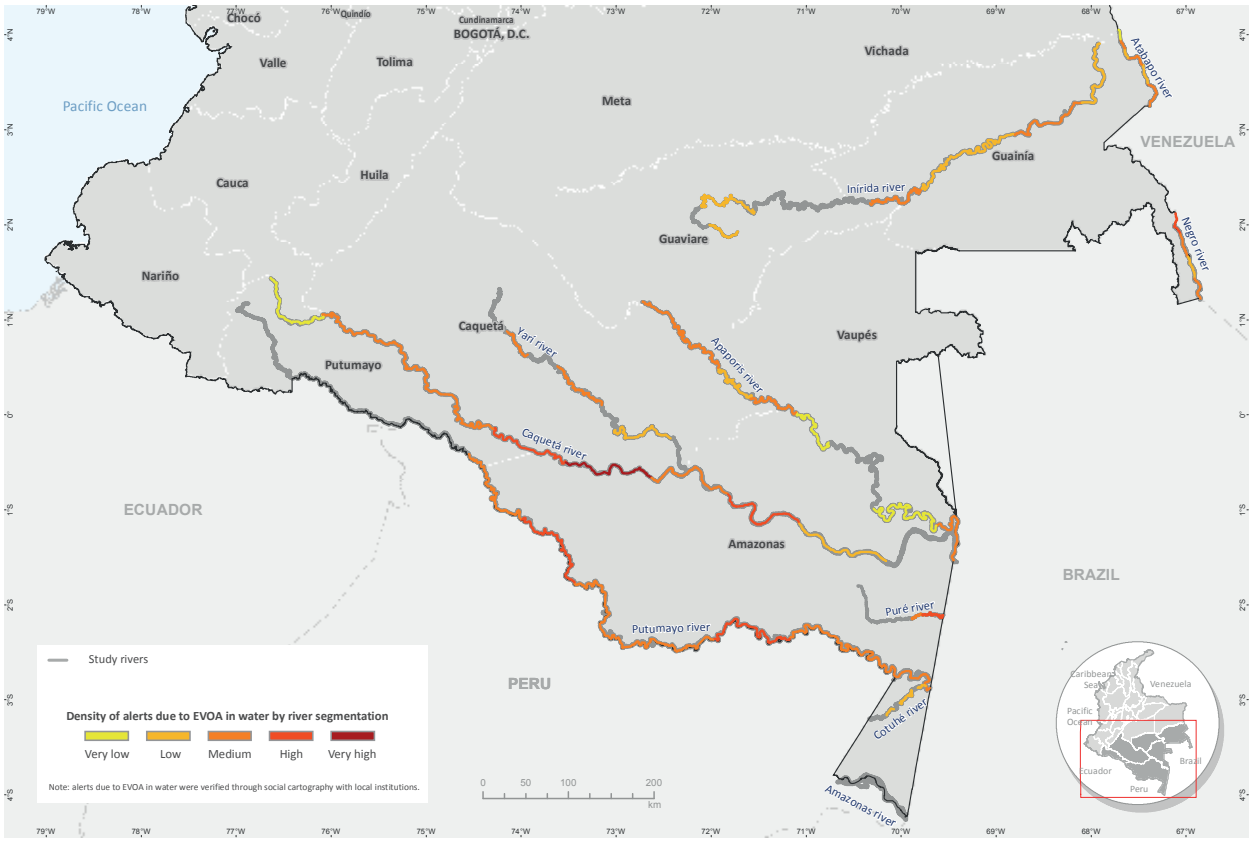
Municipalities with alerts due to EVOA in water		
Province	**Municipality**	**River**
Amazonas	Puerto Alegría	Putumayo
	La Victoria	Apaporis
	Leticia	Cotuhé
	El Encanto	Putumayo
	Puerto Arica	Putumayo
	La Chorrera	Caquetá
	La Pedrera	Caquetá
	Miritíi-Paraná	Caquetá
	Puerto Santander	Caquetá
	Tarapacá	Puré, Cotuhé, Putumayo
Caquetá	Cartagena del Chairá	Yarí
	Curillo	Caquetá
	San Vicente del Caguán	Yarí
	Solano	Apaporis, Caquetá, Yarí
Cauca	Piamonte	Caquetá
Guainía	Cacahual	Atabapo
	Inírida	Inírida
		Atabapo
	La Guadalupe	Negro
	Morichal	Inírida
	San Felipe	Negro
Guaviare	San José del Guaviare	Inírida
	El Retorno	Inírida
	Miraflores	Apaporis
Putumayo	Puerto Guzmán	Caquetá
	Puerto Leguízamo	Caquetá
Vaupés	Pacoa	Apaporis
	Taraira	Apaporis

The findings report alerts in the provinces of Amazonas, Caquetá, Cauca, Guainía, Guaviare, Putumayo and Vaupés. In addition to these, the municipalities of Puerto Alegría (Amazonas), Cartagena del Chairá (Caquetá), Cacahual (Guainía) and El Retorno (Guaviare) registered alerts compared to the previous period, which may imply that this modality has increased at the territorial level.

The provinces of Amazonas, Guaviare and Vaupés report the EVOA modality in water; the provinces of Caquetá, Cauca, Guainía and Putumayo report both exploitation modalities. Caquetá has EVOA on land in San José del Fragua, while the municipalities of Cartagena del Chairá, Curillo, San Vicente del Caguán and Solano report EVOA in water; in Cauca, the municipality of Piamonte reports both modalities. In Guainía, the municipality of Inírida has both types, in Puerto Colombia and Pana Pana EVOA on land and in Morichal and Cacahual EVOA in water; in Putumayo, Puerto Guzmán has both types and Puerto Leguízamo EVOA in water.

Of the ten rivers studied, the Amazonas River maintains the same trend throughout the different study periods and does not present alerts due to EVOA in water. Map 9 shows that high and very high densities occur mainly in the Caquetá (Solano-Caquetá), Putumayo (Puerto Alegría and El Encanto), Puré (Tarapacá-Amazonas) and Negro (San Felipe) rivers.

Map 9. Density of alerts due to EVOA in water among studied rivers.



Source: Government of Colombia - Monitoring system supported by UNODC.
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TERRITORIES WITH EVOA AND COCA CROPS

The official source, for coca cultivation figures since 2003 and EVOA since 2018, for Colombia, is the United Nations Office on Drugs and Crime (UNODC). These two phenomena converge in some areas of the country and underpin complex territories, which in turn increase the vulnerabilities of the communities present. In order to have an approximation of what happens in these areas in terms of EVOA and the presence of coca crops, the convergence of both activities was evaluated in 25 km^2 grids. It is highlighted that, in many cases, mineral exploitation, specifically gold in this case, has the framework of technical and environmental permits required to carry out the activity in territories with the presence of coca crops, a situation that generates a context of illegality (due to illicit crops) (Figure 18).

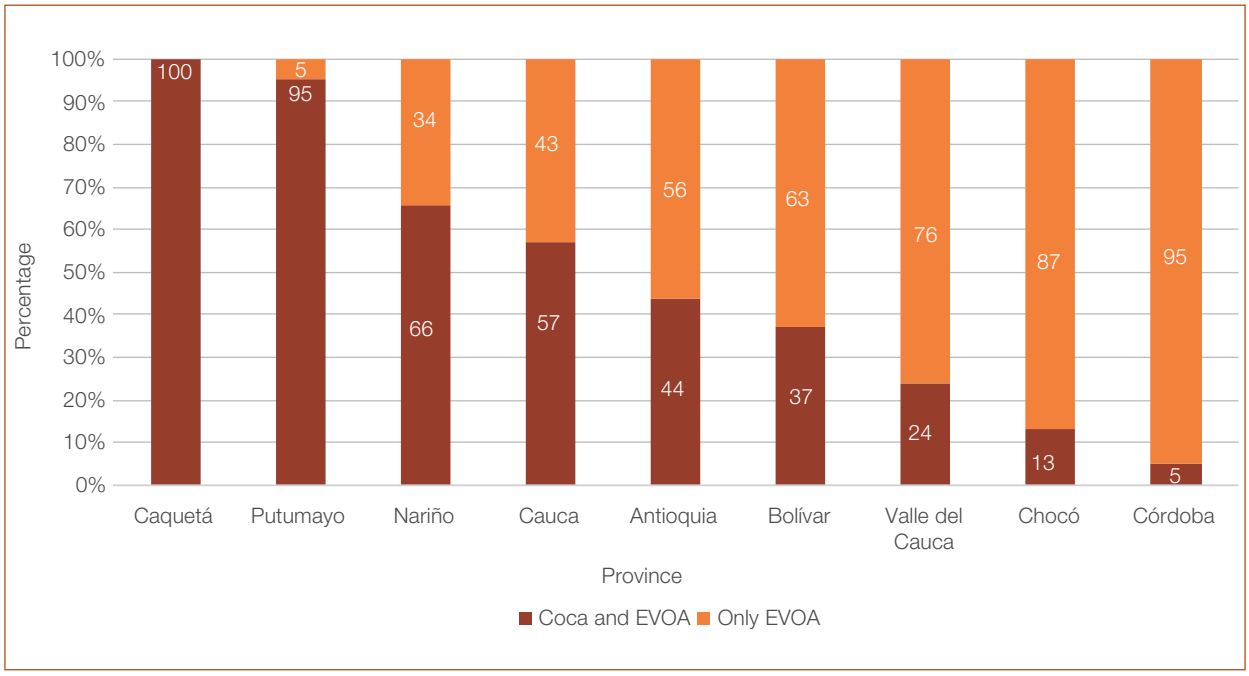
Figure 18. Zone with presence of alluvial gold exploitation on land and coca cultivation, Nariño.

As mentioned in previous studies, despite the fact that these phenomena have different production cycles and market characteristics, they are developed in vulnerable areas due to poverty, marginality, difficult access and the presence of illegal armed groups. The convergence of these two activities not only generates negative impacts on natural ecosystems but is also a determining factor in the economic dynamics of the territory. Understanding the complex interactions of the territories where these two activities coincide would facilitate the development of comprehensive public policies.

Territories with Coca Crops and Evidence of Alluvial Gold Exploitation

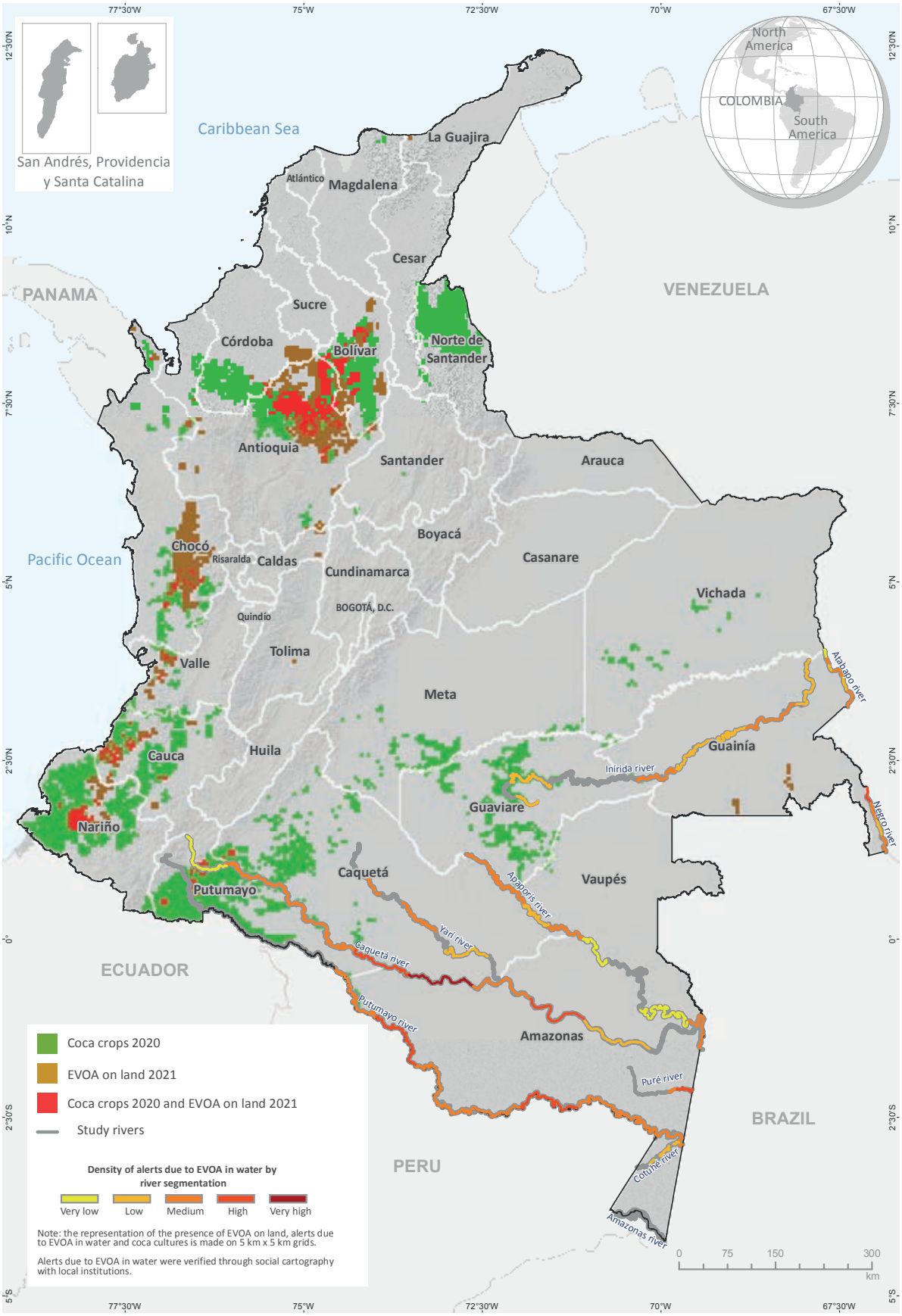
In Colombia, approximately 38% of the territories with EVOA presence on land in 2021 were identified as having coca cultivation in 2020.[37] In these areas, the surface planted with coca reached 11,102 ha and 25,462 ha of EVOA on land. When comparing the figures with the previous period, there is evidence of a 9% reduction in the territories (grids) where both activities converge; in the territories with presence of both activities, coca increased by 322 ha and EVOA decreased by 3,148 ha, a situation that can be translated in terms of stability of the phenomena, but with a slight tendency towards the concentration of coca crops (Figure 19, Map 10), a strategy evidenced in 2020 [5] and used by the groups that develop this activity to increase profits and exercise greater control over the territory.

Figure 19. Percentage of overlapping territories with EVOA on land (2021) and coca cultivation (2020).



37 The analyses of simultaneous presence of EVOA and coca crops are carried out in grids of 25 km2 of the area framework, since a territorial and not geographic coincidence is sought.

Map 10. Territories affected by coca cultivation and with presence of EVOA.



Source: Government of Colombia - Monitoring system supported by UNODC.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

At the provincial level, an increase in the number of territories (5 km^2 grids) with presence of EVOA and coca cultivation was identified in Bolívar, with an increase of 3 percentage points; in Cauca, Antioquia, Nariño, Valle del Cauca and Córdoba there was a reduction, and Putumayo, Caquetá and Chocó remained stable.

In Antioquia, Bolívar and Córdoba, the grids identified with EVOA in 2021 presented an increase of 28%, 9% and 4% respectively of the area planted with coca crops. In the rest of the provinces, coca cultivation was reduced by an average of 26% in the territory with EVOA on land. Caquetá and Putumayo stand out, with coca cultivation reductions of 71% and 42% respectively; however, it should be kept in mind that in Caquetá all grids with EVOA in 2021 presented coca cultivation in 2020.

In Putumayo, Caquetá, Chocó, Nariño and Cauca, the grids identified with EVOA in 2021 presented an increase in the area of EVOA and a reduction in the area with coca in respect of the previous period; this situation may be related to control strategies of illicit crops in the territory. In respect of the control operations of both illicit gold exploitation and illicit crop cultivation, the reported coordinates of the operations and manual eradication carried out by the security forces were cross-referenced with the territories in 25 km2 grids. The results show that only 3% of these territories had operations against mining, as opposed to 43% that reported eradication actions[38], so the actors related to both phenomena may be preferring the extraction of minerals over coca cultivation. In the provincial consolidation and in accordance with the above, the aforementioned provinces show a ratio of 43% of the territories with some activity that also presented eradication of illicit crops; on the other hand, these same territories only reported an average of 1% of actions against the illicit extraction of gold. Finally, when searching in the areas where both activities converge, only 4% present operations of both illicit exploitation of minerals and eradication, which indicates firstly the low coverage of the operation in respect of the presence of coca or EVOA and, secondly, the lack of articulated plans on the part of the authorities with jurisdiction.

In relation to the operations against illegal gold extraction, this situation may be occurring due to two phenomena: 1) the coordinates recorded have inconsistencies associated with the location; for example, the coordinate of the population center where the operation was systematized was recorded or there are no standards for capturing the coordinates; 2) it may be associated with the lack of attributes that disaggregate the type of operation or type of mining (alluvial or lode), which does not allow to correctly disaggregate the data to carry out more detailed analysis. According to the above, it is recommended to develop mechanisms to ensure the completeness and standards of the actions carried out by the armed forces and police related to operations against illegal gold extraction to facilitate the analysis of data and the implementation of an information system.

38 The exercise only included manual eradication carried out by the security forces; the value may increase if other eradication modalities, such as voluntary eradication, are taken into account.

Municipalities with Coca Cultivations and EVOA

In the municipal context, of the 101 municipalities with EVOA in 2021, approximately 69% (70) had coca cultivation (4 more than in the previous period). Taking into account the amount of coca cultivation reported in these municipalities for 2020, a total of 69,970 ha (49% of the national total in 2020) was reached. Of the 10 municipalities with more EVOA on land in 2021, 6 reported coca cultivation in 2020: 4 are located in Antioquia (Zaragoza, Nechí, Cáceres and El Bagre) and have a tendency to increase coca cultivation, and 2 in Chocó (Nóvita and Istmina) with a tendency to decrease.

El Cantón de San Pablo completed two consecutive years without reporting coca cultivation; for its part, Río Quito has not reported coca cultivation since 2015 and Unión Panamericana since 2011, and Ayapel has not reported coca in the entire historical series. A slight decrease in EVOA and a strong increase in coca cultivation is observed in Zaragoza and El Bagre (Antioquia), the opposite situation to that presented in Nóvita and Istmina (Chocó), where there was a moderate increase in EVOA and a reduction in the presence of coca cultivation (Figure 20).

Sixty-nine percent of the municipalities with EVOA on land detection showed coca cultivation and accounted for 49% of the total coca cultivation detected in 2020.

Figure 20. Series of coca cultivation 2019-2020 and EVOA on land 2020-2021, in municipalities with more EVOA in 2021.

Municipality	EVOA 2020 (ha)	EVOA 2021 (ha)	EVOA Change (%)	Coca 2019 (ha)	Coca 2020 (ha)	Coca Change (%)
Zaragoza	8,841.93	7,868.95	-11	346.37	686.02	98
Nechí	7,996.43	7,608.97	-5	530.37	551.10	4
Nóvita	5,321.69	5,676.16	7	69.32	61.85	-11
Cáceres	5,284.61	4,971.58	-6	1,101.54	1,273.92	16
Istmina	4,592.61	4,731.40	3	228.85	200.15	-13
El Bagre	4,842.97	4,569.14	-6	648.31	1,265.70	95

As a complement to the examination of the ten municipalities with the highest presence of EVOA, a municipal analysis was conducted with EVOA data for the period 2020-2021 and coca cultivation for the years 2019-2020. Four classes were created to classify the municipalities with a tendency to increase both phenomena and at the same time opposite tendencies between coca and EVOA.

