

Colombia's Coca Conundrum: Mapping Risk of Coca Production

Background

Colombia is the world's largest producer of coca leaves, the base ingredient in cocaine. While coca leaves themselves are harmless and have been used for thousands of years by indigenous communities, once processed they become a highly harmful drug. Over the last 30 years Colombia, aided by the United States has tried a variety of eradication efforts, primarily aerial spraying and manual forced eradication. None of these efforts have prevailed for a variety of reasons.

The literature identifies many different variables as indicators for cocaine production including access to roads, unsatisfied basic needs, physical boundaries, and state presence. This project looks at these four indicators to determine the risk of each municipality for coca production and then examines the correlation between the projected risk and the actual production. These indicators were chosen based on the availability of their data.

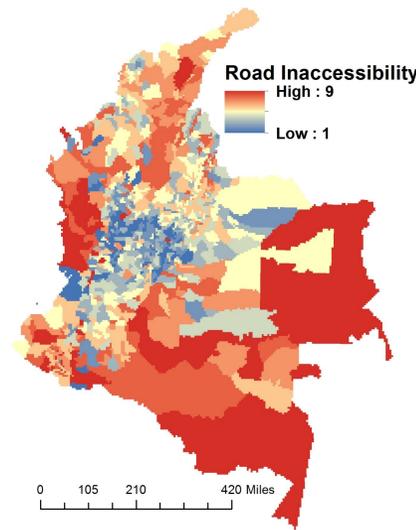


Methodology

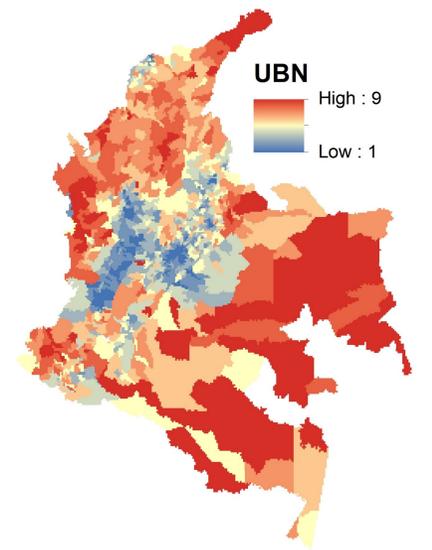
Risk of coca production for each municipality was determined by examining four indicators. High **road inaccessibility** indicates a lack of access to markets as well as low government presence, both of which may lead to high coca production. High rates of **Unsatisfied Basic Needs (UBN)** is an indicator of poverty levels, often linked to coca production. High **elevation** is considered a barrier to market access and thus indicates higher coca production. Finally, high **inaccessibility** of what the Colombian government considers "help centers" like fire departments, is considered a proxy indicator of low levels of government presence, which often indicates increased coca production.

Each indicator was reclassified on a scale of 1-9, 9 being the worst and indicating a higher risk of coca production. The reclassified layers were added together using raster calculator to determine which areas were most at risk for coca production.

