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FINAL REPORT

ARTISANAL GOLD MINING – ENVIRONMENTAL
IMPACT REDUCTION ACTIVITY (ORO LEGAL)

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Cover photo: Artisanal gold miners in Tadó, Chocó employ USAID-funded, mercury-free mining equipment to enhance productivity and mitigate environmental impact (Oro Legal)

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The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States government.

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ACRONYMS

A&ACH	Achiote & Agros del Chocó S.A.S.
ACM	Colombian Mining Association
ANM	National Mining Agency
APU	apiculture production unit
ARE	special mining reserve area
ASGM	artisanal and small gold mining
ASM	artisanal and small mining
BGI	Better Gold Initiative
BioREDD+	Biodiversity – Reduced Emissions from Deforestation and Forest Degradation Program
CAR	Regional Autonomous Environmental Authority
CC	community council
CLQ	Colorquímica S.A.S.
CODECHOCÓ	Corporación Autónoma Regional para el Desarrollo Sostenible de Chocó
COLTAPICOLA	Corporación Colombiana de Técnicos Apícolas
COP	Colombian peso
CORANTIOQUIA	Corporación Autónoma Regional del Centro de Antioquia
CORCRESER	Corporación de Centros Regionales de Servicios
EIA	environmental impact assessment
FARC	Colombian Revolutionary Armed Forces
FODC	Fundación de Oleoductos de Colombia
GDA	Global Development Alliance
GEF	Global Environment Facility
GOC	government of Colombia
GPS	global positioning system
Ha	hectare
IWRM	integrated water resources management
LOP	life of project
MADS	Ministry of Environment and Sustainable Development

MEM	Ministry of Mines and Energy
MPU	mining production unit
NGO	nongovernmental organization
NUFP	National Unified Formalization Plan
PMA	environmental management plan
PTO	mining works and operation plan
PTOC	complementary mining works and operation plan
RIA	Reforestadora Integral de Antioquia
REDD	Reduced Emissions from Deforestation and Forest Degradation
RNM	National Mining Registry
SECO	Swiss State Secretariat for Economic Affairs
TA	technical assistance
TEIA	Temporary Environmental Impact Appraisal
USAID	United States Agency for International Development
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

The United States Agency for International Development's (USAID's) Artisanal Gold Mining – Environmental Impact Reduction Activity, or “Oro Legal,” was a bold response to the growing social conflict, environmental impact, and governance challenges arising from the most recent gold mining boom in Colombia. Oro Legal recognized that while illegal artisanal gold mining is the basis of illicit economies and drives environmental degradation — and threatens Colombia's peace-building efforts, citizen security, and democratic governance — it also

supports the livelihoods of more than half a million Colombian citizens. The timing of the Activity was apt as it sought to harness the growing awareness and action at all levels of government and increasingly by larger mining companies to create a shared agenda for change in this economically important yet much-maligned sector of the economy.

“Overall, beneficiaries are highly satisfied with the Activity and place emphasis on its strengths arising from the observed effects.”

**— FINAL PERFORMANCE
EVALUATION**

Oro Legal remains USAID's largest and most ambitious bilateral initiative in support of artisanal and small gold mining (ASGM) and was implemented in two of Colombia's emblematic mining departments — Antioquia and Chocó — between September 2015 and April 2021. The Activity grew out of the mining component of the Biodiversity – Reduced Emissions from Deforestation and Forest Degradation Program (BioREDD+), an earlier USAID initiative in Colombia that piloted innovative approaches to improve the social, economic, and environmental performance of small gold miners through legalization and formalization of operations and to mitigate environmental liabilities from past illegal mining.

The Oro Legal intervention strategy was initially underpinned by the conviction that better governance, leading to improved performance in the Colombian ASGM sector, would be brought about through the complex interplay of incentives and disincentives involving a broad array of stakeholders. The expectation was that this would lead to more assertive enforcement of mining, environmental, and other laws, as well as much-needed policy reform for an improved enabling environment, which when combined with high-quality technical assistance (TA) and training, would create tangible economic gains and other benefits for informal miners who became legal and formal, or who transitioned from mining to other livelihoods. The core strategy rested on effective participation between Oro Legal and a range of stakeholders from government, communities and their representative bodies, mining companies, and ASGM operators, as well as greater collaboration among themselves. A further premise was that as a USAID program, Oro Legal would be able to parley its “neutrality,” neither expanding nor limiting mining per se, but rather supporting responsible mining where it proved technically, financially, and legally feasible to do so, in concert with government of Colombia (GOC) counterparts and in alignment with prevailing policy. These core underpinnings were tested and evolved over more than five years of implementation, spanning two GOC administrations.

Oro Legal's effectiveness and impact were due in large measure to its ability to play the role of a credible and trusted "honest broker." The Activity was adept at convening stakeholders across groups who have historically had cool and sometime antagonistic relationships to discuss an agenda for change centered on broader, more holistic models around good governance and responsible mining. This extended to a change in attitude and greater involvement of several large mining companies that became committed to legalization of informal ASGM operators on their mining titles or claims, with improvements made in their productivity and environmental management, including the reduction and later elimination of the use of mercury.

Oro Legal's strategy and interventions evolved in line with a results framework consisting of two objectives and six expected results that underlay higher-level project goals. The strategy also incorporated the then-prevailing USAID/Colombia Country Development Cooperation Strategy to consolidate Colombia's peace process and contribute to environmental resiliency and improved natural resource management. One of the hallmarks of Oro Legal was a highly adaptive management approach, allowing the Activity to pivot in response to a shifting policy landscape and changing circumstances on the ground to broadly achieve its results, objectives, and goals.

EFFECTIVE GOVERNANCE CAPACITY FOR ASGM

At the start of Oro Legal in 2015, there was optimism by USAID and the Oro Legal team that significant progress could be made to foster a policy framework and associated regulations and technical norms for ASGM that would be more conducive to legalization and formalization. However, after two years of implementation, this optimism was tempered by the reality that the political space for this to happen was limited. Instead of broadening the number of routes for ASGM legalization, only three proved to be viable for ASGM operators at any significant scale. Of those miners who could legalize their operations, the formalization process, as currently regulated, with almost no differentiation between large and artisanal/small operators, continues to be daunting for those miners not associated with a large mining concern: technically arduous, bureaucratically challenging, prohibitively costly, and frequently overshadowed by uncertainty over the outcome.

However, there were three governance areas where change was notable. The first was enforcement of the Mercury Law, which spurred small miners assisted by Oro Legal (and other international assistance programs) to initially reduce and then eliminate the use of this highly toxic element in ore processing. The second was renewed openness by the Ministry of Mines and Energy (MME) the Activity's main government counterpart, to establish special mining reserve areas (*areas de reserva especial*, ARE) expressly for informal ASGM operators, a process that Oro legal supported, particularly in the Chocó region. Thirdly, in anticipation of the incoming administration in Colombia in 2018, a final policy effort was undertaken – in close coordination with USAID and in collaboration with the Swiss-funded Better Gold Initiative (BGI) - to put forward a pragmatic proposal to make ASGM formalization more accessible and efficient through an intensive multi-stakeholder process. This resulted in a simpler temporary environmental impact appraisal (TEIA) requirement, an important step towards differentiation of regulatory requirements specific for ASGM operators.

LEGALIZATION AND FORMALIZATION OF ASGM OPERATORS

At the level of the mining production unit (MPU), legalization followed by formalization were the conduits to improved performance by ASGM operators. Initially, the large number of informal mining operators in Antioquia and Chocó seemed to imply that there would be no shortage of candidate MPUs to engage with the Activity. However, as outreach efforts during the first two years of implementation extended to more than 640 MPUs, it became apparent that while there was no shortage of “supply”, the actual universe of potential MPU stakeholders was significantly reduced by, among other things, limited, viable regulatory pathways to legalization; operations in areas where mining of any kind is prohibited; or linkages to criminal groups.

Key to successful formalization was grouping individual MPUs in formalization projects representative of the available legalization routes: operations contracts and formalization subcontracts, civil contractual agreements between legal title holders and informal miners that serve as proxy titles to underpin legality, AREs that are a type of concession where groups of small miners are legally permitted to operate, and in one case a transfer of the mining title to small miners. By the close of Oro Legal, 146 MPUs with 1,062 miners grouped in 12 formalization projects were legalized and had made significant strides in formalizing and improving the performance of their operations.

Oro Legal worked closely with the MEM to develop an innovative and rigorous formalization standard to measure progress by MPUs, which formed the basis for tailoring TA and training. The Activity supported the legalization/formalization of each MPU in two stages. Firstly, by ensuring compliance with the required, legally mandated documentation: a title or proxy title, an initial environmental guide and subsequent environmental impact assessment (EIA), and a mining works and operation plan (PTO). Secondly, by implementing with participating MPUs a mining improvement plan based on weighted measurement of performance improvement across four areas: environmental management, occupational health and safety, mining techniques and safety, and socioeconomic and business management. This, in turn, incorporated 318 evaluation criteria for hard rock mining and 337 for alluvial mining, which were assessed quarterly against initial baselines and quantified in a “score” that is displayed graphically. Graduation to full formalization only occurred when a MPU achieved an overall score of 75 percent, as measured across the weighted performance areas noted above. Undoubtedly, this is the most rigorous approach to ASGM formalization in Colombia and, with the closure of the Activity, continues to be supported by a digital learning platform available for free to any interested stakeholder.

The Corporación de Centros Regionales de Servicios (CORCRESER) is Oro Legal’s legacy organization founded by former Activity staff and subcontractor employees and forms a critical part of the Activity’s sustainability strategy. During implementation, CORCRESER was an indispensable partner, maturing to become well-positioned to play a key role to ensure that mining formalization for small miners supported by USAID continues in response to the paucity of national capacity to provide critical services to the ASGM sector. CORCRESER has become a credible partner to the private sector to mobilize investment in ASGM and income diversification and with the GOC to move the legalization/formalization policy agenda forward.

MERCURY MONITORING AND STRIDES TOWARD ELIMINATION IN ASGM THROUGH FORMALIZATION

Reducing and eliminating the use of mercury by ASGM stakeholders supported by Oro Legal was a high priority. On July 16, 2018, Colombia officially banned the use of mercury in mining under the Mercury Law. In response, Oro Legal's strategy shifted from gradual reduction to elimination of mercury in ASGM. The strategy consisted of monitoring at two levels, as well as expanding the processing of ore without mercury. The first level of monitoring was of airborne mercury from gold shops and rustic processing operations (*entables*) with innovative protocols. This enhanced Colombian institutional understanding of the scale of contamination and change as policy and legal measures were instituted. The protocols were implemented over three years in nine municipalities in Antioquia and Chocó, with results summarized in mercury heat maps. In all monitored municipalities, airborne mercury in urban centers decreased over time as the Mercury Law and other restrictions on *entables* and gold shops came into full force and amalgamation was increasingly performed in rural areas. Second, mass balance measurements were used to monitor mercury use at Oro Legal-supported MPUs making up the formalization projects, where mercury input and recovery were measured along the entire production cycle from sluices to amalgamation. From 2015 baselines, 35.95 grams and 6.66 grams of mercury were needed to produce one gram of gold in alluvial and hard rock mining, respectively. As MPUs progressed through formalization, average mercury use decreased to 3.46 grams per gram of gold in 2018 and to almost zero (just 0.19 grams) by 2020.

Elimination of mercury was achieved via formalization projects. The operations and subcontract pathways allowed mostly hard rock MPUs in Antioquia to switch to zero-mercury mining as their legal ore was channeled to mercury-free processing facilities operated by larger titleholders. The Chocó region presented a vastly different scenario because most Oro Legal-supported MPUs operated in AREs, and mining service providers and credible private company partners were noticeable by their absence. In Chocó, zero-mercury mining was based on a holistic approach to improve productivity and environmental management at the mine site, processing concentrated ore without mercury at a newly established central processing facility, and marketing mercury-free gold in legal markets with minimal intermediation and tight traceability and security protocols. Key to incentivizing formalization and investment by miners in improving performance, including zero-mercury processing, is the ASGM Service Center concept, an idea proposed at the start of the Activity. CORCRESER will operate as a center to deliver technical services, manage the processing center, and channel gold to legal markets at higher prices than those currently received by small miners. At the close of Oro Legal, CORCRESER was finalizing negotiations with international gold brokers for the purchase of legal, zero-mercury gold produced in the AREs by Oro Legal-supported miners with minimum intermediation.

REHABILITATION OF AREAS DEGRADED BY ILLEGAL MINING

In Chocó and Antioquia, degraded mining areas cover more than 35,000 ha and 40,000 ha, respectively, and are the most visible result of illegal mining and the starkest reflection of the limited capacity of authorities to enforce environmental and mining laws. Rehabilitation is negligible in Colombia, and it is in this area that some of the most visible impacts of Oro Legal

can be found via the innovative approaches deployed to rehabilitate these scarred landscapes. Although the Antioquia and Chocó rehabilitation models are very different because of the ecological, economic, and land use conditions found in these two geographies, both aimed to create a similar desired future condition: 1) fast-tracking the recovery of natural ecological features, functions, and biodiversity; 2) reforesting degraded areas combined with creating economic incentives for private and community landowners to prevent new illegal mining operations; 3) building new skills and creating jobs, especially for vulnerable groups like women, youth, and ethnic communities; 4) creating new alternative livelihood options (achiote and honey); 5) developing strong local partnerships with public and private sector co-investors; and 6) scalability.

Initially, the Activity anticipated that most rehabilitated hectares would be generated in Antioquia, with the balance in Chocó. By Year 3, the scenario was inverted, with more than 2,000 ha rehabilitated in Antioquia and 15,000 ha in Chocó. In the former region, the promising results from BioREDD+/Mining pilots were the springboard for a rehabilitation model based on private landholdings and included: 1) long-term, legal agreements with landowners; 2) leveling mine tailings to approximate original land contours; 3) planting *Acacia mangium*, a hardy, multiple-use species that is amazingly well-adapted to degraded sites; and 4) conserving remaining native forest areas. The great virtue of the Antioquia model is not only the positive environmental impact, but also the opportunity to quickly reintegrate degraded areas to productive uses and generate short-term employment and income from honey production and, in the medium term, from wood products and potentially carbon offsets. In 2020, the Antioquia departmental government initiated a program to rehabilitate 10,000 ha of degraded land based on the Oro Legal model.

In Chocó, the humid tropical forests are among the most biodiverse in the world, and the region has the highest precipitation in Colombia and extremely humid conditions year-round. These conditions make illegal mining in Chocó especially detrimental to the environment, with wholesale clearing of tropical forests, destruction of riparian areas around river systems and increased sediment loads in waterways. Ironically, these same conditions can also accelerate rehabilitation at a relatively low cost under a model based on assisted natural regeneration, because native species quickly seed-in and become established once a site is left undisturbed. This model was well-adapted to land tenancy and local governance in collective territories in Chocó, underpinned by voluntary agreements with Afro-Colombian community councils (CCs) and incorporating community action to patrol and monitor rehabilitation areas to prevent fresh incursions by illegal miners.

ALTERNATIVE LIVELIHOODS

From the more than 640 potential candidate MPUs for formalization canvassed by Oro Legal, it became clear that a large percentage of ASGMs did not have a viable pathway to legality/formality. This was especially the case for operators at the lower echelons of the gold value chain, who are extremely poor and traditionally marginalized, such as women gold panners. This was the impetus for Oro Legal to support livelihood alternatives to illegal mining. To avoid diluting resources and effort, just two value chains — honey in Antioquia and achiote, a natural colorant, in Chocó — offered, *a priori*, the best opportunities given market demand,

local conditions, and the social and economic realities of beneficiaries, especially female heads of household.

Honey production was deemed the best option in Antioquia. The Oro Legal grant fund supported nearly 350 families in the Bajo Cauca region of Antioquia - a majority of which have female heads of household and/or are vulnerable ethnic groups - to put into production 11,360 beehives clustered in apiculture production units (APUs) of 40 to 45 beehives. The paucity of native vegetation that limits productivity of apiaries was mitigated by locating beehives in areas undergoing rehabilitation with *Acacia mangium*, which provides bees with a year-round food source from the sap it exudes. Oro Legal introduced improved lines of bees and best practices and capitalized on USAID's historic investment in the apiculture sector over the past decade, including the Global Development Alliance (GDA) with Medellín-based Interactuar and a commercial alliance with a Bajo Cauca-based honey processor, Campo Dulce. The Bajo Cauca cluster is now the largest community-based honey production portfolio in Colombia, producing nearly 120 tons in 2020, and generating income for beekeepers above the minimum monthly salary.

Chocó presents enormous challenges for value chain development as numerous development efforts over the last 20 years can attest to. Unlike Antioquia, potential stakeholders in Chocó have guaranteed tenure or access to land, which makes agricultural value chains theoretically more feasible. However, any option would have to compete with wages paid by illegal gold dredgers, be suited to the agro-ecological conditions found in this extremely humid and diverse tropical region and overcome steep logistical challenges and infrastructure limitations. Achiote, which has been grown in Chocó for centuries, was considered the best alternative and was developed as part of a larger strategy to rehabilitate degraded areas and conserve intact, natural forest. Grants supported Afro-Colombian CCs to develop the achiote value chain along two parallel tracks.

The first track was plantation establishment, management, and harvesting, with improved local varieties having a high colorant or bixin content to produce dried achiote seed. CC grantees established 670 ha of plantations, benefitting 466 producer families, with associated signed commitments to rehabilitate areas impacted by illegal mining. This stage is highly labor intensive between site preparation and maintenance to control competing vegetation. The second, post-harvest and processing track, proved most challenging. No option for farm-level or semi-centralized seed drying proved feasible locally due to the extreme humidity and tremendously high energy costs and could not be performed outside the region because of high transportation costs. This was a major game-changer for the value chain and business model, requiring a pivot to: 1) developing a new product — wet bixin paste — a concentrated form of liquid bixin; 2) exploring new market outlets; 3) commissioning several local agro-industrial processing facilities to optimize bixin recovery from fresh achiote and lower processing costs; and 4) strengthening the capacity of the achiote company formed by CC grantees — Achiote & Agros del Chocó (A&ACH) — to manage the new value chain.

At Activity close, farm production and processing capacity were better aligned, and A&ACH was technically well-positioned but undercapitalized in anticipation of the next major harvest. A modest yet significant commercial agreement with a major colorant company based in Medellín,

Colorquímica (CLQ), was concluded for the purchase of concentrated wet bixin paste for processing into other bixin-based derivatives, which bodes well for future purchases to absorb production as well as a longer-term strategic business alliance for A&ACH. Likewise, the continued interest of an important impact investment fund — Acumen — has the potential to solve the vexing undercapitalization challenge.

WATER CATCHMENT CONSERVATION

Illegal mining, including contamination from mercury and other heavy metals, forest clearing and poor land uses, particularly extensive livestock production, are the main threats to the integrity of micro-watersheds or water catchments and waterways that are the source of potable water for most rural communities and smaller regional urban centers in Antioquia and Chocó.

Originally, this component intended to apply a dual approach: 1) conserving upper water catchment areas and 2) improving water capture, storage, treatment, and administration. With a better insight into local realities garnered at the start of fieldwork, it was concluded that the latter set of interventions were outside the scope of Oro Legal and a shift to an integrated water resources management (IWRM) approach in smaller water catchments in Antioquia was deemed more appropriate and impactful, locating limited Activity resources where water supplies were under stress from growing demand, increasingly erratic rainfall, and rapidly deteriorating soils and vegetative cover. The IWRM strategy was highly practical; based on the concept of “precision conservation” to target simple, low-cost conservation measures at the right place and the right scale and ensuring they work. In total, seven IWRM pilots over 3,000 ha were implemented with TA provided to Community Action Committees and outreach to communities about the links between their agricultural and household sanitation practices and the availability of clean water for their families.

CONCLUSIONS AND NEXT STEPS FOR REPLICABILITY, EXPANSION, AND CONTINUED IMPROVEMENT OF ASGM

This final report details approaches, decision points, interventions, outputs and impacts, and lessons learned under each of the Activity’s components. However, at a higher level, Oro Legal has laid bare the complex issues and principal obstacles that stand in the way of improving the environmental, social, and economic performance of the ASGM sector and breaking its ties to illicit economies and illegal groups that undermine security in Colombia, specifically:

- *Disarticulation between policies and legal frameworks and ASGM realities and needs.* National mining policies and legal frameworks across several ministries, agencies, and levels of government are ill-adapted to ASGM realities. For example, the same comprehensive requirements for EIAs¹ are applied almost uniformly to all MPUs regardless of scale, equipment used, processing technology, ecological factors, or potential environmental footprint. Authorities are reluctant to recognize that government alone cannot manage or control thousands of ASGM operators, and authorities are largely absent in the mining areas, stifling alliance-building, and exploration of co-management arrangements.

¹ The introduction of the new temporary environmental license (TIEA) towards the end of Oro Legal represents modest, yet important, progress towards differentiation.

- *Conditions that favor informality.* As in many countries, the formalization process in Colombia is wrought with onerous, excessively costly requirements and lengthy review and approval processes. The cost of PTOs and EIAs run upwards of \$50,000, even for MPUs with a footprint of less than 100 m², which is well beyond the reach of most ASGM operators. This is a main disincentive to formalization, forcing ASGM operators into illicit production chains.
- *Limited development options for subsistence miners and small MPUs that cannot be legalized.* Although the GOC recognizes the legitimacy of subsistence mining (i.e., gold panners and other rudimentary miners who produce up to 420 grams of gold/year), these miners are frequently co-opted to launder illegal gold and the broader development challenge, that of creating viable licit alternatives for the thousands of miners who are effectively ineligible for legalization, remains.
- *Access to technical assistance, mining services, and legal markets.* ASGM operators cannot legalize/formalize, improve performance, and benefit from selling their gold in legal markets without significant assistance, both financial and technical. Except for international cooperation programs like Oro Legal and BGI and, in a few cases, where MPUs are linked to large company supply chains, this assistance is not readily available to small miners.
- *Access to licit finance.* ASGM operators struggle to access licit finance, forcing them to rely on informal or illegal sources, a topic constantly raised by multiple stakeholders throughout the life of Oro Legal. ASGMs need licit finance to invest in formalization and improvements and to cover operating costs (e.g., bank accounts required for legal commercial transactions). Laudable GOC efforts to open access to financial services to the ASGM sector via the National Agrarian Bank (Banco Agrario) have largely failed, representing a main barrier for most small to mid-size MPUs that want to operate legally and sell gold into licit supply chains. Intrinsically linked to elevated fears of money laundering and criminality by the formal Colombian banking sector, this challenge has no easy or immediate solutions.

Over more than five years, the Oro Legal team worked tirelessly to address these issues through continual consultation, technological and organizational innovations, and testing and adapting a holistic framework, despite the political inertia to do so. To a significant degree, the Activity, together with partners like BGI, has laid the groundwork for a national program to scale progress and sustain the momentum achieved to date. The conclusions of the policy exercise presented to the GOC in August 2018, including a proposed National Unified Formalization Plan (NUFP), remain a valid roadmap to expand ASGM formalization, the key pillars of which are summarized below.

Pillar 1 – Differentiated approach. In recognition of the conditions, challenges, and opportunities faced by ASGM operators and their relationship with large companies, separate categories should be defined for ASGM and the concept of “traditional mining” should be reassessed. This would be the starting point for distinguishing between criminal mining operations and miners who want and are eligible to enter a formalization process, with clearly differentiated regulatory instruments and procedures tailored to the conditions of small operators. This approach would allow the government to transition a greater number of mines into the formal economy, while

better targeting its law-enforcement efforts on mining operations that are wholly criminal and severely impacting the environment.

Pillar 2 – Simplification of procedures and processes. A single, one-stop shop or window for formalization of small-scale mining operators should be created based on: 1) aligning the requirements and review of ASGM operational and environmental instruments to the scale of production and on-the-ground footprint; 2) reasonable and firm guidelines and response times for authorities to review and approve environmental and operational instruments; 3) decentralization of several key functions of the National Mining Agency (ANM) to the department level; and 4) issuance of required Mineral Commercialization Permits according to the selected formalization pathway, be it through designation of mining areas for specific recipients (i.e., ARE or new titles), application for a mining concession contract, or under an operations contract for ASGM operators located in areas already titled to large companies.

Pillar 3 – Effective articulation between institutions at national and local levels. A NUFP would have a coordination strategy among national and department mining and environmental authorities to empower local actors and decentralize regulatory authority. More effective coordination would contribute to solidifying the legitimacy of the state in these regions, nearly all of which are in post-conflict areas.

Pillar 4 – Accompaniment in the formalization process. Small miners who enter the formalization process would have access to technical assistance and training to mitigate environmental impacts, increase productivity, process ore without mercury, and market their gold legally through a network of accredited technical advisors and ASGM service centers under public-private partnerships. Miners enrolled in formalization would have access to banking and financial services and to a point of sale for gold that offers transparent transactions based on international prices and on strict internal due diligence and chain of custody processes.

Pillar 5 – Livelihood alternatives to subsistence. A NUFP would act as an articulating mechanism with other relevant stakeholders to develop alternative livelihood options for vulnerable miners who are looking to leave the sector. Since such options would contribute to reducing illegality and negative public externalities in the mining sector and would be linked to rehabilitation of areas degraded by mining, it would be logical and justified to allocate funding through transfers from centrally managed mining royalties and directly engage the private mining sector actors.

Pillar 6 – Permanent dialogue. The stakeholder dialogue spaces supported by Oro Legal and BGI that led to this proposal for a NUFP should be made permanent and expanded to the national level and those regional departments where ASGM is most prevalent to allow alliance-building that favors formality to take root and promote overall improvement in the performance of ASGM operators. Such a modality would be the first step for a co-management framework to de-link informal small miners from criminality and instead become allies with the Colombian government to strengthen governance and compliance in the sector.

Adoption of such a plan will depend on the willingness of authorities to recognize that the GOC alone cannot manage or control thousands of ASGM operators and that all parties, the public, and environment can gain from a more nuanced, pragmatic, and collaborative approach.



Before (2016) and after (2019) rehabilitation pilot with *Acacia mangium*, Bajo Cauca, Antioquia.
Photo: Oro Legal

INTRODUCTION

The Oro Legal Activity remains USAID's largest bilateral initiative in support of ASGM, implemented across 22 municipalities in the departments of Antioquia and Chocó (see Exhibit I). The Activity was a key piece of USAID's Colombia Country Strategy, boldly attempting to address higher-level concerns regarding citizen security, the influence of illicit economies, broad-scale environmental impact, and public health. Though the main institutional counterpart for the Activity was the MEM, Oro Legal worked closely with a much broader group of public, private, and civil society stakeholders throughout its implementation.