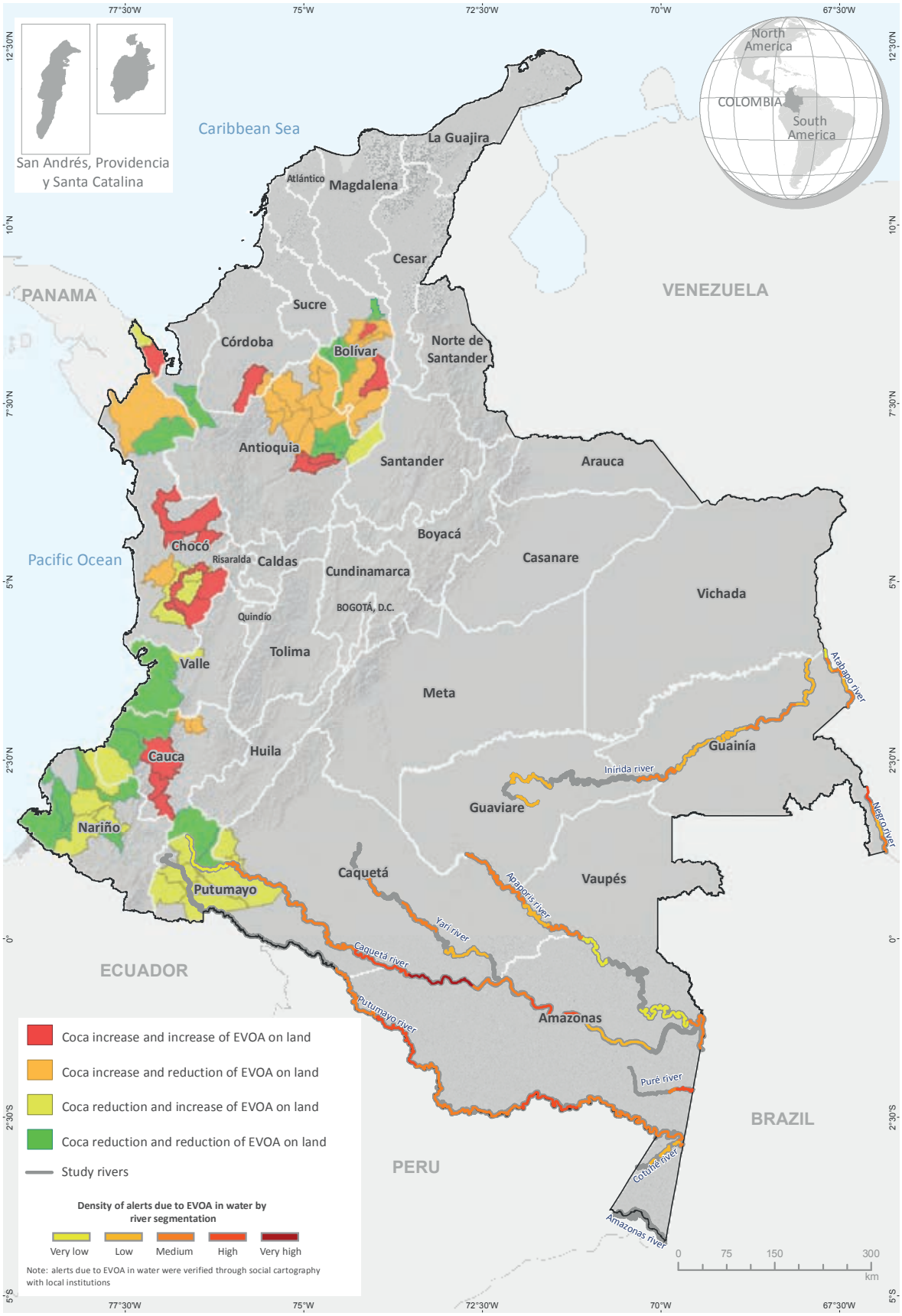
Map 11 shows growth nodes for both activities in Cauca (El Tambo, Patía and Bolívar), in Chocó (Quibdó, Lloró, Medio San Juan, Río Iró, Río Quito, San José del Palmar and Sipí) and in Antioquia (Yalí and Yolombó). In total, 16 municipalities had growth in both activities (4 more than in the previous period) and accumulate 14% of the EVOA on national land by 2021 and 8% of the national coca by 2020.

On the other hand, in 19 municipalities (6 in Putumayo, 4 in Nariño, 4 in Chocó, 2 in Caquetá, 1 in Valle del Cauca, 1 in Cauca and 1 in Antioquia) coca production decreased and EVOA on land increased; this preference for alluvial gold exploitation could indicate greater profitability of this activity.

In general, there was an increase in EVOA on land and a reduction in coca in municipalities in Putumayo (Orito, Puerto Caicedo, Puerto Asís and Villagarzón), Nariño (Los Andes, Santa Bárbara, Barbacoas and Magüí Payán) and Chocó (Istmina, Condoto and Nóvita); the opposite situation was observed in municipalities in Antioquia and Bolívar. Finally, the municipalities with a tendency to increase both activities have a node in Chocó and southern Cauca. It is recommended to develop control and surveillance actions related to both activities and thus prevent them from consolidating as highly complex scenarios, where isolated intervention strategies may result in failed efforts.

In respect of the alerts due to EVOA in water, there is coincidence with coca grids in the provinces of Guaviare (in the limits of the municipalities of San José del Guaviare and El Retorno), Cauca (Bota Caucana), Putumayo (Puerto Guzmán in the limits with Cauca) and Amazonas (Puerto Alegría). The amount of coca is insignificant when compared to national and even provincial data; however, the presence of both activities is an alert for the authorities since the armed actors involved can compare prices and control actions and migrate from one activity to the other to minimize risks. Again, it is recommended to draft integral plans that seek to control coca cultivation on the one hand, but at the same time formalizing and implementing good practices for mineral extraction on the other hand.

Map 11. Dynamics of the territories affected by coca cultivation (2020) and with presence of EVOA (2021).



Source: Government of Colombia - Monitoring system supported by UNODC.
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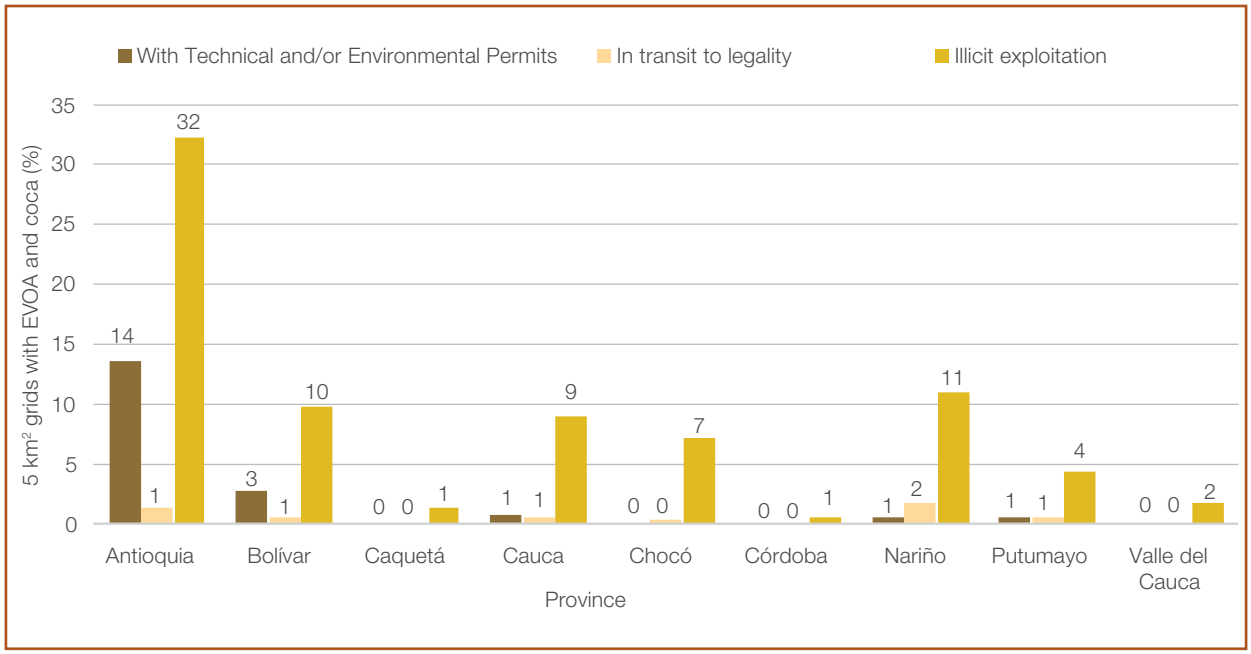
EVOA on Land and Coca Cultivation as per Law Arrangement

In order to have an approximation to the territorial complexities generated by the convergence of illicit activities, this section shows an analysis of the territories with presence of coca cultivation and EVOA on land and its relationship with the predominant law arrangements in territories of 25 km^2.

According to the classification of this pillar, illicit coca cultivation environments may be present in territories with detections of EVOA With Technical and/or Environmental Permits, In Transit to Legality or Illicit Exploitation; each one would require a different intervention according to the particularities it represents.

Based on the above, of the total territory affected by coca crops and presence of EVOA on land mentioned in the previous section, 77% of the detected EVOA is under the category of Illicit Exploitation and is focused in the provinces of Antioquia, Nariño, Bolívar and Cauca, where complex scenarios are created for intervention due to the association between illicit economies, organized armed actors, violence and criminality, with negative effects on the economic, social and environmental dimensions. The spatial environments of occurrence of the two phenomena share the circulation of inputs, substances, money, routes and commercialization, so State interventions must be comprehensive and focus actions on the upper links of the chain, but also focus on the transformation of the affected territories. A single action or intervention tool or several of them in a disjointed manner does not allow optimizing efforts and changing the conditions in the territory to achieve sustainable impacts (Figure 21).

Figure 21. Territories where coca cultivation and EVOA on land converge and their predominant law arrangements, by province.



On the other hand, in 18% of the territories affected by coca cultivation and presence of EVOA on land, there is a predominance of EVOA in the category With Technical and/or Environmental Permits; in these scenarios coca cultivation generates a context of illicitness that affects EVOA on land that have technical and/or environmental permits for exploitation. This situation occurs mainly in Antioquia in the municipalities of Zaragoza, Segovia, El Bagre and Anorí, which increased the area of coca cultivation with respect to the previous year and where authorities must intervene and avoid possible negative impacts on licit economies.

Finally, in the remaining 5% of the territory affected by coca cultivation and presence of EVOA on land, EVOA predominate in the 'In Transit to Legality' category and are mainly located in Nariño and Antioquia. A similar situation to the one mentioned above, the presence of coca crops in territories where the State has granted tools for the regularization and formalization of the gold exploitation activity for its transformation to a legal economy may affect its objective, due to the lack of articulated control by the Government in these territories. It is important to analyze these regions in detail in order to strengthen the control and intervention strategies in an articulated manner between the different arms of the Government in its fight against illicit activity and in the individual efforts for the transformation of the territories.

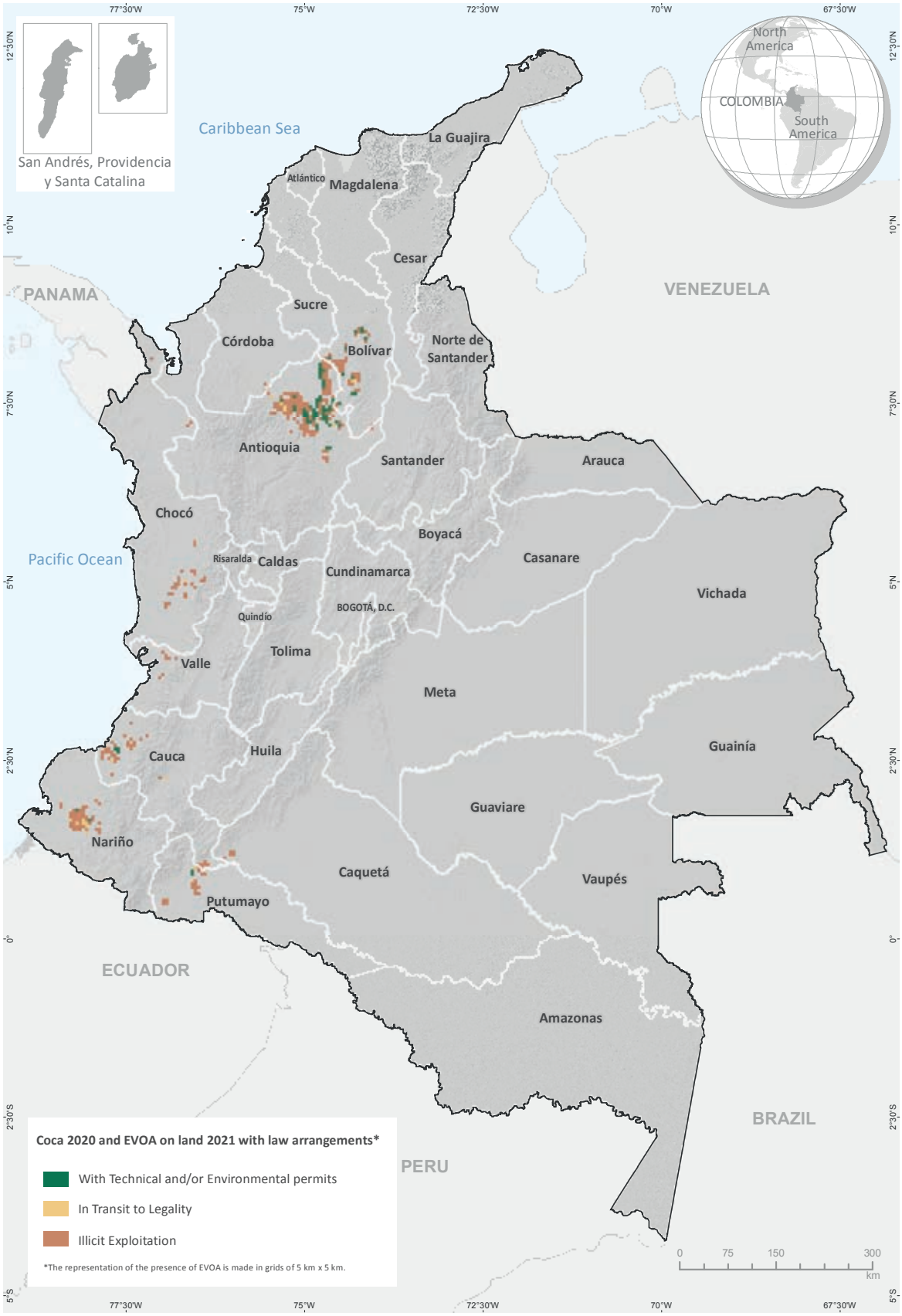
When analyzing, at the provincial level, the behavior of the law categories in the territories where these two illicit activities converge, except for Antioquia, all provinces fall into the category of Illicit Exploitation, with more than 70% of territories with EVOA and coca in this category. In Nariño, Cauca, Putumayo, Bolívar and Antioquia, all three scenarios of law arrangements are present and therefore require different types of control actions by the Colombian Government to fight against illicit gold exploitation and coca cultivation (Table 11, Map 12).

In 18% of the territories where the presence of coca crops and EVOA converge, the EVOA is in the category With Technical and/or Environmental Permits. In other words, in the context of a gold exploitation activity within the legal framework, the vulnerabilities of the territory favor the presence of coca crops, increasing the threat to the exercise of the licit activity.

Table 11. Area of coca cultivation and EVOA on land by predominant law arrangements, in territories with presence of the two activities.

	Coca crops (ha)			EVOA on land (ha)		
	With Technical and/or Environmental permits	In Transit to Legality	Illicit Exploitation	With Technical and/or Environmental permits	In Transit to Legality	Illicit Exploitation
Antioquia	1,048	484	5,274	7,546	350	6,488
Bolívar	138	14	498	622	46	1,708
Caquetá	0	0	50	0	0	101
Cauca	33	7	1,084	682	47	725
Chocó	0	6	135	0	374	3,058
Córdoba	0	0	25	0	0	5
Nariño	60	292	1,495	559	324	2,281
Putumayo	11	21	405	22	26	408
Valle del Cauca	0	0	22	0	0	89

Map 12. Prevailing legal framework in territories affected by coca cultivation (2020) and with presence of EVOA (2021).



Source: Government of Colombia - Monitoring system supported by UNODC.
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DYNAMICS OF THE PHENOMENON

SECTION III

This section addresses the results of the dynamics of EVOA, its relationship with high environmental value plant covers and official gold production.

DYNAMICS OF THE PHENOMENON

This section presents the changes of EVOA in the territory during the period 2020-2021, according to the key concepts indicated (see box) that clarify the dynamics of this phenomenon in the provinces and municipalities where it is reported.

The study indicates that between 2020 and 2021 the territory affected by EVOA on land is 113,321 ha; 76% is concentrated in Antioquia and Chocó, with 40% and 36% respectively. The affected territory is made up as follows: 76% is in stable areas, which represent 87% of the national consolidated area for 2021; 8% in expanding areas, which represent 10%; 3% in new areas, which represent 3% of the national consolidated area; and 13% in areas with signs of pastures and grasslands, areas previously detected in 2020 and which are no longer active for 2021.

Of this affected territory, 87% corresponds to stable areas, followed by expanding areas with 10%, new areas with 3% and 13% with signs of pastures and grasslands, which denotes an abandonment of the activity. It is in the provinces of Antioquia and Bolívar where these areas are most present.

Compared to previous periods, the dynamics of EVOA do not show major changes in Colombia. For the period 2019-2020 [5], 111,394 ha were recorded with the presence of EVOA, of which 78% corresponded to stable areas, a trend that persists for the period 2020-2021, where stable areas concentrate 76% of the affected territory. Meanwhile, areas with signs of pastures and grasslands show an increase of about 4,000 ha, from 10% to 15% of the total territory with EVOA presence. New areas and expanding areas maintained a share close to 12% in both the 2019-2020 and 2020-2021 periods (Figure 22).

This demonstrates the great capacity of the actors involved in the production chain to settle and to continuously exploit alluvial gold; it also demonstrates the high profitability of the activity, which urges the permanence of the extractive activity, even if much of it is performed as illegal exploitation in the territories.

Concepts:

Affected territory 2020-2021: *geographic sum of the detection of EVOA on land in the period 2019-2020.*

Stable area: *area with permanent EVOA on land, detected in the 2020 and 2021 surveys.*

New area: *area with EVOA on land detected in 2021, but not found in 2020.*

Expanding area: *area with EVOA on land detected in 2020 that presents a new area of exploitation and that presents continuity with previously detected EVOA.*

Areas with signs of pastures and grasslands: *areas with EVOA detected in 2020, but which in 2021 are found with herbaceous vegetation or short stubble, characteristic of initial stages of plant succession.*

Area without information: *areas with EVOA detected in 2020, but found to be under cloud cover during the study period.*

Figure 22. Dynamics of EVOA on land in the municipality of Simití (Bolívar).

Note: SPOT sensor image. Left: December 2020; right: September 2021. In yellow, expanding areas.

At the provincial level, Chocó and Antioquia concentrate about 77% of the total territory with EVOA presence for the period 2020-2021. In this context, the dynamics presented in these provinces compared to previous periods stand out: while Chocó shows a 60% growth in its expanding areas and 14% in new areas compared to the previous period, Antioquia decreased by 40% the number of hectares in expanding areas and reduced by 22% the number of hectares in new areas. The reduction of hectares in Antioquia could be related to the mobilization of the activity to other provinces, such as Chocó; with the deepening of excavation or the depletion of areas exploited years ago, although it is necessary to delve deeper into the causalities of these dynamics (Table 12).

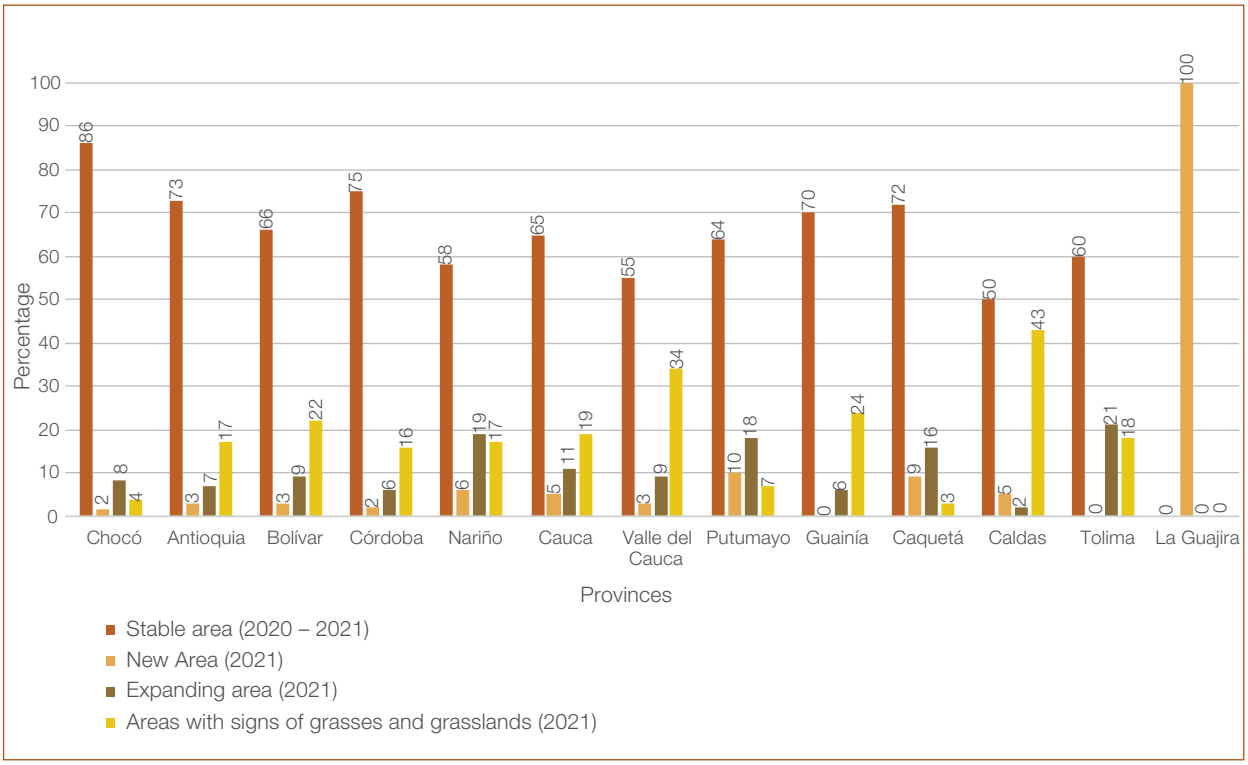
Table 12. Territory with presence of EVOA on land (ha), 2020-2021.

