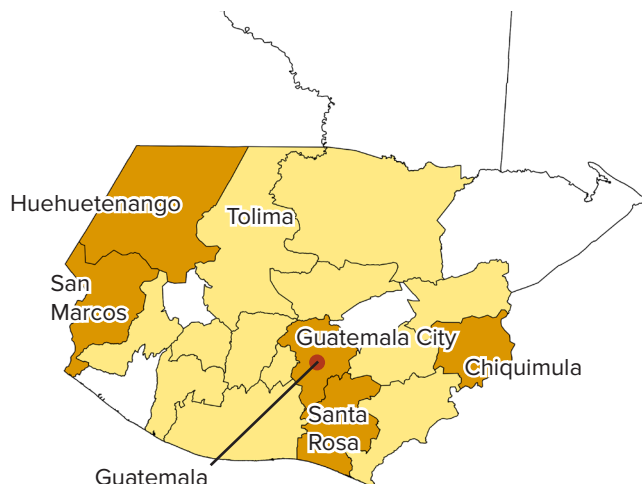


COFFEE PRODUCTION IN THE FACE OF CLIMATE CHANGE: GUATEMALA

KEY PRODUCTION AREAS IN GUATEMALA

Arabica ■ Key Departments ■ Departments with minor production



Huehuetenango and Chiquimula departments produce the largest quantity of coffee, followed by Santa Rosa, Guatemala and San Marcos. More than 80% of coffee is cultivated above 1,370m, qualifying it as "Strictly Hard Bean".^(5,12)

OBSERVED AND PREDICTED EFFECTS OF CLIMATE CHANGE IN COFFEE PRODUCING AREAS ^(4,7,8,9,10,11,13)



Rising Temperatures

- Guatemala is projected to experience an increase in temperature of 2-2.5°C by 2050.



Changing Seasonality

- Climate variability is expected to increase.
- The number of dry months is expected to decrease from 5 to 4.



Changing Rainfall

- Expected decrease in average rainfall of 13% by 2050. Less rain in particular towards the end of the rainy season.



Extreme Weather Events

- 70% of the country is at risk of extreme weather events (drought, hurricanes) linked to more frequent and intense El Niño cycles.

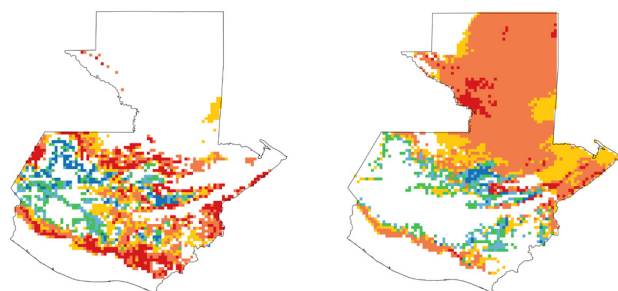
LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION

Predicted changes in coffee producing areas:

- Optimum conditions for Arabica coffee, currently between 700 and 1,700m, will shift upwards to 1,200 to 2,400 m by 2050. Arabica cultivation below 1,000m will likely cease to be feasible.⁽¹³⁾
- Around 13% of the land where Arabica can be cultivated currently will likely lose suitability entirely.⁽⁷⁾ Coping strategies include the replacement of Arabica coffee with other cash crops such as banana and cocoa.⁽¹³⁾ Robusta is already seen as an alternative crop in Guatemala and promoted by the national coffee association.⁽⁴⁾
- About 25% of the currently suitable land will become less suitable, requiring adaptation measures.⁽⁷⁾ The remaining land will remain suitable but would profit from basic adaptation measures, to mitigate losses during extreme weather events.
- Areas in the high plateau of central and western Guatemala are expected to become more suitable for Arabica coffee. However, these areas coincide with protected areas and forests. Persistent cold fronts during El Niño could limit the upward movement of coffee.^(7,13)

Arabica

Robusta



■ ■ ■ ■ ■
- Suitability +

Changes in suitability between today and 2050 ⁽¹⁴⁾

THE IMPORTANCE OF COFFEE IN THE GUATEMALAN AGRICULTURAL SECTOR^(1,2,3,4,5,6,12)

Coffee production and export in 2017/2018

- Arabica: 220,000 tons
- Robusta: < 10,000 tons
- About 90% of coffee is exported.