ASGM in Colombia is characterized by high degrees of informality and illegality, use of rustic technology and antiquated mining techniques, and significant negative environmental impact, especially from the use of mercury and wholesale degradation of large land areas. More than 80 percent of gold produced in Colombia is done illegally, with escalating revenues from unregulated gold sales financing a plethora of illegal armed groups that continue to pose a threat to Colombian democracy, as well as the country's fragile peace process. At the same time, nearly half a million Colombians earn a precarious living from ASGM, frequently in isolated, marginal communities, and are subjected to dangerous working conditions and threats by criminal elements. ASGM is a sub-sector of society and the economy that cannot be ignored by the GOC, and it made good sense for USAID/Colombia to incorporate Oro Legal into its portfolio of projects.

The policy context for ASGM in Colombia is contradictory. On one hand, it clearly identifies a small number of regulated pathways to legalization and formalization, while on the other hand, it is positively onerous in its requirements to achieve legality and formality. There is no overarching GOC strategy that cuts across key elements of ASGM — trade, mining, environmental protection, law enforcement — and as such, line ministries and other interested public bodies, particularly autonomous regional environmental corporations (CARs), frequently have conflicting policies, regulations, and procedures for ASGM that are hard to unravel and comply with in practice. This is exacerbated by varying degrees of subjectivity in the application of policy, technical norms, and regulations by government functionaries with frequent and somewhat arbitrary changes made by public officials. Further, many — perhaps, the majority of — informal ASGM operators can never realistically become legal and formal because of insurmountable constraints: 1) areas where mining is legally prohibited; 2) marked geographic isolation; 3) limited access to capital and technical know-how to embark on legal compliance; 4) links to criminal groups; and 5) a lack of incentives, motivation, or viable economic alternatives to ASGM. This all continues to stymie fundamental change and calls attention to the need to create viable, non-mining livelihood alternatives for those miners who cannot, or should not, practice ASGM.

Within this context and based on the promising results from the BioREDD+/Mining pilot, USAID centered Oro Legal on two main objectives. The first sought to build more effective governance for improved ASGM via strengthening GOC policy, fostering miner participation in formalization projects, and providing effective technical assistance and training, with a particular focus on eliminating mercury from the gold value chain. The second objective aimed to mitigate the environmental impacts of illegal gold mining by rehabilitating degraded areas, developing alternative livelihood options, and improving the management of water catchments linked to mining communities. The approach was underpinned by the Activity's theory of change, which was outlined by USAID at Activity inception:

If regional and local authorities are more effective in enforcing mining-related legislation and the right facilitating instruments (i.e., laws, regulations, partnerships, policies, or projects) are in place to support environmental recuperation of degraded lands with the participation of land owners, the private sector and local communities, then regional and municipal authorities will gain legitimacy and support, improving social, environmental and economic performance of artisanal small mining (ASM) operations and advancing Colombia's peace-building goals. (USAID, 2015).

While in general terms the original theory of change and associated results framework held true for Oro Legal over the life of the Activity, the operating context changed significantly, as several base assumptions proved to be less robust than originally envisaged, and the natural learning process that any engaged and thoughtful development project goes through underpinned an evolving vision for Oro Legal over the five-and-a-half years of implementation, all of which placed a premium on adaptive management. The most important of these changes and the implications for Activity implementation are discussed in the rest of this report.

From the outset, the Activity was deliberately ambitious in its performance indicators and corresponding targets, as illustrated by 12 mining formalization projects completed, involving 146 MPUs, \$195,000,000 in legal gold produced, and the use of 70 tons of mercury eliminated or avoided. During implementation, USAID, and its implementing partner, Chemonics International, came to appreciate the limitations and shortcomings of the initial set of indicators and targets, which were revised at the Activity's halfway mark in 2018 to better capture outcomes and impacts and account for the context and reality in which Oro Legal operated (see Oro Legal by the Numbers, p. 59). For example, once the real cost and complexity of legalizing and formalizing large numbers of individual ASGM MPUs became apparent and understanding that the number of potential ASGM operators with a pathway to legalization and formalization was severely constrained, Oro Legal pivoted from a focus on large numbers of individual MPUs supported to grouping MPUs within designated "formalization projects." In turn, it made sense to reduce the numeric target for formalized mines and add a new indicator to capture progress on the development of larger, more integrated mining formalization projects representative of the different legal pathways available to eligible MPUs.

This evolution was unsurprising given Oro Legal's uniqueness in USAID's global portfolio. It also reflected the Activity's ability to adapt its management strategy to changing circumstances throughout the course of implementation. For example, as the MEM and the ANM showed an increasing preference for AREs as a route to formalization in Year 3, the Activity was able to quickly place greater emphasis on the use of this formalization mechanism, particularly for ASGM operators in Chocó. Similarly, when the production of dried achiote seed in the extremely humid conditions of Chocó proved unfeasible, the Activity explored new, innovative processing alternatives, culminating in the production of humid bixin paste. This adaptive management approach was a hallmark of Oro Legal.

The Activity's comprehensive and precise monitoring, evaluation, and learning plan brought significant rigor to environmental management and supported a high-impact communications and outreach strategy that reached more than 420,000 recipients. It was also used as a rigorous effort to improve on standard or typical performance measures and monitoring methodologies employed by USAID, particularly for ASGM. For example, a USAID request to objectively define "mining formalization" and progress by MPUs led to the development and application of a formalization standard, or scorecard, based on a comprehensive set of criteria and benchmarks, which permitted the Activity to calculate a numeric measurement for formalization performance over time.

The environmental assessment approved by USAID in 2016 identified a set of significant issues and risks and corresponding mitigation measures that are referred to elsewhere in this report.

It also proved to be a springboard for innovative monitoring of mercury use at mine sites, as well as the release of gaseous mercury by gold shops and rustic processing workshops located in densely populated town centers. Throughout its period of performance, Oro Legal broadly disseminated information on both the problems and potential of ASGM, obstacles and opportunities to formalization, and how environmental impacts can be avoided or remediated to a wide array of public and private entities to “move the needle” on policy and perceptions regarding ASGM and new licit livelihood possibilities.

Over and above meeting specific performance objectives, which were in themselves impressive, Oro Legal can be viewed more broadly through a learning lens, whereby USAID concessionary finance supported the development of new models and novel approaches to improving ASGM performance that would have been impossible to consider by the Colombian public and private sectors alone. This report describes these models and approaches and how they ultimately played out in practice. Additionally, it offers lessons learned that allow readers to judge their efficacy for boarder application in Colombia and potential relevance elsewhere.



Gold panning in a formalized mining operation in Barbosa, Antioquia.
Photo: Oro Legal

OBJECTIVE I: BUILDING EFFECTIVE GOVERNANCE FOR IMPROVED GOLD MINING

In the Colombian context, small-scale mining operations correspond to almost 90 percent of total gold mining operations nationwide, of which 60 percent are untitled operations that are considered illegal, and, in many cases, finance organized crime. By one estimate, gold mining generates approximately \$2.4 billion in revenues, or three times the amount generated from trafficking cocaine produced in Colombia, with exports reported at \$1.74 billion². Substantial incomes from gold mining and the ease of operating informally have attracted more than 500,000 Colombians to this activity, since this type of mining is relatively accessible and often the only livelihood option available for vulnerable populations in isolated rural areas. Gold mining is a fast-growing source of revenue for the GOC and a pillar of many local economies. Nowhere is this truer than in northern Antioquia and along the San Juan and Atrato rivers in Chocó on Colombia's Pacific coast, which together account for 70 percent of ASGM in Colombia and constituted Oro Legal's key intervention geographies.

As thinking on the extractives sector has evolved over recent years, the emphasis has shifted from narrower, typically mine-focused concepts such as "social license," to broader, more holistic models centered around good governance. This is understandable given the growth of the sector, and reflects concerns over the negative social, environmental, and public health

² Colombian Mining Association (ACM). Bogota, Colombia, 2018.

impact of poorly implemented, often informal/illegal mining, as well as the involvement of large numbers of people in the extractives sector and the frequently unrealized development potential the sector offers. In Colombia, the governance debate is overlaid by concerns about the significant flow of finance from uncontrolled gold mining to a plethora of illegal armed groups and its implications for peace, democracy, and human rights.

While specific definitions of good mining governance vary, most include: 1) clear policy and regulations; 2) simple, transparent regulatory processes; 3) efficient institutions; 4) compliance by all sector stakeholders — from mines and miners through to line ministries — with the “rules of the game;” and 5) appropriate sanctions and incentives to underpin good mining. While Colombia has worked hard to confront its significant mining governance challenges, most informed stakeholders take the view that the sector has much work to do, particularly regarding the formalization of ASGM operators.

These factors defined the context in which Oro Legal’s mining activities played out and influenced the challenges, approaches, and achievements in each of the three intervention areas under Objective 1 discussed below.

STRENGTHENING COLOMBIAN GOVERNMENT POLICY AND PROCESS

Mining policy in Colombia, like most other countries around the world, has grown organically since colonial times as a response to the ebb and flow of varied, and often competing, economic and political interests. It has typically been a top-down process of development, orchestrated by those with the greatest stake in its outcome. Given this context, it is unsurprising that mining policy is an amalgam of often complex laws, norms, and regulations, implemented with varying degrees of efficiency by a broad range of institutions, led by the MEM.

Curiously enough, ASGM legalization, or “regularization” as it is currently referred to by the MEM, in Colombia is relatively clear from a strict policy perspective. Enshrined in the 2001 Mining Code, and effectively initiated as a formal policy instrument from 2015 onward, ASGM formalization establishes a separate, parallel pathway³ to legality for small, gold miners. Of the available options for formalization in Colombia, the most feasible in practice were found to be: 1) an operations contract, 2) a formalization subcontract, and 3) a declared ARE leading to a special concessions contract. The two former options are civil contractual agreements between title holders and miners, which serve as proxy titles that underpin legality, while the latter is a formal, GOC-mandated titling mechanism falling under the auspices of the ANM.

³ As distinct from the traditional legal pathway to mining development (based on the acquisition of a mining title, presentation of geological studies, development, and approval of the mine plan, securing an environmental license from the National Licensing Agency, etc.), which explicitly acknowledges the challenges to formalization faced by smaller, informal operators.



Zero-mercury improved mining
production unit; ARE Tadó, Chocó.
Photo: Oro Legal

So, if the policy framework for ASGM formalization is relatively straightforward, at least in theory, why is there so much discussion regarding the formalization of gold mining in Colombia? The answer can be found not in the “what” of formalization, but in the “how.”

In short, the process is technically arduous, bureaucratically challenging, prohibitively costly, and frequently overshadowed by high levels of uncertainty as to the final outcomes with a significant risk of failure. Many small-scale gold miners who worked with Oro Legal to formalize their activity cited

struggles to overcome regulatory obstacles, the significant sums invested in lawyers and mining consultants to develop complex mining and environmental instruments, and the long approval delays that can extend for years or even decades. Prior to working with Oro Legal, one of the Activity’s female mining beneficiaries recounted having spent some \$70,000 on legal support in an unsuccessful attempt to become legal. This all poses significant barriers to entry and, in the extreme, creates disincentives for many miners to ever begin the formalization process.

“If it is almost impossible for good miners to formalize in this country, how are we going to stop the bad ones and modernize the sector?”

— ASGM STAKEHOLDER

This background characterized much of the frustration felt during the first two-plus years of Activity implementation and led, in Year 3, to Oro Legal making a significant wager in terms of ASGM policy improvement. In close coordination with USAID, Oro Legal took the decision to work with one of its closest partners — BGI, financed by the Swiss State Secretariat for Economic Affairs (SECO) — to develop a pragmatic proposal for policy reform in support of broader and more efficient ASGM formalization. Critical to the exercise was the premise that proposals would not involve changes to the current Mining Code. Timing was critical because the work needed to be completed by August 2018 in time for presentation to the incoming Duque administration for inclusion in the national development planning process.

With this deadline in mind, OL and BGI — supported by USAID, SECO, and the U.S. and Swiss Embassies — worked with a recognized Colombian consulting firm to structure a multi-stakeholder consultation process for development of an ASGM formalization white paper directed at the incoming GOC administration. During April and May 2018, workshops were undertaken with:

- Sixty-three small gold miners from 28 municipalities in seven emblematic mining departments (Bolívar, Santander, Cauca, Antioquia, Caldas, Córdoba, and Chocó).
- Representatives of nongovernmental organizations (NGOs), academic organizations, and development projects (the Alliance for Responsible Mining, Comunica, the World Wide Fund for Nature-Global Environment Facility (WWF-GEF) project, the Universidad Externa de Colombia, the Universidad Industrial de Santander, the Universidad Nacional, and the Canadian International Resources and Development Institute).
- Representatives of medium and large-scale private mining companies (AngloGold Ashanti, Continental Gold, Mineros S.A., Córdoba Minerals, Zara Holding, Minesa, Sun Valley and Gran Colombia Gold).
- Senior government representatives from the MEM, the Ministry of Environment and Sustainable Development (MADS), the Ministry of Interior, the ANM, the Unidad contra la

Minería Ilegal, the Colombian army and police, the Corporación Autónoma Regional para el Desarrollo Sostenible de Chocó (CODECHOCÓ), and the Corporación Autónoma Regional de Rionegro.

From this broad, structured consultation process — a first for the Colombian mining sector — a proposal was drafted and refined during June - August 2018 and presented to the new vice-minister for mining, including concrete recommendations for:

- A specific plan for the formalization of artisanal gold mining: Plan Único de Formalización Minera
- A differentiated policy approach based on the size of mines and type of mineral extracted
- The simplification of regulations and procedures around mining formalization, particularly the requirements for PTOs and EIAs
- The technical and budgetary strengthening of government entities overseeing ASGM formalization
- An emphasis on overcoming specific barriers to legality (for example, accessing capital and explosives legally and establishing clear outlets to sell gold into licit markets)

The MEM expressed its appreciation for the USAID/SECO effort, as it allowed senior MEM staff to quickly respond to a series of requests from the National Planning Department for key strategic themes for inclusion in the national planning process, which were extracted straight from the white paper⁴. More concretely, it led to the inclusion of a new TEIA, which marked an important step in differentiating between the realities of ASGM and their larger sectorial counterparts.

LESSONS LEARNED

- Mining policy reform in Colombia is an enormous challenge. It is still hard to overcome the entrenched position in large parts of Colombian society that gold mining is inherently bad and needs to be limited, controlled, and policed, rather than formalized, regulated, and monitored. This is typically reflected in a hardline (*mano dura*) approach to dealing with illegal mining by the GOC, even when its impact is often more perception than real. For example, the significant reductions in legal gold production over recent years — from 63 tons in 2016 to 34 tons in 2020 — have only served to expand the amount of gold sold illegally, as well as the illicit flows of funds to illegal groups⁵.
- There is tension between mining and environmental stakeholders, and between entities focused on larger mines and those with an interest in smaller ones. This limits the possibility of instigating more reasonable mining and environmental mitigation measures, appropriately differentiated by size of mine and type of mineral. This also explains, in part, why typical approaches to formalization based on simplifying procedures and reducing the time and cost

⁴ Personal communication, MEM Formalization Unit.

⁵ It is worth noting that the only period in the implementation of Oro Legal when miners reported difficulties in selling gold was during the first few months of the COVID-19 pandemic in 2020.

of compliance have not been adopted in Colombia⁶. Ironically, this perversely leads to poorer mining practices and greater negative environmental impact as informal gold miners find themselves entrenched in illegality. In hindsight, the Activity could have worked more closely with the MADS and the ANM to engender a more pragmatic approach to documentational compliance by the ANM and the CARs.

- While most sector stakeholders — from public entities to private mining companies and smaller miners — acknowledge that broad-scale reform of the sector would be advisable, politics favor the status quo. This is typified by sustained negative public opinion of the sector by well-organized and vocal civil society groups and the exclusion of mining in high-profile local consultation processes, which has led to a ruling by the Constitutional Court in 2018 to put such processes in legal limbo. It is difficult to see this changing any time soon.
- There was value in undertaking a broad, multi-stakeholder consultation exercise and many stakeholders, particularly smaller gold miners, commented that it was the first time they were able to voice their opinions on ASGM formalization as part of a structured, inclusive process. This in turn led to the approval of a simpler TEIA requirement in the national development planning process, which is a modest but an important step towards differentiation of regulatory requirements specific for ASGM operators.
- Timing is essential for any policy reform effort, and unfortunately is typically exogenous to any international cooperation program. While Oro Legal and BGI endeavored to exploit a window of opportunity during a government transition, external political factors came into play (for example, the political and social implications of the national schism surrounding the referendum on the peace process that occurred towards the end of 2016) that reduced the political appetite for mining reform by the current GOC.

⁶ The implementation of such measures does not negate the importance of regulation and enforcement.

SNAPSHOT I The Resilient Miners of Tarazá



Iván Rodríguez, Riorayo mine,
Tarazá, Antioquia.



Luis Miranda Ortiz, Tenerife mine,
Tarazá, Antioquia.

Mining is a dynamic sector of the Colombian economy; however, its informality and illegality have significantly impacted the environment and pose serious public health risks, largely from deforestation and the use of mercury.

Mining authorities have at their disposal a host of comprehensive regulatory tools and enforcement mechanisms for legalization of small and medium-sized mining enterprises and to ensure that miners comply with the law. Unfortunately, stricter regulations have not translated into a reduction in informal mining operations, and lengthy and costly procedures to complete the legalization process often discourage miners, many of whom opt to remain illegal despite the risks and potential consequences.

However, there are those select miners who are determined to make a difference and refuse to give up despite the challenges. Such is the case of two miners in the municipality of Tarazá, Antioquia: Iván Rodríguez from the Riorayo mine and Luis Miranda Ortiz from the Tenerife mine. Iván began the process to obtain a mining title in 1998 through a family mining company, while Luis did the same starting in 2001 when the National Mining Code came into force. Both miners ended up frustrated and entangled in a complex web of bureaucracy and legalese for two decades.

In 2014, Iván and Luis resumed their legalization processes, this time with the support of USAID's BioREDD+ program and later, in 2016, through Oro Legal. Thanks to the efforts of these two USAID programs, a special mining reserve area (ARE) was finally declared in Tarazá a year after

Oro Legal recommended its use as a viable legalization route to the National Mining Agency (ANM). The two miners later grouped two more mining production units (MPU) in Tarazá into the ARE. Once the legal and technical procedures were completed, the ANM declared special concession contracts, formally certifying Iván and Luis as the mine owners.

Oro Legal not only protected the livelihood of these miners through legalization, but also filed environmental management plans with the department environmental authority and provided the mines with technical assistance until they reached one of Oro Legal's highest scores on the formalization standard, well above the 75 percent qualifying grade. Legalization process are most apparent in the 28 kilograms of gold that three of the four MPUs (Río Rayo, Puerto Escondido, and La Troja) have already exported to the European market via the Switzerland Valcambi refinery and the high-end watch, jewelry, and accessories company Chopard. This was done with the support of the Better Gold Initiative, a strategic ally of Oro Legal, that employs a "Responsible Gold" seal to reward good practices and traceability, offering a higher market price and a bonus of \$1,000 per kilo to invest in environmental and social projects.

These exports are a testament to the miners' perseverance, resilience, and desire to operate responsibly, and sets an example for other miners as well as remediating the negative perception of ASGM in many parts of the country.



Miner at San Pedro No. 2 mine in Remedios, Antioquia.
Photo: Oro Legal

ENHANCING THE PARTICIPATION OF ARTISANAL AND SMALL GOLD MINERS, THEIR ASSOCIATIONS, AND AFRO-COLOMBIAN COMMUNITY COUNCILS IN MINING FORMALIZATION PROJECTS

Economic formalization is a key goal for countries with a large informal sector. Formalization is typically seen to increase government revenues from taxes and royalties, expand gross domestic product, and improve the well-being of workers via better access to social security, health, and other benefits. These same arguments underpin the case for ASGM formalization in Colombia. At the same time, there is deep resistance from many of the same political and economic stakeholders who are some of the biggest rent-seekers and have much to lose from widescale formalization.

For clarity, it is important to distinguish between “legality” and “formality” as it is used in the context of Colombian mining. MPUs are considered legal if they possess a valid title (or proxy title), as well as an approved PTO and environmental license, typically an EIA, or more recently a TEIA. Formality refers to the ability of a legal mining operation, whatever its size, to meet accepted sector standards to mine responsibly, apply best practices, and generate a positive economic, social, and environmental impact, including the payment of royalties and taxes, social security for its workers, employing adequate safety equipment and practices, and mitigating adverse environmental impact on soils and water.

Official GOC figures on the extent of informality in the mining sector are outdated and no doubt significantly underestimate the number of informal MPUs. Still, they do serve to provide some dimension to the size of the challenge. The last Mining Census from 2010 to 2011 identified 14,357 active MPUs, of which 4,133 were gold mines. Within this latter group, only 537 MPUs possessed a valid title, meaning that 87 percent of the gold mining sector at this time was informal/illegal. Furthermore, and as mentioned earlier, more than 70 percent of production is in Oro Legal's priority intervention geographies, Antioquia and Chocó. On the surface, the universe of MPUs that can theoretically be legalized/formalized appears enormous; however, this figure must be tempered since a significant number of these mines can never become legal/formal. In the extreme, a percentage of MPUs will be linked to criminal activities (including some owned and managed by illegal armed groups) and will, by definition, always be illegal. Moreover, additional MPUs will be in areas where mining is not permitted by law (natural national parks, departmental protected areas, formally designated wetlands or paramos), while others have neither the motivation nor the financial resources to embark on a path to legality.

This being the case, Oro Legal invested significant time and resources during the first few years of the Activity to identify, filter, and ultimately make its best wager on those MPUs with the greatest chance of 1) becoming legal and 2) subsequently committing to formality. This proved to be an enormous endeavor. With the growing realization that attempting to legalize and formalize large numbers of disperse, individual MPUs was both inefficient and costly, Oro Legal pivoted mid-Activity to focus on the development of mining formalization projects, which grouped varying numbers and sizes of MPUs in defined geographic areas. Under this new approach, Oro Legal subsequently engaged 643 gold mines and initiated work with 344 MPUs, comprising 1,712 miners, grouped in 20 projects (see Exhibit 1). By Activity close, Oro Legal had successfully implemented 12 formalization projects and formalized 146 MPUs, benefitting 1,062 miners. The formalization projects in question are representative of the available formalization routes, authorized by the GOC: operations contracts, formalization sub-contracts, AREs, and one area transferred from the titleholder to small miners. The final figures and breakdown of formalization mechanisms employed are presented in Exhibit 2.

EXHIBIT 2. BREAKDOWN OF FORMALIZATION PROJECTS INITIATED AND FINALIZED

Name of Project	Formalized Project Number	Project Location (Municipality)	Titleholder/ Association/ Community Council	Legalization Mechanism Employed	No. of MPUs Intervened	No. of MPUs Formalized	No. of Mining Beneficiaries
Department of Antioquia							
North/North Eastern Region							
Gran Colombia Gold	1	Segovia	Gran Colombia Gold	CO	34	20	200
Quintana S.A.S.	2	Remedios and Vegachí	Sun Valley Group	CO/SFM	7	5	130
Maximiliano Jaraba		Remedios	Maximiliano Jaraba	SFM	2	0	108
Nugget Gold (and others)	3	Barbosa and Don Matías	Nugget Gold and others	SFM	8	8	53
Gramalote		San Roque	Anglo Gold Ashanti	SFM	7	0	51

Name of Project	Formalized Project Number	Project Location (Municipality)	Titleholder/ Association/ Community Council	Legalization Mechanism Employed	No. of MPUs Intervened	No. of MPUs Formalized	No. of Mining Beneficiaries
Bajo Cauca Region							
Emijom	4	Zaragoza	Mineros S.A.	CA	3	3	48
CEC Tarazá	5	Tarazá	4 MPUs	ARE	4	4	143
ARE Cáceres/Tarazá		Cáceres and Tarazá	ASOMIT Mining Association	ARE	13	0	97
Mineros S.A. (dredgers)	6	El Bagre	Mineros S.A.	CO	5	5	100
Mineros S.A. (small dredgers)		Nechí	Mineros S.A.	TBD	80	0	320
Asoagromicauca		Cáceres	Asoagromicauca Mining Association	SFM	20	0	20
ARE Pato		Zaragoza	9 MPUs	ARE	9	0	9
Western Region							
Continental Gold	7	Buriticá	Continental Gold	CO/SFM	8	8	102
Department of Chocó							
Cocomacoiro	8	Condoto	Cocomacoiro CC	SFM	2	2	17
Coomacón	9	Condoto	Coomacón Mining Cooperative	SFM	3	3	30
ARE Tadó	10	Tadó	Asocasan CC	ARE	52	51	107
ARE Unión Panamericana	11	Unión Panamericana	Cocomaupa CC	ARE	31	27	99
ARE Cértégui	12	Cértégui	Cocomacer CC	ARE	11	10	33
ARE Condoto		Condoto	Cocomacoiro CC	ARE	25	0	25
ARE Nóvita		Nóvita	Cocoman CC	ARE	20	0	25
Formalization Impact Summary							
Total Number of Projects Initiated			20				
Total Number of Projects Formalized			12				
Total Number of MPUs Intervened			344				
Total Number of MPUs Formalized			146				
Total number of Mining Beneficiaries (Intervened MPUs)			1,712				
Total number of Mining Beneficiaries (Formalized MPUs)			1,062				

Legend: Community Council (CC); Special Mining Reserve Area (ARE); Operations Contract (CO); Area transferred from the titleholder to small miners (CA); formalization subcontract (SFM)

During an intense formalization effort, and over and above the implementation of rigorous, mine-site TA largely by Oro Legal staff, the Activity decided to engage the services of 21 consultants specifically to develop the PTOs, EIAs, TEIAs, and environmental management plans (PMA) required under Colombian mining law to prioritize support that was specifically requested by the MEM as part of its bilateral agreement with USAID⁷. Over a period of four

⁷ Despite being key requirements to become legal, the GOC is unable to subsidize the development of these documents for smaller miners.

years, Oro Legal developed and presented 32 PTOs, 28 EIAs, 12 TEIAs, and 2 PMAs—the largest single ASGM legalization/formalization in the history of Colombian⁸.