Province	EVOA on land 2020	EVOA on land 2021	Stable area 2020 – 2021	New Area (2021)	Expanding area (2021)	Areas with signs of pastures and grasslands	Presence in the territory (2020-2021)	Total presence 2020-2021 (%)
Chocó	36,552	38,980	35,017	655	3,308	1,535	40,515	36
Antioquia	40,890	37,588	32,989	1,330	3,269	7,901	45,489	40
Bolívar	10,583	9,472	7,962	391	1,119	2,621	12,093	11
Córdoba	4,975	4,580	4,092	135	353	882	5,462	5
Nariño	3,374	3,764	2,622	264	878	752	4,516	4
Cauca	2,807	2,732	2,183	184	364	624	3,356	3
Valle del Cauca	765	575	473	25	77	292	867	1
Putumayo	405	526	365	58	103	40	566	<1
Guainía	185	151	138	0	12	46	197	<1
Caquetá	78	101	75	10	16	3	104	<1
Caldas	112	69	60	6	3	52	121	<1
Tolima	27	28	21	0	7	6	34	<1
La Guajira	0	2	0	2	0	0	2	<1
Total National	**100,753**	**98,567**	**85,998**	**3,060**	**9,509**	**14,754**	**113,321**	**100**

At the national level, the trend of previous periods is maintained, with 5 provinces concentrating the presence of EVOA. In the 2020-2021 period, 97% of the total affected territory is concentrated in the provinces of Antioquia (36%), Bolívar (11%), Chocó (41%), Córdoba (5%) and Nariño (4%). Similarly, in all provinces, stable areas comprise almost the total presence of EVOA in the territories, i.e., 87% of the hectares registered in 2020-2021 correspond to hectares previously identified in other periods. The only province that registered EVOA for the first time for this period was the province of La Guajira, where 2 ha were identified (Figure 23).

Of the 98,567 ha of EVOA for 2021, 87% corresponds to stable areas: 10% to expanding areas and 3% to new areas.

Figure 23. Territory with presence of EVOA on land, 2020-2021.



Dynamics of the Phenomenon and Law Arrangements

The detection of EVOA for the period 2020-2021 is largely related to Illicit Exploitation (73,654 ha): 75% of the findings correspond to stable areas, 16% to new areas and 9% to expanding areas. For the same period, 9,671 ha that in 2020 were under the category of Illicit Exploitation entered the category with traces of pastures and grasslands, which shows the cessation of gold exploitation activity. This contrasts with the dynamics of new and expanding areas, which will concentrate 8,837 ha by 2021. These comparative data reflect a certain stability; what is abandoned in some areas, either due to depletion of the deposit or limitations in its accessibility, is resumed in new exploitation points.

The provinces with the highest concentration of Illicit Exploitation, related to stable areas, were Chocó (27,339 ha), Antioquia (14,525 ha), Bolívar (5,077 ha), Córdoba (3,752 ha), Nariño (1,882 ha) and Cauca (1,434 ha). These provinces accounted for 97% of the stable areas under the category of Illicit Exploitation. This high stability constitutes an alert for the authorities and institutions, which must carry out effective controls and interventions to break this dynamic of illegal activity in the territories that undermine the environmental and fiscal patrimony of the State. Similarly, this alert should be extended to those provinces in which, despite registering lower numbers of EVOA detection in stable areas, Illicit Exploitation is predominant.

In relation to new and expanding areas, 3,025 ha were detected under the category With Technical and/or Environmental Permits. The provinces of Antioquia (1,886 ha), Bolívar (536 ha), Chocó (417 ha) and Nariño (118 ha) registered the highest number of hectares in this category. Regarding Illicit Exploitation, 8,837 ha were detected for the 2020-2021 period. The provinces with the highest concentration of hectares in this category were Chocó with 3,289 ha, followed by Antioquia with 2,537 ha, and Bolívar with 919 ha, followed by Nariño with 909 ha Finally, for the category In Transit to Legality, Chocó and Antioquia register 64% of this evidence (Table 13).

In this aspect, it is necessary to highlight that the exploitations under this category have the prerogative to exploit only with manual tools to remove the material; that is, the use of heavy machinery is not allowed. In this sense, new evidence that leaves a footprint in the landscape, sufficient to be detected with satellite images, must be monitored and controlled to verify and control the technical agreements established for these categories (legalization requests and declared Special Reserve Areas [ARE]).

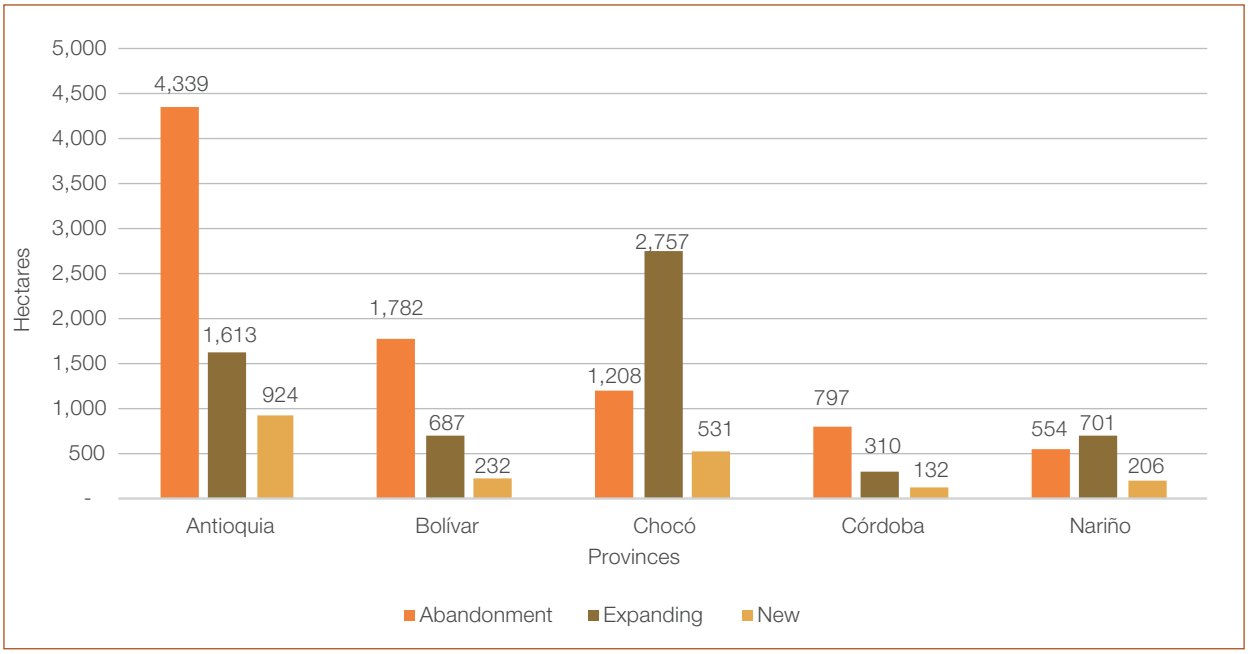
Table 13. Dynamics of the phenomenon and its relationship with law arrangements, 2020-2021.

Dynamic	Technical and/or Environmental Permits	In Transit to Legality	Illicit Exploitation
Stable areas	25,402	5,449	55,146
With signs of pastures and grasslands	4,457	626	9,671
Expanding areas	2,467	509	6,533
New areas	558	198	2,304
Total	**32,884**	**6,782**	**73,654**

Accordingly, for the category with signs of pastures and grasslands, 4,457 ha were recorded related to the class With Technical and/or Environmental Permits. In the Illicit Exploitation category, 9,671 ha were recorded, 2,493 ha more than in the previous period[39]. For the years 2020-2021 there was a generalized increase in these areas: Antioquia and Bolívar were the provinces with the highest number of hectares with signs of pastures and grasslands with 4,339 ha and 1,782 ha, respectively.

Figure 24 shows the dynamics presented under the category of Illicit Exploitation in relation to areas with indications of pastures and grasslands, new and expanding areas, in the five provinces with the highest presence of EVOA in the 2020-2021 period. Antioquia stands out, where a dynamic of abandonment of the illicit activity is detected, while Chocó shows expansion dynamics, as the number of expanding hectares exceeds the areas with indications of pastures and grasslands.

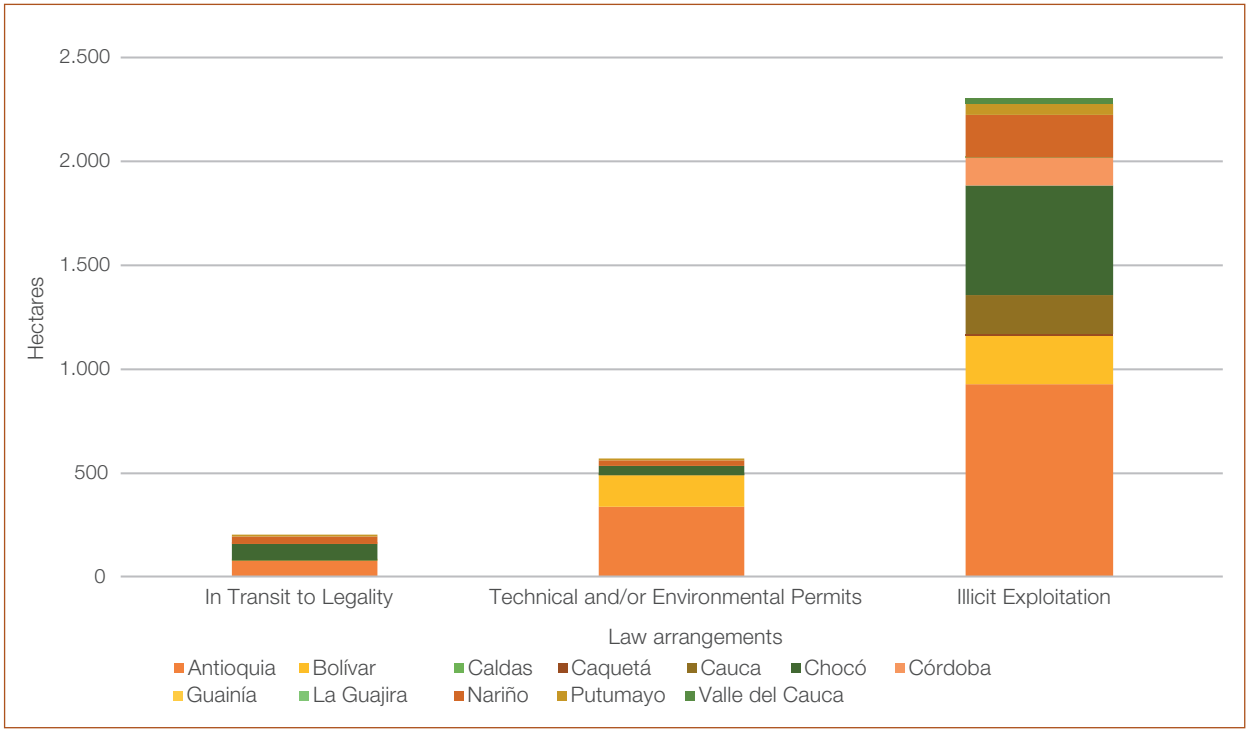
Figure 24. Abandonment and expanding dynamics in the provinces with most EVOA under Illicit Exploitation, 2020-2021.



39 For the 2019-2020 period, 7,179 ha were recorded under two categories of law arrangements: With Technical and/or Environmental Permits and In Transit to Legality.

Regarding new areas by province, for each grade figure, it can be seen in Figure 25 that the Illicit Exploitation category predominates in the appearance of new areas for alluvial gold exploitation for the period 2021. The provinces with the highest number of new hectares under Illicit Exploitation were Antioquia (924 ha), Chocó (531 ha), Bolívar (231 ha), Nariño (205 ha) and Cauca (184 ha). It should be noted that the provinces of Caldas, Caquetá, Guainía, La Guajira and Valle del Cauca registered all their new areas under the category of Illicit Exploitation, which constitutes an alert for possible expansion of the phenomenon in these provinces.

Figure 25. New areas by category of law arrangement.

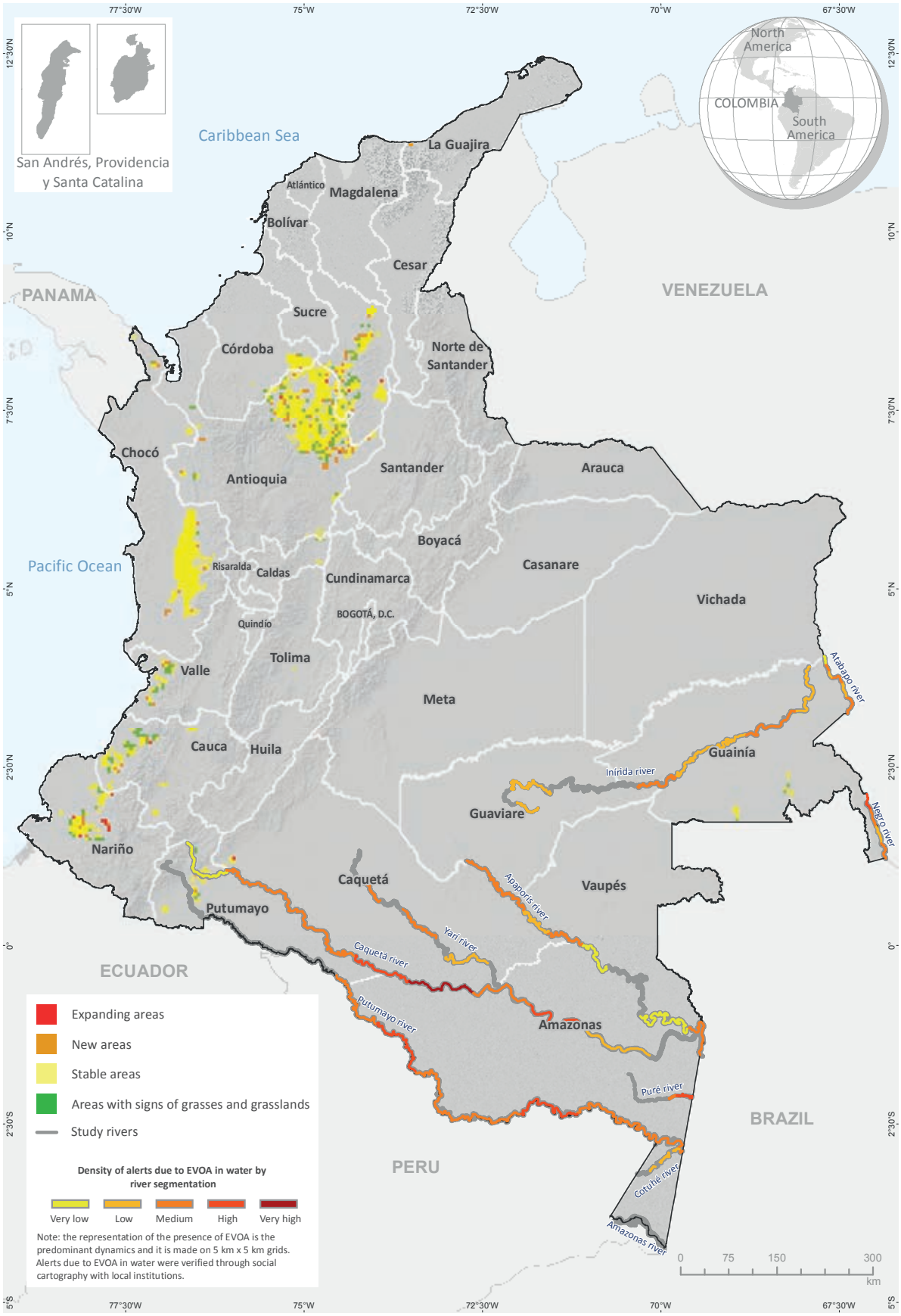


In summary, the detection of EVOA of the current year 2021 and the figures that account for the dynamics of the phenomenon in the period 2020-2021 show that stability corresponds to 87% (map 13).

It is noteworthy that Antioquia reduced the presence of EVOA in the territory by 8%, a fact that coincides with the registration of areas with signs of pastures and grasslands (7,900 ha); although the presence of organized armed groups (OAGs) persists in the territories with illegal exploitation, the strong institutional framework of the province in mining matters and the strategies that are being implemented such as the strengthening of mining formalization stand out.

In turn, Chocó is the province with the highest number of EVOA on land; approximately 80% corresponds to Illicit Exploitation and shows expansion dynamics, which makes it a territory of great interest for the OAGs that are fighting for controlling the illicit economies and increase the risk factors for the civilian population. This requires the presence of the State and close coordination between the central and provincial levels to carry out comprehensive actions on all fronts.

Map 13. EVOA Dynamics 2020-2021.



Source: Government of Colombia - Monitoring system supported by UNODC.
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EVOA AND GOLD PRODUCTION

In the current scenario, the Covid-19 crisis has had a significant impact on the gold market at the international and national levels, as it is the preferred safe-haven asset for world investors; hence, its price has been strengthened in the global market, representing an opportunity for national production. This section describes, in general terms, world supply and demand, as well as gold production in Colombia and its contribution to the global market. It also identifies the behavior in the last two years of the pandemic, a period in which the global demand drives legal production but also the illicit exploitation of gold, reflecting this situation in the figures of this EVOA report, in which it is reported that 65% of the identified hectares correspond to Illicit Exploitation, turning the country into a favorable scenario for the involvement of organized armed structures due to the high profits and low risks generated by this activity.

Gold Mining in the World and in Colombia in Times of Pandemic

- **Macroeconomic impact of mining in 2021:**
  - GDP from mining and quarrying had a share in the national aggregate of 4.1%: the fourth quarter dated 2021 grew 8.2% compared to the same period in 2020 [38].
  - Mining exports reached USD 15,788 million, an increase of 46.1% compared to 2020, when USD 10,806 million entered the country [38].
  - Mining and quarrying accounted for 10.8% of Foreign Direct Investment (FDI) in the country [39].
- **Importance of gold in the mining sector in 2021**:
  - The subsector of extraction of metalliferous minerals had a 9.4% share in the GDP of the Mining and quarrying sector [38].
  - As of October, gold exports totaled USD 2,549 million [40].
  - In the first half of the year, gold production amounted to 26.8 t [24].

Gold production and its market diversifies and increases mainly during the last decade. Gold is mainly used in the jewelry sector, in technology, in central banks and as an investment asset it is traded for reserves or as a commodity. It is recorded that the demand from investors increased at present, taking into account that gold is considered as a safe-haven asset and is one of the commodities with the lowest volatility [16], which has contributed to keep the price of gold at record levels during the last years.

Data from the U.S. Geological Survey [17] allow us to conclude that world gold production has increased in recent years: in 2005 production was 2,470 t and in 2010 it reached 2,560 t; as dated 2015, annual production exceeded 3,000 t. Indeed, between 2015 and 2019, the average production was 3,208 t [18]. This behavior is due to the strengthening of demand and the upward trend in reference prices. However, in 2020, world production was 3,200 t, 3% less than that recorded in 2019, which is basically explained by the effect of the covid-19 pandemic.

China is the world's largest gold producer, with an estimated production of 420 t in 2019 and 380 t in 2020; Australia is in second place with 320 t, followed in importance by Russia with 300 t, the United States with 190 t and Canada with 170 t. In Latin America, Peru stands out as a major player internationally with 120 t and Mexico with 100 t, while Colombia's production accounted for 1.5% of the world total with 48.5 t (27.6% more than in 2019). The world's largest consumers in 2020 (2,087 t) are China and India, with a combined share of about 50% of demand; they are followed by the USA, Germany, Turkey, Iran, Switzerland, Vietnam, Russia and Indonesia [19].

Gold reserves over the last 12 years are estimated at 52,000 t on average. In 2020, they were estimated at approximately 53,000 t of gold, 6% higher than the one determined in 2019 with 50,000 t. The largest gold reserves are in Australia (10,000 t), Russia (7,500 t), the USA (3,000 t) and South Africa (2,700 t). In Latin America, the largest reserves are found in Peru (2,700 t), Brazil (2,400 t) and Mexico (1,400 t) [20]. Regarding the dynamics of reserves in Colombia, the Central Bank in this country (Banco de la República) reported that the participation of gold in international reserves is minimal and with the sales made between May and June 2020, it was reduced from 1.4% of the total to 0.4% [21].

