Researchers
Santiago Saavedra
Universidad del Rosario

Staff
Dayana Lorena Tellez Galeano
Research Manager

Catalina Reyes Villegas
Associate Research Manager

Abraham Farfán
Research Analyst

Viviana Delgadillo
Field Coordinator

Laura Vargas Rueda
Research Manager

Margarita Rosa Cabra Garcia
Senior Research Associate

David Francisco Torres León
Research Analyst

Timeline
2017-Present

Sample Size
842 municipal authorities

Research Implemented by IPA
No

Examining the Response to Revealing the Existence of Illegal Mining in Colombia

Abstract

Illegal mining is prominent throughout the world but is rarely reported to authorities responsible for monitoring mining activities. In Colombia, Colombia Mining Monitoring (CoMiMo[1]) uses artificial intelligence and satellite technology to locate possible illegal mines. Researchers disclosed the mines' locations to local and national authorities to measure their response and determine whether this information reduces or relocates the presence of illegal mines. Results show that disclosing the location of illegal mines to local and national authorities led to an eleven percent reduction in illegal mining in the exact mine locations and in the surrounding areas. However, illegal mining increased in areas not targeted by the information. As a result, the overall impact of the intervention decreased from an eleven percent reduction to a seven percent reduction in illegal mining in the municipalities where the intervention took place.

Policy Issue

From diamonds in Africa to gold in Latin America, illegal extraction of valuable resources is prevalent worldwide. This activity entails a higher risk from a safety and health perspective for those who choose to participate, but it also encourages irresponsible behavior that can lead to negative long-term consequences. Ignoring the normative and best practices often breeds bad working conditions and practices such as child and forced labor. Environmental standards are also not usually met, and illegal mining can contribute to the destruction of ecosystems. Likewise, in many parts of the world, illegal extraction of resources is controlled by criminal organizations that increase their power through this activity.

Despite the negative outcomes associated with illegal mining, these activities tend to go unreported, allowing operations to continue. Experts attribute this to several reasons: limited government capacity given the remoteness in which illegal extraction of resources often occurs, local officials' corruption and complicity with the illegal operations, and poor government oversight in weakening the value chain in the illegal market.[2] There is a body of research on illegal extraction of resources, but not on the motivations behind authorities' decisions to report and act against these illegal activities.

Context of the Evaluation

Colombia is a country rich in natural resources, but 82% of the mining is illegal,[3] that is: carried without legal title. As the price of mineral commodities has risen to historic highs on the world market, there has been a corresponding increase in the number of mines operating in Colombia to extract and profit from producing the valuable natural resources.[4]

Many informal mines in Colombia excavate without claim or title under the mining codes in the search to earn a better living. However, because those mines, as well as the larger-scale informal mines, have no officially recognized presence, they are more difficult for officials to monitor and regulate.[5] Illegal mines contaminate the country's waterways from mercury spillage.[6] They have also been directly linked to organized crime. In general, areas where illegal mining is carried out have high levels of poverty and marginality, are difficult to access, and are characterized by the presence of illegal armed groups.

Details of the Intervention

Using satellite technology, CoMiMo located active and potentially illegal mines in Colombia. The 842 municipalities with mineral resources in the subsoil, out of the 1,103 total municipalities in Colombia were included in the study. The possible location of mines was disclosed to local, national, both, or neither of the authorities to determine whether the authorities respond differently and whether the disclosure of sites reduces or relocates the presence of illegal mines. The researchers randomly grouped the Colombia's 842 municipalities into the following categories:

- **Local authorities**: The research team shared the location of 5 possible mines in 200 randomly chosen municipalities with the local authorities of those municipalities.

- **National authorities**: The research team shared the location of mines in other randomly chosen 200 municipalities with the national authorities.

- **Both authorities**: The research team shared the location of mines in other randomly chosen 200 municipalities with both the local authorities of those municipalities and the national authorities.

- **Neither:** Although the research team located mines in another 242 randomly chosen municipalities, they did not share the location with the corresponding local nor national authorities.

A month after the last disclosure of mine locations, the IPA team conducted phone and in-person surveys with the local authorities responsible for monitoring mining activities. The surveys covered questions about how the local government works, general procedures and working structure, and how the issue of illegal mining is addressed by the municipality. If the authorities could not be contacted by phone or in-person, the research team sent them self-administered surveys via email.

Results and Policy Lessons

Results show that disclosing the location of illegal mines to local and national authorities led to an eleven percent reduction in illegal mining in the exact mine locations and in the surrounding areas. However, illegal mining increased in areas not targeted by the information. As a result, the overall impact of the intervention decreased from an eleven percent reduction to a seven percent reduction in illegal mining in the municipalities.

Breakdown of Impact: The share of mined area mined illegally was reduced by eleven percentage points (ppts) in the municipalities where authorities were informed. The reduction effect ranged from 8.14 ppts when both local and national authorities were informed and by 15.41 ppts when only national authorities were informed.

Illegal mining activity increased in areas that were distant from the disclosed locations. Mining in these distant areas increased by 2.69 ppts when only the national authorities were informed and by six ppts when only the local authorities were informed.

These results illustrate the benefits of new technologies for building state capacity and reducing illegal activity. The predictions are available for public access since September 2021, and are constantly updated every month. [1] A technology similar to the one released for Colombia could be extended to all the countries. Its success will depend on the credibility

of the source, and the use bureaucrats make of the information. Besides mining, these monitoring technologies are available for deforestation, fires, and fishing. The continuous use by government authorities will be key to controlling environmental degradation and achieving the Sustainable Development Goals.

Sources

[1] https://comimo.sig-gis.com/

[2] Mwega, F.M. ELLA Policy Brief: Small-scale and Informal Mining: A Big Problem for Latin American States. ELLA, Practical Action Consulting, Lima, Peru (2012) 9 pp

[3] Saavedra-Romero (2021) “Local incentives and national tax evasion: The response of illegal mining to a tax reform in Colombia” European Economic Review

Volume 138, September 2021, 103843
https://www.sciencedirect.com/science/article/pii/S0014292121001768

[4] Julia Symmes Cobb, “Colombia Alluvial Gold Output Area up 3%, Large Majority Illegal -Un,” Reuters (Thomson Reuters, July 27, 2021), https://www.reuters.com/article/us-colombia-mining-gold/colombia-alluvial-gold-output-area-up-3-large-majority-illegal-un-idUSKBN2EX259.

[5] The Global Initiative Against Organized Crime, *Organized Crime and Illegally Mined Gold in Latin America* (Geneva: Global Initiative Against Organized Crime, 2016)

[6] Gabrielle Gorder, “Illegal Mining behind Mercury Contamination Harming Colombia's Indigenous,” InSight Crime, December 20, 2019, https://insightcrime.org/news/brief/mercury-contamination-colombia-indigenous/

January 19, 2022