LESSONS LEARNED

- ASGM formalization is demanding and costly, but if done well can generate significant behavior change across a diverse group of MPUs (see Snapshots 1, 2, and 3 included as annexes to this report). This is particularly notable for improved environmental management. While explanations as to why this is the case vary, one key driver is financial. Legally produced gold allows miners to avoid selling at the steep discounted price offered for unregulated gold, typically on the order of 25 to 30 percent of prices offered in licit markets. This in turn incentivizes investments to improve mining and environmental performance.
- Most ASGM observers — including Oro Legal in its earlier years — assume that legalization per se acts as a counterweight to illicit activity. Unfortunately and ironically, miners are often most vulnerable to illicit pressures at the very point that a MPU first becomes legal; when pressure builds from friends, family, and sometimes illegal, armed groups to channel illegal gold through the newly legalized mining activity. This led Oro Legal to include an additional element to its work, not originally considered in the Chemonics contract, to help Oro Legal-supported mines channeled their gold through legal marketing routes. This generated \$195,000,000 in legal gold sales by Activity close, including the sale of the first 28 kg of gold to Swiss buyers via Oro Legal's partnership with BGI.
- ASGM formalization generates significant returns to the GOC, and more widely to Colombian society, via the generation of tax, royalty, and social security payments. By Activity close, Oro Legal-supported MPUs generated \$14.5 million in such payments. A master's degree thesis⁹ by two of Oro Legal's staff based on Activity data not only confirmed a significant, positive relationship between formalization and royalty payments, but estimated that more generally, formalized MPUs could be expected to generate average royalty payments of some \$200,000 per MPU per year. This alone provides a strong economic argument for expanding formalization with GOC support.
- One basic element of all economic formalization initiatives is the management of a bank account. Ironically, something this basic presents a formidable channel to formalize activity in the Colombian gold sector, including for well-established mines that frequently have their

“Empowering miners, by way of dignifying their activity, contributed to the effectiveness of Oro Legal.”

**— FINAL PERFORMANCE
EVALUATION**

⁸ While larger figures are sometimes presented by the GOC, it should be remembered that these typically refer to supporting miners in accessing legal title, but do not include the development of PTOs, EIAs, or PMAs, and thus, do not met the GOC's own definition of legality.

⁹ “Evaluating the correlation between the formalization of small and medium-sized mining in Colombia and the generation of royalty payments — the case of USAID-Oro Legal,” Liz Muñera and Juan Camilo Virgen.

bank accounts closed. By way of illustration, this obstacle led several Oro Legal-supported, formalized MPUs — at the suggestion of a local bank manager — to change names and the formal registration with the local Chamber of Commerce to enable the MPUs to open a bank account after their original accounts were closed by another bank. Ironically then, the only way for these miners to consolidate their formality was to do something that was probably illegal. This issue was clearly beyond the scope of the Activity to resolve but remains a thorn in the side of any coherent GOC effort to expand formalization.

- The Achilles heel of any legalization/formalization effort is documentary compliance, and within this, securing an environmental license is the main challenge and the lack of sensible policy differentiation is most keenly felt. Oro Legal invested on average \$25,000 of USAID funding to prepare each EIA in accordance with extremely detailed terms of reference required by the CARs. By internalizing the process within the Activity, Oro Legal generated 50 percent savings compared to commercial rates for the same work. Without USAID support, MPUs would have had to invest upwards of \$50,000 per EIA. Ignoring for a moment the financial cost, more challenging for MPUs is understanding and controlling a complex consultancy exercise over several months, which typically entails dense, technical reports of more than 200 pages. Adding insult to injury is the time taken to review documents by the relevant bodies; even for EIAs supported by Oro Legal, this amounted to two to three years. It is difficult to imagine how most small miners could undertake this process alone, which is probably the single, most significant barrier to expanding ASGM legalization/formalization.
- Over the course of Oro Legal, there has been positive movement and willingness by larger private mining companies to embrace mining formalization and develop ASGM “co-existence” models within their titles. With one or two exceptions, this was certainly not the case five years ago. Indeed, the president of one large mining company commented when discussing the possibility of formalizing miners within its title: “Why invite the bandits into your living room if there is no pressing reason to do so?” Over this period, many Colombian-based mining companies have come to see the potential benefits — social, security, governance — of formalization, although many remain fearful of the reputational risk of a formalization initiative going wrong, as well as having to deal with the challenging GOC bureaucracy associated with ASGM formalization.



SNAPSHOT 2 Legalization changed Bernardo Gutiérrez's Life

Bernardo Gutiérrez, miner in Barbosa, Antioquia
Photo: Oro Legal

Bernardo Gutiérrez is a small-scale gold miner from the municipality of Barbosa, Antioquia, who was persecuted by the authorities for years, not for being a criminal, but for his gold mining operation in the Medellín River, which lacked any type of documentation proving its legality.

Bernardo was not at all familiar with Colombian mining legislation nor with the minimum legal requirements for mining operations. Despite being nearly forced into bankruptcy due to fines, he persisted with his mining operation informally. That is, until the day when police confiscated his expensive machinery. That prompted Bernardo to join other miners in the region to initiate formalization with the help of the Antioquia Mining Secretariat; the owner of the mining title, the Ministry of Mines and Energy; and USAID's Oro Legal Activity.

In Colombia, it is estimated that 500,000 people like Bernardo mine informally, lacking the required legal, technical, or environmental approvals and usually in a very unsafe way; a situation that damages the environment and threatens their health.

When Oro Legal first began supporting Bernardo on his path to legalization and formalization, it encountered a mining operation in a very precarious condition: the encampment was little more than a plastic hut, and the workers had no protective equipment, nor were they registered in the Colombian-mandated social security system. The mining methods were highly inefficient and dangerous, damaging the environment and putting the workers' lives at risk. However, there was also something positive about this mining operation that caught Oro Legal's attention: its owner's commitment to change.

Bernardo's operation has since been legalized and formalized, and he now has a stable mine site, provided via a formalization subcontract with the owner of the mining title. His company, Dragueros de Puente Nuevo, is now registered in the National Mining Registry, and the plastic hut has been replaced by a proper facility equipped with a wastewater and septic system, a dining area, bathrooms, a secure storage room, and a waste disposal and recycling area.

The site's mining operation is safer and more productive and does not use mercury. The riverbed has been restored with the original mining ore to reduce environmental impacts, and trees have been planted along the riverbank.

All of Bernardo's employees are now enrolled in the Colombian social security system, which provides insurance in case of a work-related accident, a situation that Bernardo found himself in when he suffered an accident that resulted in the amputation of his left arm. Thanks to his social security coverage, however, he was able to receive all the medical care he needed and now receives a full pension.

Bernardo's gold is now transported without fear of confiscation and sold to an international trading company at a price 30 percent higher than what he previously received selling to illicit markets. In four years, the Dragueros de Puente Nuevo mining unit has reported income of \$1,120,000 and has paid an estimated \$75,000 in social security, income tax, and royalties to the Colombian government.

Undoubtedly, Bernardo is an exemplary miner who has shown that legality can be a profitable option for miners, with life-changing effects.



Oro Legal transitioned technical assistance to a virtual format in response to the COVID-19 pandemic.
Photo: Oro Legal

PROVIDING EFFECTIVE TECHNICAL ASSISTANCE AND TRAINING TO ASGM

The provision of TA and training is a key feature of all development projects and Oro Legal was no exception. The challenge, however, was somewhat greater given both the relative technical complexity of gold mining — even with ASGM — and the high levels of specificity of mining (e.g., the type of mining and mineral composition at each mine site) that ruled out a “one-size-fits-all” approach. In addition, Oro Legal needed to structure TA and training to ensure it generated quantifiable gains. This was important in responding to USAID’s initial concerns over potentially open-ended commitments to costly provision of TA and training and specifically to allow the Activity to define a mechanism to evaluate progress more objectively as well as defining *ex-ante* a pathway to “graduation.”

In this context, Oro Legal worked closely with the MEM to develop a formalization standard, or scorecard, which formed the basis for much of Activity-supported TA and training. Passing through a series of iterations during the first year of implementation, Oro Legal and USAID eventually settled on a rigorous format that was piloted with MPUs involved in its first group of formalization projects in association with Gran Colombia Gold and Continental Gold.

The level of formalization of each MPU (expressed in percentage terms) was determined in two stages. The first stage included key documents required for legalization.¹⁰ These were (with corresponding weights): 1) a legalization document (title or proxy title) approved by the relevant entity (20 percent); 2) an environmental guide submitted to the relevant CAR and under implementation (10 percent); 3) a PTO submitted to the ANM or Mining Secretariat in the case of Antioquia (15 percent); and 4) an EIA, TEIA, or PMA submitted to the relevant CAR (15 percent). The second stage was linked to performance improvements in the following four key areas (with corresponding weights): 1) environmental management (10 percent), 2) occupational health and safety (10 percent), 3) mining techniques and safety (10 percent), and 4) business performance and socioeconomics (10 percent).

Progress in each of these four areas, which included 318 evaluation criteria for hard rock mining and 337 for alluvial mining, was assessed every quarter against initial baselines and quantified in a score (theoretically from 0 to 100 percent) for each MPU. Graduation to full formalization occurred only when a MPU achieved an overall score of 75 percent as measured across the weighted performance areas noted above. This approach allowed for graphic presentations of progress of all participating MPUs (see Exhibit 3) so that Oro Legal field staff could quickly identify strengths and weaknesses to target TA and training more efficiently to the specific needs of individual mines.

As Exhibit 3 clearly shows, the MPU in question has all the required documentation to operate legally and scores well in business management and social and economic aspects of mining but performs less well on its environmental management and mine security and would merit support to improve its technical mining capacity. This approach led to significant, demonstrable gains across the entire mining formalization portfolio by Activity close, as illustrated in Exhibit 4.

¹⁰ The environmental guide was included to allow MPUs to undertake their mining activity during the period in which an EIA, TEIA, or PMA is being prepared and presented.

**EXHIBIT 3. GRAPHING A MINE'S PROGRESS IN FORMALIZATION
TO TAILOR TECHNICAL ASSISTANCE AND TRAINING**



EXHIBIT 4. FINAL AVERAGE SCORES FOR ALL FORMALIZED MPUs AT ACTIVITY CLOSE

Mining Formalization Project No.	Mining Formalization Project Name	No. of MPUs formalized	Average Baseline Score	Average Final Score	Average Improvement	Start of Legalization and Formalization	End of Legalization and Formalization
Antioquia							
1	Gran Colombia Gold	20	73%	86%	12%	08/07/2016	30/05/2018
2	Emijom	3	55%	89%	34%	14/04/2016	30/08/2019
3	Continental Gold	8	54%	88%	34%	10/02/2017	30/06/2020
4	Quintana S.A.S.	5	33%	91%	57%	02/02/2016	31/12/2020
5	Nugget Gold	8	23%	87%	64%	16/11/2017	31/01/2021
6	CEC Tarazá	4	37%	93%	56%	03/08/2016	31/01/2021
7	Mineros S.A.	5	72%	85%	13%	19/05/2016	31/12/2020
Total Antioquia		53	50%	88%	38%		
Chocó							
8	COCOMACOIRO	2	29%	82%	54%	12/05/2016	12/03/2019
9	COOMACÓN	3	25%	82%	56%	12/05/2016	12/03/2019
10	ARE Cértegui	9	26%	79%	54%	01/05/2016	15/02/2021
11	ARE Unión Panamericana	27	28%	78%	49%	01/05/2016	15/02/2021
12	ARE Tadó	52	28%	76%	49%	01/05/2016	15/02/2021
Total Chocó		93	27%	79%	52%		
Grand Total		146	38%	84%	46%		

CORCRESER was an indispensable partner in delivering TA and training during the last part of Oro Legal, maturing to become a reliable and unique Colombian-based organization. With a team of highly qualified administrative and technical professionals and a business model based on contracts and fee-based services, CORCRESER is well-equipped to design and effectively implement complex and ambitious ASGM initiatives and offer technical services to small miners. At the close of Oro Legal, CORCRESER had achieved a modest level of financial autonomy with a contract for a mining formalization project funded by the United Nations Development Program and will manage the gold processing center in Chocó where negotiations were being finalized with international gold brokers for the purchase of legal, zero-mercury gold produced by Oro Legal-supported miners with minimum intermediation.

Over and above significant mine-site delivery of TA and training, Oro Legal also developed a digital platform to support training and knowledge uptake, mainly for ASGM, but also for other interested stakeholders (GOC officials, private mine employees, NGOs, academics, and students). The concept behind the platform was straightforward. Gold mining is hard work, responsible gold mining is technically challenging, and legal and formal gold mining even more so, with miners having to understand complex regulatory requirements and comply with strict mining and environmental rules.

Thus, training is an essential component of any mining formalization exercise. However, traditional training is expensive, particularly when serving small gold miners in isolated regions and often with low levels of formal education. Fortunately, most miners have access to smart phones - and some to computers - and a good degree of downtime at the mine sites, where they frequently spend days on end. Moreover, Colombia has decent cell phone coverage and internet access, including in many remote, rural areas. In this context, Oro Legal designed a digital learning platform to support miners undergoing formalization. This free platform was designed to run on smart phones and personal computers.

“Oro Legal’s strengths lie in its work in the field alongside the miners, seeing them, talking to them, and building a one-to-one relationship with them, and with the communities.”

**— ORO LEGAL
SUBCONTRACTOR IN
SUPPORT OF MINING
FORMALIZATION**

“Oro Legal Virtual” is made up of 10 modules, comprising critical mining knowledge and know-how, including topics such as mining norms and regulations, good environmental management practices, and best safety practices at the mine site. It is presented in an interactive format with quizzes and games to test information acquisition and knowledge-retention. The technical content of each of the ten modules was developed by experts in each field, and then edited and translated into a more graphic/visual context, simplifying often dense and complex information, without dumbing down key content. The entire 10-module course takes around 40 hours to complete. Participants receive a formal certificate to provide positive reinforcement for their investment of time and effort in learning. The platform was launched at the end of 2020. Two months into the launch, 231 students were registered, most of them small gold miners.



LESSONS LEARNED

- High-quality TA and training, in large part at the mine-site, must be a key element of any ASGM formalization initiative. This should be hands-on and locally delivered, ideally by mining professionals with experience in formalization. It is expensive, but necessary. By way of illustration, Oro Legal undertook TA at more than 250 site visits, over 14 months in support of its first formalization project with Gran Colombia Gold in Segovia, Antioquia.
- If TA and training is not structured and focused on tangible objectives, miners soon become bored and diminishing returns quickly set in. While the Oro Legal formalization standard took more than a year to develop, it provided the structure to underpin effective TA and training. It is notable that all MPUs formalization performance improved significantly over baseline figures (45 percent on average across all projects as indicated in Exhibit 4), and notable early differences between mines in Antioquia and Chocó were largely smoothed out by Activity close. Despite its successful use and its co-development with the MEM, the formalization standard has yet to be employed by the GOC to support its own ASGM formalization efforts.
- A virtual learning option is a valuable USAID contribution to the Colombian ASGM sector largely because of the significant reduction in costs of reaching large numbers of geographically dispersed miners vs. traditional approaches. This is more pronounced now within the COVID-19 context. Still, Oro Legal underestimated the complexities of developing a digital platform, and what was anticipated to take two years to develop require more than four years. Despite this, there is certainly a sense of satisfaction in seeing a large and growing group of miners beginning to access this tool.



SNAPSHOT 3

Miriam García: A Paradigm-Shifting Miner

Miriam García, a legal and formalized miner
from Vegachí, Antioquia

Photo: Oro Legal

There is a common misperception in Colombia that gold mining is exclusively the domain of men given its physical demands, and that women contribute little to the sector beyond rustic gold panning, seeking basic sustenance for themselves and their families. This misconception, and other factors like gender-based violence, has made it difficult for women to fully participate in the mining sector.

However, women mining entrepreneurs who are not intimidated by these biases have begun to break paradigms and shown that they are not only capable of playing a key role in the sector but have the skills to lead mining projects and transform them into profitable companies.

Such is the case of Miriam Rocío García Soto, a miner from the municipality of Vegachí, Antioquia, who had been mining illegally since the age of nine and has become an example of female empowerment in this sector. Such was her impact that in 2019, the Antioquia Secretariat of Mines recognized her as an “Outstanding Female Miner” for her leadership and contribution to the economic and social growth of the region, as well as contributing to a sustainable and inclusive industry.

But not everything was always rosy for Miriam, and her achievements did not come easily. Tired of fleeing and hiding from the authorities, she turned to the wrong people to support her quest to become legal, losing some \$70,000 to false promises to legalize her mining operation.

However, Miriam refused to give up, and in 2018 she contacted the Oro Legal Activity. Oro Legal supported

Miriam on her path to legality, first by securing a subcontract with the mining title owner and then filing the necessary documentation and completing required procedures to obtain a formalization subcontract for the Aluviones Playa Rica mine.

To satisfy the strict environmental requirements mandated by the government, Oro Legal supported Miriam in the preparation of the complex and costly mining works and operation plan (PTO) and the environmental impact assessment (EIA) and provided technical assistance at the mine site.

Thanks to Oro Legal's support and to Miriam's desire to operate responsibly, her mine underwent a complete transformation, greatly improving the quality of life for herself and her workers. Miriam's employees left their precarious dwellings and were provided with proper accommodations, including a dining area and bathrooms, protective equipment, a salary with social benefits, and registration in the Colombian pension system.

The mine's production system is low impact, does not use mercury, and combines mechanized and traditional mining practices. Additionally, Aluviones Playa Rica sponsors regular tree-planting campaigns to rehabilitate previously mined areas to mitigate the environmental impact of past operations.

Miriam no longer hides from the authorities or sells her gold illegally. Today she is a fully legal and formal miner overseeing an operation that generates 20 full-time jobs, pays taxes and royalties, is protected by the authorities, and sells its gold to an international trading company.



Traditional use of mercury in the gold amalgamation process; Bajo Cauca, Antioquia
Photo: BioREDD+

MERCURY: ELIMINATING THE BANE OF GOLD MINING THROUGH FORMALIZATION AND GOOD GOVERNANCE

Mercury is the oldest, cheapest, and fastest way to extract fine gold via amalgamation once ore has been concentrated mechanically or manually, making it traditionally the method of choice for ASGM operators globally, particularly alluvial miners and river dredgers. Colombia is no exception to this practice. In 2015, Colombia ranked among the top five countries in overall mercury consumption (UNEP, 2015) and among the world's largest mercury polluters per capita from ASGM¹¹. It is estimated that in 2012, gold mining by small operators in Colombia released over 200 tons of mercury into the environment¹². Although there is no official figure for gaseous emissions of mercury, monitoring airborne mercury conducted by Oro Legal over three years in nine municipalities in Antioquia, where many gold buying shops are located, showed concentrations significantly above permissible levels as defined by the World Health Organization.

The impacts from mercury use in ASGM are especially nefarious. Metallic mercury is converted into mobile forms that are inhaled and accumulate along the food chain, concentrating in human tissues and causing a range of health problems from genetic malformations to cancers. Children and pregnant women are especially at risk. The widespread use of mercury in gold mining since the colonial era, explained, until recently, by its ready availability and low-cost, means that mercury pollution in soils, water, and aquatic food chains is widespread and long lasting in regions where gold mining occurs, as well as downstream from these areas. For this reason, reducing and eliminating the use of mercury by ASGM stakeholders receiving support from Oro Legal was a high priority.

¹¹ Cordy, et al., 2011

¹² IDEAM, 2014

Immediately after Activity launch, a framework for monitoring mercury was developed. Through 2018 the strategy was focused primarily on two key areas:

1) establishing rigorous airborne monitoring protocols to contribute to Colombian institutional understanding on the scale of mercury contamination, as well as evaluating mercury release to the environment in municipalities where Oro Legal was operating and 2) reducing mercury use by ASGM operators at the mine site as a steppingstone to full elimination. On July 16, 2018, Colombia officially banned the use of mercury in mining under the Mercury Law. In March of that year, Colombia ratified the Minamata Convention, the international treaty to reduce global emissions of mercury. In response, Oro Legal's strategy shifted to elimination of mercury in

ASGM in compliance with the law, aided by additional USAID funding for zero-mercury pilots supported by then-USAID Administrator Mark Green, following his field trip to Bajo Cauca, Antioquia. This shift coincided with a three-fold increase in the price of mercury and reduced availability in mining regions following the imposition of strict import quotas by the Ministry of Commerce in 2016.

“As of today, the miners with a mining title and environmental authorization must continue their activities without the use of mercury. This measure reduces emissions into the environment, which are highly polluting. The challenge now will be to control mercury use in illegal mining.”

**— LUIS GILBERTO MURILLO,
FORMER MINISTER OF
ENVIRONMENT AND
SUSTAINABLE DEVELOPMENT**

Monitoring airborne mercury. Most MPUs bring gold amalgam or concentrated ore to gold shops or rustic processing facilities known as *entables*, where large amounts of mercury are vaporized and emitted into the atmosphere in densely populated regional urban centers. The World Health Organization (2007) considers exposure to an annual average mercury concentration of 0.2 mg/m³ to be tolerable, whereas 1 mg/m³ or greater is considered hazardous to human health. Sampling in Antioquia prior to Oro Legal revealed levels of mercury well above these limits; in an extreme case, the center of Segovia was shown at one point to have the highest concentrations of airborne mercury in the world. This environmental hazard was addressed by the environmental assessment for Oro Legal, and monitoring in key urban centers of towns in Antioquia and Chocó was included in the Activity's mercury monitoring framework as a way of raising awareness about contamination levels and exposure and risks to the local population that would lead to action by authorities. It is worth recalling that during the life of Oro Legal, no other GOC, academic, or NGO entity was monitoring airborne mercury contamination, despite Colombia being a signatory to the Minamata convention and having its own Mercury Law.

The methodology employed consisted of sampling in nine representative gold mining municipalities where sampling was done over 12 days, divided in three sampling trips, spaced over a full calendar year. Sampling was undertaken in:

- Bajo Cauca, Antioquia – Caucasia, El Bagre and Zaragoza
- North and Northeast Antioquia – Santafé de Antioquia, Segovia, and Remedios
- Chocó – Quibdó, Istmina, and Condoto

Spatial measurements of mercury concentrations in high-risk areas (markets, schools, and health centers, for example) were obtained using a Lumex RA 915M sampler — recommended by the U.S. Environmental Protection Agency — according to the following protocol:

- Establish sampling routes based on the location of gold shops and relevant sites such as hospitals, schools, or daycare centers.
- Set up the Lumex in a backpack or on a vehicle with the sampling nozzle always facing the front.
- Initiate simultaneously the Lumex and a Global Positioning System (GPS) tracker at the starting point of the sampling route to ensure accurate generation of mercury contamination heat maps.
- Program both the Lumex and the GPS to take measurements every second.
- Undertake sampling along routes for at least 20 minutes and not exceeding one hour.
- Leave an interval of half an hour between samplings to avoid measuring the tail end of the previous sampling route.
- Download information from the GPS and Lumex at the end of the sampling period, upload to a geographic information system, and interpolate data using the inverse distance weighted to produce mercury concentration heat maps (see Exhibit 5).

The full Airborne Mercury Sampling report can be found on the [USAID Development Experience Clearinghouse \(DEC\)](#).