Gold Prices in the World[40]

The last two years have seen high swings in gold prices driven by factors such as interest rates and strengthening demand. Data from the London Bullion Market Association (LBMA) indicate that the average price in 2020 was USD 1,770.4/oz and in 2021 USD 1,800.2/oz, reflecting an increase of approximately 2%. The lowest quotation in 2020 was in January (USD 1,560.7/oz) and the highest in August (USD 1,971.2/oz). Regarding gold price behavior in 2021, the first and second quarters presented increases of 14% and 6%, in respect of the same periods dated 2020, and the third and fourth quarters registered drops of 6% and 4% respectively. This behavior could be influenced by the new covid-19 surges that occurred in these periods and the confinements, situations that continue to represent a challenge in the future [22].

40 According to the World Gold Council prices are determined by the interaction of four key categories: 1) economic expansion: rising incomes are associated with increased demand for jewelry, technology and long-term savings; 2) risk and uncertainty: market downturns often drive investment demand for gold as a safe-haven asset; 3) opportunity cost: the relative value of assets such as bonds and currencies; and 4) momentum: asset flows and price trends can intensify or diminish gold's performance [41].

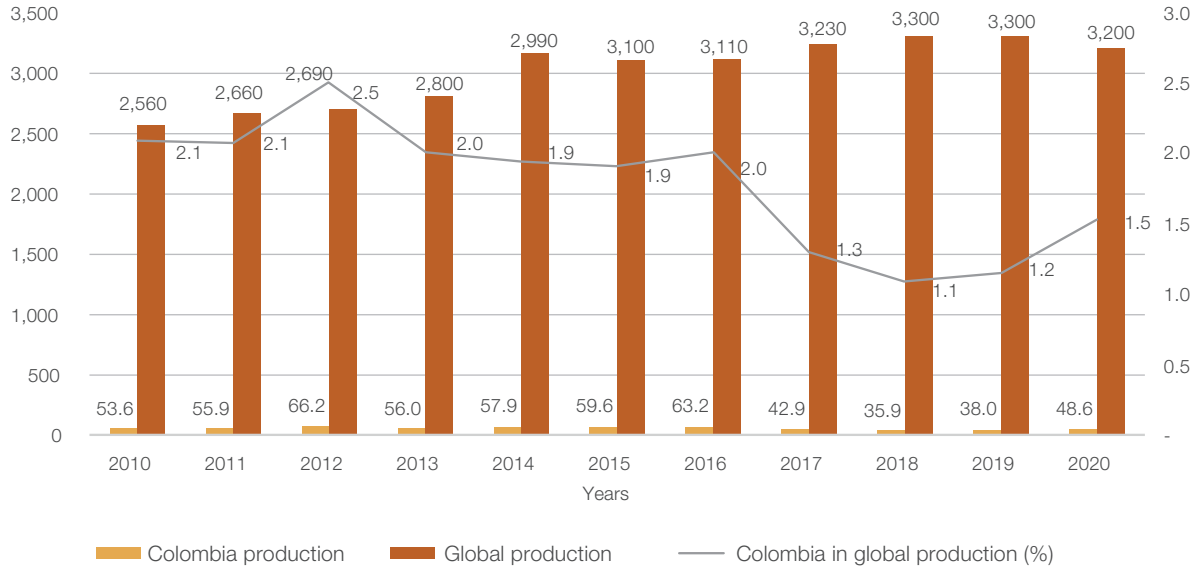
Gold Production in Colombia

In the 2010-2020 period, Colombian gold production, according to data from the National Mining Agency (ANM)[41], represented about 2% of world production. The highest production was recorded in 2012 with 66.2 t (2.5% of world production) and the average international price for that year was $1,669/troy ounce. As dated 2017, production levels decrease in relation to previous periods, due among other factors to the implementation of controls on subsistence mining production. In 2020 reported production was 48.6 t (1.5% of world production) and in the first half dated 2021 26.8 t.

The exploitation of mines without hydrocarbons has had a share in GDP between 1.5% and 2% in the last ten years. Coal is the second largest export earner for the country, after oil, and is the largest contributor to mining exports and royalties; however, the sector has been affected by the pandemic crisis and changes in international demand, so its production fell to historic lows, in contrast to gold, which rebounded in exports. The composition of the mining GDP could change in the coming years due to the global energy transition towards cleaner and more economical energies, a context in which minerals such as copper and gold could emerge [23]. Betting on other key minerals such as gold, which presents better prospects in the international market, implies intensifying controls on illicit gold extraction and increasing the levels of formality and legality, thus improving fiscal revenues from taxes and royalties, which can be invested in the territories highly affected by this phenomenon (Figure 26).

41 The official report of mineral production in the country is in charge of the ANM and is obtained from the production declaration made by the six categories of miners authorized to exploit and the corresponding liquidation and royalty payments; in the case of precious metals, the productive level, the quantities of mineral exploited, as well as the origin (municipality and province) are determined.

Figure 26. Gold production in Colombia and its share in world production, 2010-2020.



Source: [3] [17] [24].

At the national level, the production structure for the 2017-2021 period (first semester) shows concentration between two types of exploiters: 45.3% comes from mining titles (87.0 t) and 42.9% from Artisan miners i.e., "barequeros" (82.4 t), while the remaining 11.8% (22.5 t) is distributed in subcontracts, legalization requests, ARE and Scrap miners i.e., "chatarreros". It is highlighted that in the first semester dated 2021 the production was 26.8 t, of which 46.5% came from Artisan miners and 43.6% from mining titles (Table 14).

Table 14. Gold production (t) by type of operator, 2017-2021 (1st semester).

Type of operator	2017	2018	2019	2020	2021 (I semester)	2017 - 2021*	
						Total	Participation
Mining titles	20.8	17.1	17.6	19.8	11.7	87.0	45.3%
Artisan miners	19.3	15.9	15.3	19.4	12.5	82.4	42.9%
Formalization Subcontracts	0.7	1.1	3.0	5.8	1.6	12.2	6.3%
Legalization requests	0.9	0.3	0.5	2.0	0.5	4.2	2.2%
ARE	0.8	0.7	0.9	0.9	0.5	3.8	2.0%
Scrap miners	0.3	0.6	0.8	0.6	0.1	2.3	1.2%
Total	**42.9**	**35.6**	**38.0**	**48.6**	**26.8**	**191.9**	**100%**

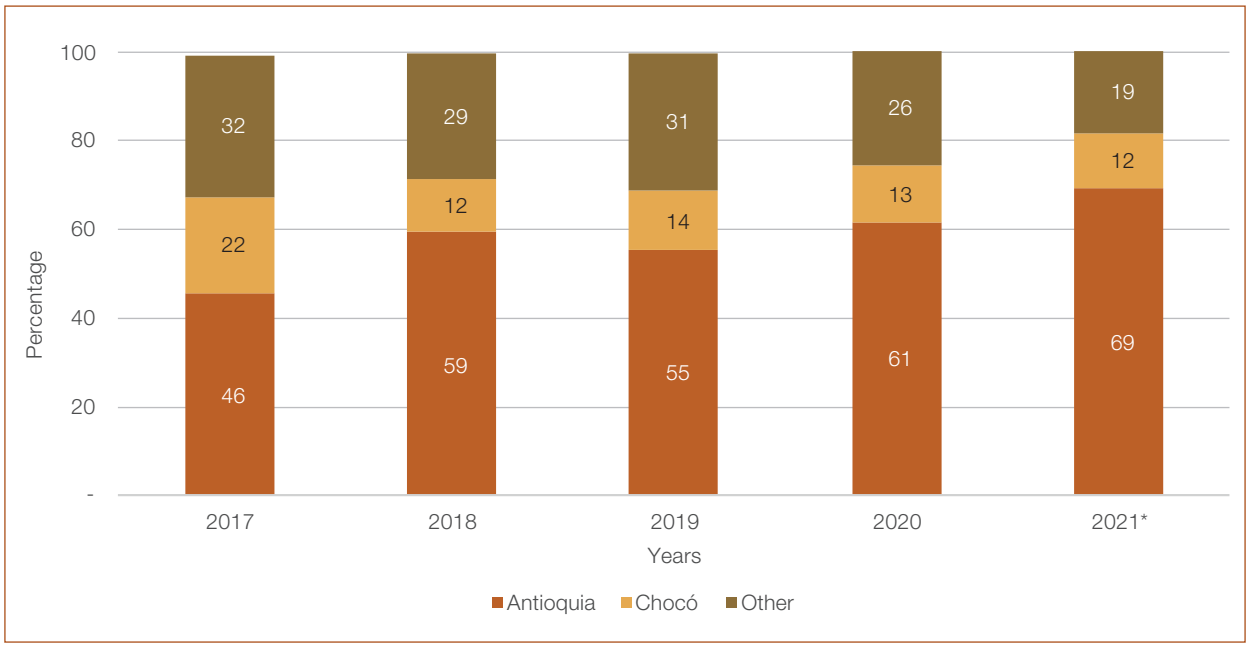
* Cut off date as of the first semester, 2021.

Source: [24].

At the provincial level, Antioquia ranks first in gold production. In the period 2017-2021 (first semester) the accumulated production was 110.1 t, of which 49.8% came from mining titles and 42.7% from artisan miners in the first semester dated 2021, on the other hand, production was 18.6 t: 9.4 t from mining titles (50.3%) and 8.3 t from artisan miners (44.5%). Regarding Chocó, with the second place in the national total of gold production, in the period 2017-2021 (first semester) it reached a production of 28.6 t: 53.6% came from artisan miners, 33.5% from mining titles, 7.5% from Legalization requests and 5.4% from subcontracts, ARE and scrap miners. In the first half dated 2021, production was 3.3 t, of which 70.6% came from artisan miners and 15.7% from mining titles.

The largest gold producers in the 2017-2021 period (first semester) are Antioquia (57.4%) and Chocó (14.9%); the provinces of Bolívar, Caldas, Córdoba, Nariño and Cauca are also important producers. In the first semester dated 2021, gold production in Colombia was 26.8 t: Antioquia with 18.6 t (69.4%) and Chocó with 3.3 t (12.4%), followed in importance by Bolívar, Caldas and Córdoba, with shares of 5.9%, 4.2% and 3.6% respectively (Figure 27).

Figure 27. Gold production in Colombia, participation by province.

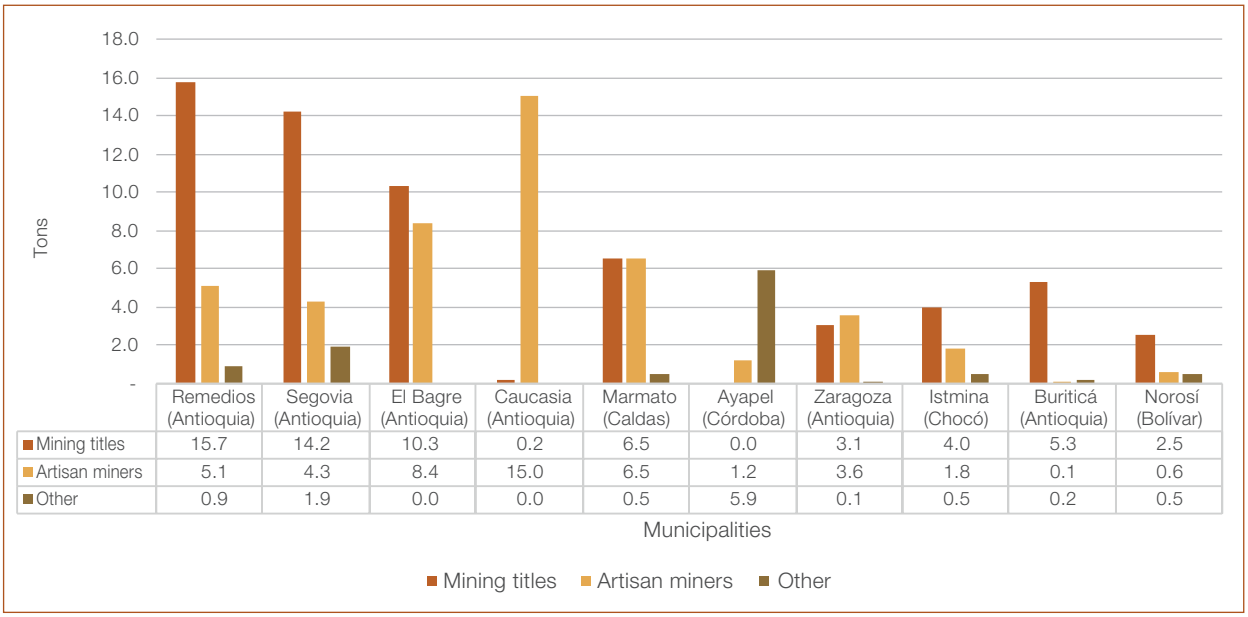


* Cut as of the first semester dated 2021.

Source: [24]

At the municipal level, the 10 municipalities with the highest reported gold production in the period 2017-2021 (first semester) concentrated 58.8% (112.8 t) of the national production: Remedios (11.3%), Segovia (10.6%), El Bagre (9.7%), Caucasia (8.0%), Zaragoza (3.5%) and Buriticá (2.9%), in the province of Antioquia, with a combined share of 46.1%; Marmato (3.8%) in Caldas; Ayapel (3.7%) in Córdoba; Istmina (3.3%) in Chocó and Norosí (1.9%) in Bolívar (Figure 28).

Figure 28. Main gold-producing municipalities by type of exploiter, 2017-2021 (1st semester).



	Remedios (Antioquia)	Segovia (Antioquia)	El Bagre (Antioquia)	Caucasia (Antioquia)	Marmato (Caldas)	Ayapel (Córdoba)	Zaragoza (Antioquia)	Istmina (Chocó)	Buriticá (Antioquia)	Norosí (Bolívar)
Mining titles	15.7	14.2	10.3	0.2	6.5	0.0	3.1	4.0	5.3	2.5
Artisan miners	5.1	4.3	8.4	15.0	6.5	1.2	3.6	1.8	0.1	0.6
Other	0.9	1.9	0.0	0.0	0.5	5.9	0.1	0.5	0.2	0.5

Source: [5] [24].

Gold Production and Areas Detected with EVOA in the Illicit Exploitation Category

According to studies conducted on the evidence of gold exploitation by the United Nations Office on Drugs and Crime (UNODC) and the Ministry of Mines and Energy (MinEnergía), the trend at the national level is towards an increase in the detected area of EVOA on land. The territory with presence of EVOA has had an upward trend, with an increase of 28% between 2014 and 2020; in 2021 the presence of EVOA was estimated at 98,567 ha with a reduction of 2% in relation to the previous year.

On the other hand, in 2020, 69% of alluvial gold exploitation with machinery on land was carried out outside any law arrangement (69,199 ha). In 2021, 65% is in the category of Illicit Exploitation, which constitute scenarios conducive to the involvement of armed structures in this activity (Table 15).

Table 15. Gold production and EVOA (Illicit Exploitation category) by province, 2020-2021.

Province	EVOA 2020 (ha)	Illicit Exploitation 2020 (ha)	%	Gold Production, 2020 (t)	EVOA 2021 (ha)	Illicit Exploitation 2021 (ha)	%	Gold production 2021 (1st semester)- (t)
Chocó	36,552	29,878	82	6.5	38,980	30,688	79	3.3
Antioquia	40,890	19,842	49	29.8	37,588	17,062	45	18.6
Bolívar	10,583	8,444	80	2.2	9,472	5,996	63	1.6
Córdoba	4,975	4,549	91	3.2	4,580	4,194	92	1.0
Nariño	3,374	2,549	76	0.6	3,764	2,789	74	0.2
Cauca	2,807	2,456	87	0.7	2,732	1,882	69	0.3
Valle del Cauca	765	765	100	0.1	575	573	100	0.0
Putumayo	405	370	91	0.0	526	474	90	0.0
Guainía	185	185	100	0.1	151	151	100	0.1
Caquetá	78	78	100	0.0	101	101	100	0.0
Caldas	112	81	72	2.9	69	69	100	1.1
Tolima	27	2	7	0.7	28	2	7	0.3
La Guajira	0	0	0	0.9	2	2	100	0.0
Other	0	0	0	1.0	0	0	0	0.0
Total	**100,752**	**69,199**	**69**	**48.6**	**98,567**	**63,984**	**65**	**26.8**

Source: [16] [12].

Chocó is the province with the highest presence of EVOA in 2021: 78.7% is in the category of Illicit Exploitation and, as of the first semester, it is the second province with the highest gold production with 3.3 t (national total = 26.8 t). Antioquia is the second province with the second highest presence of EVOA on land with 17,062 ha, equivalent to 45.4% in the Illicit Exploitation category, and has the highest gold production report in the country with 18.6 tons. In third place is Bolívar with 63.3% in the Illicit Exploitation category and a production of 1.6 tons. The provinces of Córdoba, Valle del Cauca, Putumayo, Guainía, Caquetá, Caldas and La Guajira are in the Illicit Exploitation category with over 90%.

Subsistence mining in the period 2017-2021 (first semester) represents about 46.5% of the total extraction of this mineral in the country. In the producing regions with high participation of artisan miners, there is evidence of a greater area with EVOA detected, in relation to those with mining titles. It has been established through field work conducted by UNODC that informality makes communities vulnerable to OAGs; under the guise of subsistence miners to commercialize gold, actions are carried out to evade the law, such as identity theft, falsification or violation of real production reports.

It is relevant to know and understand in depth the real production levels, due to the illicit exploitation of gold in several areas of the country. The illicit exploitation of gold is a source of income for the OAGs, taking into account that gold is more profitable than cocaine, involves less risk and is susceptible to being used for money laundering.

ILLICIT DYNAMICS AND CONDITIONS OF TERRITORIES WITH A HIGH PRESENCE OF EVOA

This section presents the ten municipalities with the highest presence of EVOA in the country that participate with 53.6% of the national total, from where 25.5% of the national gold production was extracted in 2020 and with high presence of illicit gold exploitation (59.2%). These territories are highly complex, because in addition to the presence of illicit gold exploitation, some of them also have coca crops and this also coincides with high levels of poverty and low development indexes, factors that become favorable scenarios for organized criminal structures that fight for territorial control, due to the high profitability of illicit economies. Sizing the causes, as well as the possible social, economic and environmental effects of illicit economies in these territories, requires studies that analyze the value chain in depth and contribute to making impact decisions in these highly vulnerable territories.

For the period 2017-2021 (first semester) in the country, gold production was recorded in 19 provinces and 194 municipalities. 58.8% of production was concentrated in 10 municipalities[42], 4 of which coincide with the municipalities with the highest presence of EVOA.

The ten municipalities with the highest presence of EVOA in the country, with 52,859 ha in 2021 (54% of the national total) are: Zaragoza, Nechí, Nóvita, El Cantón de San Pablo, Cáceres, Istmina, El Bagre, Ayapel, Río Quito and Unión Panamericana, from where 25.5% of the national production was extracted in 2020. Five municipalities are located in Chocó (Nóvita, El Cantón de San Pablo, Istmina, Río Quito and Unión Panamericana), from where 60.5% of the province's gold was extracted; four municipalities correspond to Antioquia and are located in the Bajo Cauca sub-region, from where 18.73% of the province's gold was extracted (Zaragoza, Nechí, Cáceres and El Bagre), and one in Córdoba (Ayapel) with a volume equivalent to 89.2% of the province.

In 2021, 59.2% of alluvial gold exploitation with machinery on land in the ten municipalities was carried out outside any law arrangement or in the category Illicit Exploitation (31,291 ha). The municipalities of Chocó registered 17,802 ha in this category (75.8% of the province), Antioquia 9,518 ha (38.04% of the province) and Ayapel 3,971 ha (91% of the province). According to UNODC/SIMCI information, some of these territories are also affected by coca cultivation, with the municipalities of Zaragoza, Nechí, Nóvita, Cáceres, Istmina and El Bagre reporting 4,039 ha planted.

Formal gold production, informal gold production and illicit gold exploitation, as well as the presence of illicit crops in these same territories, are factors that have influenced the emergence of organized criminal structures, which fight for controlling the territory for the income from illicit activities to strengthen themselves, and where State intervention has been insufficient to influence the driving factors of the scourge.

42 The municipalities with the highest gold production are: Remedios, Segovia, El Bagre, Caucasia, Marmato, Ayapel, Zaragoza, Istmina, Buriticá and Norosí.

It is noteworthy that these municipalities with high gold production, with impacts on royalty revenues and where the largest mining companies operate, have low levels of economic development and community wellbeing. Most of these territories, although they have the potential provided by natural wealth, are characterized by poverty levels above the provincial and national average, low development and municipal performance indexes, and high levels of violence. The populations face several risk factors, among them the lack of job opportunities, which makes them vulnerable to the illegal gold exploitation and illicit crops (Table 16).

