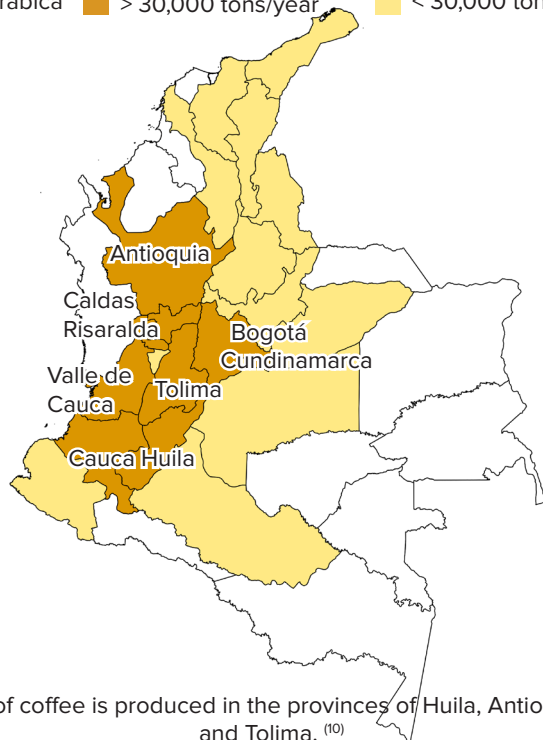


COFFEE PRODUCTION IN THE FACE OF CLIMATE CHANGE: COLOMBIA

KEY PRODUCTION AREAS IN COLOMBIA ⁽⁷⁾

Arabica ■ > 30,000 tons/year ■ < 30,000 tons/year



47% of coffee is produced in the provinces of Huila, Antioquia and Tolima. ⁽¹⁰⁾

OBSERVED AND PREDICTED EFFECTS OF CLIMATE CHANGE IN COFFEE PRODUCING AREAS ^(5,9,11,14)



Rising Temperatures

- Expected average temperature rise of 1.3-2.5°C
- Expected increase in hot days and nights*



Changing Seasonality

- Seasonal differences between wet and dry season are expected to increase.
- El Niño events are expected to happen more often



Changing Rainfall

- Minimal increase in average annual rainfall.
- Higher rainfall expected mainly at the end of the rainy season, with a possible decrease of at the start of the rainy season.



Extreme Weather Events

- By 2050, extreme rainfall days are likely to increase by around 30%.
- Droughts, high temperatures and precipitation will become more extreme related to El Niño events.

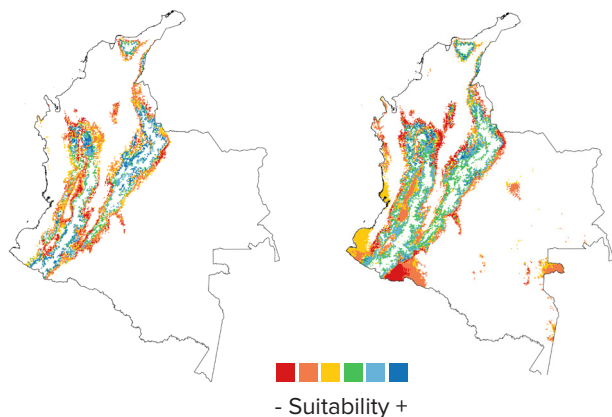
LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION

Predicted changes in coffee producing areas:

- Approximately 30% of currently suitable areas located at lower elevations are expected to become unsuitable for coffee. Farmers growing Arabica coffee in these areas will likely have to switch to other crops.⁽⁴⁾ Another source⁽⁵⁾ states that about 15% of the current coffee growing area is likely to get temperature increases of up to 3°C, making them unsuitable for Arabica coffee cultivation.
- In Colombia, coffee production can shift to higher altitudes, but such an expansion may be in conflict with other land uses, including natural forest.⁽¹⁶⁾
- All other areas require at least some investments into adaptation to remain suitable.
- Robusta could be an alternative crop for some of the lower lying areas.

Arabica

Robusta



Changes in suitability between today and 2050 ⁽¹⁶⁾

THE IMPORTANCE OF COFFEE IN THE COLOMBIAN AGRICULTURAL SECTOR ^(3,5,6,10,22)

Coffee production and export in 2017/2018

- Arabica: 882,000 tons
- Export: 816,000 tons, of which 93% was exported as green beans