EXHIBIT 5. SEGOVIA MERCURY CONCENTRATION HEAT MAPS

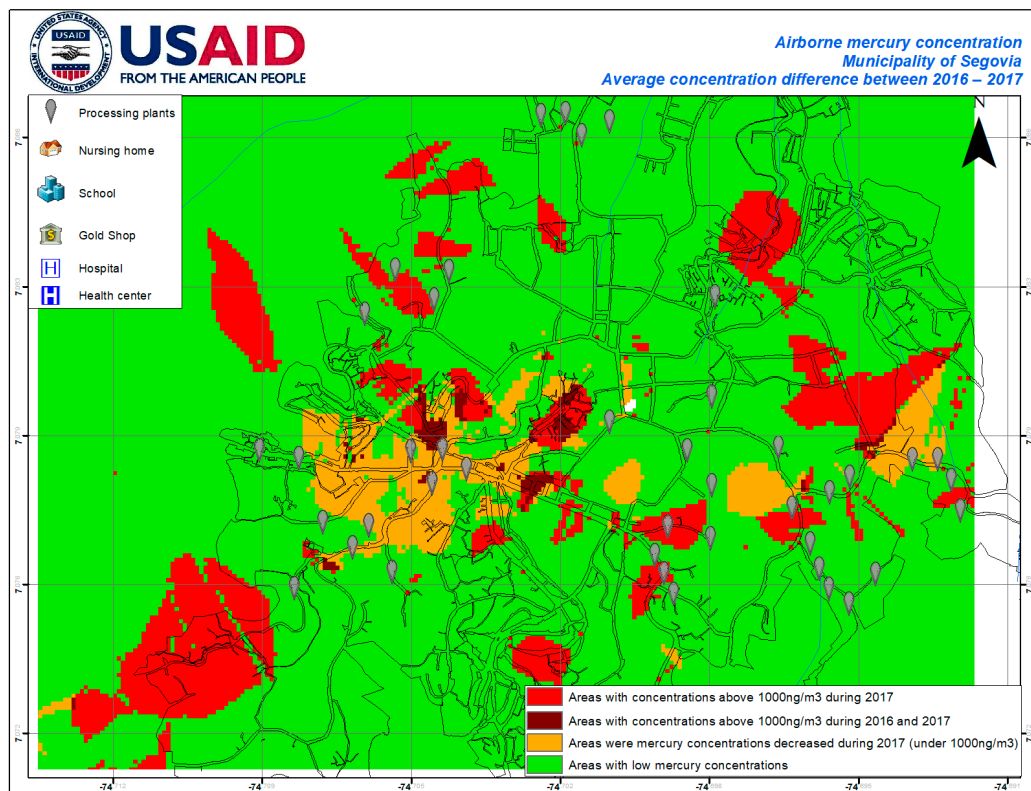
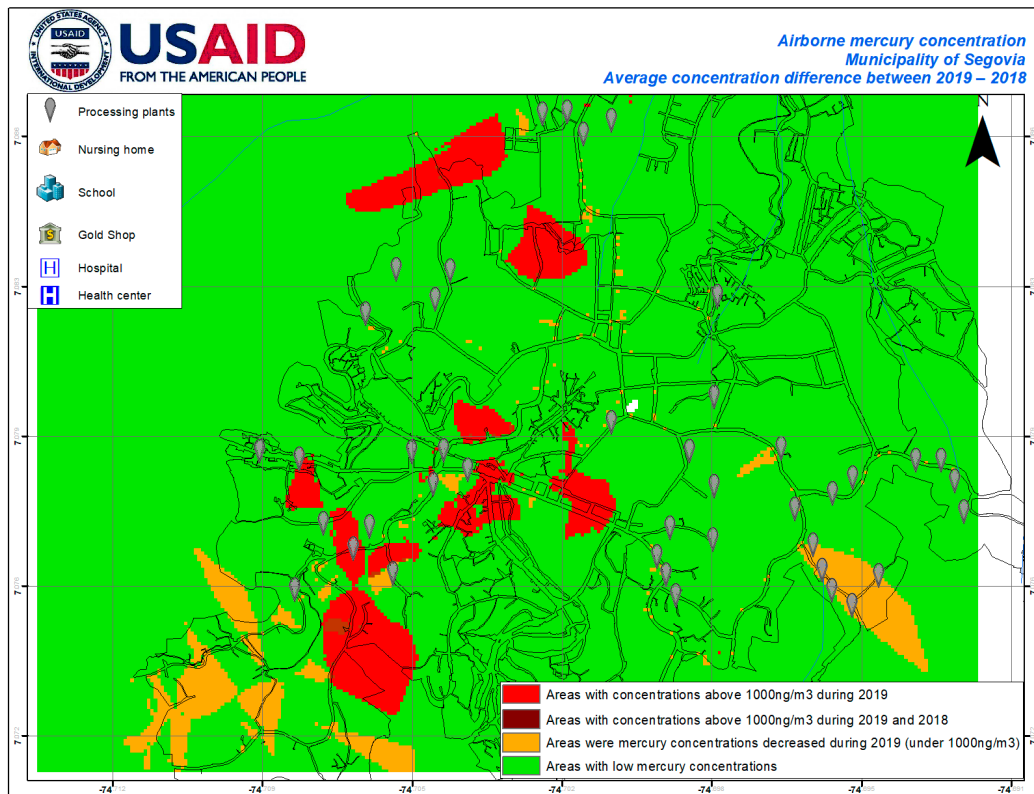


EXHIBIT 5. SEGOVIA MERCURY CONCENTRATION HEAT MAPS (CONT'D)



The heat maps for all municipalities showed decreasing concentrations of airborne mercury in urban conurbations over time — reflected in reductions mercury use at Oro Legal-supported MPUs — and greater dispersion to less populated rural areas. Several reasons explain this. First, there was a marked increase in the local price of mercury¹³: between 2016 and 2018, the price per kilogram of mercury rose from approximately \$73 to \$258 as the impacts of the significant reductions of mercury imports instigated by the Ministry of Commerce began to be felt in mining communities¹⁴. Second, gold shops stopped accepting gold amalgam in response to the Mercury Law and local enforcement by environmental corporations, the Chamber of Commerce, and others. Third, ASGM operators began to burn off mercury from gold amalgam in less densely populated areas. Fourth, all rustic processing plants for hard rock mining (*entables*) within urban centers became illegal, resulting in many plants closing or reducing their operating hours, thus reducing the quantity of burned amalgam. Fifth, regional communications campaigns by the Antioquia Mining Secretariat in Antioquia and CODECHOCÓ in Chocó also affected polluter behavior. Lastly, above-average rainfall in 2017 and 2018 probably reduced the concentration of airborne mercury as it washed from the air and transferred to the water; a pollution matrix interchange that requires further study.

Monitoring mercury use at the mine via mass balance measurements. Mass balance measurements are the most direct, intensive, and precise way to monitor mercury use and emissions. A mass

¹³ Based on primary data collected by Activity field staff.

¹⁴ Miners also reported a scarcity of *asoge* (the common term for mercury) in local hardware stores, which was the typical salespoint for mercury in most ASGM regions.

balance consists of measurements of every input and recovery of mercury in the mining process with sampling done over the entire cycle of mercury application and recovery to directly measure the amount of mercury added in each step with the use of electronic scales. Oro Legal believed that changes in mercury use would be best measured by mass balance at mine sites to capture not only mercury used in final amalgamation but also mercury added to primary concentration in sluices, for example. The main challenge of this approach was developing sufficient trust with miners to enable the sampler to be present when mercury is added to the system and when it is recovered or released. The confidence and trust between Oro Legal and beneficiary MPUs making up the ASGM formalization projects aided this effort to no end.

Between 2016 and 2019, Oro Legal undertook mass balance measurements in Chocó and Antioquia across mining operations that were representative of the different types of ASGM operators supported by the Activity (hard rock, alluvial, and small dredging). Baselines from 2015 showed that alluvial mining used the highest amounts of mercury at 35.95 grams of mercury to produce one gram of gold, small dredgers used an average of 12.94 grams of mercury per gram of gold produced, and hard rock mining applied an average of 6.66 grams of mercury per gram of gold. As TA and training progressed through 2018, new measurements showed that average mercury use by Oro Legal-supported MPUs had decreased to 3.46 grams/gram gold produced, a marked reduction compared to baselines. By Activity close this had been further reduced to almost zero (just 0.19 grams of mercury per gram of gold); in other words, eliminated. In total, Oro Legal prevented just shy of 70 tons of mercury from being released into the environment.

Zero-mercury gold processing. ASGM formalization that occurs under an operations contract or formalization subcontract often provides an important way for ASGM operators to switch to zero-mercury gold mining, because they can use mercury-free processing facilities operated by larger titleholders to process their ore. This was commonly seen with Oro Legal-supported MPUs in Antioquia, mainly in hard rock mining. Oro Legal played an important honest broker role to bring parties together to arrive at equitable arrangements that overcome the legacy of mistrust between these two groups.

The Chocó presents a vastly different scenario, where the majority of Oro Legal-supported MPUs operate in legally sanctioned AREs that are distinct from other titleholders' claims, mining service providers are nonexistent, and miners work in remote areas with limited access to legitimate buyers of legally produced gold. With only one notable exception, there are no large companies and few credible medium-sized companies with which to partner to improve mining performance, including zero-mercury processing of ore.

In this context, Oro Legal was obliged to adopt a completely different approach to promoting mercury-free gold processing, implementing mining pilots directly with Chocoan MPUs, the main features of which were:

- Simple exploration techniques to orient mining operations to the most productive sites and lower the overall environmental footprint.
- Improved washing and sluicing practices to increase recovery of fine gold with low-cost equipment manufactured in Colombia.

- Simple gabions to channel sediment-laden runoff to infiltration areas.
- Improved ore concentration practices at the mine site.
- Establishment of a central processing facility where concentrate is further processed without mercury, which ASGM operators can observe.
- Direct placement of ASGM gold in legal markets with minimal intermediation and tight traceability and security protocols.

LESSONS LEARNED

- Many miners talk of mercury as a “necessary evil,” which makes mercury elimination challenging. It involves access to zero-mercury technology (either the miner’s own or via a titleholder’s facilities), education, training, awareness raising, and an enabling policy environment that provides an appropriate balance of incentives and disincentives. That Oro Legal-supported MPUs were effectively able to eliminate the use of mercury from their operations reflects the impact, to a greater or lesser extent, of all the above.

“Oro Legal technical assistance, within the framework of the PTOs, promotes best practices without the use of mercury. Formalization is correlated with not using mercury.”

**— FINAL PERFORMANCE
EVALUATION**

- Oro Legal’s work in airborne mercury monitoring was undoubtedly important to enable the Activity to evaluate what was happening with mercury use in its key intervention municipalities, and to correlate with mine-site mass-balance information. Moreover, it represented an important USAID contribution to Colombia’s knowledge base on mercury contamination and the results were widely disseminated to a variety of Colombian stakeholders, including the MEM, MADS, the Corporación Autónoma Regional del Centro de Antioquia (CORANTIOQUIA), CODECHOCÓ, and the Procuraduría.
- Mercury elimination and improved environmental performance are intrinsically linked to legalization and formalization. It makes little sense for illegal MPUs to alter their mining behavior, least of all mercury use or abuse.
- Oro Legal’s approach to mercury elimination in Antioquia took advantage of the existence of private sector partners with mercury-free processing facilities. In Chocó, the approach was more hands-on and direct, leveraging improved productivity and profitability for better environmental stewardship, including the elimination of mercury. In the final analysis, both approaches were effective.



Acacia mangium plantation in Asogauca, Cauca.
Photo: Oro Legal

OBJECTIVE II: MITIGATING THE ENVIRONMENTAL IMPACT OF ILLEGAL GOLD MINING

The devastating environmental and health impacts of illegal/informal mining in Colombia are wide-ranging, severely degrading the quality of air, forests, water resources, and soils. NASA Landsat imagery shows large patches of land severely degraded by mining visible from more than 700 km away in space. Environmental deterioration is enhanced by the illegality and informality of the activity. The lack of state presence and capacity to enforce legislation greatly contribute to degradation because no one is held legally responsible for the devastating and expensive environmental damages (*pasivos ambientales*) left behind. A 2018 study by the United Nations Office on Drugs and Crime¹⁵ reports that nearly 85,000 ha of land in Colombia have been severely degraded by destructive and illegal alluvial gold mining, with 76 percent concentrated in the departments of Chocó (39 percent) and Antioquia (37 percent). Further, approximately 47 percent of illegal alluvial gold mining takes place in ecologically sensitive protected lands, with 42 percent directly affecting Afro-Colombian or indigenous communities.

As much as responsible mining was the principal rationale underpinning the Activity, USAID recognized that mining could not and should not be undertaken by all those interested in doing

¹⁵ [Alluvial gold exploitation – Evidence from remote sensing 2016](#), May 2018

so. Further, a significant proportion of the population involved in ASGM operations are not necessarily miners by training or tradition. Displaced and unemployed people are also involved in unauthorized mining activities because of the lack of alternative income generating activities in these remote areas of the country.

Thus, innovative approaches to recover areas degraded by illegal mining and provide viable alternative income-generating activities were needed, and Oro Legal built on some of the successful approaches and lessons learned during the implementation of USAID's BioREDD+/Mining pilot in its approach to this challenge.

Oro Legal's approach to addressing the environmental impacts caused by illegal mining in Chocó and Antioquia were carried out via three expected results areas:

- Rehabilitation of degraded mining areas primarily through forestry plantations in Antioquia and rehabilitation and protection of Afro-Colombian collective territories in Chocó
- Generation of alternative incomes for communities that cannot or should not be involved in gold mining, focusing on honey production in Antioquia and achiote in Chocó
- Implementation of IWRM in communities linked to gold mining

Oro Legal combined interventions across results areas to capture economies of scale and use approaches that can be expanded to other areas or significantly ramped up.

REHABILITATION OF AREAS DEGRADED BY ILLEGAL MINING

The most visible impact of illegal ASGM, particularly alluvial mining, is the damage to land, water, and forest resources and the scenes of land scarred by mining pits and hills of tailings, punctuated by small, contaminated ponds. Once gold deposits have been played out and illegal operators move on, these wastelands become a significant environmental liability both on private lands and collective territories that can have far-reaching on- and off-site impacts far into the future. In Chocó and Antioquia, abandoned, degraded mining areas cover more than 35,000 ha and 40,000 ha, respectively, and are the starkest reflection of the lack of state presence and the low capacity of Colombian authorities to enforce environmental and mining laws and regulations.

The GOC, while placing a high priority on rehabilitation of degraded mining areas is hamstrung by the lack of a legal definition of “environmental orphans,” which prevents the use of public funds in rehabilitation initiatives. Over and above this, rehabilitation is typically costly, fraught with challenges over tenancy, and often overshadowed by the risk of future mining incursions once rehabilitation has been completed. Oro Legal broke new ground with innovative, cost-effective approaches to rehabilitation built on local partnerships that are robust and scalable with the right financing. Despite the vastly different ecological, economic, and land-use conditions found

“Oro Legal’s intervention was undertaken in areas of great ecological importance, the rehabilitation of which contributed to important national and international goals.”

**— FINAL PERFORMANCE
EVALUATION**

in Antioquia and Chocó, Oro Legal's approach to mine-site rehabilitation in both geographies aimed to create the following desired future condition:

- Fast-tracking reestablishment of natural ecological features and functions: topsoil building and productivity, biodiversity, and hydrological cycles.
- Reforesting degraded areas with commercial forest plantations (in Antioquia) and restoring degraded areas through assisted natural regeneration (in Chocó).
- Creating economic incentives to private and community landowners to prevent new illegal mining operations.
- Applying good management practices to plantations and natural regeneration on rehabilitated sites.
- Building skills and creating jobs, especially for vulnerable groups like women and youth.
- Associating other productive activities with tree plantations to generate more income for marginal miners and rural families (see the case of honey production in Antioquia, p. 38).
- Harnessing public/private sector co-investment in rehabilitation activities where possible.

As with other aspects of Oro Legal, lessons learned during implementation informed an agile and highly adaptive management approach. One major shift was geographic. At the start of the Activity, it was anticipated that most rehabilitated hectares would be generated in Antioquia, with the balance in Chocó. During Year 3 work planning, the scenario was inverted, and by the close of the Activity, this ratio stood at 2,000 ha rehabilitated in Antioquia and 15,000 in Chocó. This reflects two factors: 1) a higher-than-expected interest by Chocoan CCs in rehabilitating parts of their territories degraded by illegal mining, and 2) the higher cost of rehabilitation¹⁶ and limited number of private landowners in Antioquia willing to sign long-term agreements under the conditions required by Oro Legal (i.e., 3:1 leverage for every USAID dollar invested).

ANTIOQUIA REHABILITATION MODEL

Experience during BioREDD+/Mining and elsewhere had shown that reforestation of areas degraded by mining with *Acacia mangium* is both technically and financially feasible to quickly reestablish vegetation cover and jumpstart the gradual process of restoring natural ecosystems. In Years 1 and 2 of the Activity, an intensive exercise was undertaken to identify suitable land and partners and ensure 30-year commitments by stakeholders to establish and manage plantations and protect degraded areas once restored. In Antioquia, it was necessary to make long-term, legally enforceable agreements with landowners of degraded land (who are usually distinct from the illegal owners and/or operators of the mining claim) to ensure that rehabilitated land is not re-mined in the future. To gain economies of scale to drive down the unit cost of rehabilitation, it was also necessary to cluster individual degraded properties into

¹⁶ That being said, Oro Legal's rehabilitation model in Antioquia was significantly lower cost than traditional approaches, coming in at slightly less than \$1,680/hectare. The cost of natural regeneration in Chocó was just \$540/hectare.

nucleos of not less than 100 ha. In Antioquia, this led to a series of rehabilitation projects with private landowners, community partners, honey producers, and, in several instances, municipal government participation via use of their heavy equipment for recontouring areas.

The great virtue of the Antioquia model is that in addition to rehabilitating mined-out land and mitigating environmental impacts, it provides an opportunity to quickly reintegrate areas to productive uses, generating local employment and revenue streams in the short term from honey production and in the medium term from wood products, and potentially carbon offsets (see box). Beekeeping can be easily integrated into the model, providing a rapid source of additional income for ex-mining families.

ANTIOQUIA REHABILITATION MODEL BASED ON REFORESTATION WITH *ACACIA MANGIUM* AND INCORPORATION OF APIARIES

- Site selection based on the level of degradation and risk to adjacent natural resources, confirmed land title, potential to group plantations to gain economies of scale to increase impact, and signing of long-term reforestation contracts with landowners.
- Site layout and preparation: mapping, recontouring using heavy equipment to approximate the original topography and to fill-in areas that were flooded during exploitation, as well as digging holes for planting.
- Production of high-quality tree seedlings by verified commercial growers.
- Plantation establishment at a density of 1,100 tree seedlings/ha (3m x 3m) with addition of an organic fertilizer.
- Preparation and implementation of a long-term plantation management plan.
- Installation of apiaries.

CHOCÓ REHABILITATION MODEL

The humid tropical forests of Chocó are among the most biodiverse in the world, and the region has the highest precipitation in Colombia and humid conditions year-round. Alluvial mining is the dominant form of ASGM in Chocó, where gold is recovered from perched sediments by washing embankments and deposits using high-pressure hoses. More recently, well-organized illegal mining has been undertaken by large dredging operations along the Atrato and Quito rivers. These conditions make illegal mining in Chocó highly detrimental to the environment with wholesale clearing of tropical forests and increased sediment loads in waterways. Ironically, these same conditions also accelerate rehabilitation at a relatively low cost, based on assisted and natural regeneration as native species quickly seed in and become established. Likewise, the significant differences in land tenancy and local governance in collective territories in Chocó vis-à-vis Antioquia required a different intervention model based on voluntary agreements with Afro-Colombian communities.

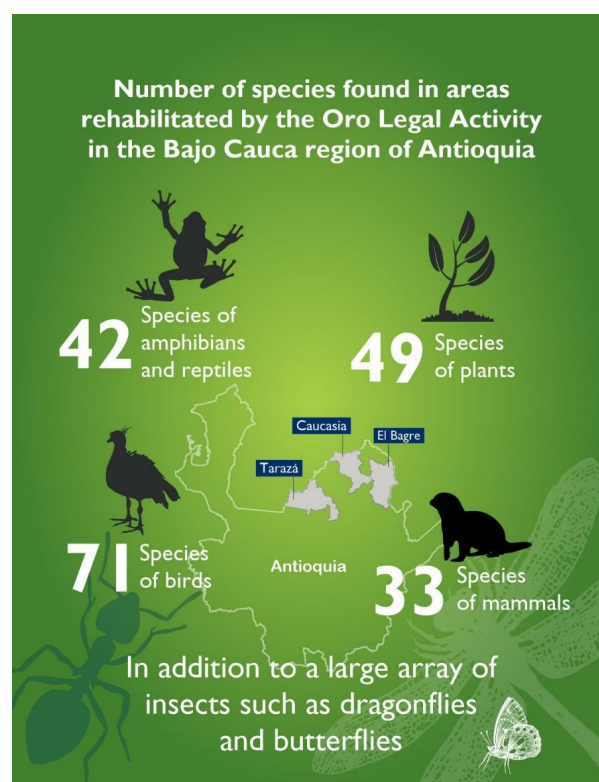
The objective of natural regeneration is to revegetate degraded sites quickly and inexpensively with pioneer species found in nearby forest fragments and fallow areas to kickstart natural succession and, over time, approximate the species composition and structure of natural forests. This strategy works well if new mining incursions in selected areas can be prevented. For this reason, creating CC-staffed environmental brigades to patrol the intervention areas was key. While these areas are initially quickly revegetated and stabilized, the goal of restoring the biodiversity found in native forests is more gradual and long term and thus, voluntary commitments by CCs to protect rehabilitated areas over longer periods of time are crucial¹⁷.

¹⁷ During the life of the Activity there were several incidents of environmental brigades reporting illegal miners to the governance boards of the CCs who were able to persuade them to leave.

LESSONS LEARNED

- Oro Legal successfully confirmed the technical and social viability and positive impacts of two rehabilitation models adapted to the vastly different conditions found in each of the Activity's geographies. This led to the successful rehabilitation of 17,000 ha of degraded ex-mining land by Activity close.
- Initial concerns about the use of an exotic species in the Antioquia rehabilitation model proved to be unfounded. There was no evidence — either directly observed during the life of the Activity or documented instances in similar ecosystems elsewhere in Colombia — of *Acacia mangium* escaping from planted areas and becoming an invasive species. More generally, experience by Oro Legal and other stakeholders has shown that native species are ill-adapted to the highly degraded conditions found in illegal mining sites in Antioquia without the benefit of a hardier species like *Acacia mangium* to first create a more favorable setting for these species to naturally regenerate.
- In a similar vein, concerns over the impact of a monoculture plantation model using acacia led the Activity to undertake a study in 2018 to evaluate the soil micro fauna and flora, herbaceous and woody plants, and presence of bird species in planted areas. The results supported the counter argument that the model contributed positively to ecosystem recovery and in turn biodiversity (see Exhibit 6).
- The early promise of capturing external investment in acacia plantations based on the positive experience with the reforestation company Reforestadora Integral de Antioquia during BioREDD+/Mining was not fulfilled. The company itself underwent a change in structure/focus by the new regional government of Antioquia, and other reforestation companies interested solely in wood production proved hesitant to invest in rehabilitation contracts with many different small individual landowners and on such poor sites as those degraded by mining areas. In Chocó, the local social and cultural dynamics and rehabilitation model do not lend themselves to private investment centered on wood products.
- The most promising finance mechanisms rest on public sector funding and private sector carbon funding. With regard to the former, there is a strong argument for direct GOC investment or subsidies for rehabilitation of areas degraded due to mining given how: 1) lack

EXHIBIT 6. ILLUSTRATION OF RECOVERY OF BIODIVERSITY IN A SAMPLE OF REHABILITATED AREAS IN ANTIOQUIA



of government action to control illegal mining led to the environmental liabilities in the first place; 2) these liabilities generate serious health, economic, and ecological negative public externalities and impacts; and 3) conversely, mitigation measures like rehabilitation generate significant positive public externalities and benefits. This recognition led to the departmental government of Antioquia in 2020 to commit to investing in the rehabilitation of 10,000 ha using the Oro Legal model.

- The most promising source of private sector investment in rehabilitation is in monetizing the significant carbon values from both avoided deforestation and reforestation and forest restoration under both the Antioquia and Chocó models. Colombia is an international leader in market-based mechanisms, financial incentives, and economic instruments to mitigate greenhouse gas emissions and stimulate investment in conservation with a carbon tax that allows for purchase of domestic certified offsets in lieu of paying the tax and a progressive payment for environmental services law for monetary transfers for conservation and restoration. In this context, Oro Legal undertook a rapid survey that showed how potential income from carbon credits layered with wood and honey production would make the Antioquia model more attractive to outside investors. Oro Legal also supported several CC partners in Chocó to develop the concept for a REDD+ (reduced deforestation and forest degradation) project on the Pacific coast, which is under development with the international REDD+ developer Wildlife Works Carbon.

SNAPSHOT 4

Renewed hopes for a brighter future in Puerto Claver



Community maintenance activities on trees planted in newly rehabilitated area.

Photo: Oro Legal

Most of the nearly 80,000 hectares of land degraded by alluvial gold mining in Colombia are due to illegal mining operations, with 41 percent located in the Bajo Cauca region of Antioquia. This severe degradation has had far-reaching consequences, negatively affecting the soil's ability to support vegetation and significantly limiting income-generating activities in these communities.

The municipality of El Bagre has a long tradition of gold mining, as is evidenced by the thousands of hectares decimated by wide scale illegal, alluvial gold mining. For the families of Afro Claver, an Afro-Colombian collective territory populated by families displaced more than three decades ago by the armed conflict, the only available income-generating activities have been gold panning or illegal mechanized gold mining.

Despite the recognition of collective land ownership granted to most Afro-Colombian communities by the Colombian government beginning in 1993, Afro Claver had not been able to secure its legal collective territory status; a situation that was remedied thanks in part to Oro Legal's rehabilitation initiative.

In 2017, through a joint effort with the municipality of El Bagre, Oro Legal supported rehabilitation of 409 hectares that were completely degraded - unproductive and of no commercial value - by planting *Acacia mangium* to regenerate the soil and put these areas into productive forest plantations, creating jobs for 113 families in the process, particularly for women heads of households. This initiative also supported the legal recognition of Afro Claver's collective territory by the Colombian Land Agency.

Oro Legal also supported entry of 30 of families into honey production in and around the acacia plantations as a supplemental income-generating activity. Oro Legal provided these families with 18 months of training in beekeeping and 600 beehives.

Four years on from the start of rehabilitation activities, the outlook for Afro Claver is encouraging. The land is once again turning green, symbolizing the community's hopes for a more prosperous future.



Apiary established in an area rehabilitated with *Acacia mangium* in the Afroclaver CC, El Bagre, Antioquia.
Photo: Oro Legal

DEVELOPING ALTERNATIVE LIVELIHOODS AND ECONOMIC FORMALIZATION FOR THE GOLD VALUE CHAIN

As Oro Legal canvassed more than 640 potential candidate MPUs for formalization and then capitalized on the positive impact of bringing an important number of MPUs into legality and formality (see Objective I, above), it became evident that a large percentage of the universe of ASGM operators did not have a pathway to legality/formality. Thus, particularly for those engaged in the lower echelons of the gold value chain, formal (non-

gold mining) economic alternatives will need to be found over time. This was the impetus for Oro Legal to support livelihood alternatives to illegal mining in the key geographies where mining formalization was underway. Since the Activity is not an economic or rural development project per se, the strategic decision was taken to avoid diluting finite resources on the development of several alternatives. A survey of options was undertaken, and the decision was made to focus on just two value chains — one in Antioquia and one in Chocó — that offered the best, *a priori*, chances of generating returns to a large group of beneficiaries. In Antioquia, Oro Legal supported honey production and in Chocó, the production and processing of the natural red colorant, achote. Both are described in more detail below.

MAIN CRITERIA FOR SELECTION OF VALUE CHAINS

- Strong current market demand by national buyers
- Relatively low input, simple production systems
- Adapted to agroecological conditions and land tenure challenges
- High value to volume or weight ratio
- Products are not highly perishable
- Opportunities for women's participation, especially female heads of household

HONEY PRODUCTION IN ANTIOQUIA

The challenge for Oro Legal in supporting alternative livelihoods in Antioquia was twofold. First, many small gold miners do so, in part, because land distribution in the department is highly unequal and most do not have legal access to land, which limits alternative agricultural options. Second, many potential beneficiaries were single female heads of household with multiple domestic responsibilities, including child raising, and could not invest large amounts of time in productive activities outside of the home. These were key considerations in formulating Oro Legal's intervention strategy.

Against this background, Oro Legal focused its alternative livelihood support to mining communities in Antioquia on beekeeping and honey production, building on 10 years of USAID financing of apiculture development in Bajo Cauca. The results of a study¹⁸ conducted at the beginning of the Activity on beekeepers in the Oro Legal area of influence showed that while there had been multiple donor-financed interventions in apiculture, less than half of beehives were still active, and many others had lost their productive capacity due to insufficient vegetation in surrounding areas, as well as the poor quality of the genetic material of the bee colonies themselves. Furthermore, just 10 percent of the beekeepers were earning sufficient income from honey production to support their families, some of whom are ex-gold panners who live in extremely precarious socioeconomic conditions.