Although it is not possible to delve into and affirm with certainty the causes of territorial vulnerabilities, the indicators presented in Table 16 can show the negative impacts on these territories.

The municipalities of Antioquia belong to the Bajo Cauca subregion and, according to the Departmental Development Plan [27], in terms of poverty indicators, these territories present the lowest living conditions among the 9 subregions of the province. The percentages of people living in multidimensional poverty and with UBN are high and are more acute in rural areas. The municipalities with the highest level of extreme poverty are Nechí (20.54%), Cáceres (18.43%) and Zaragoza (16.74%); Antioquia reports 2.48% (Figure 29) [25]. The participation of municipalities in the provincial GDP is between 0.2% and 0.6% [28].

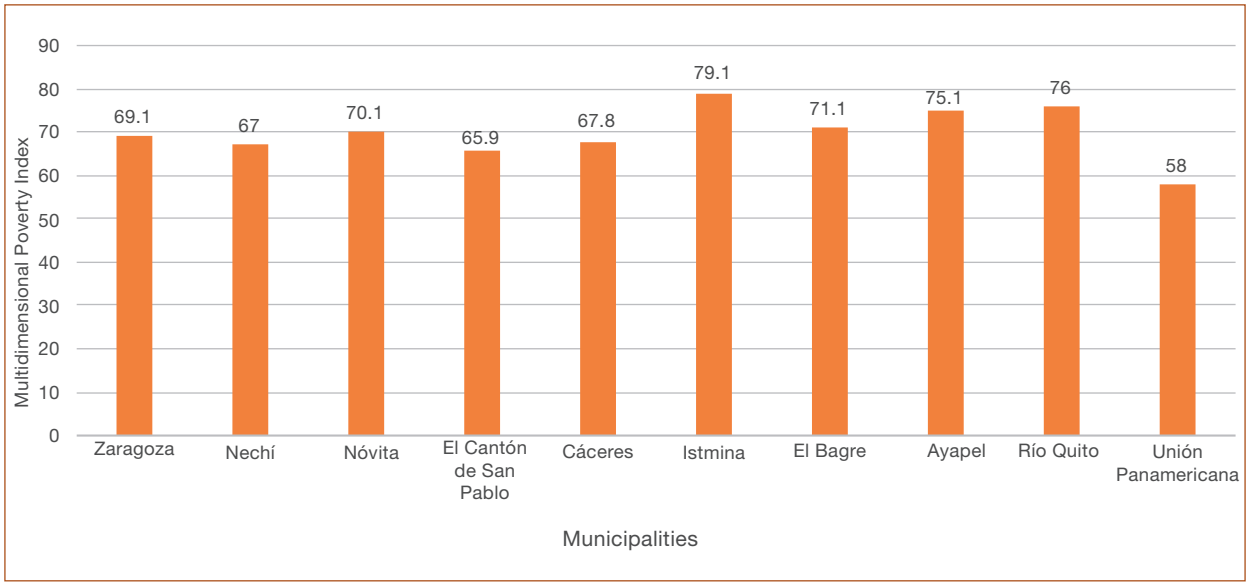
Regarding Chocó, the Ministry of Industry and Commerce (MinComercio) in the provincial profile published in February 2022, indicated that the contribution to the country's GDP in 2020 was 0.45% and at the sectoral level the GDP of mining and quarrying had a share dated 20.6% of the province's total [29]. In 2020, this province ranked fifth in the unemployment rate in respect of the national rate, according to data from the National Administrative Department of Statistics (DANE). The municipalities of Río Quito and Istmina register the highest levels of multidimensional poverty and NBI. The population living in extreme poverty is in Río Quito (18.10%), Istmina (11.74%) and El Cantón de San Pablo (11.52%). This province has the highest levels of EVOA in the country with 39.5% for 2021 and Illicit Exploitation of 78.7%.

Table 16. Municipalities with the highest presence of EVOA, illicit crops and territorial conditions.

EVOA 2020 y 2021 (ha)								Gold production (g)		Coca crops (ha)		Conditions of the territory						
Provinces	Municipalities	EVOA 2020 (ha)	Illicit Exploitation 2020	%	EVOA 2021 (ha)	Illicit Exploitation 2021	%	Gold Production, 2020	Gold Production, 2021	Coca crops 2019	Coca crops 2020	Population	UBN rural	UBN urban	Population living in extreme poverty	IPM capital	IPM rural	Homicidies rate* 100,000 inhabitants
Antioquia	Zaragoza	8,842	1,961	22	7,869	1,324	17	1,312,370	365,387	346	686	24,651	64.82	23.27	16.74	45.1	69.1	91.95
Antioquia	Nechí	7,996	3,665	46	7,609	3,339	44	311,517	190,571	530	551	25,790	67.30	43.03	20.54	56.8	67.0	36.72
Chocó	Nóvita	5,322	4,055	76	5,676	4,047	71	134,239	177,685	69	62	9,153	44.78	57.07	9.11	45.6	70.1	37.66
Chocó	El Cantón de San Pablo	5,253	5,203	99	5,643	5,598	99	1,052,786	769,576	-	-	6,116	30.58	58.78	11.52	53.4	65.9	22.20
Antioquia	Cáceres	5,285	3,258	62	4,972	3,189	64	379,061	141,323	1,101	1,274	28,996	53.46	35.47	18.43	60.9	67.8	178.08
Chocó	Istmina	4,593	2,953	64	4,731	2,626	56	951,018	580,262	229	200	30,742	56.88	92.45	11.74	47.5	79.1	30.61
Antioquia	El Bagre	4,843	2,064	43	4,569	1,666	36	3,576,982	2,561,057	648	1,266	51,862	59.27	20.97	13.15	43.0	71.1	99.71
Córdoba	Ayapel	4,768	4,342	91	4,357	3,971	91	2,891,207	599,097	-	-	46,968	67.52	35.43	14.33	55.0	75.1	7.13
Chocó	Río Quito	3,810	3,398	89	4,291	3,851	90	210,467	78,912	-	-	8,236	66.29	36.89	18.10	42.6	76.0	63.08
Chocó	Unión Panamericana	3,077	1,831	59	3,142	1,680	53	1,578,227	561,368	-	-	6,982	23.88	86.33	8.50	56.7	58.0	9.63
Total 10 municipalities		**53,789**	**32,730**	**61**	**52,859**	**31,291**	**59**	**12,397,873**	**6,025,239**	**2,923**	**4,039**	-	-	-	-	-	-	-
Total National		**100,752**	**69,199**	**-**	**98,567**	**63,984**	**65**	**48,560,925**	**26,808,057**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Source: [5, 24, 25, 26]

Figure 29. Rural multidimensional poverty index in municipalities with the highest presence of EVOA in the country, 2018.



Source: [25].

In relation to the conflict, according to information from the security forces and various studies conducted for the Bajo Cauca area, in this region there is a presence of GAOs such as Los Caparros, the Autodefensas Gaitanistas de Colombia (AGC) also known as the Clan del Golfo, the National Liberation Army (ELN) and dissidents of the Revolutionary Armed Forces of Colombia-People's Army (FARC-EP) [30]. In Chocó, the Clan del Golfo and the ELN have territorial influence; these groups are fighting for territorial control in order to take over the areas abandoned by the FARC-EP to take advantage of the high profitability derived from illicit economies[43], especially gold due to the high prices currently being recorded, which provides them with higher profits and lower risks.

The presence of OAGs in these territories entails their involvement in all phases of the value system associated with the illicit gold exploitation, extraction, transport, commercialization) [34]. According to the Ombudsman's Office in Colombia, the chain begins at the gold production sites, whose relationship with organized criminal groups responds to the dynamics used by these groups to steal capital. In order to move the mineral of illicit origin, marketers use the figure of subsistence miners, hence the production registered under this modality is significant [31]. In the Development Plan of the Province of Chocó [32] and in the field work carried out by UNODC, the difficulties of the mining communities to access formalization are mentioned, due to factors such as lack of knowledge, problems of displacement from the communities of origin to Quibdó, where the formalities are carried out, and the presence of OAGs.

43 The security forces and various reports from the Ombudsman's Office in Colombia mention that the presence of OAG responds to the variety of illicit economies in Chocó, such as timber extraction, coca cultivation and illicit mineral exploitation [31].

The statistical relationship between armed violence (homicide rate, armed confrontations), humanitarian impacts (forced displacement), economic activity (extortion) and serious damage to natural resources with alluvial gold exploitation (EVOA) has been identified [34]. Regarding homicide in 2020, the sub-region of Bajo Cauca has the highest rate per 100,000 inhabitants; the municipality of Cáceres has the highest rate (178.08), followed by El Bagre (99.71), Zaragoza (91.95) and Nechí (36.72) [33]. The municipalities of Chocó also report homicide rates above the national rate; Río Quito is the municipality with the highest homicide rate (63.08), Nóvita (37.66) and Istmina (30.61), these results reinforce a problem of high violence, intrinsically related to the control of economies associated with the illicit gold exploitation and illicit crops.

Illegal gold extraction with high levels of informality, coupled with the presence of illicit crops and the historical conditions of economic and social backwardness in these territories, create a favorable scenario for OAGs to obtain rents from their involvement in illicit economies [31]. The challenge is to design and implement a comprehensive strategy, for these territories characterized by their high vulnerability, focused on: 1) *strengthening the formalization policy*, enhancing institutional capacities to exercise accompaniment that allows reaching technical, environmental and economic standards for the communities; 2) *guaranteeing security and the implementation of actions that potentiate impacts and allow striking the value networks of illicit economies*, oriented to the nodes of high strategic value that support illicit mining exploitation and other illicit economies in the territories; 3) *social investment in line with the Sustainable Development Goals (SDGs)*, with the purpose of consolidating sustainable economies for social and environmental development, which reduces the vulnerabilities of the population. This requires generating technical evidence to identify these vulnerabilities in order to guide the monitoring and evaluation of intervention strategies, as well as an in-depth analysis of value network systems to focus on the nodes with the highest strategic value.

LOSS OF HIGH ENVIRONMENTAL VALUE PLANT COVERS CAUSED BY EVOA ON LAND

One of the activities on the ground that are part of the context of alluvial gold exploitation with the use of machinery on land involves the removal of large volumes of soil around water tributaries, which also results in the soil being stripped of its vegetation cover [34]. Although mineral exploitation is considered one of the direct causes of deforestation in Colombia, it is not the purpose or scope of this document to address this issue, which encompasses different concepts and methodologies.[44]

Therefore, this section addresses the loss of high environmental value plant covers, which correspond to a classification defined by UNODC/SIMCI in agreement with MinEnergía, in which methodologically four categories organized in two groups have been established [2]: 1) primary vegetation, unique in this group, and 2) vegetation in succession, comprising secondary vegetation, high stubble and short stubble (Table 17). The precept of this classification obeys to the identification, by remote sensing, of the degree of intervention on the original vegetation covers, according to interpretation elements such as tonality, color, brightness, texture and pattern, which determine a spectral behavior in the optical satellite images according to the biomass content and density of the vegetation [4].

Table 17. Categorization of high environmental value plant covers.

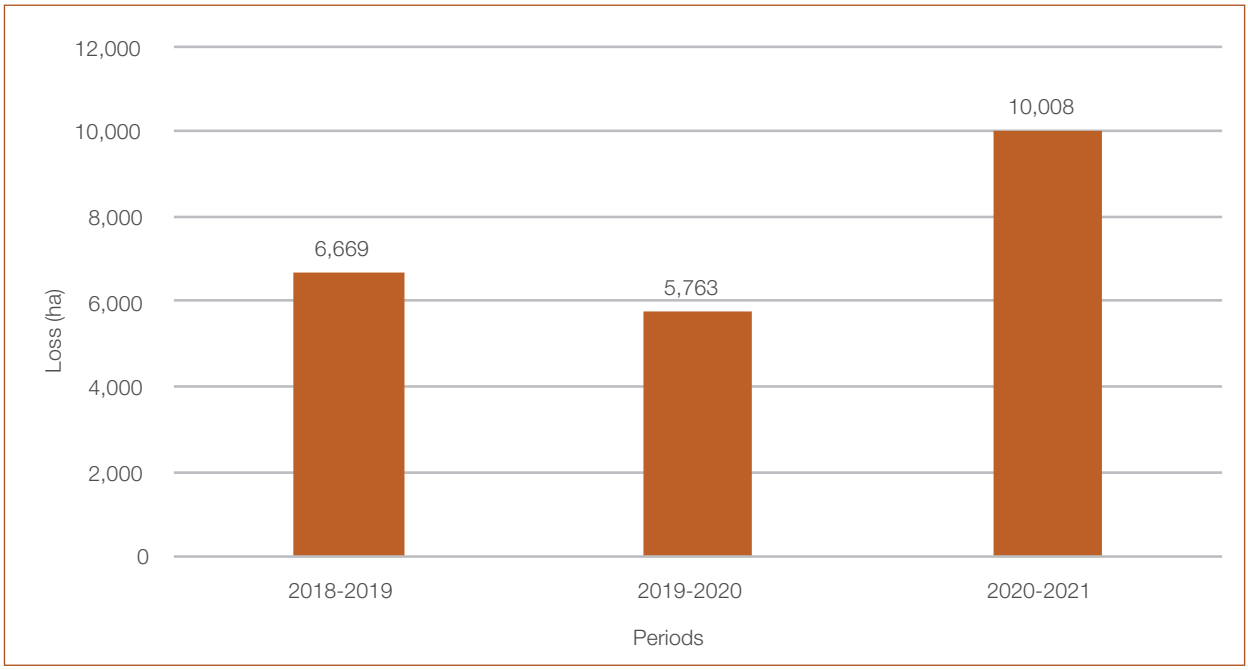
Group	Category	Description	Timing
Primary Vegetation	Primary Vegetation	Primary natural forests and other vegetation covers that have not had any type of intervention.	Hundreds or thousands of years since the last intervention.
Vegetation in succession	Secondary Vegetation	Vegetation cover that has gone through different stages of natural succession after the primary vegetation was intervened anthropically or naturally, and that has achieved a high level of recovery.	5 years or more since the last intervention.
	High stubble	Vegetation cover at an intermediate stage of vegetation succession, resulting from the natural regeneration process after the intervention of primary vegetation.	2 to 5 years since the last intervention.
	Short stubble	Vegetation covers in the first stage of plant succession, once the primary vegetation has been intervened or altered.	6 to 24 months since the last intervention.

44 The official entity in charge of presenting deforestation figures in Colombia is the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM).

General Findings

The appearance of new and expanding areas, with the presence of EVOA on land between 2020 and 2021, caused the loss of 10,008 ha of high environmental value plant covers in this period: 75% (7,550 ha) is due to expanding EVOA while the remaining 25% corresponds to new EVOA[45]; 80% of the total recorded in the sum of these two categories of dynamics of the phenomenon result in the loss of this type of land cover. This is the highest figure recorded for this concept in the last three study periods, with an increase of 74% In respect of the data reported in the years 2019-2020, when the lowest figure was recorded, a period in which 22,440 ha of coverages of high environmental value have been reported lost due to EVOA on land (Figure 30).

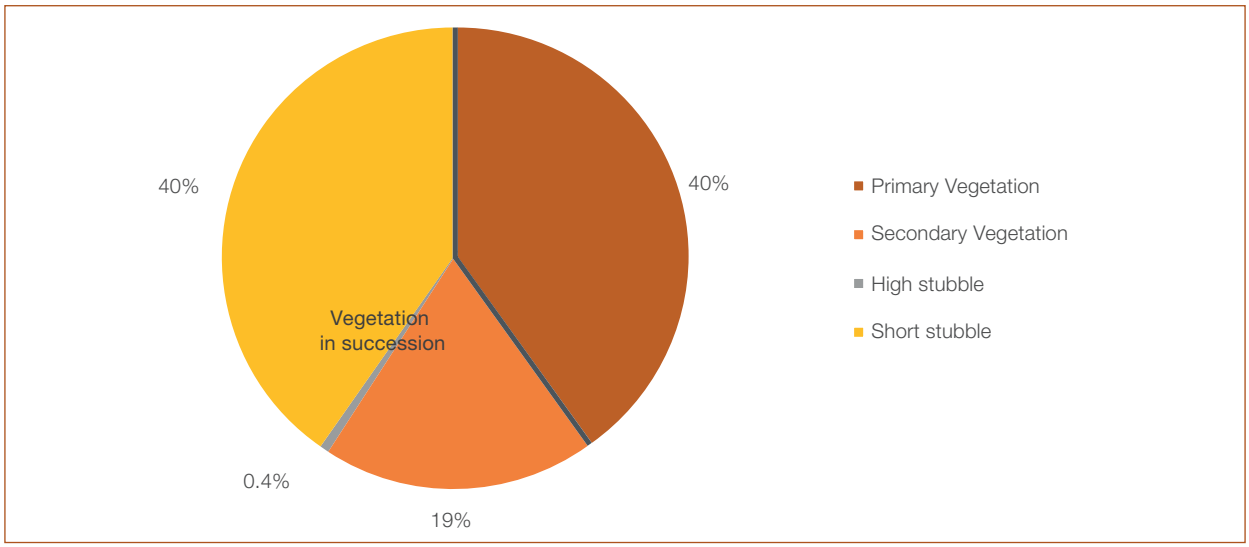
Figure 30. Comparison of the loss of high environmental value plant covers by EVOA on land in the last three periods of analysis.



In terms of the type of cover that was lost due to EVOA on land, 60% (5,994 ha) corresponds to vegetation in succession (secondary vegetation, high stubble and short stubble), while primary vegetation represents the other 40% (4,014 ha). However, when disaggregated into the four categories analyzed, short stubble (4,037 ha) has the same percentage share as primary vegetation; secondary vegetation is equivalent to approximately half of these two categories (1,917 ha) and high stubble contributes a very unrepresentative value in the figure (39 ha), as shown in (Figure 31).

45 See section "Dynamics of the phenomenon" in this document: 12,570 ha in areas without EVOA on land in 2020 reported the appearance of this evidence in 2021.

Figure 31. Distribution by category of high environmental value plant covers lost by EVOA on land, 2020-2021.



It should be noted that, in terms of ecosystem services, those territories in the land cover categories that represent the greatest importance under this precept due to the effect of the arboreal size of the individuals that compose them (primary vegetation and secondary vegetation), had the greatest loss in area due to the phenomenon (5,931 ha - 59% of the total of the high environmental value plant covers reported with loss).

In 12 provinces this condition occurred, one more than in the previous period (in the years 2019-2020 this situation was not reported in Caldas), within which it is highlighted that Antioquia and Chocó concentrate 70% of the losses due to EVOA on land (37% and 32% respectively), followed by Bolívar and Nariño with 21% (11% and 10% respectively), while the remaining 8 provinces group the other 10%.

Compared to 2020, there are provinces that do not have a high participation in the total cover that was lost and had an internal increase in their figure for this concept, higher than 100% compared to the previous period (Caquetá, Cauca, Córdoba and Guainía); however, it is evident that in Chocó the losses of vegetation cover by EVOA on land increased 93% in the last year (mainly in Nóvita, El Cantón de San Pablo and Istmina), when in the 2018-2019 period it had shown a decrease of 30% in this aspect. For its part, Antioquia recorded 54% more in 2021 compared to 2020 (mainly in Cáceres, Remedios and Tarazá) when in 2018-2019 it had remained stable (Figure 32).

Chocó, as the most biodiverse province in the country and with the most EVOA on land, has a high vulnerability in its tropical forest areas due to the high number of endemic and endangered species that live there [42]; it ranks second in losses of vegetation cover by EVOA on land and reports the highest proportion in terms of primary vegetation 58% of the total analyzed in this category.

Antioquia, on the other hand, ranks first and concentrates the phenomenon in successional vegetation with 3,087 ha.

Figure 32. Comparison of the loss of high environmental value plant covers by EVOA in the last three periods of analysis, by province.

