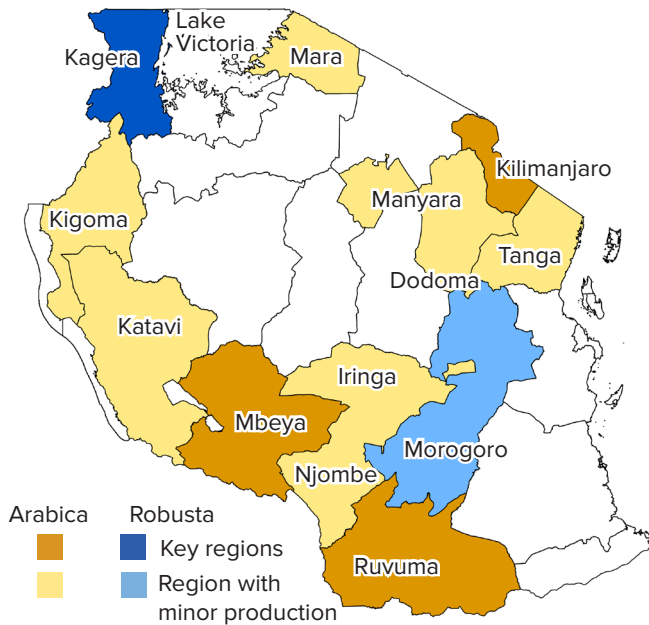


COFFEE PRODUCTION IN THE FACE OF CLIMATE CHANGE: TANZANIA

KEY PRODUCTION AREAS IN TANZANIA



The most important regions for Arabica coffee are the Southern Highlands and areas around Mt. Kilimanjaro. Robusta is predominantly grown in Kagera Region.

OBSERVED AND PREDICTED EFFECTS OF CLIMATE CHANGE IN COFFEE PRODUCING AREAS ^(8,10,12,16)



Rising Temperatures

- Mean annual temperature increase of 2.3°C by 2050.
- The daily temperature range is expected to decrease.
- Cold days and nights are expected to decrease to almost zero.*



Changing Seasonality

- Seasonality will be more pronounced, with wetter rainy and drier dry seasons (especially in the Southern Highlands).
- The cumulative number of dry months may decrease.



Changing Rainfall

- Annual precipitation is expected to increase by 48 mm by 2050. Increases are expected to be greatest in the Lake Victoria Basin (Kagera) and the north (Kilimanjaro, Arusha, Manyara).



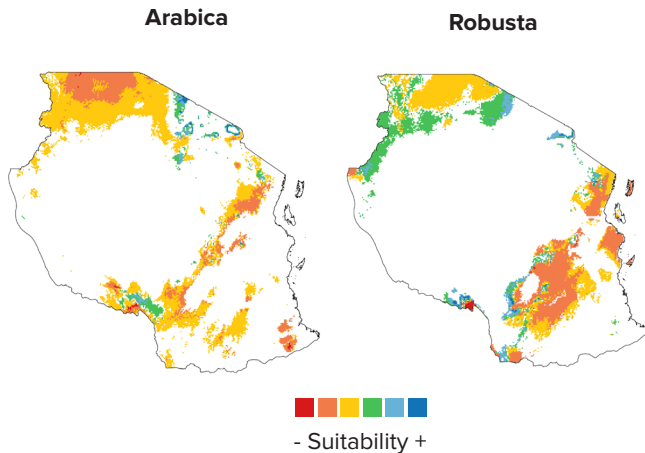
Extreme Weather Events

- Heavy rainfall and flooding, and severe and recurring droughts are expected to increase due to increased frequency and intensity of El Niño cycles.

LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION

Predicted changes in coffee producing areas:

- Currently the optimum for Arabica coffee is between 900 and 1,800 m. By 2050, the optimum is expected to be between 1,400 and 2,500 m. Nonetheless, the majority of the key Arabica areas (Kilimanjaro and Southern Highlands) are expected to remain moderately suitable. By 2050 land suitable for Arabica will likely be concentrated in these regions.⁽¹²⁾
- Suitability for Arabica below 1,200 m will likely be lost, constituting a decrease of about 20%.⁽¹³⁾ Suitability gains at higher altitudes fall to a large extent in forested and protected areas, i.e. are to a large extent not available for coffee cultivation.⁽¹²⁾
- The most important Robusta coffee areas in Kagera are expected to remain suitable.
- Adaptation options for areas with decreasing suitability are the introduction of varieties with higher temperature tolerance, good agricultural practices to retain soil moisture and use of shade trees/banana. Irrigation may be an option in some cases but requires public investments into infrastructure, is likely not affordable for most farmers and may be restricted by overall water shortages.⁽¹⁶⁾