Despite this scenario, the potential for growth in this sector was significant given the large, unsatisfied national and international demand for unadulterated honey¹⁹, as well as Bajo Cauca's favorable ecological conditions for beekeeping, given the general absence of pesticide-heavy agriculture. Over and above this, Oro Legal's rehabilitation of degraded mining land using *Acacia mangium* undertaken in many of the same Antioquian geographies provided an additional year-round food source for bee colonies, which can feed on the sap produced by acacia trees.

More specifically, Oro Legal's intervention strategy for apiculture focused on:

- Developing an integrated honey production model alongside rehabilitation activities.
- Building a critical production mass with each participating family using hives built from *Acacia mangium* plantations (involving female heads of household in the production and assembly process, thus stimulating additional, local, non-mining-related income).
- Locally producing high-quality, productive bee colonies.
- Developing strong, local technical capacity in apiculture.
- Linking production to regional commercialization efforts.
- Leveraging co-financing from an eclectic group of public and private sector partners, including municipal administrations, CCs, indigenous *resguardos*, social foundations from several large Colombian companies such as La Fundación de Oleoductos de Colombia (FODC) and La Fundación Mineros, and private sector partners such as Custodiar.

¹⁸ Undertaken by the Corporación Nacional de Investigación y Fomento Forestal.

¹⁹ The global honey market suffers from honey that is adulterated with processed sugars. This appears to be a particular issue with honey from Chinese sources.

Over four years via the grants portfolio, Oro Legal supported nearly 350 families in the Bajo Cauca region of Antioquia, a majority of which had female heads of household and/or were vulnerable ethnic²⁰ groups, to establish and put into production 11,360 beehives, the largest community-based, honey production portfolio in Colombia to date. Most families managed a full APU of between 40 and 45 beehives and had the potential to generate the equivalent of roughly 12 monthly GOC-established minimum salaries from the sale of honey over the course of a year. Moreover, recognizing the financial limitations faced by potential beneficiaries in Bajo Cauca, Oro Legal harnessed nearly \$865,000 of public and private financing in building its apiculture portfolio. Exhibit 7 shows a breakdown of the Oro Legal apiculture portfolio.

**EXHIBIT 7. BREAKDOWN OF ORO LEGAL'S
HONEY PRODUCTION PORTFOLIO AT THE CLOSE OF 2019**

Grantee	Total Populated Beehives	No. of Families Benefitted	Final Honey Production through Activity Close (kg)	Value of honey sales to date	Value of Resources Leveraged	Municipality
FODC I	1,250	50	43,750	\$33,603	\$157,431	Caucasia y Zaragoza
FODC II	420	0	32,000	-	-	Caucasia y Zaragoza
Asociación de Productores Agrícolas y Pecuarias de Cuturú (ASOCUTURU)	540	12	18,900	\$15,774	\$19,480	Caucasia
Creomas El Bagre	1,150	38	40,250	\$2,454	\$39,340	El Bagre
Creomas Tarazá	1,050	30	36,750	\$6,674	\$39,526	Tarazá
Carbebias	1,100	20	38,500	\$6,991	\$33,691	Nechí
Asociación de Caucheros de Cauca la Corcovada (ASOCCOR)	600	16	21,000	\$1,133	\$25,295	Caucasia
Asociación campesina apícola de Nechí (ACANE)	300	10	10,500	\$570	-	Nechí
Custodiar	1,150	30	52,500	\$59,104	\$100,975	Caucasia
Asociación de Apicultores del Bajo Cauca (ASAPIBAS)	2,250	89	111,300	\$66,483	\$301,913	Caucasia, El Bagre, Nechí, Zaragoza
Coltapícola	350	0	20,000	-	-	Caucasia
Consejo Comunitario Afroclaver	600	20	24,000	-	\$24,147	El Bagre
Resguardo Indígena Vegas de Segovia	600	20	24,000	-	\$6,123	Zaragoza
Total	11,360	335	373,550	\$192,785	\$802,921	---

Oro Legal worked with an international apiculture expert to lead apiary establishment and the production queen bees and brood stock. Oro Legal established one main production center in Cauca and seven satellite production centers located near project sites to ensure the ready availability of a large volume of bee colonies with genetic stock that combined South American “Africanized” bees with European hybrids to reduce aggression and increase productivity.

²⁰ Indigenous *resguardos* and Afro-Colombian CCs.

In parallel, Oro Legal established a solid base of local technical experts skilled in honey production, several of whom formed their own organization, Corporación Colombiana de Técnicos Apícolas (COLTAPICOLA). With a small grant and a series of business and organizational strengthening workshops, COLTAPICOLA has continued the work started by Oro Legal, with a focus on the production and provision of bee colonies for the region's broader apiculture sector, including USAID programs under the Plan Antioquia initiative.

Over and above a significant effort in expanding honey production, Oro Legal was cognizant of the need to connect honey producers with large commercial buyers of honey²¹; interactions that both confirmed the significant national demand for honey and the small volumes of unprocessed honey that are traded. Given this context and capitalizing on USAID's investment in the apiculture sector over the past decade, Oro Legal helped the El Bagre-based honey processing company Campo Dulce secure low-interest loans²² to purchase honey from Oro Legal-supported beekeepers and to provide a much-needed injection of working capital for future consolidation of the Bajo Cauca honey value chain. The impact of this was immediate with sales by Campo Dulce of 141 tons of processed honey in 2020, almost 70 tons of which came from Oro Legal-supported beepers and associations, despite the challenges of the COVID-19 pandemic²³. This is almost double the previous year's production (see Exhibit 7).

LESSONS LEARNED

- Oro Legal's decision to focus on one value chain in Antioquia was initially debated with USAID, but in hindsight was a sound decision that allowed the Activity to focus scarce resources to significantly expand production to reach a critical mass, which is paying economic dividends for Bajo Cauca producers with \$300,000 earned by beekeepers in 2020.
- Oro Legal's legitimate focus on initially expanding the local productive base and sourcing high-quality, national commercialization options diverted attention from two pressing regional issues: 1) honey processing capacity and 2) working capital constraints to underpin honey purchases from local producers. That Oro Legal was able to partially respond to both these challenges is encouraging; however, these constraints continue to impede consolidation of other USAID-support livelihood initiatives in Bajo Cauca.
- The participation of private sector partners in regional economic development initiatives was key to success. Despite a significant level of USAID investment in Bajo Cauca and the presence of multiple potential partners, it was hard to find strong partners to support

"I have a mine, but not a gold mine... a mine filled with bees. Because if gold mining generates cash, look at what it destroys... the environment... other things. Beehives are different, they are a great alternative to mining."

— BEEKEEPER IN ANTIOQUIA

²¹ Including the ÉXITO supermarket chain, Nestlé, COLANTA, and others.

²² \$57,000 from the IC Foundation and \$16,000 secured through one of USAID's GDA partners, Interactuar.

²³ Personal communication, Sandra Marquez, general manager of Campo Dulce. This figure is higher than totals presented in Exhibit 7 because the latter reflects production totals at the close of formal Activity monitoring at the end of 2019.

honey production. Ironically, the two projects that suffered most challenges in meeting co-financing commitments were the two foundations mentioned previously.

- Rich in both gold and coca, the Bajo Cauca region has long been a hotbed of criminal activity and violence, with a marked deterioration in public order in many of the municipalities in which Oro Legal operated as illegal armed groups filled the void left by the departure of the Colombian Revolutionary Armed Forces (FARC)²⁴. This impeded access to many of the more remote locations where apiaries were established, cutting off for several months at a time critical inputs and TA. Oro Legal staff were often warned off entering certain communities or told to inform controlling groups when and where activities were due to take place to be permitted entry. Public order continues to present challenges to project development in Bajo Cauca.

²⁴ The FARC signed a peace agreement with the GOC in 2016, which led to the demobilization of FARC combatants in many parts of Colombia, including Bajo Cauca.

SNAPSHOT 5

Liquid gold

Leticia Ortiz Hernández, honey producer,
El Pato, Zaragoza
Photo: Oro Legal



Bajo Cauca is one of the subregions of Antioquia hit hardest by the decades long armed conflict in Colombia, which in recent years has been fueled by illegal and informal mining operations that finance armed groups, and ultimately cause devastating environmental impacts.

Despite the hostile territory, which is plagued by social and environmental conflicts, honey production has emerged as an attractive livelihood, generating incomes for local communities thanks to USAID initiatives in the region dating back over a decade, planting of acacia plantations in degraded areas, and most of all, the determination of local communities for change.

Such is the case of the women of El Pato, Zaragoza, and their “liquid gold,” as they have monikered honey. Thanks to the tenacity of these 50 women heads of household to overcome seemingly insurmountable personal, social and economic challenges, Oro Legal, in partnership with the Fundación Oleoductos de Colombia, was able to set the women up with apiaries of 30-40 beehives each.

In 2017, Leticia Ortiz Hernández—one of the El Pato beneficiaries—received 25 fully populated beehives to supplement the five hives she already owned and managed. From her 30 beehives, Leticia extracted one ton of honey during the following harvest.

Across the municipalities of Caucasia, El Bagre, Nechí, Tarazá and Zaragoza, Oro Legal supported 350 families to establish and put into production 11,360 beehives. The honey produced by these families was sold at a local market through support from honey processor and commercial partner Campo Dulce, which also received support from the Activity to secure a line of credit at low interest rates for operating costs. These efforts positioned Campo Dulce to guarantee the purchase of honey from Oro Legal-supported producers. Campo Dulce sold 188 tons of honey in 2020, half of which originated from producer groups like El Pato.

By project-end, Oro Legal supported honey producers had reported production of 373,550 tons of honey, totaling \$192,785 in sales. This activity transformed the lives of families, especially those headed by women who were marginal and vulnerable gold panners, contributed to strengthening the local honey value chain, and generated additional jobs from fabrication of beehives and processing to grow and diversify the local licit economy in an environmentally responsible manner.



NATURAL COLORANT (BIXIN) PRODUCTION IN CHOCÓ

Chocó presented enormous challenges for value chain development. It is a large geographic area that is sparsely populated and with CC governance mechanisms overlapping those of municipal authorities. Investment is low and infrastructure poor, the public sector is rife with corruption, heat and high humidity bring both advantages and disadvantages, and private sector investment is notable by its absence. USAID has tried to promote more coherent development in the region for more than a decade — as have many other donors — with few successes.

Unlike in Antioquia, most potential stakeholders in Chocó have tenure or access to land. On one hand, this made several agricultural value chains more feasible. On the other hand, any initiative would have to compete with wages paid to day laborers on illegal dredgers — a growing source of local income for Chocoans over recent years — and be suited to the agro-ecological conditions found in this extremely humid tropical region.

The starting point was a small subset of crops identified by BioREDD+ in 2015 — including achiote, *naidi* (acai), and cacao — that were evaluated further by Oro Legal before deciding to further develop the achiote value chain. Achiote, or *bija* as its commonly referred to locally, has been cultivated and used in Chocó for centuries and is a staple of the diverse Chocoan gastronomy. It is a crop that is deeply embedded in the collective Chocoan culture, with a long history of cultivation, mainly for family use and limited small-scale commerce. Achiote seeds contain bixin, a natural colorant, which has a large and growing international demand for use in the food, textile, pharmaceutical, and cosmetics industries.

The achiote value chain was developed as part of a larger strategy for rehabilitating areas degraded by mining and conserving intact natural forest areas through six grant agreements implemented by Afro-Colombian CCs. The grantees established 670 ha of native achiote plantations, using Chocoan varieties and benefitting 466 producer families. Under the grants, CCs committed to undertaking parallel rehabilitation actions in specific areas impacted by illegal mining, while locating small 2.5 ha achiote plots in areas previously cultivated, such that no clearing of primary forest was permitted. Starting in Year 2, the achiote value chain was developed in earnest based on an innovative, organic process in response to multiple socioeconomic challenges encountered in Chocó, and focused on the following key areas:

- Crop establishment, production, and maintenance, Years 2 to 3
- Agro-industrial processing, Years 3 to 5
- Full transition to local ownership, Years 3 to 5
- Commercialization, Years 4 to 5
- Private sector alliances and investment, Years 4 to 5

Twenty-three different types of achiote, including a number of Peruvian ones, are cultivated in Chocó. They vary widely in productivity and bixin content. Therefore, the first logical step was to decide on which achiote variety to cultivate. Research conducted by the National University – Medellín, sponsored by Oro Legal, determined that the native Chocoan variety was the most appropriate, outperforming a more common, non-native Peruvian variety in terms of yield, bixin content, and adaptation to the high humidity of Chocó. A centralized nursery managed and operated by one of the CC grantees guaranteed the production of high-quality achiote seedlings. In parallel, CC-led agro-forestry teams were organized and trained to ensure that the

“Achiote allowed women to work... there is a lot of machismo here, but I think women influence a lot. In the group there were more women than men.”

— ACHIOTE PRODUCER,
CHOCÓ

establishment and maintenance of the achiote plantations were carried out using environmental and agricultural best practices.

Achiote is a challenging agricultural value chain to develop at a commercial level with a production-cycle that includes 1) site preparation of selected plots with suitable soil, a labor intensive task taking on average one and a half months for 2 ha; 2) planting followed by seven rounds of maintenance activities over 18 months; 3) two harvesting campaigns annually; 4) organization of transportation of seed pods from remote plantation sites to one of five CC-operated threshing centers (see box); 5) a two-step agro-industrial transformation process to extract the bixin from seeds to produce a bixin paste, followed by sophisticated processes to concentrate and purify the paste into commercial-grade bixin or norbixin, and 6) commercialization of the final products. The latter phases of the production cycle proved to be the most challenging to resolve.

IMPROVED THRESHING

Manual threshing of seed pods is time consuming, and much of the precious bixin powder in the seeds can be lost. Oro Legal introduced a simple, low-cost threshing machine developed for Chocoan achiote by the Medellín-based company Naranja Madura, an innovation welcomed by producer families, particularly women who typically assume this task. The threshers reduced the time to process seed pods to yield 30 kg of seed from a full day manually to eight minutes, with minimum loss of bixin.

The high humidity and constant precipitation in Chocó quickly proved to have both virtues and challenges. The climate was ideal from a productivity standpoint with impressive crop yields; nearly 50 percent higher than the global average. These same conditions, however, created several challenges. First, the extraordinarily fast growth of competing vegetation required much more labor to maintain the farm plots than originally projected, at a concomitant higher cost. This led to the decision to scale back by almost 50 percent the number of hectares originally planned: from 1,200 ha to a more manageable 670. Second, the extreme humidity, coupled with the higher-than-average oil content of the native Chocoan achiote, made air drying seeds at the farm, which is the standard entry-level processing method the world over, virtually impossible.

Attention then turned to considering options for industrial or semi-industrial drying. Trials were undertaken by an agroindustry specialist from the National University whose post-graduate research focused on the feasibility of several different methods for drying achiote seed in both Chocó and Medellín. All trials came to the same conclusion that it was too expensive to mechanically dry achiote seed to the 12 percent humidity content — the industrial standard — on a semi-industrial scale in Chocó and transportation costs, precarious road infrastructure, and the higher perishability of seed after threshing all limited options to dry seeds in Medellín or elsewhere. Furthermore, exposure of seeds to high temperatures for prolonged periods changed the chemical composition of the bixin, further affecting quality.

The inability to dry seed proved to be a major game-changer in terms of the overall value chain and business model. A solution was found in a partnership between the Medellín-based juice processing company Naranja Madura and grantees in Canton de San Pablo such as Corpocantón. The owner of Naranja Madura is a self-taught inventor who had been experimenting with innovative techniques to process achiote seeds into bixin paste and norbixin for more than a decade. This new capacity underpinned the decision to focus on processing fresh seed into a wet bixin paste at an industrial level instead of the conventional

processing of dry seed into bixin powder. Oro Legal, Corpocantón, and Naranja Madura agreed to outfit a large warehouse belonging to Corpocantón into a pilot processing plant to conduct trials on the transformation process and serve as a prototype for a larger-capacity future plant to process seed from all Oro Legal-supported threshing centers. Beginning in late 2018, with the first achiote harvest, the Activity embarked on an organic approach to transform Chocóan achiote into commercial grade bixin and norbixin colorant, principally for the food industry²⁵.

Naranja Madura, in turn, connected Oro Legal with Colorquímica (CLQ), the largest food colorant company in Colombia based in Medellín. At the time, CLQ was looking to expand its line of natural, bixin-based colorants for domestic markets and export. Dry bixin powder was imported primarily from Peru, Brazil, and Mexico since Colombia did not have an organized commercial achiote sector. This led to interest by CLQ in accompanying the development of the achiote transformation process and potentially becoming a commercial partner in the endeavor. This engagement was formalized under a memorandum of understanding signed with Oro Legal in July 2019 and proved to be instrumental in surmounting processing and marketing challenges. Given its technical and commercial prowess in industrial processing of colorants, CLQ played a pivotal role in extensive analyses of the chemical and phytosanitary characteristics of the various samples of bixin paste produced at the pilot plant in Chocó to achieve commercial-grade standards.

“For the first time we saw crops established with clear, well-defined, technical criteria.”

**— ACHIOTE PRODUCER,
CHOCÓ**

As processing issues were being resolved, a more daunting challenge was marketing and sales of large volumes of a novel agro-industrial product²⁶ — bixin paste — in a highly competitive industry. First, the market price for bixin fell significantly between 2015 and 2020, in large part due to the entry of significant volumes of a low-cost, dried, and vacuum-packed Brazilian product. Second, the domestic market for bixin paste is relatively modest, meaning that most production from Chocó would have to be exported. Third, the wet bixin paste would have to be further processed into a dried bixin powder or refined into concentrated bixin oil or norbixin, where CLQ was essentially the only viable buyer of this intermediate product. Although CLQ planned to expand its natural colorant product line over the long term, in the short to medium term, the company could only commit to procuring a fraction of the projected production from the Oro Legal achiote portfolio until technical development for bixin paste reached commercial-grade standards in terms of bixin concentration, humidity levels, and phytosanitary characteristics, and so CLQ could ensure sufficient demand for the finished products from its existing international client base²⁷.

This new market reality and lessons learned from the first major harvest and processing campaign from October 2019 to February 2020 led the Activity to adapt its value chain strategy and business model to emerging realities, however challenging these were. The new focus

²⁵ Industry requirements for the food industry are less demanding than for the pharmaceutical and cosmetic industries.

²⁶ Note that the bulk of the market is served by dried, ground, and vacuum-packed bixin powder.

²⁷ CLQ conducted extensive trials on the application potential of each product and sent samples to its clients in Peru and Mexico to glean feedback, establish interest, and determine profitable price points.

pivoted to 1) improving productivity and profitability of transformation processes; 2) exploring final product diversification; 3) strengthening the organizational capacity of A&ACH so it could assume overall management of the value chain²⁸; and 4) commissioning major structural and technological improvements to the existing pilot processing plant in Canton de San Pablo to optimize bixin recovery and lower processing costs.

Beginning in 2019, Oro Legal supported the CCs in the formation of a A&ACH, which is owned by the five community councils and Naranja Madura. Over a two-and-a-half-year period, the company gradually assumed full responsibility for value chain development, with continued support by Oro Legal on transformation processes and marketing and business capacity-building workshops at the start of 2020. Specifically, this support included: 1) business and financial modeling from crop production to final bixin powder/norbixin transformation; 2) validation of logistics and costs; 3) quality-control protocols along the production chain with an emphasis on the threshing and processing centers; 4) business structure and roles and responsibilities of different members; and 5) internal communication and decision-making protocols. Although this support was disrupted in March 2020 by the onset of the COVID-19 pandemic, a set of manuals, protocols, and policies were developed in anticipation of the next major harvest to ensure that collection, threshing, and processing operations were synchronized for optimal efficiency and final product quality.

Commissioning the agro-industrial processing plant with proper residual water treatment facilities and the installation of new external reception and threshing facilities during the COVID-19 pandemic was no small feat. Notwithstanding the enormously challenging circumstances imposed by the strict nationwide lockdown during most of 2020, the multiple construction projects progressed remarkably close to schedule with all new processing equipment and machinery installed and staff trained by the end of 2020. Operationalization of the bixin paste processing plant, however, proved to be more vexing, and not all issues were fully resolved before the harvest season closed in early February 2021. This impacted the ability of the plant to purchase and process achiote seed from producers, inevitably affecting their motivation. It also meant that critical data needed to calculate production costs of finished products, and in turn, the profitability of A&ACH, were not available to share with potential investors (see below for more information). The calculation of these yield measurements was a priority for A&ACH as Oro Legal closed.

CLQ's involvement in the development of the value chain was important and reflected in the generous provision of technical and commercial support. However, facilitating a long-term formal contractual agreement between CLQ and A&ACH proved more challenging. While CLQ confirmed early on its intention to purchase small volumes of both wet bixin paste for production of liquid norbixin and dried bixin powder for an oil-based colorant, it could not commit to precise monthly volumes until late 2020. By the close of Oro Legal, a pilot commercial agreement had been signed for the purchase of more than three tons of bixin paste in June 2021 at a competitive market price per percentage point of bixin. Although, the modest initial volume under the pilot purchase agreement will not cover all of A&ACH's production

²⁸ Note that A&ACH was formed at the end of 2019 but focused initially on its role in organizing the CC production base, building CC capacity for product reception and threshing, and adequately structuring the company itself to fully comply with Colombian legal requirements for a company of this type.

costs, CLQ agreed to cover the shortfall, estimated at \$10 million COP, by way of a forward payment for future bixin paste. Based on the performance of A&ACH under this trial agreement and progress on other potential large commercial deals²⁹, CLQ and A&ACH will sign a longer-term agreement in mid-2021 for the major harvest that starts in October.

While A&ACH-produced dried bixin powder was confirmed by CLQ to be of commercially acceptable quality, most bixin powder in the international market is derived from naturally dried seed, which is a much simpler and cheaper process. Given this, it is doubtful that A&ACH will be able to drive down costs sufficiently to be competitive at current market prices. For this reason, CLQ recommended that A&ACH focus first and foremost on raising the efficiency of processing wet bixin paste to maximize bixin extraction and concentrations and minimize impurities and water content. This would allow A&ACH to diversify into norbixin — a water-based concentrate that can be processed directly from the wet bixin paste — which CLQ agreed to process for A&ACH at-cost³⁰. This is an important development that could underpin the future consolidation of the achiote value chain and A&ACH profitability.

As with most agricultural products, short-term working capital is critical to bridge the gap between payments to farmers and receipt of payments from buyers. Anticipating this need for the achiote value chain, Oro Legal facilitated discussions with the international impact investment fund and USAID/Colombia partner Acumen for investment in achiote in early 2019. Subsequently, Oro Legal dedicated significant effort to respond to Acumen's demanding due-diligence process, a requirement before a project can be approved by its investment review committee. The achiote project had passed the first investment approval round in mid-2020. Final approval, however, requires a more in-depth analysis of the overall business model, financial viability, and organizational structure of A&ACH, which was impeded by delays in validation of final yields from the new processing plant. Despite initial assurances from Acumen that an investment would be approved for the April harvest, presentation of the proposal to the investment committee was delayed until May 2021, with a best-case scenario for any subsequent investment in September 2021. Should the September 2021 timetable hold, A&ACH will receive a much-needed injection of working capital in time for the large year-end harvest that begins in October 2021. There were clear indications of such an outcome at the time this final report was prepared.

LESSONS LEARNED

- Despite a set of unique challenges to establishing new productive ventures in Chocó, Oro Legal was able to establish the platform for a viable agro-industrial value chain — achiote and bixin — on a scale previously unseen in this demanding geography.
- Oro Legal was able to diligently craft and facilitate a novel commercial alliance between the incipient A&ACH CC enterprise and the well-established CLQ company, which took an inordinate amount of patience and tenacity to overcome a series of technical and business challenges that usually overwhelmed most endeavors of this type.

²⁹ Such as the large Medellín-based multinational nutrition and livestock feed company, [PREMEX](#), interested in procuring oil-based bixin for their line of poultry feed.

³⁰ Norbixin has a market price of \$3.75 (April 2020).

- In the same vein, Oro Legal engaged the Acumen impact investment fund to secure much-needed working capital for A&ACH in the short term and pave the way for more a substantial equity investment in the medium term. This required the Activity to work closely with A&ACH to prepare detailed financial analyses, often with notably short deadlines, developing local capacity in the process.
- Oro Legal worked closely with several participating CCs to structure a new REDD+ initiative with Wildlife Works Carbon (see section on rehabilitation in Chocó), which will include achiote as the key alternative productive activity to lessen pressure on native forests from deforestation. The REDD+ investment will provide fresh finance to capitalize on the significant early investment made by USAID in this incipient but high-potential value chain.
- The selection of candidate producer families with full participation of the CCs, though socially equitable, was not always efficient or strategic, and in some cases led to a wide geographic dispersion of beneficiaries, many located in remote locations, which in turn made it difficult to provide TA and affected profitability due to high transport costs.
- It was hard to predict or entirely mitigate the consequences of the COVID-19 pandemic, which hit at a critical moment. Restrictions affected the construction and operation of collection, threshing, and processing facilities and impacted global demand for bixin, as reflected in lower prices. This in turn had other varied and far-reaching impacts, including producers only partially maintaining and harvesting crops and enormous communications challenges because of poor telecommunications and internet coverage in Chocó.
- Governance challenges in Chocó, particularly within and between CCs, were underestimated. The low level of education in the region makes good governance generally, and good business practices more specifically, challenging. Indeed, many of the challenges that A&ACH faces in becoming a legitimate player in a competitive market are reflected in its limited ability to execute simple administrative and business tasks in a timely manner.
- The assumption that significant donor funding will attract private investment is not necessarily valid, since experience has shown that investment decisions are more often based on perceived future risk. The engagement of CLQ, Acumen, and other potential investors in the achiote value chain with nascent community-based organizations was possible due to a small, dedicated team.
- Value chain development anywhere in the world is hard, takes time, and has a high risk of failure. This is hold even truer in Chocó where the longer-term sustainability of A&ACH would undoubtedly benefit from additional USAID support. One needs to look no further than the recent success of the honey initiative in Bajo Cauca, Antioquia, which reflects more than a decade of USAID support via various mechanisms. The achiote value chain in Chocó will probably require a similar timeframe to raise the business acumen of A&ACH, continue to improve efficiency and productivity, conclude robust, long-term investment and market agreements, and attain growth over the long term.