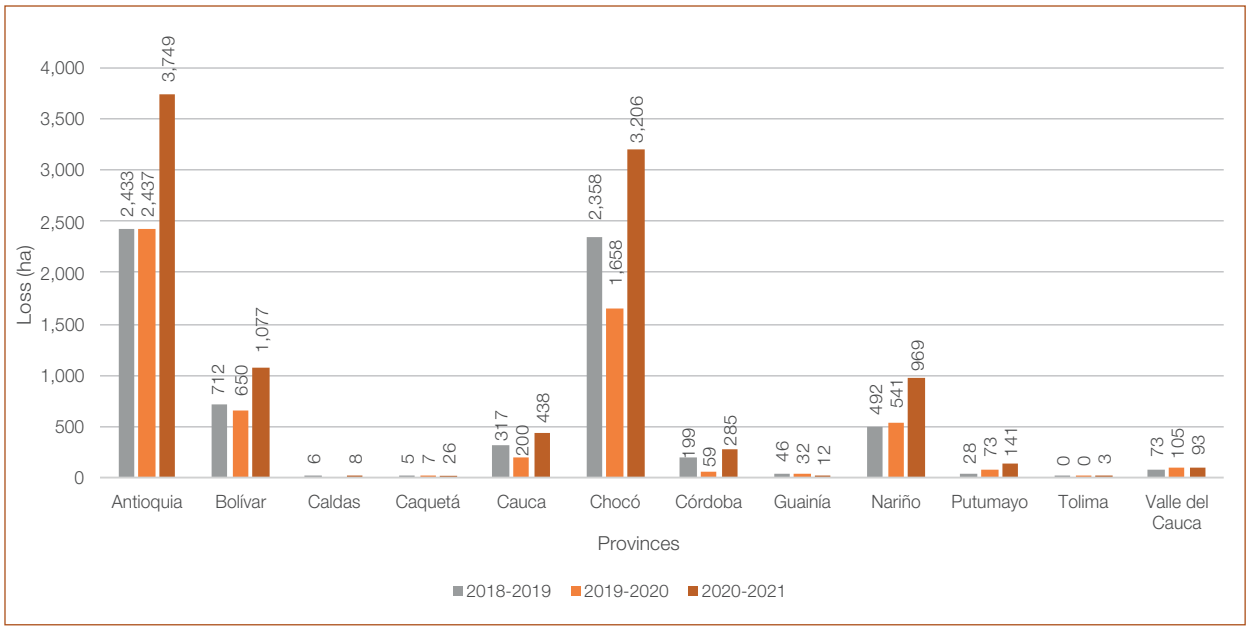


Table 18 presents the ten municipalities with the highest number of hectares lost by EVOA on land in the years 2020-2021 and their comparison with previous periods.

Table 18. Municipalities with the most area lost in high environmental value plant covers by EVOA on land, 2020-2021.

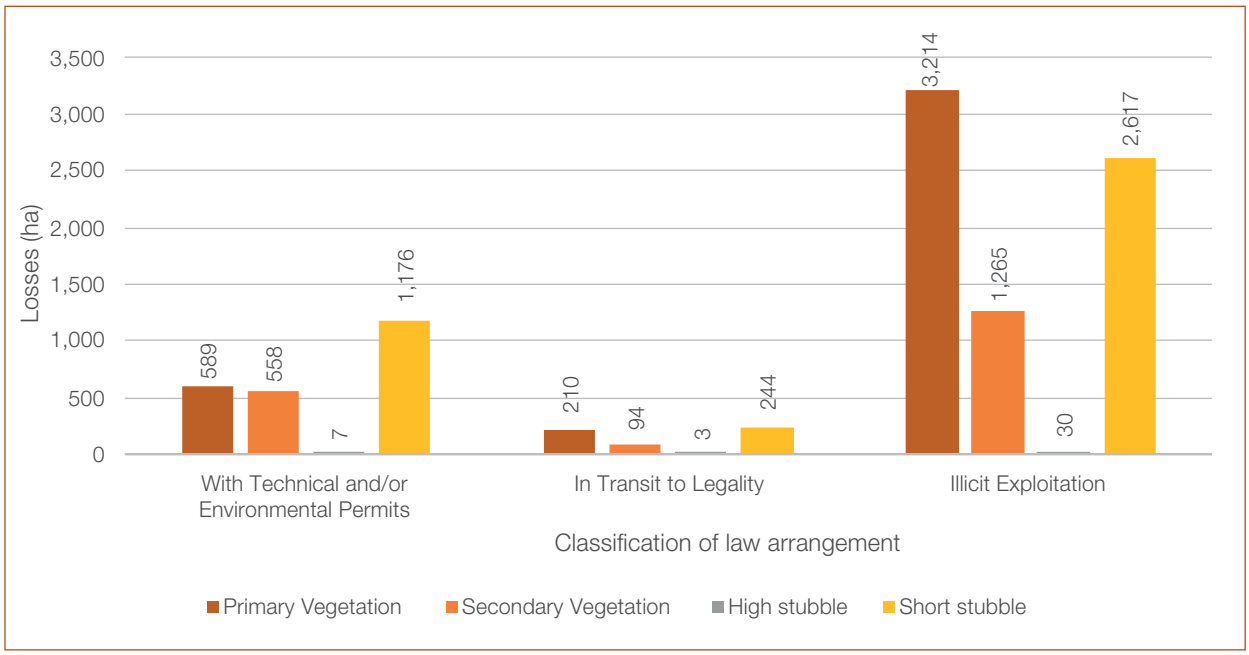
Province	Municipality	2018-2019		2019-2020		2020-2021	
		ha	Percentage	ha	Percentage	ha	Percentage
Antioquia	Cáceres	327	5	255	4	678	7
Chocó	Nóvita	457	7	235	4	646	6
Antioquia	Zaragoza	390	6	489	8	564	6
Antioquia	El Bagre	439	7	324	6	486	5
Antioquia	Remedios	111	2	190	3	470	5
Chocó	El Cantón de San Pablo	372	6	151	3	463	5
Nariño	Barbacoas	233	3	244	4	393	4
Chocó	Río Quito	404	6	274	5	390	4
Nariño	Magüí Payán	169	3	200	3	387	4
Bolívar	Santa Rosa del Sur	253	4	180	3	295	3

Loss of Plant Covers and Law Arrangements

71% of the loss of high environmental value plant covers (7,127 ha) was concentrated in areas under the category Illicit Exploitation, followed by the category 'With Technical and/or Environmental Permits' where 2,331 ha were lost (23%), and finally in areas In Transit to Legality there were losses of 550 ha (5%). Compared to the previous period (2019-2020), there was an increase of 78% in terms of hectares lost under Illicit Exploitation, although this category decreased its percentage of representativeness over the total losses by going from 74% to 71%.

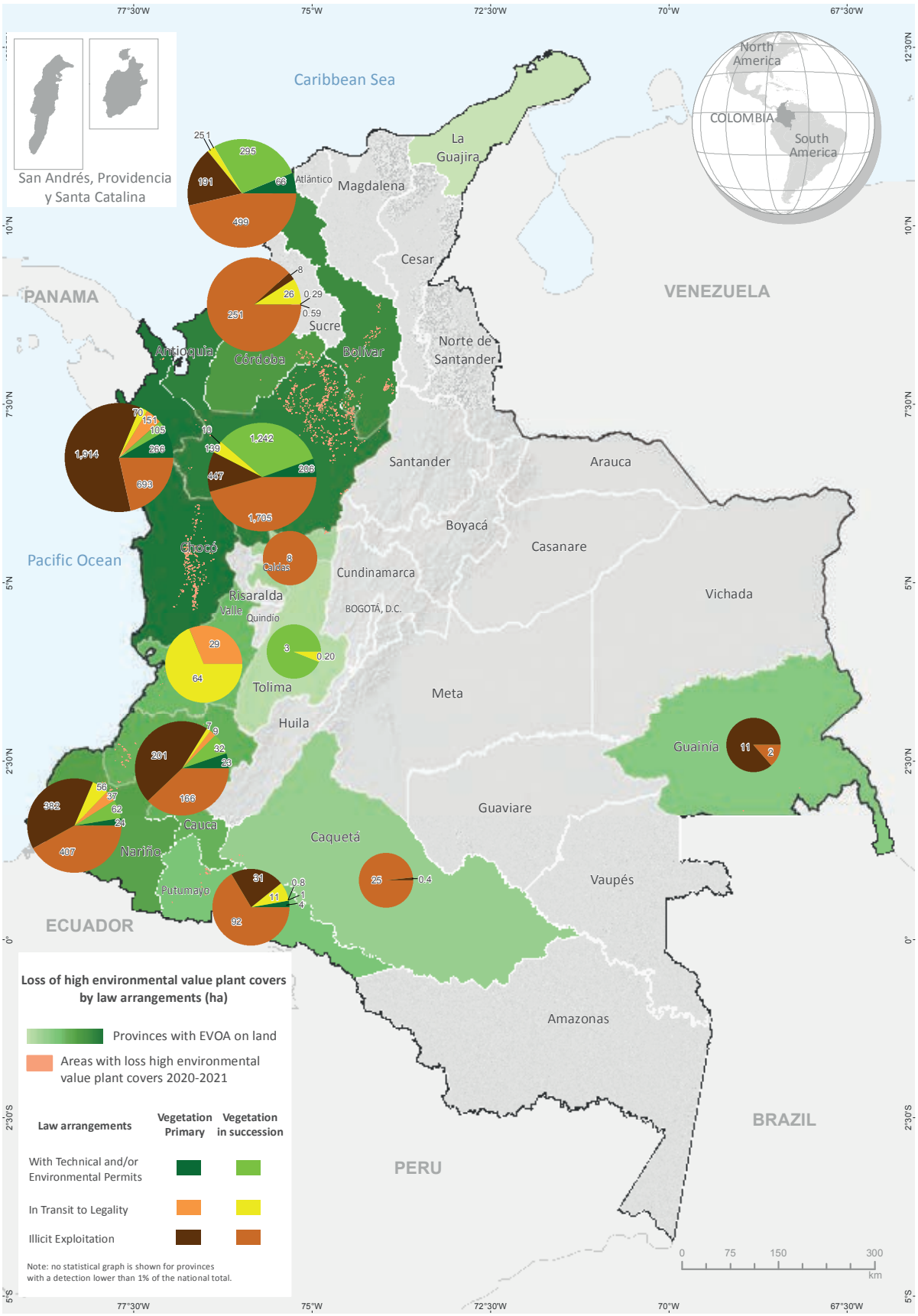
A deeper analysis by category of high environmental value plant cover shows that vegetation in succession is predominant in the law arrangement categories: in areas of Illicit Exploitation, 55% (3,912 ha) is of this cover category; in areas With Technical and/or Environmental Permits this concept corresponds to 1,741 ha (75% of the class in these coverages), and in areas In Transit to Legality, the participation of vegetation in succession is 62% (340 ha). Figure 33 illustrates the disaggregated behavior of all categories according to the law arrangements contemplated.

Figure 33. Loss of high environmental value plant covers according to law arrangements, 2020-2021.

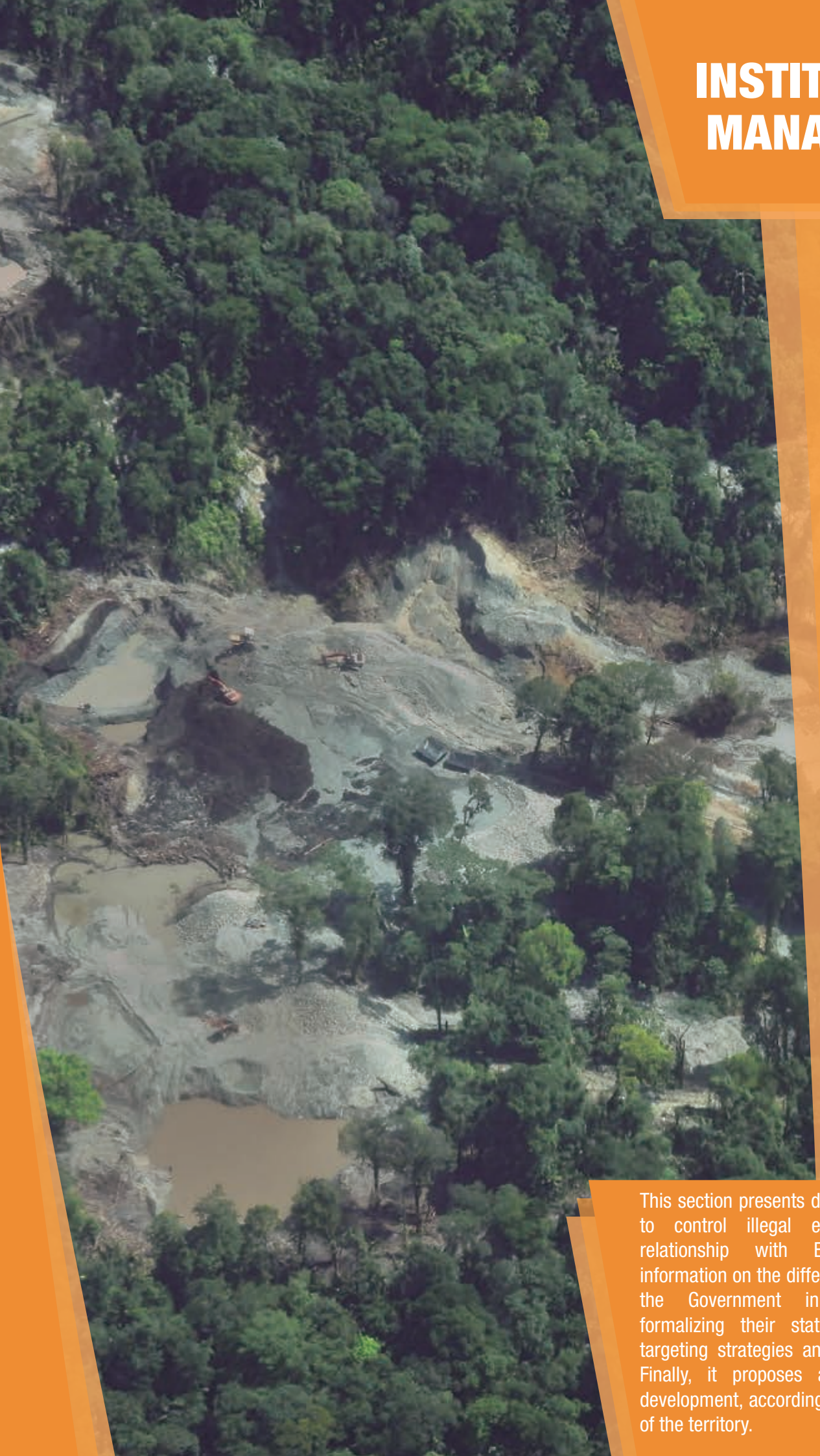


In terms of provincial analysis, Antioquia is the province with the most hectares lost: 57% originated from EVOA on land in areas of Illicit Exploitation (2,152 ha), representing 30% of all losses in this type of law arrangement; for its part, in Chocó, 81% of the area where losses were reported is due to Illicit Exploitation (2,606 ha), equivalent to 37% of what was lost in this law arrangement at the national level. It should also be emphasized that, by category of cover, the areas with the largest reported area under Illicit Exploitation in primary vegetation are in Chocó (1,914 ha), which represents 48% of all losses in this type of cover and is equivalent to 27% of all losses in this type of legal category at the national level (map 14).

Map 14. Provincial distribution of the loss of high environmental value plant cover by EVOA on land, in contemplated law arrangements, 2020-2021.



Source: Government of Colombia - Monitoring system supported by UNODC.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.



INSTITUTIONAL MANAGEMENT

SECTION IV

This section presents data related to actions to control illegal exploitation and its relationship with EVOA. It provides information on the different tools available to the Government in regularizing and formalizing their status, as well as in targeting strategies and policy formulation. Finally, it proposes alternatives for licit development, according to the particularities of the territory.

INSTITUTIONAL MANAGEMENT

During 2021, the Ministry of Mines and Energy (MinEnergía) reached different provinces in order to train and to strengthen local authorities and the security forces, agencies that exercise control over the illegal exploitation of minerals in the context of the processes and procedures established under current regulations, to ensure that all mining activities are carried out within the framework of legality.

To this end, we work in coordination with different institutions of the Colombian State, in order to demonstrate and to socialize the competencies and activities that each one executes to support and control the phenomenon of illegal exploitation of minerals in the national territory.

In this sense, twelve virtual and four face-to-face trainings were carried out in 2021, aimed at regional, provincial, municipal and local authorities that exercise control over the illicit exploitation of minerals (Table 19).

Table 19. Quantity of trainings, 2021.

Province	Date	Number of participants
West of Antioquia	March 18th and 19th	77
Brigade Against Illegal Mining - National Army	March 25th and 26th	59
Caquetá	April 15th and 16th	25
Caldas	April 22nd and 23rd	35
General Prosecutor´s Office	June 24th	26
Córdoba	July 25th	151
MinEnergía	August 18th	22
Attorney General's Office	August 27th	24
Corporinoquia	October 28th	31
Middle Magdalena / South of Bolívar	November 10th	73
Farallones de Cali	November 23rd	23
Norte de Santander	September 8th, 9th and 10th	38
Norte de Santander	November 24th	24
Boyacá	October 5th, 6th, 7th and 8th	42
Guainía	October 20th	32
Antioquia	November 25th and 26th	36

Source: [35].

Actions of the Colombian Government against Illegal Exploitation

The Colombian Government's control actions in the fight against the illegal exploitation of minerals are aimed at reducing criminal finances, as well as to mitigating the environmental damage caused by this type of activity. This is carried out through the seizure and destruction of raw materials and machinery, in addition to the intervention and closure of mines that are exploiting without a license, which in most cases do not contemplate actions to mitigate, prevent or repair the damage caused by the exploitation.

There are cases in which, as a result of an administrative injunction, intervention actions are carried out in areas that are titled and protected under the regulations for a technically and environmentally responsible exploitation; such situations occur when illegal exploitation is identified and is not carried out by the holder of the exploitation permit.

The Mounted Police' Directorate, attached to the National Police, is the armed body in charge of carrying out control operations against illegal exploitation; however, the National Army is a strategic and supportive player for this type of operations, since through the Brigade Against Illegal Mining it continuously accompanies the operations against illegal exploitation of minerals.

For this report, the interventions carried out and registered between 2020-2021[46] were taken as a reference; in total there is information on 3,362 general intervention operations[47] that accumulated 6,223 operational results. In general, a significant increase is observed between what was reported as intervened in 2019; for 2020 the total number of operations amounted to 1,528 (2,742 operational results), this meant 3.4 times more operations than in 2019 and 4 times more operational results for the previous reference year. As for the cumulative to date for 2021, there is a 20% increase in operations (1,834) and a 27% increase (3,481) compared to 2020 (map 15).

Despite the reported increase in the number of reported intervention operations, when these are analyzed in respect of the territories that have evidence of EVOA on land 2021, a low spatial relationship is observed; 4% of the total number of operations in the period analyzed is evidenced.

This result should be approached with caution given that the registration of the information captured on the ground may not have taken place at the site of the operation but in the nearest urban center (it is important to mention that there are types of actions that are derived from the operations to control illegal exploitation such as the capture of people and these are not directly associated with the site of exploitation); this can be seen when reviewing the relationship of the operations with the action model in the territory, which shows that 55% of the operations are related to a population center or urban perimeter. Another aspect that should be taken into account is that, since one does not have detailed information on the type of exploitation, it can be presumed that the actions

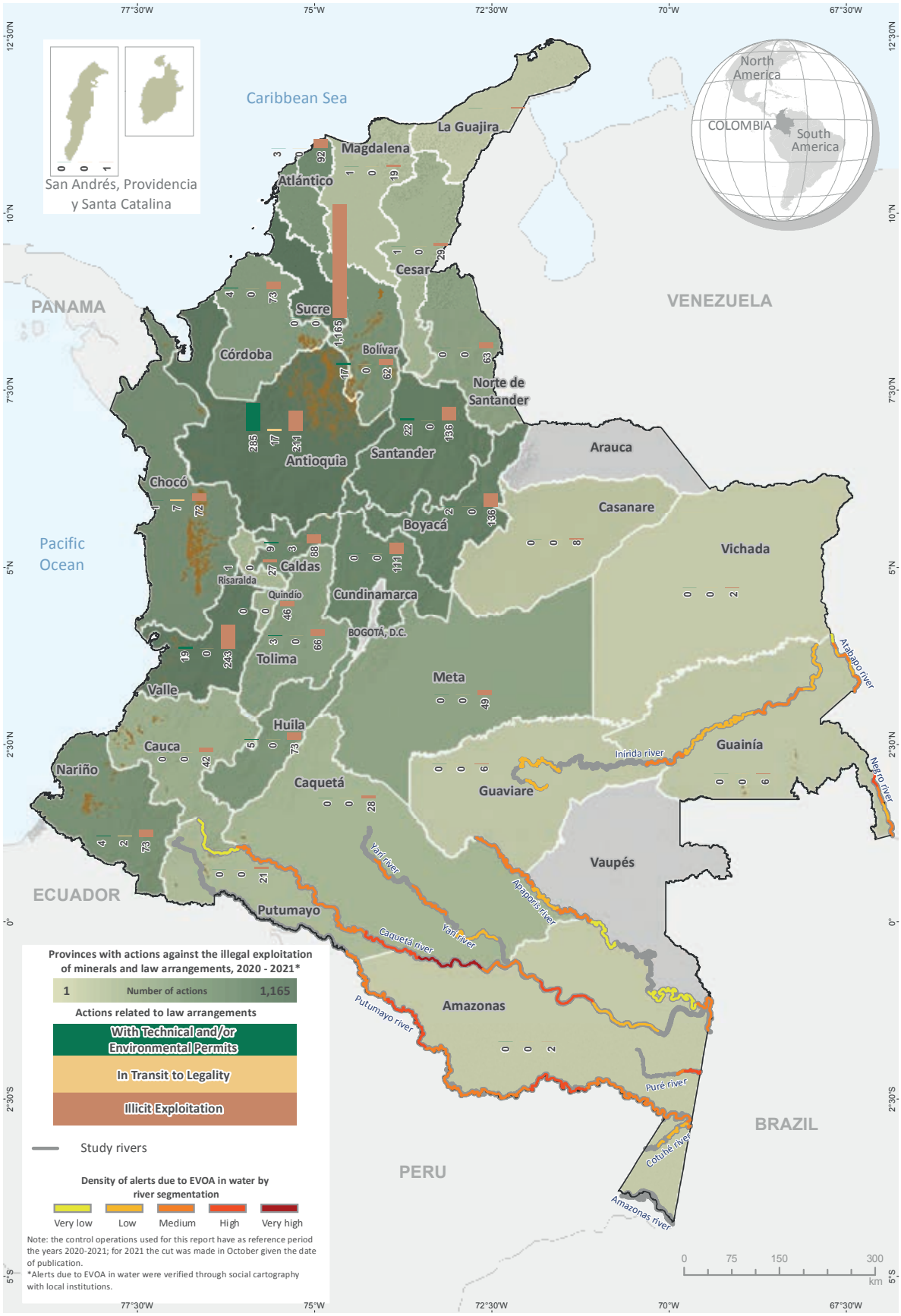
46 The control operations used for this report have as reference period the years 2020-2021; for 2021 the cut was made in October given the date of publication.