Changes in suitability between today and 2050 ⁽¹⁷⁾

THE IMPORTANCE OF COFFEE IN THE TANZANIAN AGRICULTURAL SECTOR ^(1,2,3,4,5,11)

Coffee production and export in 2017/2018

- Arabica: 29,000 tons
- Robusta: 12,000 tons
- About 95% is exported

Area under coffee production

Arabica
210,000 ha
 Robusta
55,000 ha

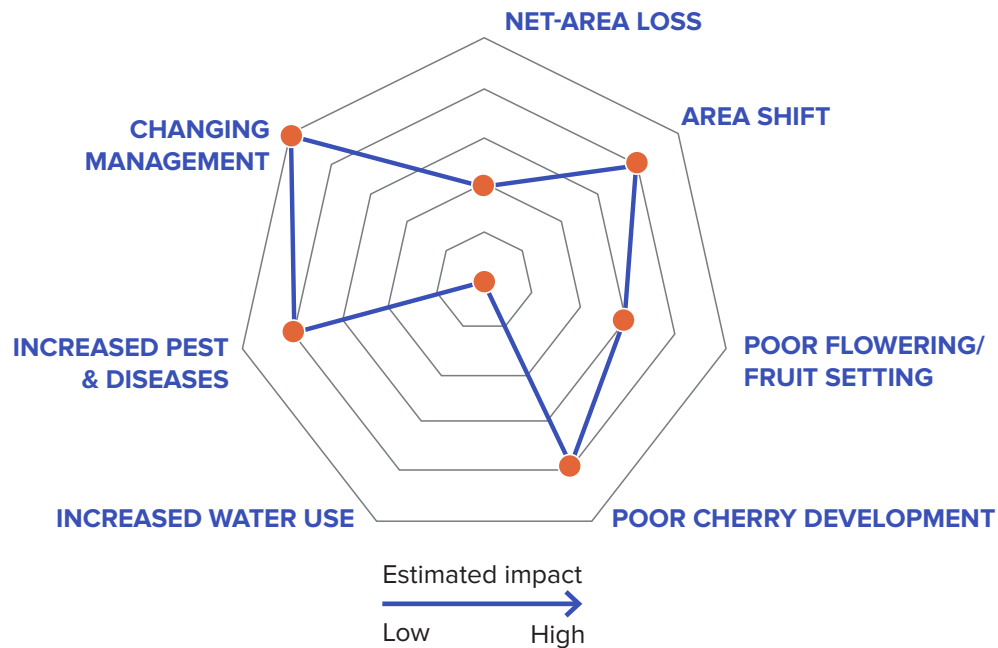
Farms

- 450,000 smallholders (~ 0.8 ha) produce about 90% of coffee

Importance in the national economy

- Coffee generates:
- 5 % of export revenues
 - 0.2 % of gross domestic product

LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION



- Dispersed rainfall at the beginning of the rainy seasons/during flowering will lead to heterogeneous cherry development. Yield, harvesting, and processing will be affected.⁽⁹⁾
- The incidences of diseases (Coffee Leaf Rust, Coffee Wilt Disease) are expected to increase with rising temperatures and lower diurnal temperature range. Resistant varieties are available, but not yet widely adopted.⁽¹⁴⁾
- The coffee berry borer is found at higher altitudes today than previously. The upward trend of the pest is expected to continue.⁽¹⁵⁾

PRODUCTION STANDARDS AND PRACTICES



CERTIFIED PRODUCTION

- About 7% of coffee is exported as certified.⁽³⁾
- High costs of being standard compliant and low price premiums discourage farmer participation.⁽⁷⁾



FARM PRACTICES

- Coffee is grown in full sun in the Southern Highlands and intercropped with bananas (main crop) in the north-west.^(4,8)
- The use of agrochemicals is limited across the country. In the Southern Highlands, adoption is slightly better.^(5,8)
- About 70% of farmers grow old varieties with low pest and disease resistance.⁽⁵⁾
 - About 45% of Arabica coffee is processed at central washing stations. The majority of the remainder is semi-washed. Robusta is sun-dried.^(5,6)