Tributary of Pozo Hondo, water source for the Tarazá municipal aqueduct; Bajo Cauca, Antioquia.
Photo: Oro Legal

WATER CATCHMENT CONSERVATION IN MINING COMMUNITIES

Illegal mining, including mercury and heavy metals contamination and forest clearing, and poor land use, particularly extensive livestock production, are the main threats to the integrity of micro-watersheds or water catchments and waterways that are the source of potable water for most rural communities and smaller regional urban centers in Antioquia and Chocó. Poor household and animal sanitation upstream are the main sources of organic contaminants affecting the water quality for downstream users. Most community and municipal water systems are managed under contracts with private companies or under-resourced local water boards or committees and have a mandate restricted to maintenance of delivery infrastructure, water treatment, and administration. Rarely do authorities extend to the management and conservation of the water catchment to address point and non-point sources of pollution or mitigation of general degradation.

As originally conceived, this component of Oro Legal planned to apply a dual approach to improve water quality and secure sustainable water supplies for growing urban areas: conservation of upper water catchment areas and improved water capture, storage, treatment, and administration. In Year 1, the Activity concluded that the latter set of interventions, which require specialized engineering expertise and significant capital investment, fell outside the Oro Legal scope in terms of expertise and budget. Subsequently, the thrust of this component shifted to an IWRM approach in smaller water catchments located above municipal and community water supply in-takes where the needs are most acute and where USAID investments and Oro Legal support would have greater impact. The IWRM component focused on Antioquia, where water supplies are under stress from growing demand, increasingly erratic rainfall, and rapidly deteriorating soils and vegetative cover.

Given that most water systems in Chocó pump water directly from rivers and streams that are part of larger watersheds, opportunities in this geography, within this new scope, were more limited. The IWRM strategy was a highly practical approach, avoiding costly, overly sophisticated plans, which are seldom implemented, and targeted interventions to improve land-use practices and conserve forest cover. It was implemented in close partnership with private landowners and local water and government authorities (see box).

ORO LEGAL IWRM STRATEGY

- Apply the theory of change methodology to understand main threats and drivers.
- Limit the geographic focus to smaller water catchments (usually less than 500 ha) that are the source of potable water systems.
- Apply the concept of precision conservation to target conservation measures at the right place and the right scale, and make sure they are working.
- Collaborate closely with local partners and stakeholders who are directly affected by deteriorating water quality and are most motivated to act, especially more vulnerable segments of the population.
- Leverage resources and expertise from local counterparts and implementing partners, including larger formalized mining companies.
- Link IWRM interventions to other Oro Legal initiatives such as alternative livelihood activities and support for legalization of mining production units.
- Strengthen governance of land and natural resource uses to regulate or prohibit certain practices to prevent future degradation.
- Ensure Oro Legal investments serve as pilots across a broad representation of the threats and drivers affecting water quality.

In total, the Activity implemented seven IWRM pilots over 3,000 ha in Antioquia (see Exhibit 8 on the next page for more detail). Common to all pilots was technical training on water catchment management for Community Action Committees and more generalized education of community beneficiaries on the links between their agricultural and household sanitation practices and the availability of clean water for their families.

LESSONS LEARNED

- Given the precarious economic conditions in communities where interventions were implemented, the incorporation of income-generating activities to complement conservation efforts would greatly increase the sustainability of these interventions. Recommended income-generating activities that would enhance and promote the sustainability of IWRM interventions include beekeeping, vanilla cultivation, trout farming, and silvopastoral systems.
- Given the prevalence of extensive livestock grazing in the region and the negative impacts resulting from the unconstrained access by livestock to water courses and high runoff from degraded pastures, an emphasis should be placed on the design of silvopastoral systems writ large. However, it should be noted that silvopastoral systems require upkeep after initial establishment to ensure that species planted for the enrichment of fallow and secondary forests and shade and forage for cattle, remain healthy, and that fencing (whether traditional or live plant-based) remain in good-condition.

- Despite significant efforts to engage municipal environmental officials and water boards in the design of IWRM interventions, co-investment from municipalities did not materialize despite initial pledges.
- Attempts to develop IWRM projects at the water catchment or micro-watershed level in Chocó that could yield short- to medium-term impacts were thwarted by the scale of the development challenge in terms of investment needed in basic infrastructure and land management issues and the limited resources available. This was further complicated by issues around communally held land and resource rights.

EXHIBIT 8. DESCRIPTION OF IWRM PROJECTS

Water Catchment	Location (Municipality)	Area (ha)	Implementing Partner	Main Interventions
Pozo Hondo	Tarazá, Antioquia	800	FUNDAMUET	Fencing off of water catchment areas that source the aqueduct of Tarazá to prevent illegal exploitation of natural resources, enrichment, and management of fallow areas to create larger, more contiguous blocks of forest cover, and a socialization campaign for community members on responsible water use and protection of water and forest resources.
La Siberia	Tarazá, Antioquia	8.5	FUNDAMUET	
San Cayetano	El Bagre, Antioquia	300	Grupo Trópico Diverso	Conservation of streams and springs, promotion of improved silvopastoral practices, and training to local beneficiaries to implement simple water quality monitoring systems
La Ceiba	Remedios, Antioquia	388	Grupo Trópico Diverso	Enrichment planting around the water catchment protected area and training to the local community action committee on protection of water and forest resources, implementation of simple water quality monitoring systems, and gender and youth empowerment.
La Cruz	Remedios, Antioquia	401	Grupo Trópico Diverso	
La Trigueña	Buriticá, Antioquia	864	Conhydra & Continental Gold	Development of a management model for an aqueduct system for the community constructed by Continental Gold. The management model included the costs and revenue structure for the provision of water services and a community development and training program to promote community ownership of the aqueduct system, improved hygiene practices, and conservation efforts.
El Sauzal	Buriticá, Antioquia	271	Conhydra & Continental Gold	Measurement of residential waste being discharged into the river and proposal of mitigation measures to reduce the contamination of the river.

SNAPSHOT 6

Protecting watersheds and strengthening local livelihoods through ecological rehabilitation



The Márquez López family, beneficiaries of Puerto Claver, El Bagre

Photo: Oro Legal

The San Lucas mountain range — an area of approximately 16,000 km² — spans the northern Colombian departments of Antioquia and Bolívar and is considered one of the last primary remnant forests that encompasses both Andean and Caribbean ecological zones. In recent years, the Colombian government's Early Warning System for Deforestation has reported the presence of illegal activities such as mining, illegal logging, and coca production in the foothills of the San Lucas mountain range, threatening its rich biodiversity and the habitat of the high number of endemic species it hosts.

Through a multistakeholder agreement with implementing partner Corporación Trópico Diverso, the municipality of El Bagre (Antioquia), and the community located in the Quebrada Villa watershed, Oro Legal implemented a rehabilitation initiative to protect the native forest and the watershed, remediate historical environmental impacts, and develop sustainable livelihood alternatives for the 246 families that live in 23 villages in the area, specifically in the townships of Puerto Claver and Puerto López.

This activity spurred the enrichment of 565 hectares by planting native tree species to promote silvopastoral systems. These activities improved the health of the soil and surrounding vegetation, accelerating the forest's natural succession. The recovery of fallow areas, in addition to counteracting the effects of deforestation, strengthened the communities' long-term economic prospects. Under a balanced and sustainable forest management system, these trees can serve as a long-term source of income for the families that care for them.

Silvopastoral systems generate environmental and productive benefits and stimulate the local economy. The trees, in addition to providing shade to temper the heat, improve soil nutrition and supply nutrition for livestock, in turn improving their productivity.

These activities built upon the rehabilitation efforts of USAID's BioREDD+ program, which between 2013 to 2015 enriched 400 hectares of silvopastoral systems and introduced beekeeping.

A man wearing a blue face mask and a pink t-shirt is working in a field of yellowish-brown soil and rocks. He is holding a long wooden stick or pole. The background shows lush green vegetation. The t-shirt has text on it, including "CENTRO MÉDICO" and "ALCALDÍA DE SANTO DE CALI".

#LaVidaValeMásQueElOro



USAID

DEL PUEBLO DE LOS ESTADOS
UNIDOS DE AMÉRICA

Oro Legal

TELLING THE ORO LEGAL STORY

Over its five-and-a-half years of implementation, Oro Legal successfully positioned USAID as a key player in Colombia's mining sector by implementing a highly effective and wide-reaching communications strategy, largely centered on free press and social media. This was achieved through the generation of compelling content based on real accounts of Activity beneficiaries and communities, as well as the “media savvy” to know when and where to position stories.

In lieu of a dedicated budget for a communications team, the Activity designed and implemented low-budget, high-impact strategies. Oro Legal effectively employed a single communications consultant, who worked closely with Oro Legal management and in collaboration with Activity technical and field teams to produce content for with multiple uses, thereby maximizing the impact of communications outputs across a variety of existing communications platforms, including radio, print media, social media, and local television. By Activity close, Oro Legal had reached almost 420,000 communications recipients across these various platforms.



<https://www.larepublica.co/economia/usa-id-se-une-con-el-gobierno-nacional-para-trabajar-por-la-formalizacion-de-la-mineria-de-oro-en-colombia-2355981>

FREE PRESS AND SOCIAL MEDIA

Oro Legal content was regularly featured in the free press, including recognized media outlets such as El Tiempo, La Semana, RCN, Caracol, El Mundo, Tele Medellin, Tele Antioquia, and El Portafolio.

Despite not having dedicated, Activity-specific social media accounts, Oro Legal successfully utilized WhatsApp, which is extremely popular across all socioeconomic segments in Latin America, and collaborated with partners to share Activity content across established social media platforms and accounts. Through USAID/Colombia's YouTube channel, for example, Oro Legal broadcast the launch of its mining e-learning platform (date), a graduation ceremony for formalization of MPUs (date), and other key programmatic events (USAID Administrator, Mr. Green / Date). This approach took advantage of existing social media audiences, while also ensuring continuity of the Activity's content beyond the life of the project (LOP).



<https://www.semana.com/contenidos-editoriales/colombia-sin-mercurio/articulo/mediciones-de-oro-legal-muestran-reducciones-en-el-uso-del-mercurio/576824>

Inicio / Medio Ambiente / Reforestar las heridas que dejó la minería

EL PROYECTO FORMA PARTE DEL PROGRAMA ORO LEGAL, DE USAID

Reforestar las heridas que dejó la minería

Medio Ambiente 12 Ago 2017 - 9:00 p.m.

Por: María Mónica Monsalve S. / @mariamonic91

Mientras en los municipios de Remedios y Segovia se vive un paro minero, en el corregimiento de Puerto Claver, El Bague, una comunidad afro está empeñada en reforestar las áreas que olvidó la ambición del oro.



Puerto Claver, ubicado en el municipio de El Bague, Antioquia, es una de las zonas más degradadas por minería extensiva.

<http://www.elespectador.com/noticias/medio-ambiente/reforestar-las-heridas-que-dejo-la-mineria-articulo-707708>

Negocios agronotas LUNES 24 DE ABRIL DE 2017 9

Campesinos le ponen color a la minería ilegal en el Chocó

Un proyecto que juega Usaïd le permite cambiar una actividad extractiva a una productiva.

El programa 'Oro Legal', de la Agencia de Estados Unidos para el Desarrollo Internacional (Usaid) le cambiará este año el color a 8.500 hectáreas afectadas por la minería ilegal y ayudará a establecer 1.200 más de cultivo con la especie achioté.

Esta ofrece un colorante natural de sus semillas conocido como anatto.

Además, sus componentes básicos (bíxina y norbíxina) tiene una amplia demanda como insumo de la industria de alimentos, para darle color a productos como quesos, margarinas, salsas, aceites de cocina, carnes o lácteos.

También se utiliza en la fabricación de cosméticos, textiles y en la industria farmacéutica.

Así, con este proyecto, Usaïd está ofreciendo a los mineros ilegales (que no pueden legalizar sus explotaciones por estar en inviables), una alternativa productiva en el sector agrícola.

En la primera etapa de ejecución del programa, se brindó asistencia técnica para mejorar las condiciones fitosanitarias de los cultivos de achioté ya existentes y apoyo logístico para el proceso de cosecha en los Consejos Comunitarios de Cantón de San Pablo y San Isidro (Chocó).

"Este ejercicio, además de acopiar y poner en el mercado 14,5 toneladas de cápsula de achioté, se convirtió en una experiencia de aprendizaje para los productores", indicó un vocero de Usaïd.

Para los propósitos de este año se estableció un vivero que se encargará de suministrar 857.000 plántulas anualmente al proyecto, con el fin de ampliar las áreas de cultivo con esta especie.

Estas actividades les permitirán a 600 familias (que durante años han vivido de las explotaciones mineras no regularizables o están vinculadas a estabos muy débiles de la cadena de valor de la minería de oro) producir 2,5 toneladas por hectárea al año y obtener ingresos mensuales aproximados de 625 dólares, lo que equivale a dos salarios mínimos vigentes en Colombia y un aumento alrededor del 40 por ciento del PIB agrícola de los seis consejos comunitarios.

Con el apoyo de la Universidad Nacional, se realizan pruebas de laboratorio con diferentes variedades de semilla nativa para identificar la que ofrezcan una mayor concentración de bíxina, y ensayos técnicos para la producción de colorantes orgánicos.

"La tendencia mundial se orienta al consumo de productos naturales sin conservantes ni colorantes artificiales, panorama que representa una gran oportunidad para este cultivo en el Chocó."

"Esto, si se tiene en cuenta que el mercado peruano, por ejemplo, demanda cerca de 7.500 toneladas de semilla de achioté al año, y los territorios colectivos involucrados en el proyecto, una vez los cultivos estén en su máxima etapa productiva, obtendrán 1,5 toneladas de semilla seca por año", afirmó Usaïd.

"Oro Legal" trabaja en la implementación del plan de negocios para el desarrollo de la cadena productiva del achioté en el departamento del Chocó.

Además, está orientado a reducir la dependencia económica de explotaciones mineras informales y mejorar las condiciones de vida de las comunidades afrodescendientes mediante su vinculación efectiva y sostenible al mercado de los colorantes naturales.

Un total de 600 familias podrán producir unas 2.5 toneladas por hectárea al año. Foto: Jorge Martínez

Los componentes del achioté se utilizan para colorear alimentos, cosméticos, textiles y fármacos.

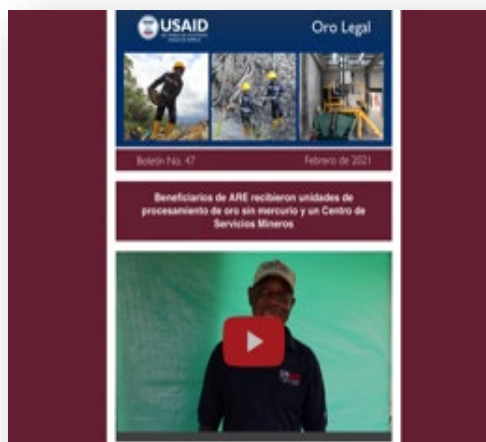
<https://www.portafolio.co/tendencias/campesinos-le-ponen-color-a-la-mineria-ilegal-en-el-choco-505176>



Publicación Noticias Caracol, 15 de enero de 2020

COMMUNICATIONS CAMPAIGNS

Oro Legal implemented two dedicated campaigns over the life of the Activity. The first was designed to promote its e-learning platform, “Oro Legal Virtual” while the second was implemented at the onset of the COVID-19 pandemic. Employing the tagline “Life is Worth more than Gold” (La Vida Vale Mas Que El Oro), the campaign was designed to reinforce best practices in hygiene among small-scale miners, largely via the wide-scale distribution of short videos produced by miners themselves and supported by the creative use of spots on local and community radio. The same content was also shared more widely across other across social media platforms like Facebook and Twitter. (Please place these campaigns in any date(s))



MONTHLY BULLETIN

From 2017 onwards, Oro Legal produced and distributed a monthly electronic bulletin, highlighting Activity impact stories and lessons learned. These bulletins encompassed a balanced and rich combination of success stories, field work experiences, technical and local wisdom, and the use of systematic monitoring data, packed in modern graphic format pleasant to digest. With a subscriber base topping 450 individuals and institutions, the bulletin was read by practitioners, academics, government officials, development practitioners and experts in ASGM. In total, Oro Legal produced and distributed 47 electronic bulletins.

ORO LEGAL BY THE NUMBERS

Although numbers alone only tell part of the story of a project's performance, there is typically a strong underlying correlation between successful implementation and attainment of results indicator targets. This was certainly the case for Oro Legal, as demonstrated by the figures presented in this section. What makes the Activity's performance especially noteworthy is that the last 13 months of Oro Legal occurred during the global COVID-19 pandemic.

OVERALL PERFORMANCE AGAINST INDICATOR TARGETS

This section presents Oro Legal's main technical outputs and outcomes as measured by the final set of 20 contractual indicators and targets and summarized in Exhibit 9.

EXHIBIT 9. ORO LEGAL PERFORMANCE AGAINST INDICATORS AND TARGETS

Indicator	Activity Final Achievement		
	Total	LOP Target	Percent ³¹
OL-OB1-001. Number of formalization projects implemented	12	11	109
OL-OB1-002. Number of MPUs formalized	146	135	108
OL-OB1-003. Number of MPUs engaged by Oro Legal	643	600	107
OL-OB1-004. Value of gold produced by MPUs supported by Oro Legal	\$194,469,357	\$155,000,000	125
OL-OB1-005. Estimated value of payments in royalties, taxes, and social security from MPUs formalized with Oro Legal support	\$14,411,735	\$28,000,000	51
OL-OB1-006. Quantity of mercury used to produce 1 gram of gold by MPUs supported by Oro Legal	0.19	0	100
OL-OB1-007. Reduction of mercury released to the environment (in Metric Tons) due to U.S. government assistance (EG.10.1-1)	70	55	127
OL-OB2-008. Number of hectares of land degraded by mining rehabilitated	16,994	17,000	100
OL-OB2-009. Number of long-term agreements signed to underpin rehabilitation activities	128	150	85

³¹ Percent attainment of life of project targets of indicator targets.

Indicator	Activity Final Achievement		
	Total	LOP Target	Percent ³¹
OL-OB2-010. Number of hectares of biological significance and/or natural resources improved under natural resource management as a result of U.S. government assistance (EG.10.2-2)	70,760	50,000	142
OL-OB2-011. Number of families benefitting from income diversification and integrated water resource management	8,204	10,000	82
OL-OB2-012. Value of smallholder incremental sales generated with U.S. government assistance	\$332,210	\$750,000	44
OL-OB2-013. GHG emissions, measured in metric tons CO ₂ equivalent, reduced, sequestered and/or avoided as a result of U.S. government assistance (EG.13-6)	3,465,306	1,600,000	217
OL-OB2-014. Number of water catchments where IWRM is undertaken	7	10	70
OL-15. Value of resources leveraged to support mining formalizations processes, rehabilitation of degraded areas and value chain development	\$2,566,759	\$6,000,000	43
OL-16. Estimated number of recipients of communications events and instruments	420,805	60,000	701
OL-017. Number of people trained	6,258	5,000	125
OL-018. Percentage of female beneficiaries as a proportion of total beneficiaries	30	40	75
OL-019. Value of leveraged funds*	11,117,197,890 COP	N/A	N/A
OL-020. Value of USAID investments linked to leveraged funds*	11,717,559,057 COP	N/A	N/A

* Indicators OL-019 and OL-020 are standard USAID/Colombia indicators that are tracked across all projects, are derived from the estimated share of Activity funds used to leverage funds, and do not have contractual targets. Both are reported in Colombian Pesos and not U.S. dollars (the average exchange rate at the moment of this report is about 1 USD:3,500 COP).

Exhibit 9 reflects strong technical performance over most expected results areas. Of the 18 indicators with numeric targets, 11 met or surpassed LOP targets. Of the remaining seven indicators, the average completion was 63 percent. This is impressive given both the challenges of the sector and the novel nature of many activities implemented. In total, Oro Legal legalized and formalized 146 MPUs across 12 mining formalization projects; generated more than \$194 million in legal gold sales; generated almost \$14.4 million in royalty, tax, and social security payments; eliminated the use of 70 tons of mercury; rehabilitated approximately 17,000 ha of degraded ex-mining land; and posted positive news of USAID's impact in Colombia with an audience of almost 420,000 people.

In addition, Oro Legal brought almost 71,000 ha of land under improved management and avoided close to 3.5 million metric tons of greenhouse gas emissions in the process. The Activity developed new skills for more than 6,000 trainees — including launching the region’s first digital training platform for ASGM — and improved incomes and access to water resources for more than 8,000 families, generated more than \$330,000 in incremental sales from new value chain activities, most notably from honey sales. More than \$2.5 million of fresh public/private investment was harnessed in support of activities. Finally, 30 percent of Activity beneficiaries were women, an impressive achievement in a sector traditionally dominated by men.

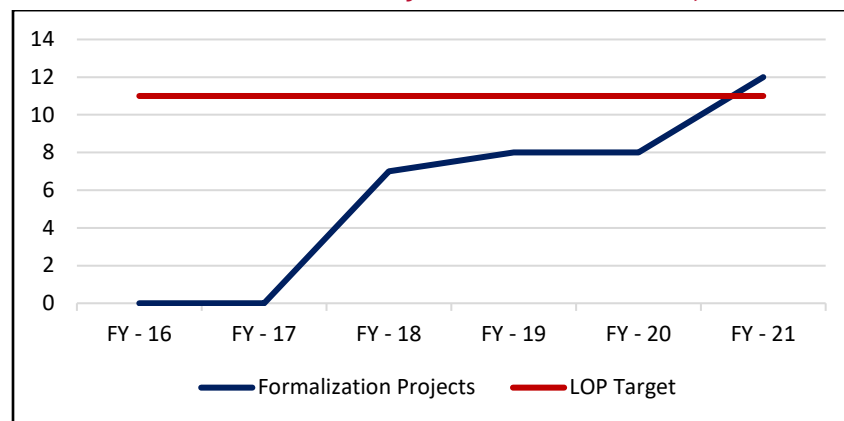
DISCUSSION OF RESULT INDICATOR PERFORMANCE

Oro Legal’s performance against individual indicators is discussed in more detail below.

OL-OBI-001. NUMBER OF FORMALIZATION PROJECTS IMPLEMENTED

Oro Legal successfully implemented 12 mining formalization projects (109 percent of the LOP target). These projects reflected the most feasible routes to legalization/formalization in Colombia over the period: operations contracts, formalization subcontracts, AREs, and in one case, transferring part of a private title to small miners. This is Colombia’s largest portfolio of ASGM formalization projects.

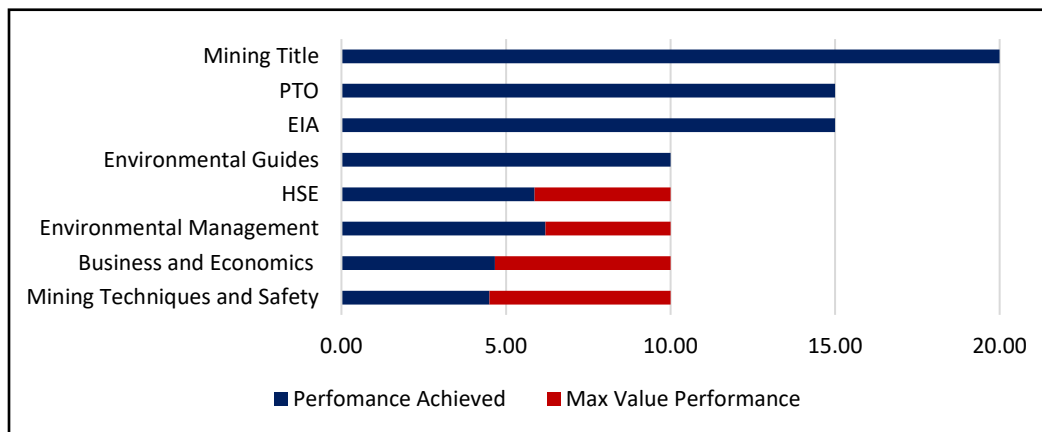
EXHIBIT 10. FORMALIZATION PROJECTS IMPLEMENTED, CUMULATIVELY



OL-OBI-002. NUMBER OF MPUs FORMALIZED

Within the 12 mining formalization projects, Oro Legal successfully legalized or formalized 146 MPUs (108 percent of the LOP target), involving 1,062 individual miners. Of this total, 53 (36 percent) are located in Antioquia and 93 (64 percent) in Chocó. Except for five larger formalization subcontracts in Condoto, Chocó, MPUs in Antioquia mines are larger than the MPUs formalized in Chocó. Exhibit 11 on the next page provides a breakdown of average achievement of all formalized MPUs against the formalization standard developed by Oro Legal with the MEM. Support provided to MPUs was particularly important for preparation of complex PTOs and EIAs (second and third items in Exhibit 11 on the next page), without which mines cannot be considered legal.

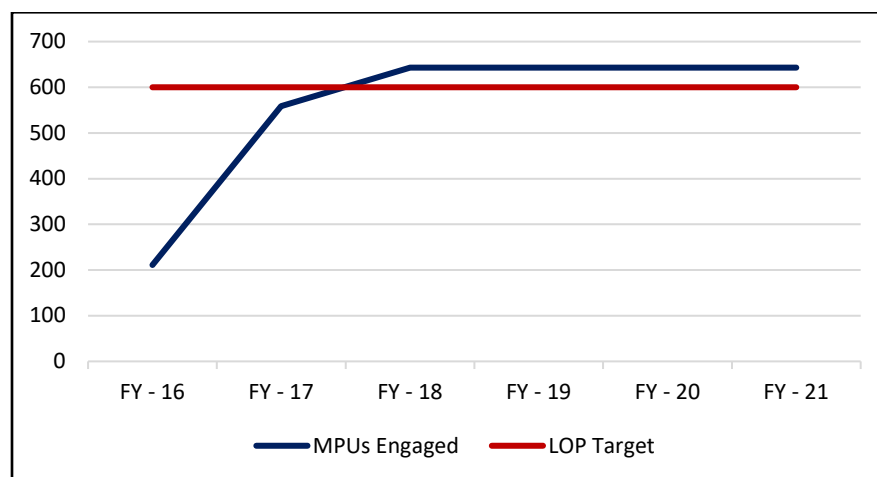
EXHIBIT 11. AVERAGE SCORE PROGRESS (PERCENTAGE) BY MPUS IN KEY FORMALIZATION



OL-OBI-003. NUMBER OF MPUs ENGAGED BY ORO LEGAL

Oro Legal engaged with 643 MPUs (107 percent of the LOP target) over the life of the Activity. This figure is illustrative of the arduous outreach conducted in Years 1 and 2 to identify candidate gold mines with legalization/formalization potential, as well as the high rate of attrition of MPUs due to ineligibility or dropping out of the process (77 percent). The road to ASGM formalization in Colombia is indeed a hard one and only open to a small percentage of all small miners.