47 Due to the lack of completeness of the information provided, it is not possible to filter the type of mine involved in the operation; therefore, the results presented and analyzed may be related not only to gold mining but also to other types of minerals. Likewise, it is important to mention that the file provided for this analysis does not discriminate the type of exploitation, so this report includes illegal exploitations related to vein or lode.

carried out in this period may be associated with other types of minerals or exploitation of gold in vein or lode. Regarding the operation in areas with alerts due to EVOA in water, none of the analyzed areas is related to the presence of this phenomenon in the territory.

One aspect to keep in mind is that, within the framework of the current regulations on the exploitation of metallic minerals and precious and semiprecious stones, control operations can be carried out in any part of the Colombian territory in which the exploitation of minerals is not carried out under the parameters established and agreed upon in each of the regulatory figures stipulated by law and whose source is the National Mining Agency (ANM) and the National Environmental Licensing Authority (ANLA).

Map 15. Actions against Illegal Gold Extraction, 2020-2021.



Source: Government of Colombia - Monitoring system supported by UNODC for figures of law: Ministry of Mines and Energy; for actions against illegal exploitation: Ministry of National Defense, 2021.
The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Figure 34. Control operations carried out in areas with some law arrangement, 2020-2021.

Regarding the relationship between control operations and law arrangements (Figure 34), the analysis was approached according to the classification scheme: 1) In Transit to Legality; 2) With Technical and/or Environmental Permits, and 3) Illicit Exploitation.

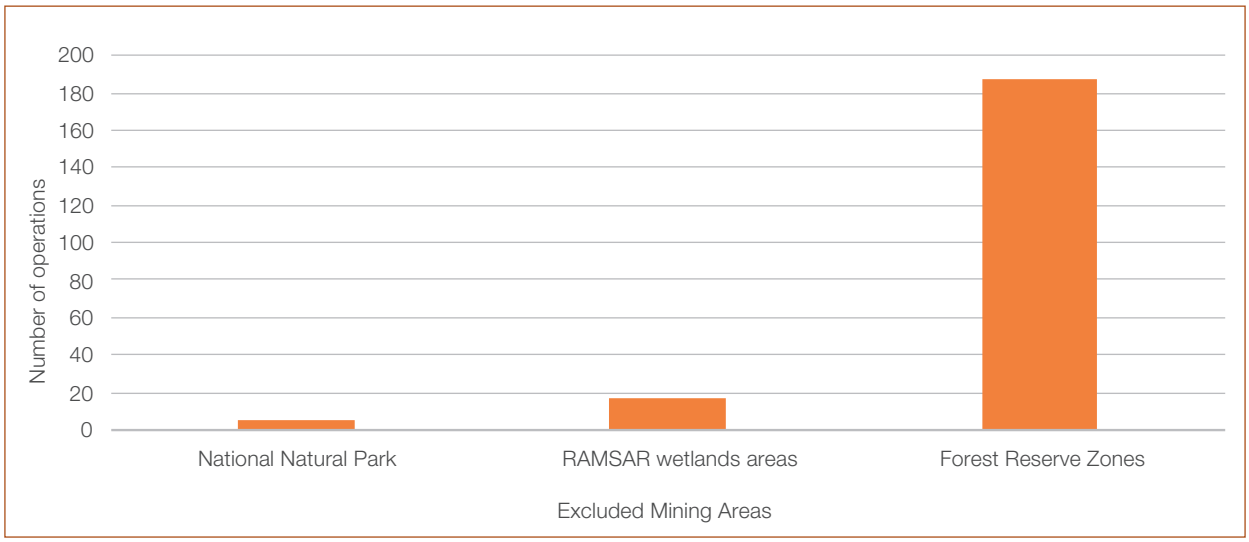
In the intervention analysis period, it was identified that 88% of the operations carried out were developed in areas of Illicit Exploitation, being significantly predominant (92% of the total of the type of law arrangement) those actions executed in areas in which there is no reference of any previously established law arrangement.

Eleven percent of the interventions are associated with areas With Technical and/or Environmental Permits, being the areas with some type of title the ones that have presented the greatest intervention. Finally, the areas 'In Transit to Legality', with only 1% of operations, are associated with those with a request for legalization.

From a provincial perspective, three provinces account for 58% of operations. Sucre reports the highest number of operations (35%), all in the category of Illicit Exploitation, with the municipalities of Morroa, San Luis de Sincé, Los Palmitos and Corozal being the most involved. In second place, Antioquia with 15% and close to 50% of the actions carried out in areas With Technical and/or Environmental Permits. Lastly, Valle del Cauca with 8% of the actions, all located in areas of Illicit Exploitation.

In accordance with the conditions of environmental importance of some territories in the country, there are Excluded Mining Areas of any type of mineral exploitation (a subject developed extensively in previous chapters); of the total number of operations analyzed, only 7% can be associated with this type of area (Figure 35), a reduction compared to previous years. In the Forest Reserve Zones is where a greater number of actions are concentrated: 86% of the total in Excluded Mining Areas; 18% of the operations in forest reserve zones are related to EVOA.

Figure 35. Control operations carried out in Excluded Mining Areas, 2020-2021.



Three PNN presented intervention in the analyzed period, being Los Farallones de Cali (Valle del Cauca) with three registered operations the one with the highest intervention; it is followed with one operation by Río Puré (Amazonas) and Selva de Florencia (Caldas).

According to the model for developing actions in the territory, 33% of the operations were located in Areas without Environmental Restrictions and 55% in territories related to population centers or to urban perimeter.

Typification of Control Operations

For the 2020-2021 period, each of the results obtained in the intervention operations carried out were typified as follows: 1) captures; 2) known case of illegal mining; 3) destruction; 4) seizure; 5) immobilization; and 6) mines intervened. For the actions of destruction, seizure or immobilization, it is specified whether the action was carried out on some type of input (ACPM, sodium cyanide, mercury) or machinery used in the exploitation (dredge, clarifier, backhoe, engines) or result of the exploitation (gold).

Of the total operational results, 42% relate to seizures, with sand (41%) being the material with the highest number of seizures reported, followed by motor pumps, engines and backhoes. The second action with the highest number of seizures is that of intervened mines (27%).

In the case of intervened mines, 46% of the operational results in this category does not mention the type of mineral of the operation; therefore, it is not possible to make a consistent analysis for this variable. For those results where the type of mine does exist, the gold and haulage mines stand out. Finally, operational results are recorded for the known case of illegal mining, with 17% of the total results.

Operational results are concentrated in eight provinces (75%); Antioquia, Sucre, Caldas and Valle del Cauca account for 59% of these. Antioquia, with 38% of the EVOA detected in 2021, ranks first in operational results (29% of the total); Sucre is a province with no record of EVOA on land or in water, and Caldas and Valle del Cauca account for less than 1% of the total EVOA on land. These results indicate that operational activity is not concentrated in the provinces with the highest presence of EVOA on land or in water, but in areas with exploitation of other minerals.

Chocó has nearly 40% of the EVOA on land, which places it in the first place with presence of the phenomenon; only 3% of the operational results are reported to have been executed in these territories. A similar case occurs in Bolívar, the third province with a record of EVOA on land, where less than 3% of operational results are reported.

A total of 425 municipalities have at least one operational result registered between 2020-2021; however, Buriticá and San Roque (Antioquia) with vein gold exploitation, and Morroa (Sucre), with no defined exploitation, are the three with the highest number of operational results: 10%, 4% and 3% respectively. For Buriticá and San Roque, the results are mainly associated with seizures of motors, motor pumps and mercury, and for Morroa, sand.

In Zaragoza, Nechí and Nóvita, municipalities that concentrate about 22% of the EVOA on land, less than 3% of the operational results are reported, which indicates that for this period there is no correlation between greater presence of EVOA mineral exploitation activity versus control operations carried out.

Registration and Control of Subsistence Mining

This section addresses the issue of subsistence mining: a general review of the requirements for its development, the number of artisan miners registered with production reports, targeting and concentration in the country and the presence of EVOA. The results show that the number of artisan miners as dated 2021 (August) amounts to 116,612; the largest number of artisan miners with reported production in the country is concentrated in ten municipalities located mainly in Antioquia and Chocó. EVOA is present in these municipalities and the largest detections are in Nechí, El Cantón de San Pablo, El Bagre and Unión Panamericana.

Subsistence mining includes activities of artisan miners and is regulated in Article 327 of Law 1955 dated 2019. This type of mining requires for its development the personal and free registration before the Mayor's Office of the municipality where the activity is carried out; it does not include subway activities, does not allow the use of machinery or mechanized equipment for the removal of the mineral or explosives, and cannot exceed the production volumes indicated by MinEnergía. For the exercise of this activity, miners must comply with the restrictions established in articles 157 and 158 of Law 685 dated 2001.

"These miners may not be registered in more than one municipality at a time but only in the jurisdiction where they develop their activity. The registration must be renewed annually in person, and the information may be updated by the miners at any time, in the event of a change in the execution of the activity. It is the responsibility of the mayors to monitor compliance with the provisions of

the aforementioned article and impose the necessary measures, without prejudice to the preventive and punitive measures imposed by the environmental authority for the prevention or commission of environmental damage in accordance with the provisions of Law 1333 dated 2009, or the rule that modifies, adds or replaces it. Additionally, the mayor may refrain from registering or canceling the registration of the subsistence miner in the following events:

Transcription of Article 327 of Law 1955 dated 2019.

a) If the activity takes place in areas excluded or prohibited from mining activities;

b) If the activity is not carried out with the restrictions established in articles 157 and 158 of Law 685 dated 2001;

c) If the activity is carried out in a different place than the one indicated in the registration;

d) When it exceeds the production volumes indicated by the Ministry of Mines and Energy or the competent authority;

e) When it uses machinery, mechanized equipment or explosives to remove the minerals;

f) If the activities are carried out underground;

g) When it extracts a mineral different from the one established in the registration.

The subsistence miner whose registration is canceled will not be able to register before any municipality for a term of six (6) months. If the requirements demanded in this article for the development of subsistence mining are not met, the miners will be considered illegal exploiters of mining deposits under the terms of the Colombian Criminal Code or the norm that modifies or substitutes it".

In this context, and in order to facilitate the work of the mining institutions and users, since the end dated 2010 the information system for the management of procedures for the administration of mining resources, called SI.Minero, was made available to the public and migrated to Génesis.

As dated 2014, this platform provides a module so that registration and procedures related to subsistence miners can be carried out by them and with the support of the municipalities, via the web [36]. To that effect, since March 31st, 2020, the ANM made available the Génesis platform to carry out the renewal of the registration of subsistence miners, with the compliance of the aforementioned requirements within the following six months. However, due to the strong pressure of illicit economies on the vulnerable population around gold extraction, MinEnergía established through Resolution 40103 dated 2017 the maximum monthly and annual production volumes for subsistence mining (Table 20).

It is important to note that subsistence mining is related to alluvial mining, in which the use of machinery and explosives for the development of the activity is completely prohibited. The Ministry of Energy establishes the obligation to comply with the following production ceilings included in Table 20.

Table 20 . Permitted gold production for subsistence mining in Colombia.

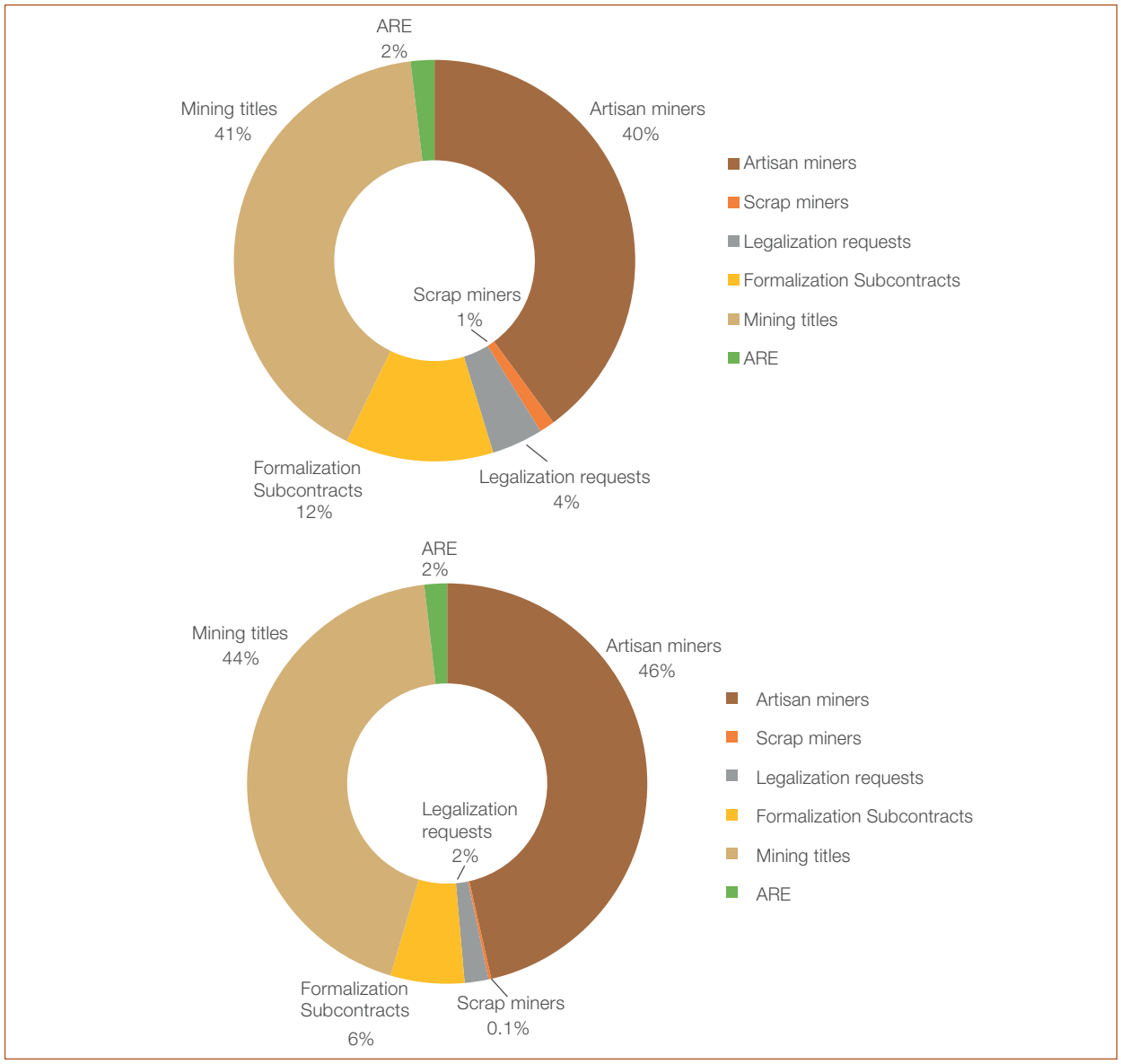
Mineral and/ or materials	Average monthly value	Maximum annual production value
Precious metals (gold, silver, platinum)	35 grams (g)	420 grams (g)

At the national level, the production structure in 2020 shows concentration in two types of exploiters: artisan miners and mining titles. Forty-two percent of gold production in Colombia came from subsistence mining (artisan miners, 41% and scrap miners, 1%) and a similar proportion corresponds to mining titles (41%); the remaining 17% was distributed in formalization subcontracts, legalization requests and Special Reserve Areas (ARE). Likewise, in the first half dated 2021, 46% of gold production comes from artisan miners and 44% from mining titles; the remaining 10% is distributed in Formalization Subcontracts, Legalization Requests and ARE (Figure 36).

Approximately half of the reported production comes from subsistence mining, which is developed in an artisanal manner and, by its very nature, presents low levels of productivity. The other half of the production is carried out under mining titles, with individuals or companies that extract material using heavy machinery, greater exploitation capacity, better yields and compliance with legal and technical standards. The similar percentages of participation in the reported production are striking, taking into account the capacity that each of these types of producers have.

In this sense, the challenge is to dimension the territorial specificities, to implement strategies that generate positive impacts in the communities and that the income generated by gold exploitation is reverted in these territories that, in their majority, are characterized by a great natural wealth, although they present high economic and social backwardness. Therefore, it is necessary to strengthen the formalization strategy to make it a profitable and environmentally responsible activity, with a positive impact on the quality of life of the mining communities that, in some territories, have a tradition of artisanal and ancestral mining. Of utmost importance in this aspect is to effectively control the illegal exploitation of minerals (value chain) through the dismantling and disruption of criminal structures that fight for control of the territories for the income from illegal economies and increase the risk factors for the civilian population.

Figure 36 . Reported national production, 2020 and 2021 (1st semester).



Source: [24].

The number of registered artisan miners reporting production for 2021 (August) amounts to 116,612; the largest number of these producers reporting production corresponds to Antioquia with 72,467 (62% of the total) and the second province is Chocó with 16,079 (14%). At the municipal level, the largest number of artisan miners with reported production is in Caucasia, Remedios and El Bagre (47%).

According to the production report of artisan miners and their volumes recorded during 2021, it is found that each artisan miner reports on average 214 g of gold, about half of the maximum amount of production established for this exploitation modality, according to which the limits are 420 g per year, under the established monthly of 35 g. It is worth bearing in mind that the list of "barequeros" provided by the ANM has a cut-off date of August 2021, while production data is considered until June 2021.

In 2020 and during the first half dated 2021, 100% of the gold production record of Guainía, Sucre and Valle del Cauca comes from artisan miners. Chocó's gold production records that 57% comes from artisan miners in 2020 and 71% in 2021 (first semester), with 16,079 artisan miners registered with production reports. The municipalities of El Cantón de San Pablo, Lloró and Unión Panamericana have the highest reported production under this modality.

In the same period, the largest number of artisan miners with reported production in the country is focused in ten municipalities located mainly in Antioquia and Chocó, corresponding to 65% of the country's total; in turn, gold production in these municipalities, in this category, corresponds to 68% in 2020 and 74% in the first half dated 2021. In these municipalities there is presence of EVOA and the largest detections are in Nechí, El Cantón de San Pablo, El Bagre and Unión Panamericana (Table 21 and Map 16).

Table 21 . Municipalities with the highest number of registered artisan miners, gold production and EVOA detected in the artisan miners category.

