Shifting distributions of malaria cases in Colombia that are closely tied to temperature show how climate change could affect human health.

Colombia was part of a territory under Spanish colonial rule until it gained its independence in 1819. Throughout the nineteenth century, this territory broke up into multiple smaller countries until the Republic of Colombia as we know it today emerged in 1903. Colombia is now the fourth largest country in South America by land area, and it has the third largest economy in the continent, though a large portion of its population lives in poverty. The country has highly varied geography, with densely populated mountainous regions in the northwest, tropical rainforests that are home to many different plant and animal species in the southeast, and low-lying coasts on both the Pacific and Atlantic Oceans. Its economy is based on exporting goods like coffee, sugar, and bananas as well as oil and coal production (it is the fourth largest coal exporter in the world). Despite political instability and violence associated with the drug trade, Colombia’s economy is quickly growing and it is becoming a more important player on the global stage. Studying how climate change affects Colombia can help us better understand how climate change affects human health.
Colombian coffee is known as some of the best in the world. Certain types of Colombian coffee beans need to be hand-picked and hand-sorted, which makes it possible for small family farms to compete in the international market. Coffee plants are very sensitive to climate conditions, and climate change may be increasing the prevalence of disease among the plants.

How is Colombia experiencing climate change?

Because of the diversity of landscapes present in the country, Colombia is experiencing a wide range of climate change’s effects. Between 1990 and 2000, increasing temperatures shrunk the glaciers (large masses of ice) in the Colombian Andes Mountains by over 80 percent, and the glaciers are continuing to melt even more quickly. From 2002 to 2007, Colombian glaciers shrunk, on average, by three square kilometers each year. At this rate, experts project these glaciers to completely disappear between 2010 and 2020. This affects the amount of water available for drinking and farming as well as for electricity generation (almost 80 percent of the electricity produced in Colombia is from hydropower). In addition, like in many other coastal countries, flooding from sea level rise could displace many people and cause huge losses in the croplands that are vital to Colombia’s economy.

Colombia may also experience some of the health effects of climate change. About 18 percent of Colombia’s population is at risk of malaria infection, a disease that affects over 300 million people around the world each year. Malaria can be deadly if not treated quickly, and in many parts of the world, malaria medicines are no longer effective to treat it. A certain type of mosquito spreads the parasite that causes the disease, and where these mosquitoes are able to live is highly dependent on climate conditions. While the environmental factors that determine where mosquitoes live are highly complex, both the malaria parasite and the mosquitoes that carry it generally thrive in warm temperatures.

For decades, the disease has been present only in the country’s lower elevation regions, and its overall prevalence has even decreased throughout the country. Nevertheless, as temperatures have risen over the past few decades, more cases of the disease have emerged at higher elevations. With warming temperatures, the mosquitoes that spread malaria may be able to live in the higher, traditionally cooler, areas of the country—bringing malaria to those regions where it had not been common before. This means that climate change may put the dense populations of Colombia’s mountainous regions at greater risk of malaria.

A rural road in Colombia. Colombia has a highly varied landscape with the Andes mountains, lowland coasts, and tropical rainforests.
Certain types of mosquitoes, called Anopheles mosquitoes, can carry the malaria parasite and spread the disease to humans.

"Our latest research suggests that with progressive global warming, malaria will creep up the mountains and spread to new high-altitude areas."
—Menno Bouma, London School of Hygiene & Tropical Medicine, 2014

How is Colombia responding to climate change?

Before the mid-2000s, Colombia focused primarily on climate change mitigation projects that were also seen as economic opportunities. For example, it participated in programs that allowed wealthier countries to assist with projects, like new fuel-efficient bus systems, to reduce greenhouse gas emissions in Colombia. These projects helped Colombia pursue sustainable development while also helping wealthier countries reach their emissions reductions goals to prevent continued global climate change.

Colombia’s response to climate change has recently shifted. In 2010 and 2011, the country experienced devastating rainfall, flooding, and cold from a cyclical climate condition called La Niña, which shifts ocean and air temperatures in the southern Pacific into a roughly ten month cold phase. The intense flooding affected four million Colombians and caused more than US$7 billion in damages related to loss of livestock, homes, and infrastructure. It is not clear how La Niña (and its warmer counterpart, El Niño) is linked to global warming, but the extreme weather made people in Colombia more concerned about the effects of a changing climate. After this environmental disaster, Colombia shifted its focus to adaptation. This is similar to various other countries in South America, like El Salvador and Uruguay, where recent climate-related disasters led government officials and the public to pay more attention to climate change.

"Colombia is not a country with high polluting emissions, but we want to assume our responsibility with the planet and its future."
—Colombian President Juan Manuel Santos, 2010

Colombia has now made climate change adaptation a national priority. Policies to combat the effects of climate change are integrated into many country-wide plans and projects. For example, Colombia created an Adaptation Fund to help farmers recover from the damaging effects of the 2010-2011 La Niña, and it is working on writing a National Adaptation Plan for the UNFCCC. In addition, as part of the Colombian National Pilot Study of Adaptation to Climate Change, the country has increased its malaria monitoring and prevention efforts. Colombia has recently developed new maps, mathematical models, and early warning systems to help plan for changes in patterns of malaria exposure. Collaboration between government ministries that focus on climate and those that focus on malaria is increasing. Because of these efforts, Colombia has become internationally recognized as a leader in South America on climate change issues.