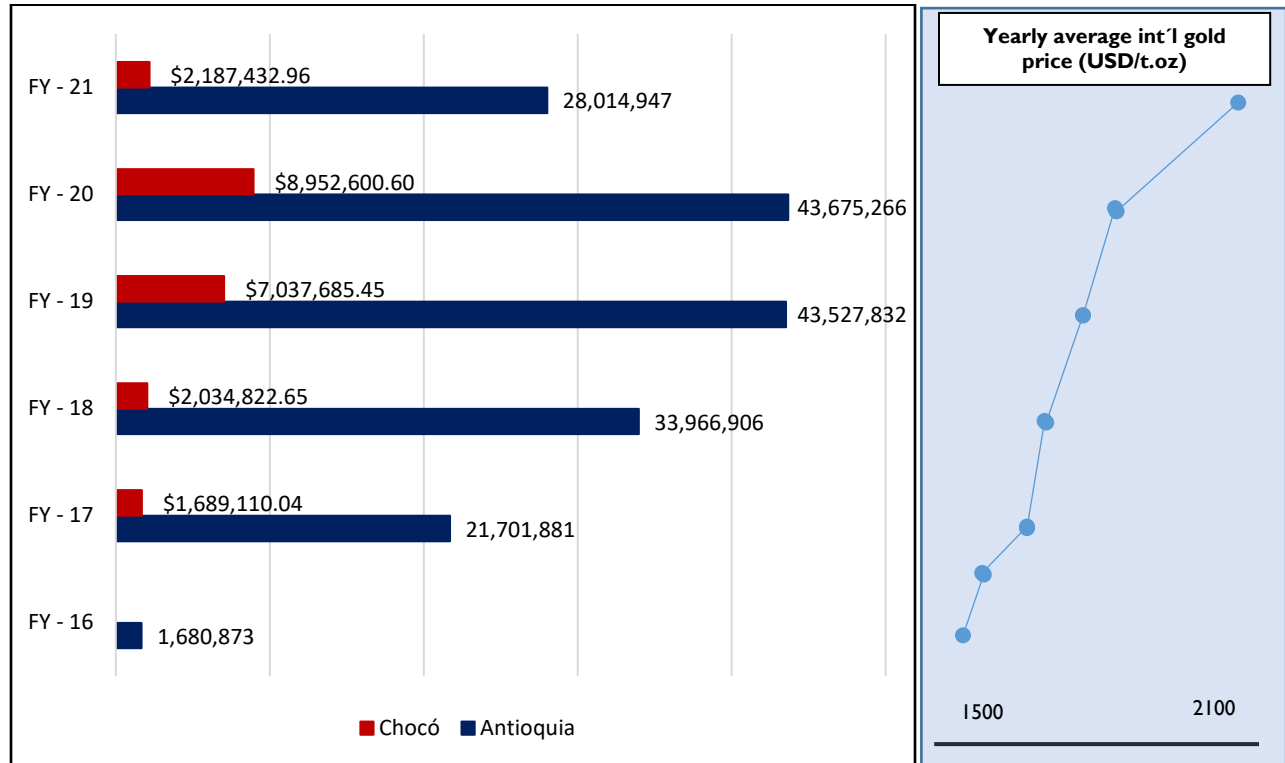
EXHIBIT 12. MPUS ENGAGED, CUMULATIVELY



OL-OBI-004. VALUE OF GOLD PRODUCED BY MPUs SUPPORTED BY ORO LEGAL

Oro Legal-supported MPUs produced 4.44 tons of legal gold over the LOP, with a market value of \$194,469,357 (125 percent of the LOP target), gold that would have otherwise been sold in illicit markets controlled by numerous illegal armed groups. The annual breakdown of gold sales during Oro Legal is disaggregated by intervention geography in Exhibit 13 on the next page, the bulk of which was produced by MPUs in Antioquia.

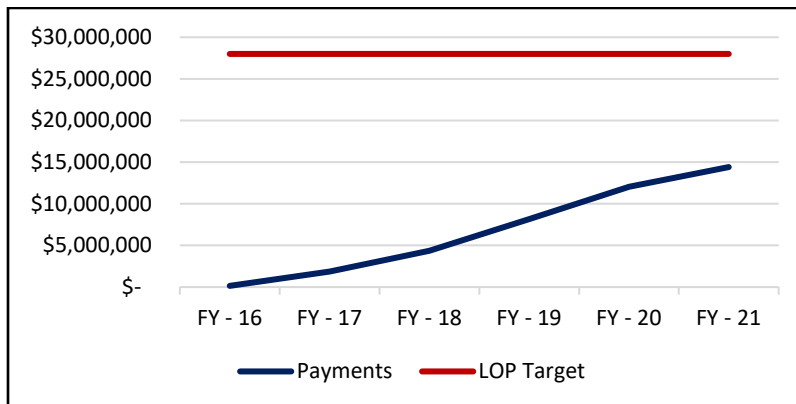
**EXHIBIT 13. VALUE OF GOLD PRODUCED BY FISCAL YEAR
AND INTERVENTION GEOGRAPHY (U.S. DOLLARS)**



OL-OBI-005. ESTIMATED VALUE OF PAYMENTS IN ROYALTIES, TAXES, AND SOCIAL SECURITY FROM MPUS LEGALIZED WITH ORO LEGAL SUPPORT (U.S. DOLLARS)

The estimates of royalties, taxes, and social security payments derived from the legal production of gold totaled \$14,411,735 (51 percent of the LOP target). This is a significant contribution to the national/regional income and accounts, which can support broad scale licit development activities, largely via the National Royalties Fund.

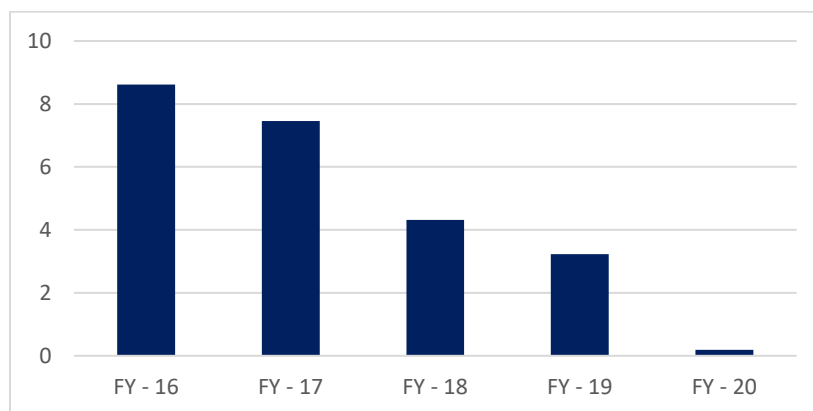
EXHIBIT 14. VALUE OF PAYMENTS FROM OL-SUPPORTED LEGALIZED MPUS, CUMULATIVELY



OL-OBI-006. QUANTITY OF MERCURY USED TO PRODUCE ONE GRAM OF GOLD BY MPUs SUPPORTED BY ORO LEGAL

Over the course of the Activity, Oro Legal-supported MPUs reduced their mercury use to almost zero, with just 0.19 grams of mercury used on average to produce one gram of gold (100 percent of the LOP target). This largely reflects 1) a drastic reduction of legal mercury imports to Colombia via the introduction of a Ministry of Commerce trade regulation in 2016 and the associated increase in price for mercury sold illegally; 2) processing of gold in mercury-free processing plants managed by a number private sector partners where MPUs have been legalized under their titles; and 3) effective training, TA, and in some cases, the provision of mercury-free processing equipment to small miners (see Objective I for more details).

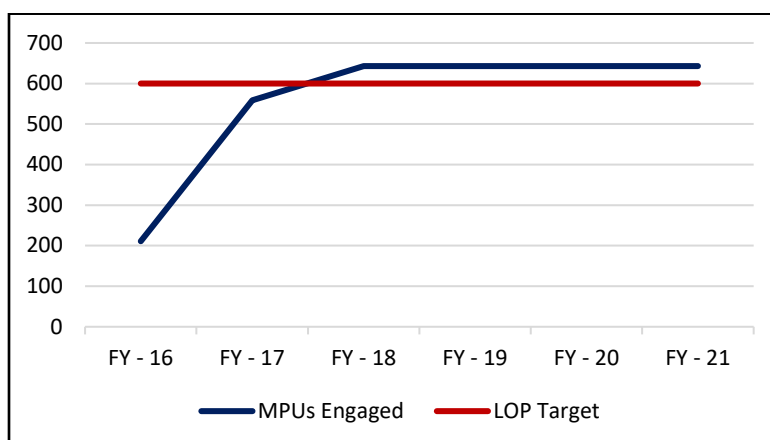
EXHIBIT 15. QUANTITY OF MERCURY (IN GRAMS) USED TO PRODUCE ONE GRAM OF GOLD



OL-OBI-007. REDUCTION OF MERCURY RELEASED TO THE ENVIRONMENT (IN METRIC TONS) DUE TO U.S. GOVERNMENT ASSISTANCE (EG.I0.I-1)

Oro Legal-supported MPUs avoided releasing 70 tons of mercury to the environment (127 percent of the LOP target). Of this total, 79 percent of mercury reductions were from alluvial mines that are traditionally the highest users of mercury, with a further 19 percent accounted for by underground hard rock mines, and the remaining 2 percent from small dredgers.

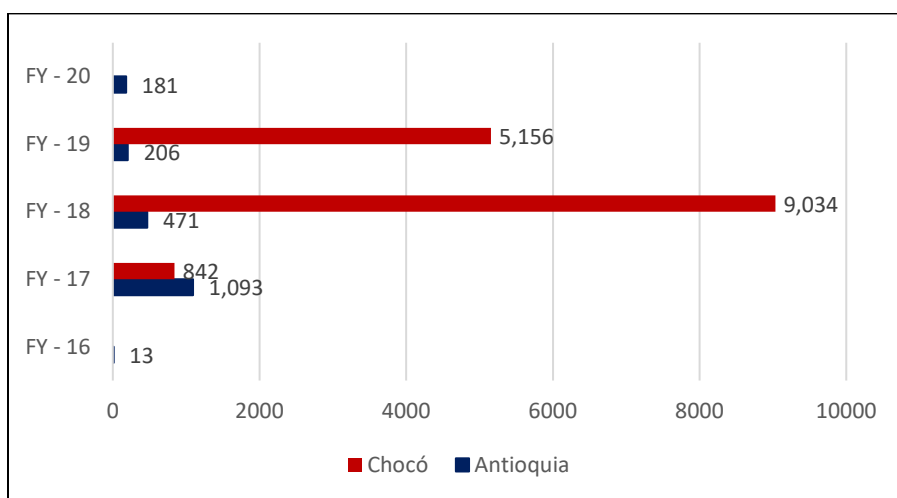
EXHIBIT 16. MERCURY (TONS) AVOIDED BY OL-SUPPORTED MPUS, CUMULATIVELY



OL-OB2-008. NUMBER OF HECTARES OF LAND DEGRADED BY MINING REHABILITATED

Oro Legal rehabilitated 16,994 ha of land degraded by illegal mining (100 percent of the LOP target). The bulk of this area (88 percent) is located in Chocó, using the assisted natural regeneration and local patrolling model under voluntary agreements with Afro-Colombian CCs. The remaining area (12 percent) is based on formal contracts with landowners in Antioquia under the *Acacia mangium* plantation model. Exhibit 17 breaks down rehabilitation performance over time by intervention geography. More information on Oro Legal's differentiated approach to rehabilitation in Chocó and Antioquia can be found in the Objective II section above.

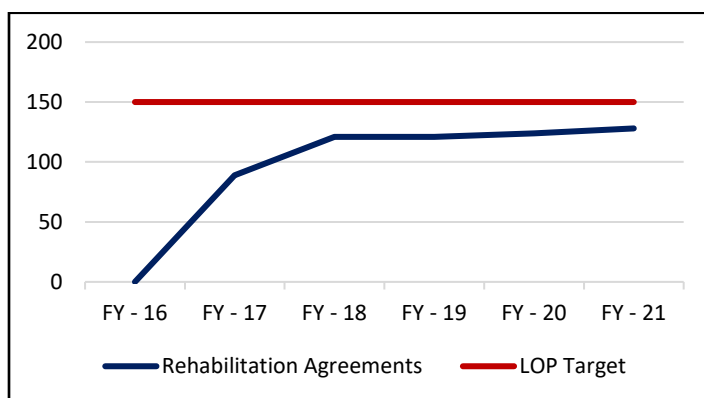
EXHIBIT 17. AREAS REHABILITATED DISAGGREGATED BY INTERVENTION GEOGRAPHY (HA)



OL-OB2-009. NUMBER OF LONG-TERM AGREEMENTS SIGNED TO UNDERPIN REHABILITATION ACTIVITIES

A total of 128 long-term agreements to underpin rehabilitation activities (85 percent of the LOP target) were signed. The small outstanding group pertains to stakeholders located in more remote areas, which became impossible to access due to the COVID-19 pandemic.

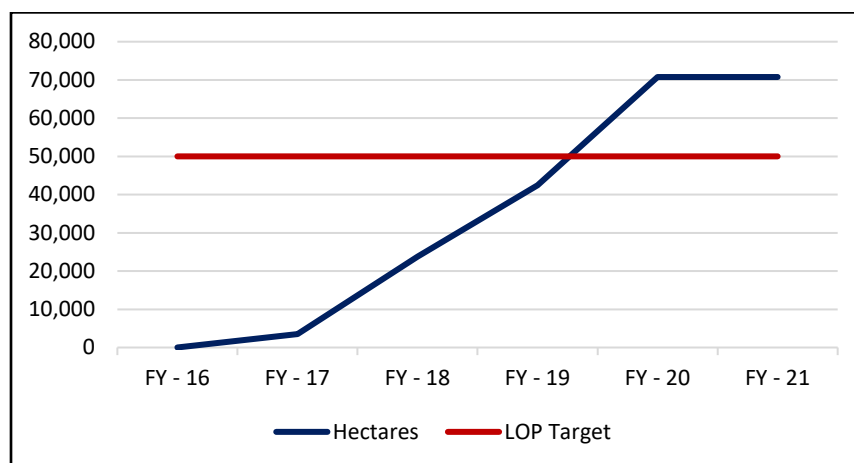
EXHIBIT 18. REHABILITATION AGREEMENTS SIGNED, CUMULATIVELY



OL-OB2-010. NUMBER OF HECTARES OF BIOLOGICAL SIGNIFICANCE AND/OR NATURAL RESOURCES IMPROVED UNDER NATURAL RESOURCE MANAGEMENT AS A RESULT OF U.S. GOVERNMENT ASSISTANCE (EG.10.2-2)

Oro Legal brought a total of 70,760 ha under improved management (142 percent of the LOP target). This total is made up of land under rehabilitation, areas under IWRM, and areas of influence around apiaries associated with honey production. Of this total, slightly less than 15,682 ha (22 percent) were located in Chocó, with the remaining 55,078 ha (88 percent) in Antioquia.

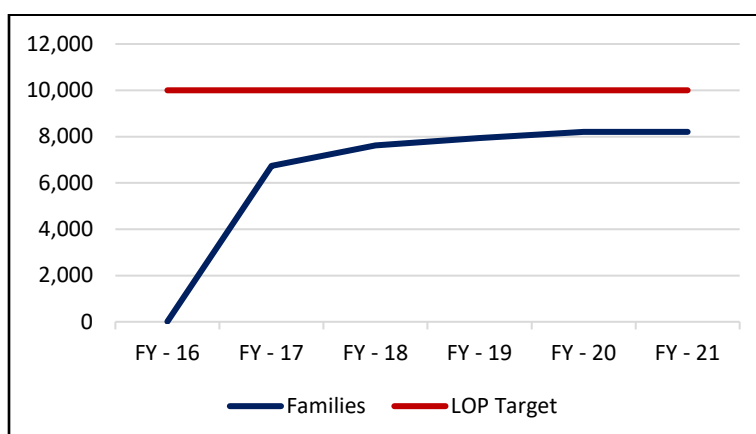
EXHIBIT 19. HECTARES WITH IMPROVED MANAGEMENT, CUMULATIVELY



OL-OB2-011. NUMBER OF FAMILIES BENEFITTING FROM INCOME DIVERSIFICATION AND INTEGRATED WATER RESOURCE MANAGEMENT

Oro Legal supported 8,204 families (82 percent of the LOP target) who benefitted from their participation in alternative livelihoods and IWRM activities. This figure would have been greater had the Activity been able to implement IWRM projects in larger watersheds in both geographies — as originally envisaged — rather than the precision conservation strategy applied in small water catchments in Antioquia only.

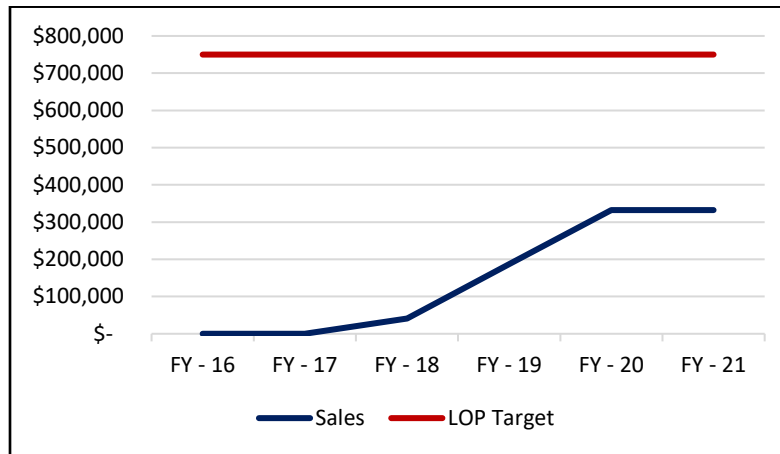
EXHIBIT 20. FAMILIES BENEFITTING FROM INCOME DIVERSIFICATION AD IWRM, CUMULATIVELY



OL-OB2-012. VALUE OF SMALLHOLDER INCREMENTAL SALES GENERATED WITH U.S. GOVERNMENT ASSISTANCE

Oro Legal generated \$332,210 in incremental sales (44 percent of the LOP target) by smallholders, largely through the production and sale of honey in Bajo Cauca, Antioquia. Had the achote value chain not encountered multiple challenges during its development, this target would have most likely been surpassed. (See Objective II, above).

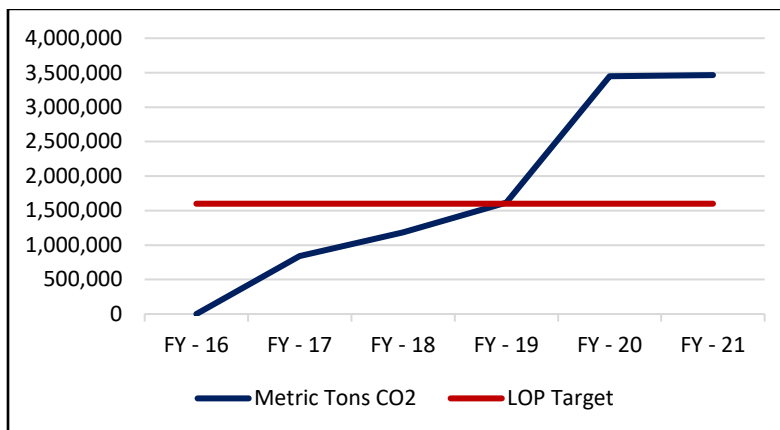
EXHIBIT 21. SMALLHOLDER SALES, CUMULATIVELY



OL-OB2-013. GHG EMISSIONS, MEASURED IN METRIC TONS CO² EQUIVALENT, REDUCED, SEQUESTERED, AND/OR AVOIDED AS A RESULT OF U.S. GOVERNMENT ASSISTANCE (EG.13-6)

During Oro Legal, estimated emissions of 3,465,306 tons of CO² equivalent were reduced, sequestered, or avoided in rehabilitation and IWRM areas (217 percent of the LOP target).

EXHIBIT 22. GHG EMISSIONS REDUCED, SEQUESTERED, OR AVOIDED, CUMULATIVELY



OL-OB2-014. NUMBER OF WATER CATCHMENTS WHERE IWRM IS UNDERTAKEN

Oro Legal implemented seven IWRM activities, all in Antioquia (70 percent of the LOP target). Because of the COVID-19 pandemic, a group of three planned projects in Chocó in the final year of implementation were cancelled.

OL-015. VALUE OF RESOURCES LEVERAGED TO SUPPORT MINING FORMALIZATIONS PROCESSES, REHABILITATION OF DEGRADED AREAS AND VALUE CHAIN DEVELOPMENT

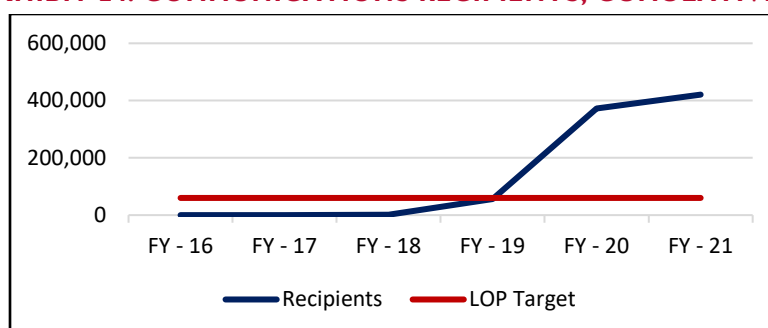
Oro Legal leveraged \$2,566,759 in support of activity implementation (43 percent of the LOP target), which is detailed in Exhibit 23 on the next page by main activity. Despite the enormous effort in building promising relationships with a wide range of potential investors, including support from an experienced private sector investment consultant based in the United Kingdom, it was not possible to close a single large investment by the end of Oro Legal. The perceived elevated risk by most potential private investors of the gold mining, achiote, and honey portfolios supported by the Activity could not be overcome. At the close of Oro Legal, the Acumen Impact Investment Fund remained the only significant investment possibility for critical finance for the achiote value chain in Chocó. Further, the assumption in the design of Oro Legal that commercial reforestation companies and investors would be interested in cost-sharing Acacia plantations in rehabilitation areas in Antioquia proved to be unfounded because of the ready availability of land in the region with a higher production capacity.

EXHIBIT 23. VALUE OF RESOURCES LEVERAGED BY TYPE OF ACTIVITY

Financial Year	Sustainable Livelihoods	IWRM	Mining	Rehabilitation	Total
2016	47,586	0	0	6,211	53,797
2017	147,113	0	0	95,574	242,687
2018	418,566	751	0	437,221	856,539
2019	416,945	11,090	8,270	31,332	467,637
2020	270,896	18,006	0	358,756	647,658
2021	0	0	0	298,439	298,439
Total	1,301,107	29,84	8,270	1,227,533	2,566,757

OL-016. ESTIMATED NUMBER OF RECIPIENTS OF COMMUNICATIONS EVENTS AND INSTRUMENTS

The creative, low-cost approach to communications and outreach adopted by Oro Legal effectively leveraged the free press and established social media platforms to reach a large audience that massively surpassed initial projections, reaching 420,805 people (see p. 56).

EXHIBIT 24. COMMUNICATIONS RECIPIENTS, CUMULATIVELY

OL-017. NUMBER OF PEOPLE TRAINED

Oro Legal trained 6,258 people (125 percent of LOP goal) in a variety of areas spanning forestry, agriculture, agro-processing, mining, environmental management, and more recently, biosafety protocols for COVID-19 prevention. Exhibits 25, 26, and 27 provide more information on people trained over the LOP.