Area under coffee production

Arabica
305,000 ha

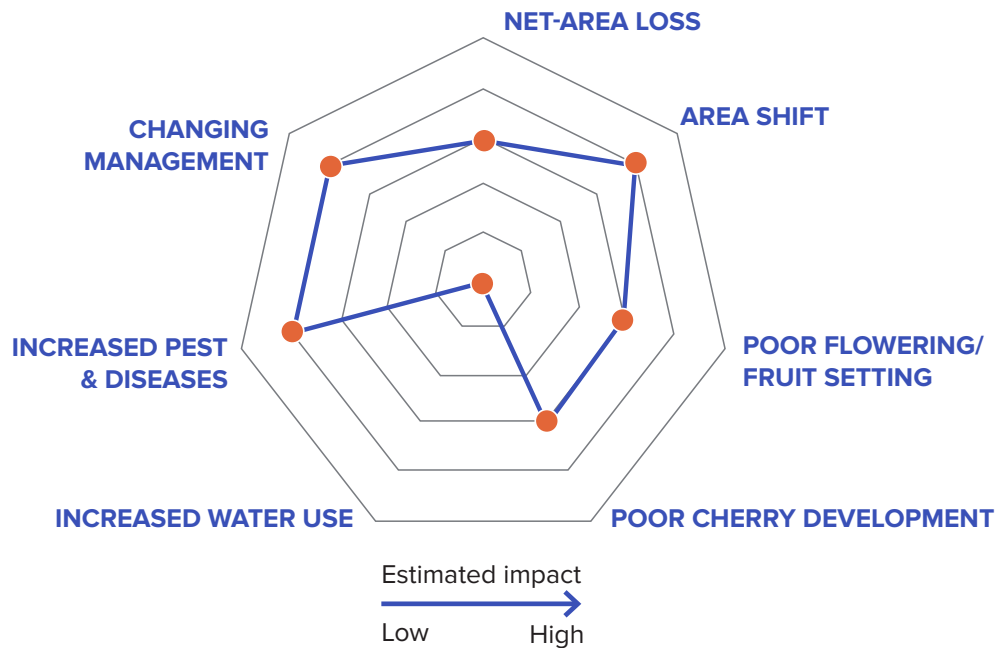
Farms

- 120,000 smallholder farmers account for 90% of coffee area but only 47% of total output. Their average plot size is 1.2 ha.

Importance in the national economy Coffee generates:

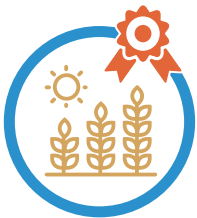
- 6.2% of export revenues (40% agri. export revenue)
- 2% of gross domestic product

LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION



- Diseases (e.g. Coffee Leaf Rust) and drought would reduce production.⁽⁷⁾
- Higher humidity (La Niña) can lead to abortion of cherries and accentuate outbreaks of diseases, including less common ones such as Coffee Thread Blight and American Leaf Spot.⁽⁷⁾
- Hurricanes and persistent storms in La Nina years will continue to cause damage to coffee farms and processing equipment.⁽⁷⁾
- Longer dry seasons can lead to defoliation of coffee and shade trees, in extreme cases causing dieback of plants.^(7,8) Farmers can adapt to some degree by managing shade and soils well to reduce moisture loss.

PRODUCTION STANDARDS AND PRACTICES



CERTIFIED PRODUCTION

- 13% of coffee produced in Guatemala was certified in 2012.⁽⁶⁾
- Certification is highest in Huehuetenango province with 30% of the total area certified.⁽⁶⁾
- The majority of certificate holders are independent farms (> 60%).⁽⁶⁾



FARM PRACTICES

- 98% of coffee in Guatemala is shade-grown.⁽⁵⁾
 - About 20% of coffee are rust-resistant varieties.⁽⁵⁾
 - 98% of Guatemalan coffee is washed at centralized wet mills or independent washing stations.⁽⁵⁾ Some farmers own small pulping machines at the farm level, others use cooperative-owned facilities.⁽¹²⁾
- In most regions washed coffee is sun-dried. In more humid regions (e.g. Cobán in the north), coffee is partly dried with electric dryers owned by cooperatives.^(5,10)



FARM ECONOMY

- Average productivity is 0.65 ton/ha.⁽¹⁾
 - Inputs are the biggest cost item for smallholders (> 50%), followed by labor. To remain financially viable, small farmers limit input use and discount own labor from production costs.⁽¹⁾
- Coffee qualifying as “Strictly Hard Bean” can fetch higher prices.^(5,12)
- Farmers receive between 70% and 85% of export price, depending on region.⁽¹²⁾

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