Provinces	Municipality	Number of artisan miners with production report	Gold production 2020 (g) by artisan miners	Gold production 1st semester 2021 (g) by artisan miners	EVOA 2020 (ha)	EVOA 2021 (ha)	Illicit Exploitation (ha) 2021	%
Antioquia	Caucasia	33,795	5,041,259	3,313,004	2,047	2,006	561	28
Antioquia	Remedios	11,432	2,303,623	1,905,881	2,316	2,211	1,409	64
Antioquia	El Bagre	9,688	1,485,279	1,313,214	4,843	4,569	1,666	36
Chocó	El Cantón de San Pablo	5,109	1,052,541	769,531	5,253	5,643	5,598	99
Antioquia	Segovia	3,475	1,526,101	532,224	2,479	1,865	1,142	61
Córdoba	San José de Uré	3,234	271,416	323,772	142	139	139	100
Chocó	Lloró	2,607	284,388	369,926	625	634	634	100
Chocó	Unión Panamericana	2,280	778,152	350,123	3,077	3,142	1,680	53
Antioquia	Nechí	2,029	310,473	187,343	7,996	7,609	3,339	44
Antioquia	Briceño	1,794	119,245	132,664	-	-	-	-
Total 10 municipalities		75,443	13,172,477	9,197,682	28,780	27,819	16,168	58
Total country		**116,612**	**19,382,342**	**12,454,595**	**95,408**	**92,781**	**59,132**	**64**

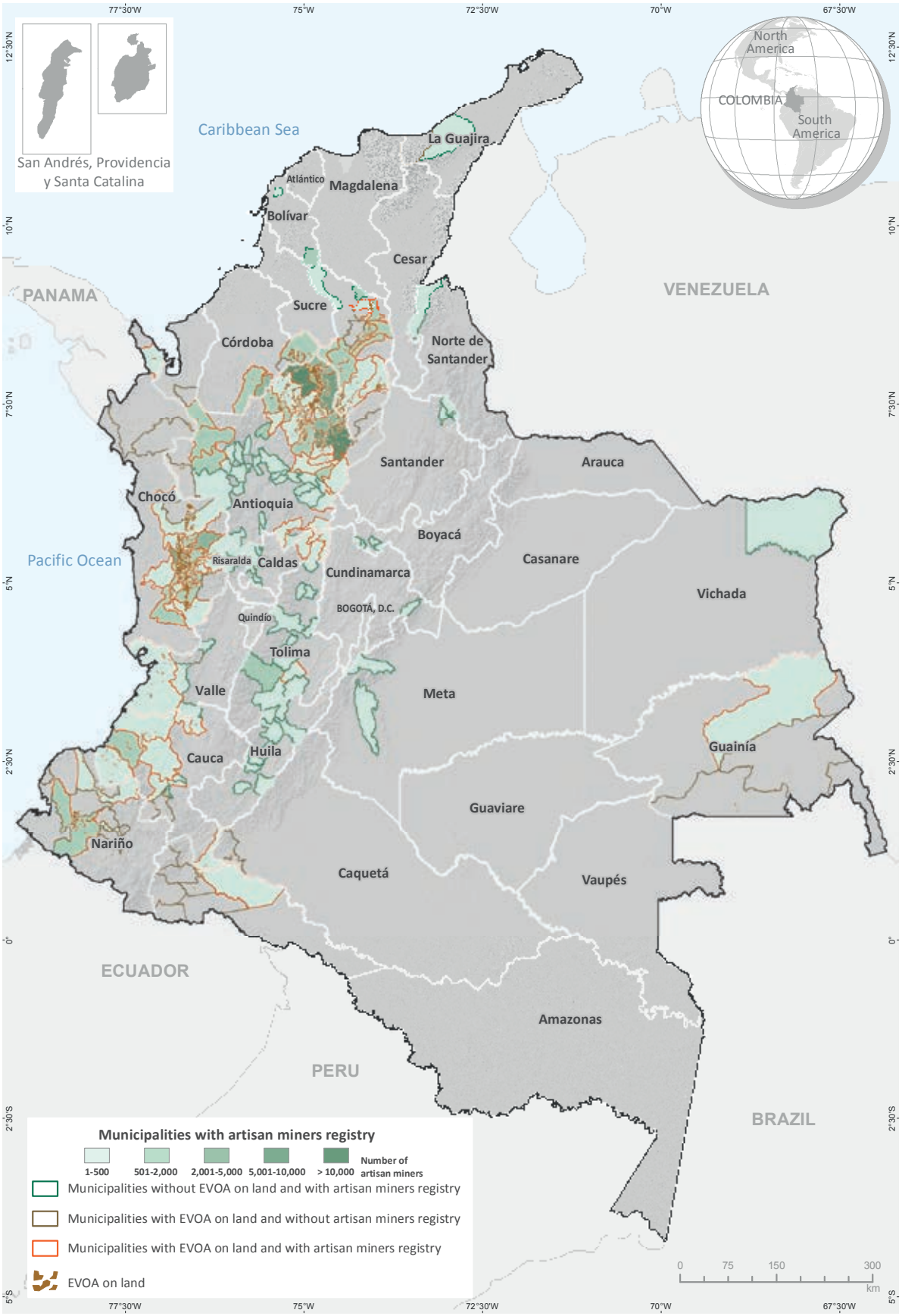
Source: [5] [24]

As indicated, for subsistence mining to be within the legality it requires miners to be registered and approved with the Mayor's Office, in the Génesis platform and in the Single Registry of Minerals Marketers (RUCOM), which enables them to market the product of their work. Miners must commercialize volumes that do not exceed 420 g per year or 35 g per month, and may not use machinery to remove the material, which includes motor pumps, small dredges or any mechanical means. Currently, reports indicate

that there are 116,612 registered and approved artisan miners. It is suggested to clarify that the production referred to should be measured on an individual basis, i.e., for each subsistence miner.

This requires monitoring by national and regional institutions in the territories, to discourage illegal extractive activity, taking into account that there are factors of illegality in the exploitation phase of subsistence mining. In this sense, it is necessary to increase the capacities of local governments to face the challenges of mining activity in the territories, design strategies for the integration of subsistence miners in business projects with corporate social responsibility, as well as provide technical assistance and training to achieve greater effectiveness.

Map 16. Distribution of artisan miners registry (Génesis), 2021.



Source: Government of Colombia - Monitoring system supported by UNODC for artisan miners registry: Ministry of Mines and Energy, 2021. The boundaries, names and titles used on this map do not constitute endorsement or acceptance by the United Nations.

Formalization: Legal Mining

The National Development Plan (PND) 2018-2022, "Pact for Colombia, pact for equity", Law 1955 dated 2019, is the framework in which MinEnergía focuses its efforts in the short and medium term. The two NDP objectives directly related to the sector are: 1) consolidating the mining-energy sector as a dynamizer of the development of sustainable territories and 2) promoting the development and competitiveness of the mining-energy industry.

Within this framework, the mining sector has proposed to work within its Strategic Plan along the following lines: 1) promoting agile, efficient and coordinated management; 2) diversifying the mineral production matrix; and 3) promoting legality and encouraging mining activity, as well as strengthening the policy framework to consolidate a mining activity with a business vision and in line with the challenges of social and environmental responsibility.

It is essential to recognize that legality is the starting point and means that mining operations are carried out under the protection of a mining and environmental instrument. Thus, mining formalization is developed within the framework of two basic lines: 1) legality, whose objective is to support those miners who have exercised the activity without the protection of the law (mainly subsistence and small-scale mining), through knowledge of the applicable regulations for the development of the activity and the identification of alternatives within the framework of the mechanisms provided by the mining and environmental regulations, as the case may be; 2) mining development, which corresponds to technical assistance and comprehensive support, with segmented strategies for subsistence miners and mine owners, seeking compliance with standards and the exercise of good practices in the technical, environmental, social, economic and business components. Regarding the legality axis, Table 22 shows the different existing regulatory alternatives to achieve mining legality.

Table 22. Alternatives to achieve legality.

El futuro es de todos · Minenergía	ALTERNATIVES TO ACHIEVE LEGALITY	
MECHANISM	**LEGAL SUPPORT**	**REQUIREMENTS**
Legalization of Traditional Mining	Article 165, Law 685 of 2001	* Filed up to January 1st, 2005. * They must have the area free to contract. * They have the prerogative of exploitation until the mining authority makes a substantive decision. * They are subject to inspection during the prerogative stage.
Special Reservation Area	Article 31, Law 685 of 2001. Article 22, Temporary Environmental License for Formalization	* Free area and demonstrate traditionality. * They have the prerogative of exploitation and are subject to the Temporary Environmental License as of the enactment of Law 1955 dated 2019. * They are subject to inspection in the prerogative stage.
Operation Contract	Article 221, Law 685 dated 2001	Mining title in force and up to date.
Subcontract for mining formalization	Law 1658 of 2013; Law 1753 dated 2015; Article 22, Law 1955 dated 2019, Temporary Environmental License for Formalization.	*Mining exploitation developed since before 2013 in titled areas. * Once the subcontract is authorized, it has the prerogative of exploitation. * They are subject to the Temporary Environmental License as from the enactment of Law 1955 dated 2019. * They are subject to inspection in the prerogative and differential inspection stage.
Return of areas for mining formalization	Law 1753 dated 205; Decree 1949 dated 2017; Articles 326 and 22, Law 1955 dated 2019	* Once the return is approved, there is an exploitation prerogative. * They are subject to a Temporary Environmental License. * They are subject to inspection in the prerogative and differential inspection stage.
Formalization of Traditional Mining	Articles 325 and 22, Law 1955 dated 2019, Temporary Environmental License for formalization	* Applications filed before May 13th, 2013 and that at the date of issuance of Law 1955 are in force in the mining authority. * They have the prerogative of exploitation. * They are subject to a Temporary Environmental License for formalization. * They are subject to inspection during the prerogative stage.
Differential requirements for the granting of the concession contract for small miners	Article 326, Law 1955 dated 2019; Decree 1378 dated 2020; ANM Resolution 614 dated 2020	* Not having a mining title in force. * To require in concession a maximum of up to 100 hectares under the mining grid system. * That their production meets the maximum annual volume established according to the type of mineral, in accordance with the norm. * Interested parties may not submit simultaneously more than one proposal for a concession contract with differential requirements. * There is an option to change the procedure for interested parties with applications for: (i) concession contract proposal; (ii) legalization or formalization of traditional mining, and (iii) special reserve area, under the conditions established in the norm.

For the above, in development of Law 1955 dated 2019 and the described mechanisms, the following results are available for 2021:

- 119 Special Reserve Areas (ARE) delimited and declared, allowing the legal work of about 1988 miners in 95 municipalities in 22 provinces.
- 73 Mining Formalization Subcontracts, which cover the legal work of approximately 876 miners in 31 municipalities in 11 provinces.
- More than 673 applications for the legalization of traditional mining covered by Article 325 of the NDP, located in free areas in 341 municipalities in 29 provinces, which may cover the legal work of more than 6,164 small miners.
- 42 operating contracts, under which more than 992 miners work in 5 municipalities of Antioquia and Bolívar.

Additionally, as a result of the dialogue processes carried out and the application of the different regularization mechanisms for work under the protection of a mining title, as of December 31st, 2021, there are 436 current processes of accompaniment and mediation in 22 provinces.

Regarding legality in subsistence mining, one of the challenges for the Mining Formalization Directorate during 2021 was to strengthen the institutional capacities of the territorial entities regarding the registration of subsistence miners in the national territory.

Therefore, the Ministry of Mines and Energy, with the support of the National Mining Agency, has coordinated and implemented a plan to train municipal mayors' offices and subsistence miners on the technical and legal aspects of subsistence mining and the Génesis information system. As part of this alliance, 213 officials from 153 municipalities in the country were trained. In addition, six support workshops were held in the region, specifically in the provinces of Huila, Quindío, Santander and Nariño, where 192 miners and 29 officials were trained on aspects of this activity.

On the other hand, as of December 31st, 2021, 113,446 subsistence miners were registered in the Génesis information system, of which 110,789 are artisan miners, 633 scrap dealers and 2,024 correspond to other subsistence miners.

In the development of the promotion line, MinEnergía conceptualized and designed a mining development model, highlighting the strategic vision of the mining business as a tool to impact the best performance of the country's mining operators. To this end, we are working under the concept of "Mining Development Ecosystem", understood as the set of national and regional, public and private entities related to the sector, which make up the "Support Network for Mining Development", so that these entities interact in a harmonious and coordinated manner among themselves and with their environment to offer the mining community a portfolio of services in the five strategic lines of the model: 1) Technical Assistance; 2) Business Development and Scaling; 3) Commercialization and Traceability; 4) Financing and Financial Inclusion, and 5) Research and Development.

Therefore, Resolution 40195 of June 22nd, 2021, of MinEnergía "Whereby the Formalization Guidelines for Mining Development are adopted" was issued; these guidelines will set

the tone for the different strategies led by the national government that will promote mining formalization in Colombia.

In order to activate the mining development model, MinEnergía is leading the strategy of development pilots in five provinces (Antioquia, Caldas, Cundinamarca, Boyacá and Chocó), which in addition to initiating the implementation of the model, seek to analyze the impact and determine the strengths, opportunities for improvement and its viability.

On the other hand, and for the first time in history, MinEnergía has a financial line of support for the country's miners: the Special Credit Line (LEC), which corresponds to a 3% subsidy on the interest rate that is granted to holders or beneficiaries of small-scale mining titles who request financing for the development of activities required to improve the productivity and competitiveness of the mining sector.

The line may be requested at any of the financial intermediaries or second floor banks. The investments that may benefit from the interest rate subsidy of the LEC MINING line are classified in the following credit destinations: Mining extraction and commercialization, working capital and infrastructure, machinery and equipment for mining and will have a maximum subsidy term of four years and a maximum credit amount per beneficiary of COP 174,000,000. This alliance with the fund to finance farming projects (Finagro —Fondo para el Financiamiento del Sector Agropecuario) has a two-year term, which began on December 15th, 2020, so its execution term is until December 14th, 2022, or until resources are exhausted [37].

Regarding Training for small miners and subsistence miners, with the support of the National Learning Service (SENA — Servicio Nacional de Aprendizaje), 320 small miners and legal subsistence miners were trained through a 360-hour complementary course called: "Construction, operation and maintenance of gold ore beneficiation equipment with cleaner production techniques" given in six gold producing provinces: Antioquia, Bolívar, Cauca, Nariño, Santander and Caldas, which seeks to strengthen the technical capacities of the miners.

Likewise, In respect of access to resources for technological reconversion and productive improvement, in conjunction with the National Planning Department (DNP), work was carried out on the construction of a standard project called "Construction and Provision of a Community Plant for Gold Processing", which will help territorial entities that have identified low levels of clean production of gold ore in mining operations to access resources to improve environmental conditions and optimize the use of gold ore in their territories.

On the other hand, and to promote the presentation of projects to the General Royalties System for the strengthening of the mining sector, by means of Resolution 40356, dated November 30th, 2020, the call was carried out that adopted the methodology for the distribution and allocation of royalty resources for the commercialization of mineral without identification of origin, which was directed to territorial entities receiving direct royalties in the 2019-2020 biennium, so that they could present projects in three lines: 1) Strengthening of infrastructure for the provision of mining development services; 2) Construction of community plants for gold ore beneficiation, and 3) Preparation of methodological guide for productive improvement in the gold ore beneficiation stage.

A total of fifteen initiatives from eight provinces (Antioquia, Bolívar, Caldas, Cundinamarca, Chocó, La Guajira, Santander and Boyacá) were presented, where finally six of them, after the evaluation process, achieved an allocation of resources of more than COP 36,600 million through Resolution 40137 of April 30th, 2021, to invest in mining development as a commitment of the national government to strengthen this activity in the country.

In addition to the above, MinEnergía launched the Mining Learning Center strategy, a space in the ministry's web portal that seeks to leave a legacy in the sector's education by promoting legal mining activity, with training programs aimed at improving the application of the best standards in the mining sector. This center brings together a catalog of ninety offers between free and fee-based programs at different levels of training (technical courses, diploma courses, workshops, among others), with classroom and/or virtual offerings, and focused on eight fronts: technical assistance, environmental and social management, quality management and high standards, legislation for mining activity, risk mitigation, occupational health and safety, operation of machinery and equipment, and financial inclusion[48].

EVOA Monitoring Data Access Model

Since 2016, the United Nations Office on Drugs and Crime (UNODC), in coordination with MinEnergía, has conducted the EVOA monitoring studies that include the area data, the analysis of law arrangements, the environmental restriction model for the exercise of the activity and other socioeconomic data concerning the territories with EVOA in Colombia. All of the above has contributed to the design of intervention strategies implemented by the State, aimed at resource management and control of illegal exploitation and the construction of public policy based on technical, robust and transparent evidence.

In order to facilitate access to EVOA data to government institutions, the Information Access System (SAI) was designed and implemented three years ago. The SAI is a web application that centralizes EVOA's information and allows the visualization, consultation and analysis of geo-referenced data. The tool is aimed at any type of user and it is not necessary to have specialized software; to create a user it is necessary to have authorization from MinEnergía.

During 2021, two new modules were included (Precious Metals Production and Management) and improvements were made in terms of platform performance; the design, as in previous years, presents responsive features to be viewed on any type of device. Currently, EVOA's SAI has ten information modules and different access roles: Training, Managerial and External User; each one has access to different experiences and levels of the information in the database.

Geographic Information Available in the Application

The information collected as input for the application considers geographical data from different sources, related to the alluvial gold exploitation. Table 23 shows the information used in the design and construction of the application.

48 See: https://www.minenergia.gov.co/centro-de-aprendizaje-minero

Table 23. Information available in EVOA's SAI.

Name	Description	Source	Validity
Evidence of Alluvial Gold Exploitation (EVOA)	1km * 1 km grids with EVOA hectares	UNODC	2014, 2016, 2018, 2019, 2020, 2021
Provinces	Political-administrative delimitation of provinces	DANE	2021
Municipalities	Political-administrative delimitation of municipalities	DANE	2021
Indigenous Reservations	Delimitation of Indigenous Reservations	ANT	2021
Community Councils	Delimitation of black, Afro-Colombian, Raizal and Palenquero communities	ANT	2021
National Natural Parks	Demarcation of zones declared as national protection zones corresponding to the National System of National Natural Parks	PNN	2021
Regional National Parks	Delimitation of declared areas of national protection corresponding to regional National Natural Parks	SINAP	2020
Ramsar Sites	Delimitation of paramo ecosystems and wetlands designated within the list of international importance of the RAMSAR Convention	MinAmbiente	2018
Forest Reserve Zones	Demarcation of areas declared as national protection corresponding to Protected Forest Reserve Areas	RUNAP	2021
Populated centers	Territorial information corresponding to the delimitation of urban areas	DANE	2021
Mining Areas of Ethnic Communities	Territories recognized by law that belong to ethnic communities with autonomy for decisions on the use of their natural resources	ANM	2021
Environmental Licenses	Delimitation of the areas that have the permission granted by the environmental authority	ANM	2021
Protection of exploitation and exploration titles	Delimitation of the area in which the right to explore and exploit the soil and subsoil is granted	ANM	2021
Special Reservation Areas	Delimitation of areas where there are traditional informal mining operations, at the request of a mining community	ANM	2021
Legalization requests (Law 685 dated 2001)	Delimitation of the area that contemplates the legalization of exploitation activities by means of a concession to the operators of state-owned mines without a title registered in the National Mining Registry	ANM	2021
Legalization requests (Decree 933 dated 2013)	Delimitation of the area that contemplates the legalization of applications under this decree	ANM	2021
Ecosystem Map	Delimitation of continental ecosystems	Alexander von Humboldt Institute	2016
Change in the area of natural forest (deforestation)	It corresponds to the cartographic delimitation of the change in the area of natural forest in Colombia	IDEAM	2020
Production of precious metals	Production data in grams per quarter of precious metal production (gold, silver and platinum)	ANM	2021

Additionally, road and river cartography is included which, together with the base maps, allows contextualizing the thematic information. To facilitate integration and spatial analysis, the area framework is used; this framework ensures that changes and updates in the limits of territorial entities do not alter the results and allows for efficient information updates.

Application

The EVOA information access application was built on the basis of a modular thematic scheme, according to the interest of the query (Table 24). Access to these modules is through a web interface. It is possible to see the description and user experience of the EVOA SAI in the following link (https://www.youtube.com/watch?v=wbeibInVLXM):

Table 24. EVOA SAI Information Modules.

Name	Description
EVOA in Colombia	Presents an overview of EVOA in the Colombian territory with data by province and municipality.
EVOA in Special Management Territories	This module presents data by PNN, Indigenous Reservations and Black Community Lands.
EVOA and territory management	This module integrates data on actions in the territory based on a hierarchy model; as mentioned above, it prioritizes territories according to the Mining Code.
EVOA and law arrangements	The application based on the methodology used for the detection of EVOA does not characterize the legality of alluvial gold exploitation; however, within the Colombian regulations there are certain figures that regulate the mining activity, data that are crossed with those of EVOA on land.
EVOA in ecosystems	Knowing the intersection of EVOA with ecosystems.
EVOA and hydrographic sub-zones	The EVOA is associated with the material dragged, product of the extraction of the mineral deposited in the water streams. The viewer allows knowing which subzones and hydrographic areas present EVOA detection.
Alerts due to EVOA in water	Alerts on possible EVOA activities in water are presented.
Spacial query in Excluded Mining Areas and Restricted Mining Areas	Allows performing a customized query; the user draws the polygon of interest on screen which intersects with the Excluded Mining Areas and Restricted Mining Areas. The result is a report in PDF format with the area report in hectares containing the point or polygon of interest.
Precious metal production in Colombia	It presents precious metal production data by year, type of operator, province and municipality.
Management	Integrates all the previous modules in a single visualization by province and municipality.

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United Nations Office on Drugs and Crime