EXHIBIT 25. NUMBER OF PEOPLE TRAINED BY GENDER

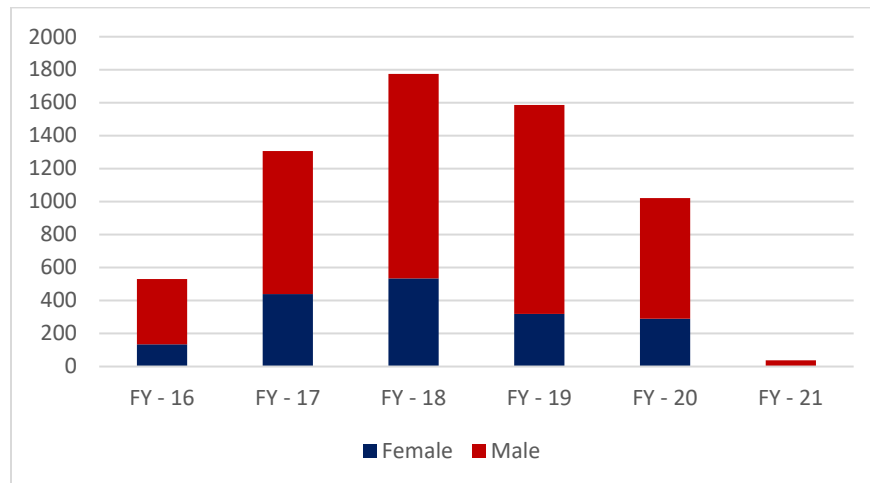


EXHIBIT 26. PEOPLE TRAINED DISAGGREGATED BY GENDER AND ETHNICITY

Fiscal Year	Afro-Colombian		Indigenous		Other		Total
	Female	Male	Female	Male	Female	Male	
2016	5	21		1	130	373	530
2017	166	286	4	8	270	573	1,307
2018	171	241	15	19	348	980	1,774
2019	173	581	62	67	84	620	1,587
2020	71	241		2	219	489	1,022
2021	2	22				14	38
Total	588	1,392	81	97	1,051	3,049	6,258

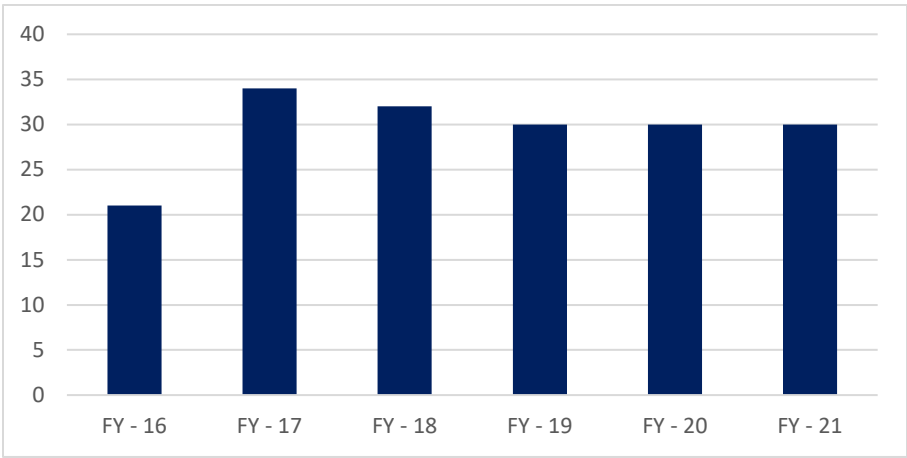
EXHIBIT 27. PROGRESSION OVER LOP OF PEOPLE TRAINED BY ACTIVITY

Fiscal Year	Achiote	Honey	IWRM	Mining	Rehabilitation	Total
2016		95		435		530
2017	365	8		381	553	1,307
2018	225	926	40	428	155	1,774
2019	437	109		919	122	1,587
2020	157	93	107	647	18	1,022
2021	24			14		38
Total	1,208	1,231	147	2,824	848	6,258

OL-018 PERCENTAGE OF FEMALE BENEFICIARIES AS A PROPORTION OF TOTAL BENEFICIARIES

The final percentage of female beneficiaries during the life of Oro Legal was 30 percent (75 percent of the LOP target), with outreach and strategies targeted to this vulnerable group. Although men dominate small and medium-sized MPUs, women comprise a significant percentage of gold panners who occupy the lowest, or most marginal, echelons of the gold value chain and are most at risk from the health risks of mercury exposure. This was the impetus for the livelihood alternatives to illegal mining, where honey production in Antioquia in particular is especially suited to women who comprised 76 percent of people involved in this activity.

EXHIBIT 28. WOMEN BENEFICIARIES, PROPORTIONATE TO TOTAL BENEFICIARIES



ANNEX I:

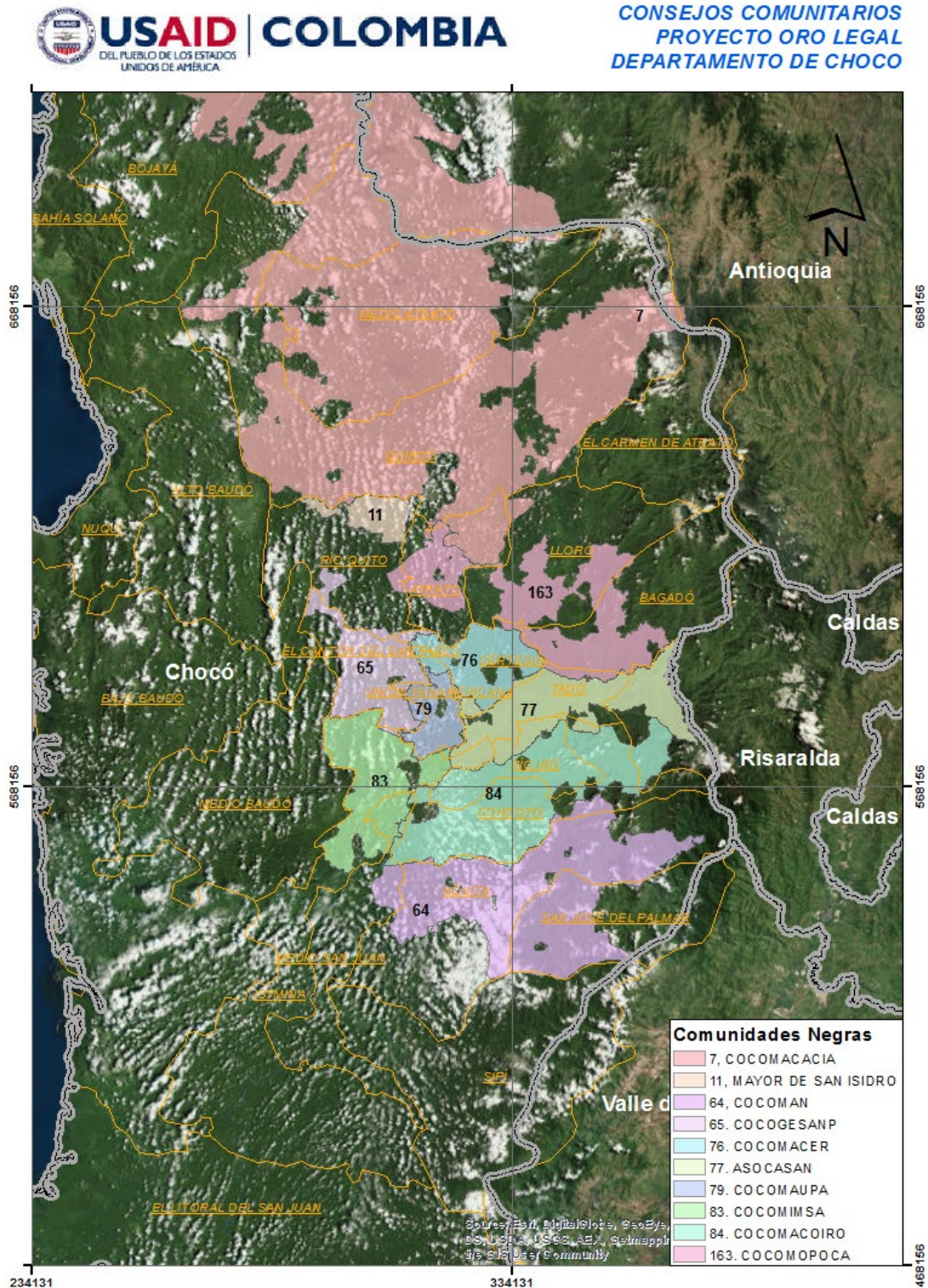
INDEX OF ACTIVITY REPORTS

Per Section F.4.A., below we present an index of reports and information products produced under contract no. AID-514-C-15-00003, and corresponding links to USAID's Development Experience Clearinghouse.

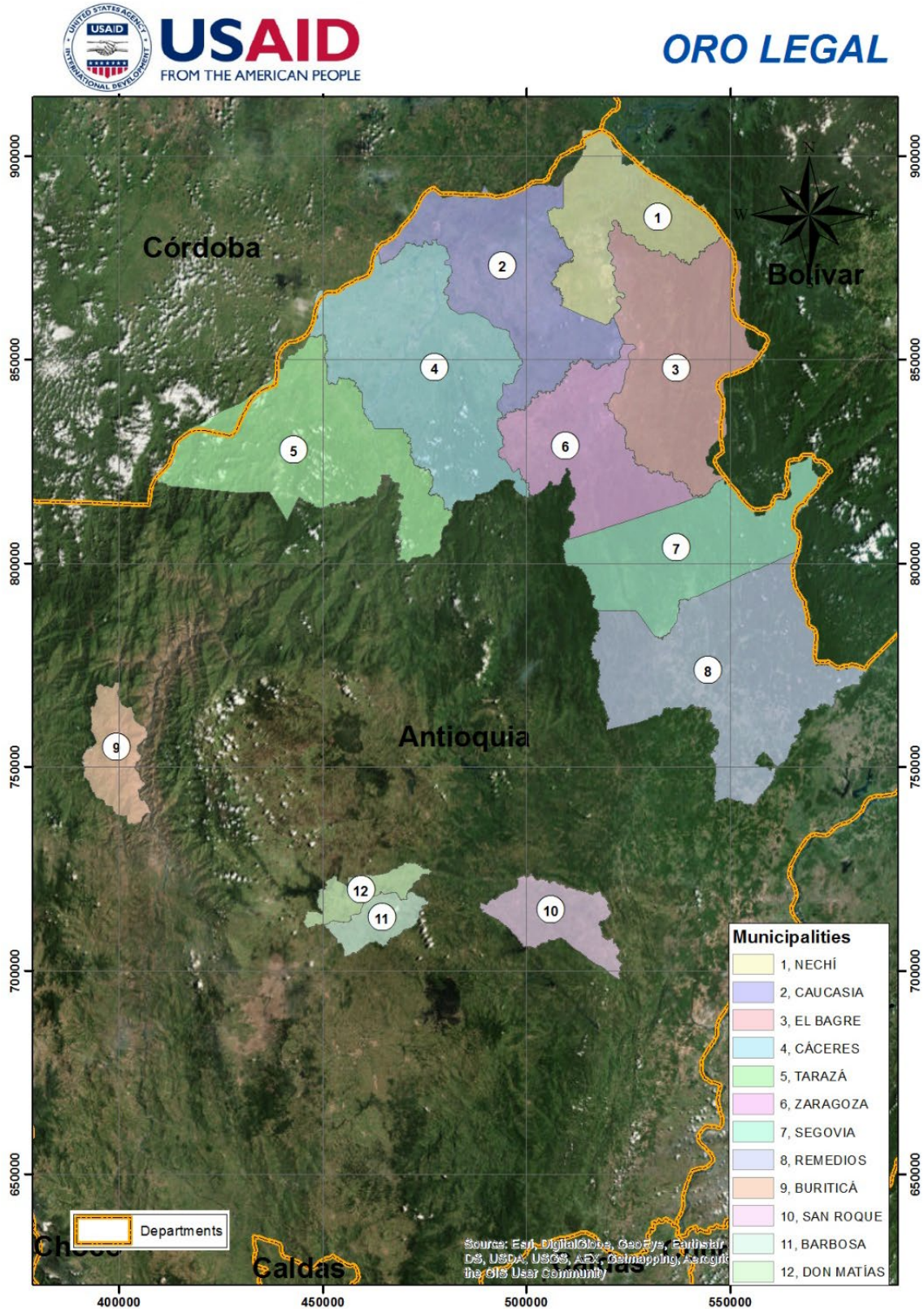
1. Annual Progress Report, Fiscal Year 2016
[Link to DEC](#)
2. Annual Progress Report, Fiscal Year 2017
[Link to DEC](#)
3. Annual Progress Report, Fiscal Year 2018
[Link to DEC](#)
4. Annual Progress Report, Fiscal Year 2019
[Link to DEC](#)
5. Annual Progress Report, Fiscal Year 2020
[Link to DEC](#)
6. Airborne Mercury Concentration Sampling in nine municipalities in Colombia
[Link to DEC](#)
7. Evaluación de coberturas vegetales en parcelas establecidas con achiote en los Consejos Comunitarios apoyados por el programa en Chocó
[Link to DEC](#)

ANNEX 2: MAPS OF IMPLEMENTATION AREAS

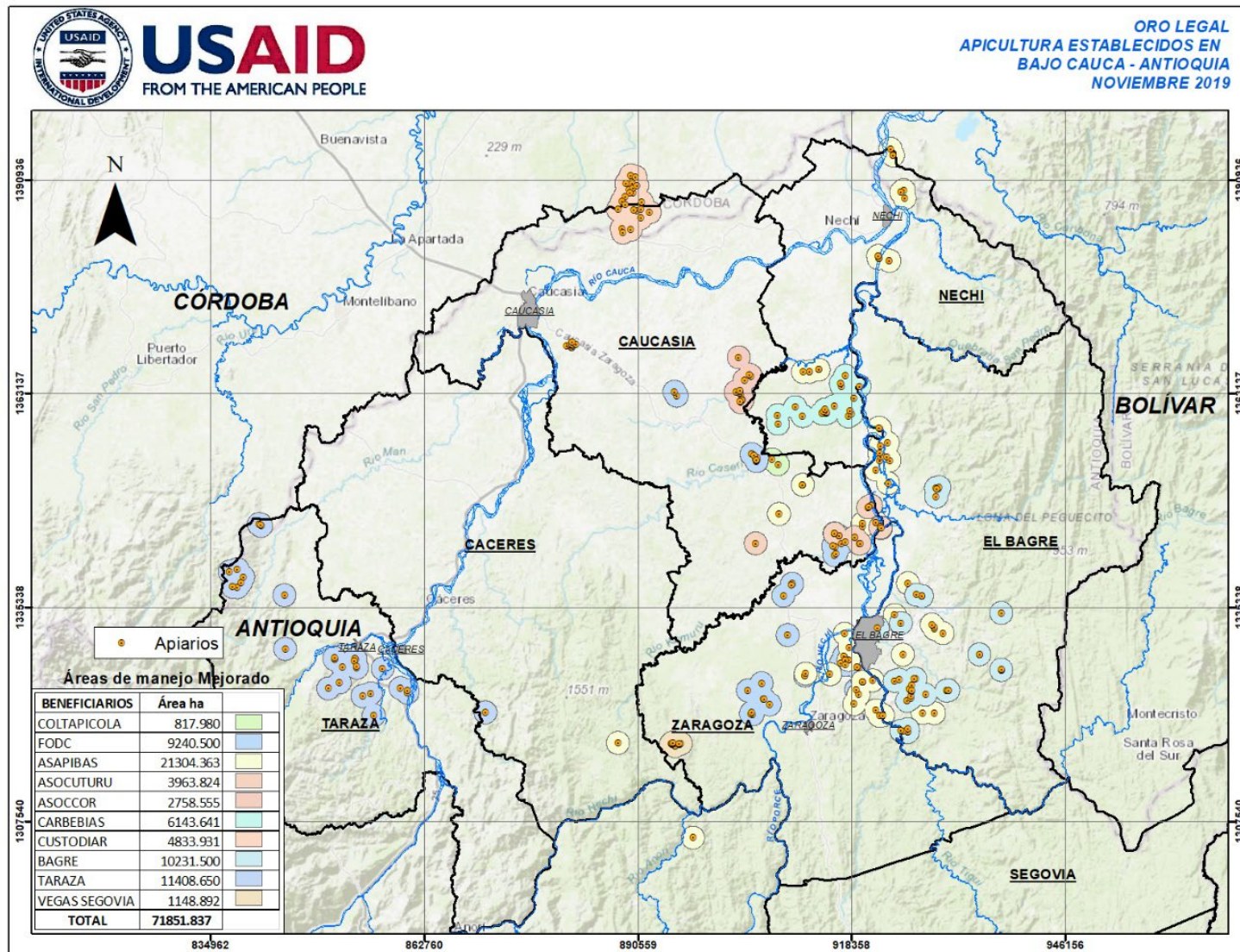
CHOCÓ AREAS OF IMPLEMENTATION



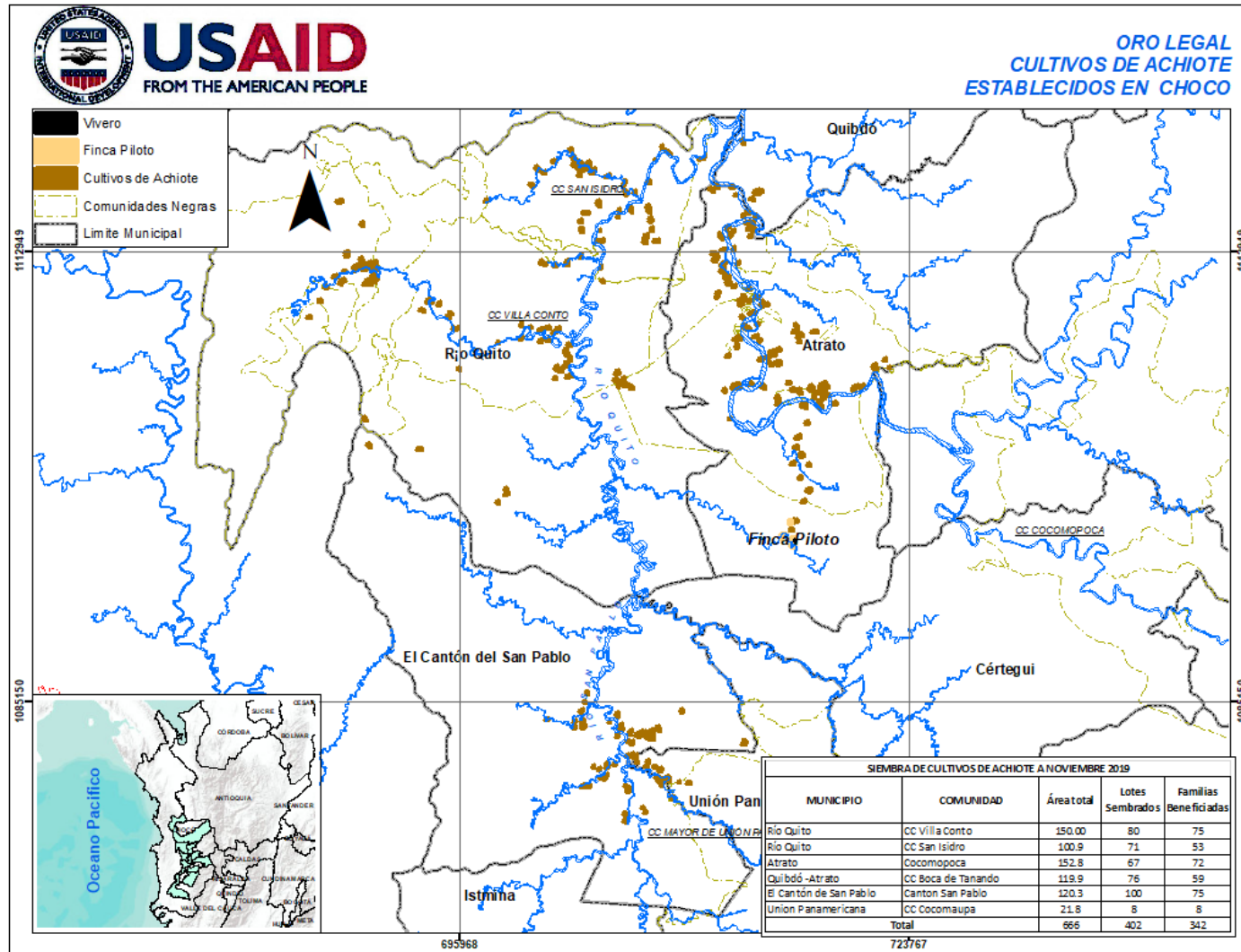
ANTIOQUIA AREAS OF IMPLEMENTATION



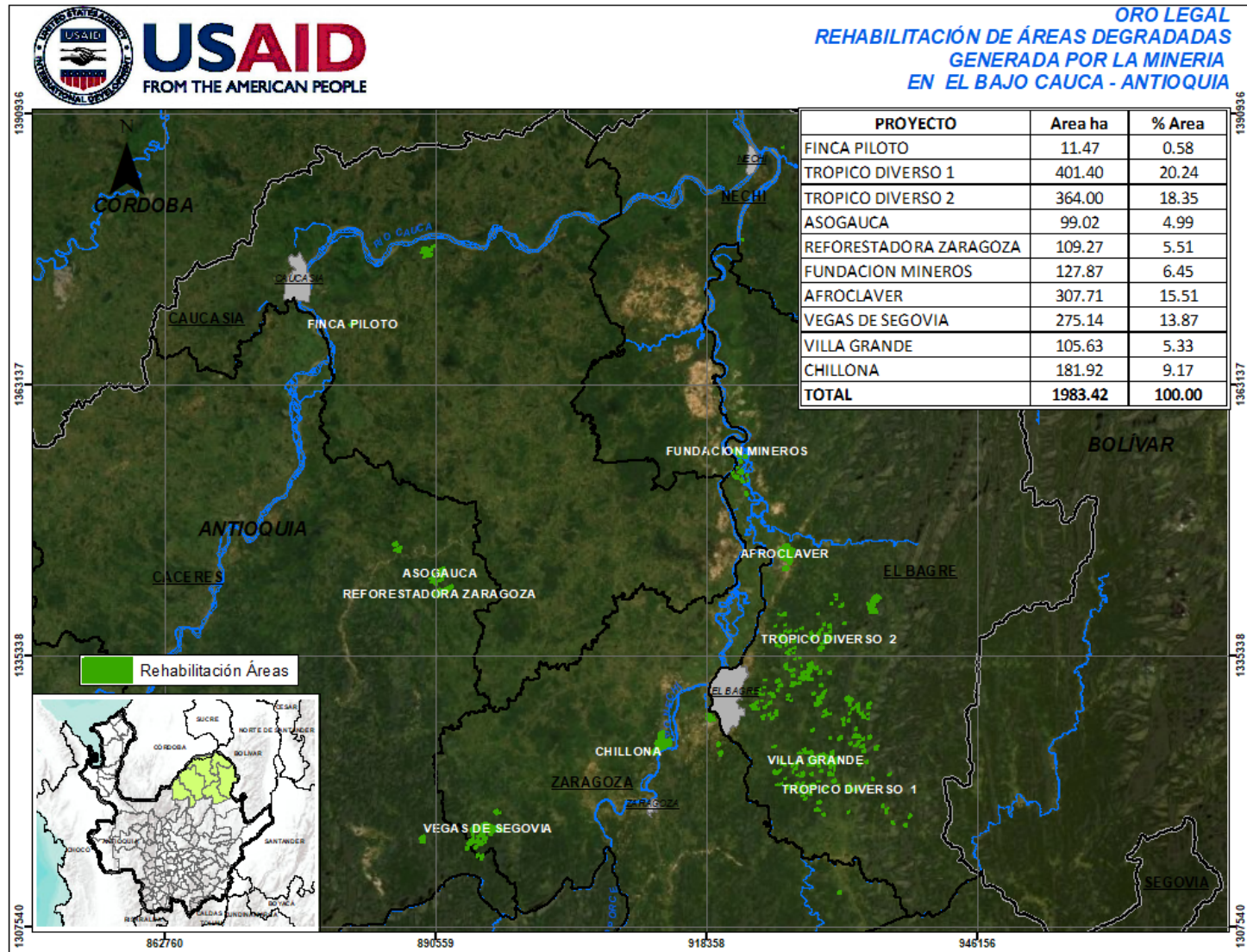
ORO LEGAL-SUPPORTED APIARIES BY THE APICULTURE ACTIVITY'S CLOSE IN NOVEMBER 2019



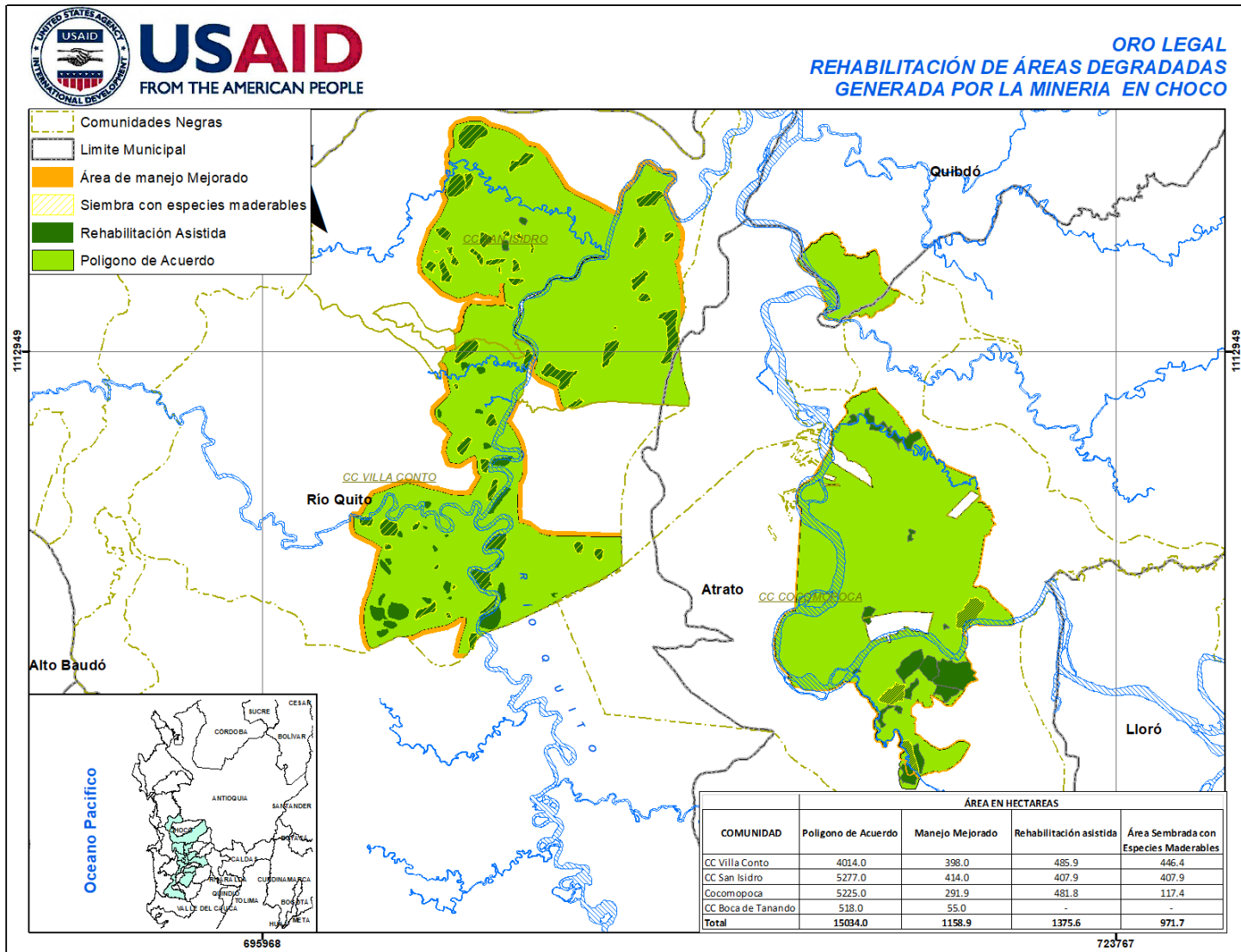
CHOCÓ ACHIOTE PLANTATIONS SUPPORTED BY ORO LEGAL THROUGH NOVEMBER 2019



REHABILITATED HECTARES IN ANTIOQUIA



REHABILITATED HECTARES IN CHOCÓ



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