FARM ECONOMY

- Productivity is low with estimates ranging between 0.2 tons/ha (Arabica & Robusta) to 0.5 tons/ha (Robusta).⁽¹¹⁾
- Farmers receive 68% of the export price.⁽¹¹⁾
- Production costs at farm level are relatively low. Due to the low yields, coffee farming is not very attractive.⁽³⁾

REFERENCES

1. USDA, 2018: Tanzania Coffee Annual. USDA Foreign Agricultural Service. Retrieved from https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Coffee%20Annual_Nairobi_Tanzania%20-%20United%20Republic%20of_5-24-2018.pdf. Accessed on 15.10.2018.
2. ICO, 2018: Trade Statistics Tables. International Coffee Organization. http://www.ico.org/trade_statistics.asp. Accessed 20.07.2018.
3. GCP, 2016: African Coffee Sector, Addressing National Investment Agendas on a Continental Scale: Tanzania Case Study. Global Coffee Platform. Retrieved from: https://www.globalcoffeeplatform.org/assets/files/Documents/African-Coffee-Investment-Agendas/African-Coffee-Investment-Agendas_Tanzania_Full_Report.pdf. Accessed on: 14.11.2018.
4. TFC, 2012: Tanzania Coffee Industry Development Strategy 2011/2021. Tanzania Federation of Cooperatives. Retrieved from: http://www.coffeeboard.or.tz/News_publications/startegy_english.pdf. Accessed on: 06.11.2018.
5. Mhando DG, Mdoe NSY, 2017: Mid-term Evaluation Report of the Tanzania Coffee Industry Development Strategy 2011-2021. National Stakeholders Coffee Conference. Morogoro, Tanzania.
6. USDA, 2017: Tanzania Coffee Annual. USDA Foreign Agricultural Service. Retrieved from: https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Coffee%20Annual_Nairobi_Tanzania_6-9-2017.pdf. Accessed on 26.11.2018.
7. Lazaro E, Makindara J, Kilimi F, 2008: Sustainability Standards and Coffee Exports from Tanzania. Danish Institute for International Studies. Retrieved from: <http://www.value-chains.org/dyn/bds/docs/668/SAFETanzaniaCoffee.pdf>. Accessed on 16.11.2018.
8. Haggard J, Schepp K, 2012: Coffee and Climate Change: Impacts and options for adaptation in Brazil, Guatemala, Tanzania and Vietnam. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Initiative for Coffee&Climate. Retrieved from: <https://www.nri.org/publications/working-paper-series/4-coffee-and-climate-change/file>. Accessed on 14.11.2018.
9. Craparo A, Van Asten P, Laederach P, Jassogne L, Grab S, 2015: Coffea arabica yields decline in Tanzania due to climate change: global implications. Agriculture and Forest Meteorology 207.
10. Division of Environment 2015: Second National Communication to the United Nations Framework Convention on Climate Change. Dar es Salaam, United Republic of Tanzania.
11. GCP, 2018: Tanzania – A Quick Scan on Improving the Economic Viability of Coffee Farming. Presentation prepared by Technoserve for the Global Coffee Platform.
12. CIAT, 2012: Future Climate Scenarios for Tanzania's Arabica Coffee Growing Areas Final Report. International Center for Tropical Agriculture. Cali, Colombia.
13. Ovalle-Rivera O, Läderach P, Bunn C, Obersteiner M, Schroth G, 2015: Projected Shifts in Coffea Arabica Suitability Among Major Global Producing Regions Due to Climate Change. PLoS ONE 10(4).
14. EU – Capacity for development: <https://europa.eu/capacity4dev/article/tanzania-new-resistant-coffee-varieties-developed-eu-support>. Accessed on 30.11.2018
15. Jaramillo J, Muchugu E, Vega F, Davis A, Borgemeister C, Chabi-Olaye A, 2011: Some Like It Hot: The Influence and Implications of Climate Change on Coffee Berry Borer (*Hypothenemus hampei*) and Coffee Production in East Africa. PLoS ONE 6 (9)
16. Baker PS, 2013: Coffee & Climate: The Geometry of Change, A Rapid Diagnostic of Coffee Farmers' Production Challenges in the Mbeya region of Tanzania. Study for the Initiative for Coffee&Climate.
17. Bunn C, Läderach P, Ovalle-Rivera O, Kirschke D, 2015: A bitter cup: climate change profile of global production of Arabica and Robusta coffee. Climatic Change (2015) 129:89–101

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