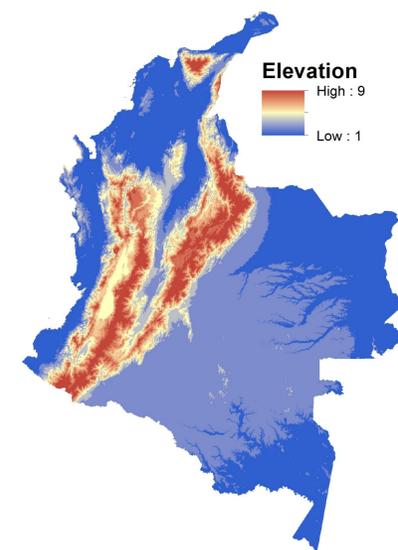
Road Inaccessibility



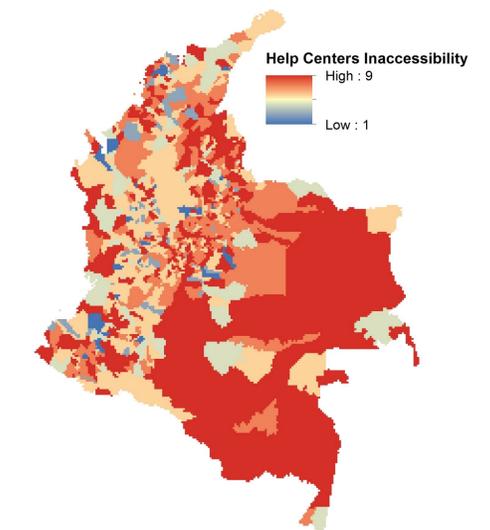
Unsatisfied Basic Needs



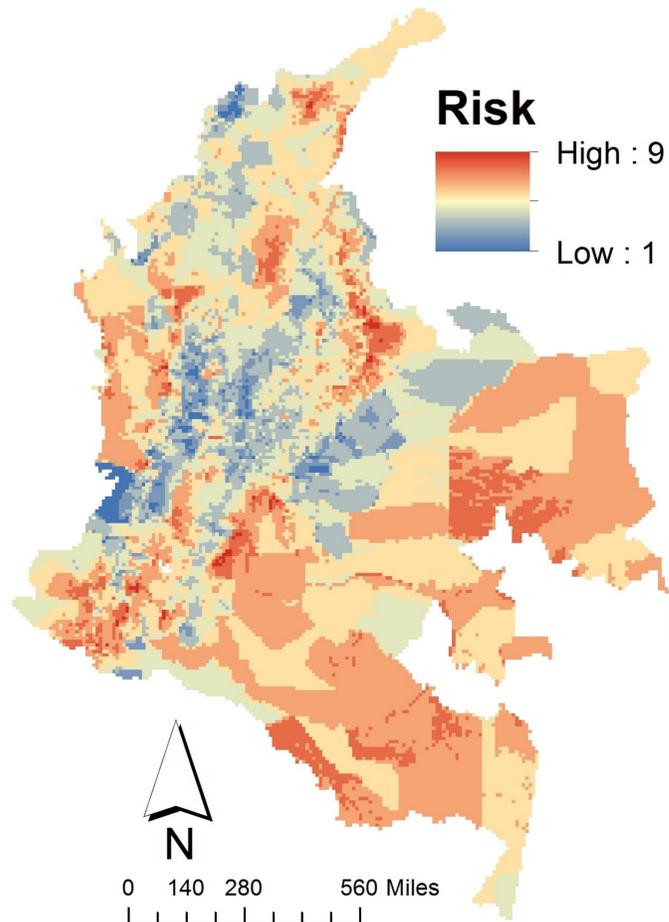
Elevation



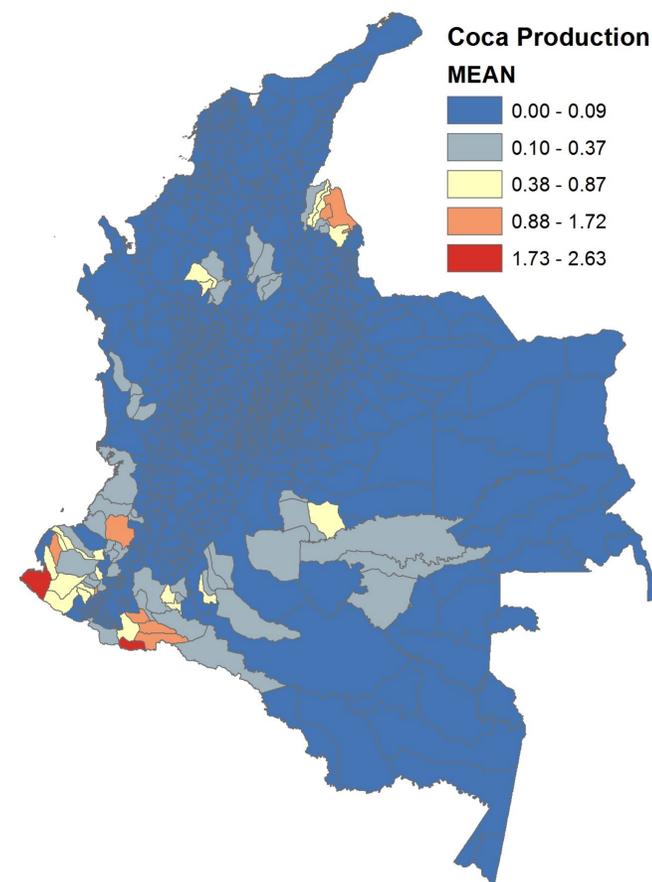
Help Center Inaccessibility



Risk of Production



Actual Production



Results and Limitations

Final analysis shows that there is a correlation between mean coca production per municipality and mean risk per municipality of 0.05602. While small, this shows that the chosen variables are in fact indicators for coca production. Further studies should look to see which indicator has the most influence. Since aerial spraying and forced eradication have not proven to be effective, it would be advisable that the Colombian government focus on more primary prevention methods like increasing government presence through infrastructure and social programs to decrease coca production.

This study was limited by not including all of the variables mentioned in the literature due to an inability to access data. Elevation was studied at very low resolution and thus does not necessarily account for all physical barriers. Finally, the correlation between the indicators and actual production of coca is very small, and while important to note, requires further analysis to determine its significance.

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GIS 101

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Projected Coordinate System: SIRGAS 2000 UTM Zone 17N

Data Sources: Coca Production UNODC; Elevation DIVA-GIS Colombia; Help Centers UNGRD; UBN and Roads Tufts Geodata

Images: BBC.com