Area under coffee production

Arabica
940,000 ha

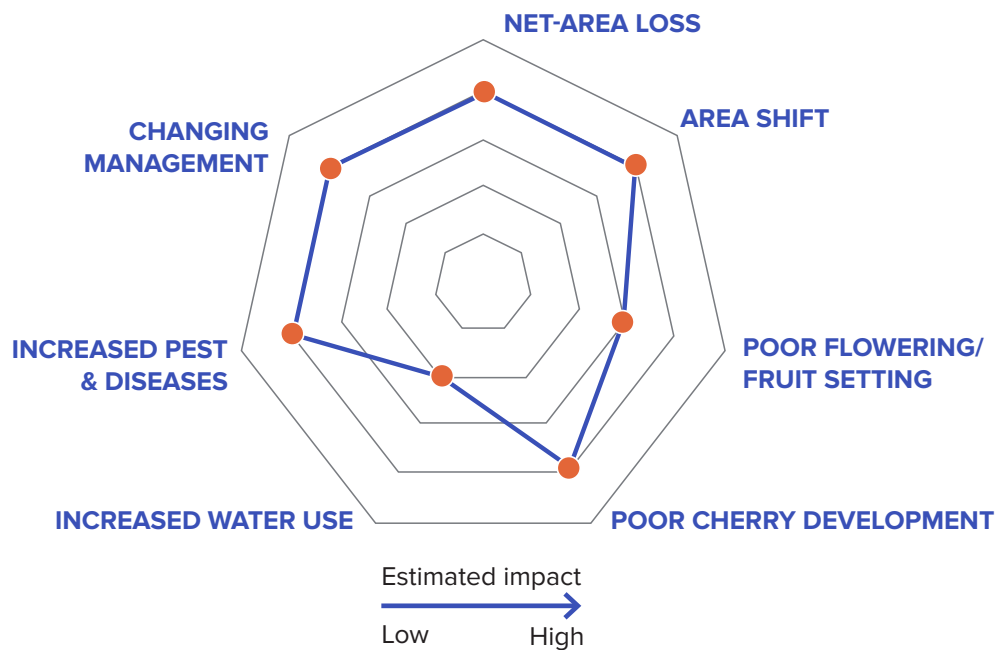
Farms

- 560,000 smallholders (~ 2 ha and < 5 ha) produce 69% of coffee
- 95% of farmers are smallholders

Importance in the national economy Coffee generates:

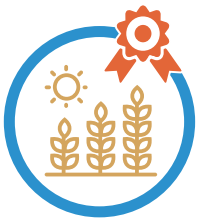
- 7% of export revenues
- 3,4% of gross domestic product

LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION



- Rising temperatures will lead to increasing pest and disease incidences above 1,500 m, especially the Coffee Berry Borer and Coffee Leaf Rust are expected to cause losses.^(5,15)
- Rising temperatures and water shortages may have a negative impact on coffee quality and quantity. Planting shade trees and, where feasible, investments in irrigation will be necessary.^(2,15)
- The wetter conditions during the more frequently occurring El Niño events are likely to affect flowering and berry development negatively.⁽¹¹⁾

PRODUCTION STANDARDS AND PRACTICES



CERTIFIED PRODUCTION

- More than 65% of production is certified by sustainability standards: 4C (vast majority), Fair Trade and UTZ.⁽²⁴⁾ About 50% of the certified coffee is double certified.
- Only 28% of coffee is exported as certified.⁽²⁴⁾



FARM PRACTICES

- Coffee is cultivated in mono-cropping or with shade trees. Main shade tree species are rubber and Spanish Elm.⁽¹³⁾
- Many farmers use too much fertilizer and pesticides.
- 80% of coffee plants are rust resistant varieties.
- Farmers wash and sun-dry the coffee at the farm level.⁽²¹⁾



FARM ECONOMY

- The average yield is 900 kg/ha.⁽⁶⁾
- Labor costs account for ca. 70-80% of the production costs. Costs have risen in the past decade, without a corresponding increase in productivity. Costs vary strongly among different production systems and regions.⁽⁸⁾
- Farmers receive an estimated share of 96% of the export price.⁽²³⁾

CLIMATE CHANGE ADAPTATION:

STRENGTHS

Technical aspects

About 80% of coffee trees are rust-resistant varieties. Approximately 420,000 ha were replanted between 2012 and 2018 to cope with the Coffee Leaf Rust crisis (Coffee Leaf Rust caused high losses between 2008 and 2011).⁽¹⁰⁾

The National Federation of Coffee Growers of Colombia (FNC) targets an annual replanting of the remaining areas in the range of 80,000 to 90,000 ha.⁽¹⁰⁾ At this rate, all remaining coffee farms with old trees could be rejuvenated within two to three years. Rust-resistant varieties, developed by the National Coffee Research Center Cenicafe, are available from the research center and private sector nurseries.

Economic aspects

Farmers receive a guaranteed minimum share of 85-90% of the export price since 2013.^(8,17)

The volume of coffee traded as specialty coffee is estimated to be between 10%⁽²¹⁾ and up to 40%⁽¹⁰⁾ of the export volume, translating into higher prices for farmers. Colombian coffee is an established trademark on the world market, contributing to the development of specialty coffees by roasters.

Organizational aspects

The National Federation of Coffee Growers of Colombia is the biggest coffee farmers association worldwide. It works as an exchange platform for farmers, provides marketing and extension services, and access to subsidized inputs. The federation manages low-interest loan programs for replanting with rust-resistant varieties available from the National Coffee Fund.^(11,18) Extension services are also provided by the private sector.

The National Coffee Fund sources funding exclusively from Colombian coffee growers (the main source of finance are levies on coffee exports), i.e. provides services to the sector with funding from the sector.

The National Federation of Coffee Growers of Colombia, the National Coffee Fund and the National Coffee Research Center are closely connected. As a result, public sector actors are perceived to respond well to challenges and new developments.

Political aspects

The Colombia coffee NAMA (draft) identifies four core areas for improvement: fertilizer use, upscaling of agroforestry systems, post-harvest efficiency, and waste management.⁽¹⁷⁾ The implementation of related mitigation actions would also have adaptation benefits.

The Colombia government is planning to produce only certified coffee by 2027.⁽¹²⁾

OPPORTUNITIES

Technical aspects

In the majority of the current coffee growing areas, Arabica coffee can remain a viable crop if adaptation techniques are applied.

Investments into larger, efficient wet-mills for central processing of smallholder coffee would reduce water pollution and costs at farm level.^(6,21)

The introduction of/shift to Robusta coffee could help to buffer possible losses of farmers growing Arabica coffee at lower altitudes. There is already increasing interest by farmers to plant Robusta coffee, which is perceived to be less disease-prone and sensitive to climate change than Arabica coffee.⁽²⁰⁾

Economic aspects

Improving fertilizer use will contribute to higher yields and potentially reduce costs. Optimized fertilization will help to keep coffee trees healthy and more resistant to stresses posed by climate change.

Adaptation measures such as agroforestry with fruit trees and banana can help to reduce costs for fertilizers⁽¹⁹⁾ and diversify and increase income from shade tree trees.⁽⁶⁾

WEAKNESSES

Technical aspects

The vulnerability of coffee farmers to climate change is emphasized through mono-cropping and high dependency on coffee as the single cash crop.^(6,17)

The farm level washing of coffee cherries leads to high water consumption and pollution of streams and rivers.

The use of fertilizers and other agrochemicals is often inefficient, with farmers using too much or too little (e.g. diverting subsidized inputs for coffee to other crops).

Economic and political aspects

The Coffee Leaf Rust crisis, in combination with volatile world market prices and high labor costs, weakened the economic situation of farmers, making coffee farming less attractive.

The average coffee farmer is between 40 and 56 years old, and young farmers often perceive coffee farming as unattractive. The lacking handover to younger generations has been identified as a structural challenge to the Colombian coffee sector.⁽¹⁹⁾

Private sector players are, in comparison to other countries, little involved in sector development, i.e. in policy formulation and implementation.

THREATS

Technical aspects

Many farmers perceive rejuvenation of coffee farms as a crisis measure (replacement of Coffee Leaf Rust prone coffee trees) rather than a normal part of coffee management which can be implemented gradually and with a long-term view towards sustainable production.⁽¹⁷⁾ Without changing farmers' mind-sets, climate change might cause equally large crises in the future.

Political aspects

The National Federation of Coffee Growers of Colombia and the National Coffee Fund combine public and private roles. The federation is a trade association, designs national coffee policies in the framework of the National Coffee Committee, and regulates and implements exports. The federation also provides a diverse range of trade support activities. The National Coffee Fund, a public account, is managed by the federation. Stakeholders are concerned, that this set-up cannot deliver optimal sector development and benefits to coffee growers.⁽¹⁷⁾

The finance available to the National Coffee Fund depends on coffee production, exchange rates, and world market prices. That is, large drops in production, such as during the Coffee Leaf Rust crisis, may reduce the ability to deliver services when they are most needed.⁽¹⁾



THE ROLE OF STRONG PUBLIC SECTOR ORGANIZATIONS IN CLIMATE CHANGE ADAPTATION

Most of the 560,000 Colombian smallholder coffee farmers are members of the national coffee growers federation, the “Federación Nacional de Cafeteros de Colombia” (FNC).⁽¹¹⁾ The federation was established in 1927 as a non-profit organization to promote Colombian coffee production and marketing. They offer extension services to coffee farmers, and trade coffee of farmers and cooperatives.

The National Coffee Fund is a para-fiscal institution. It is funded from levies on exported coffee. It is used to fund activities of the federation and provides loans to coffee farmers. The federation is the current manager of the fund.

The two organizations, with additional funding from the government, were crucial in responding to the Coffee Leaf Rust crisis. The crisis reduced annual production by 30 to 40% from 2008 to 2011. The outbreak was triggered by the wet climate of an “El Niño” event. Aged coffee trees and insufficient use of fertilizer (exaggerated by high prices at this time) made coffee trees susceptible to the disease.^(11,18) The “Coffee Prosperity Accord 2010-15”, established in 2009, resulted in an ambitious and successful renovation program.

Today, the average age of coffee trees is seven years, production recovered fully by 2013/14 and now exceeds pre-crisis production by 10%.^(14,22) While production was stable over the last three years, experts see further potential for increasing productivity and income sustainably, by implementing good agricultural practices and more efficient processing (e.g. collective/centralized washing).^(7,21)

The quick and comprehensive response to the Coffee Leaf Rust epidemic shows that climate change-related challenges can be addressed successfully. It remains to be seen if stakeholders in Colombia can be equally successful in implementing adaptive measures before the next crisis hits and if/how the private sector can play a greater role in designing and implementing adaptive measures.

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