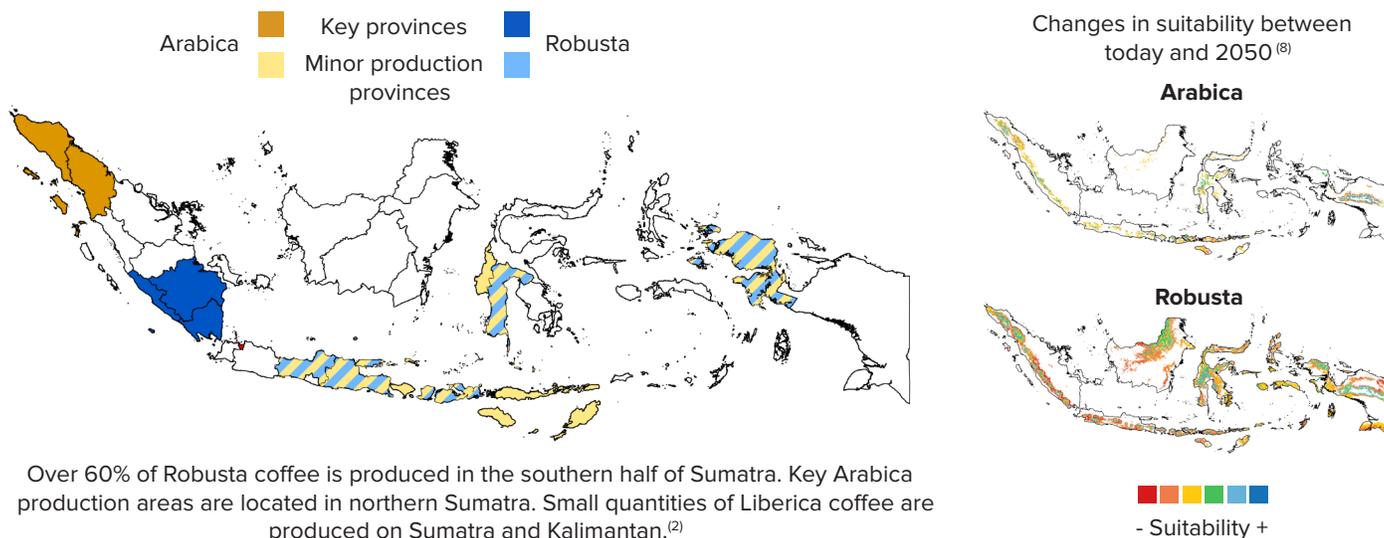


COFFEE PRODUCTION IN THE FACE OF CLIMATE CHANGE: INDONESIA

KEY PRODUCTION AREAS IN INDONESIA



OBSERVED AND PREDICTED EFFECTS OF CLIMATE CHANGE IN COFFEE PRODUCING AREAS^(8,9,10,11,12,16)



Rising Temperatures

- Average temperature increase of 1.7°C
- Increased number of hot days and nights
- Decrease of cold nights, likely to zero by 2060



Changing Seasonality

- More frequent delays in the onset of monsoon rains
- Intermittent rain in the dry season



Changing Rainfall

- Increasing rainfall on northern Sumatra, Sulawesi, Bali and Flores
- Slightly decreasing rainfall on southern Sumatra and Java



Extreme Weather Events

- Higher proportion of rain falling in heavy events

LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION

Predicted changes in coffee producing areas:

- Currently suitable land in Arabica production areas is expected to be reduced by > 80%. This can be offset partially by higher altitudes becoming suitable for Arabica. Overall, land suitable for Arabica production is expected to be two-thirds of today's area suitable for Arabica.⁽¹²⁾
- Some of the areas cultivated with Arabica today will remain suitable for Arabica but require adaptive measures to mitigate the effects of climatic changes.⁽¹²⁾
 - Farmers may be able to change from Arabica to Robusta in some areas.
- Changes for Robusta growing areas are expected to be of equal magnitude but have not been as well researched yet.

THE IMPORTANCE OF COFFEE IN THE INDONESIAN AGRICULTURAL SECTOR^(1,2,3,4)

Coffee production and export in 2017/2018

- Arabica: 90,000 tons
- Robusta: 520,000 tons
- Ca. 40% are consumed in Indonesia
- Less than 10% of exports are processed

Area under coffee production

Arabica
310,000 ha
Robusta
930,000 ha
Liberica
< 10,000 ha

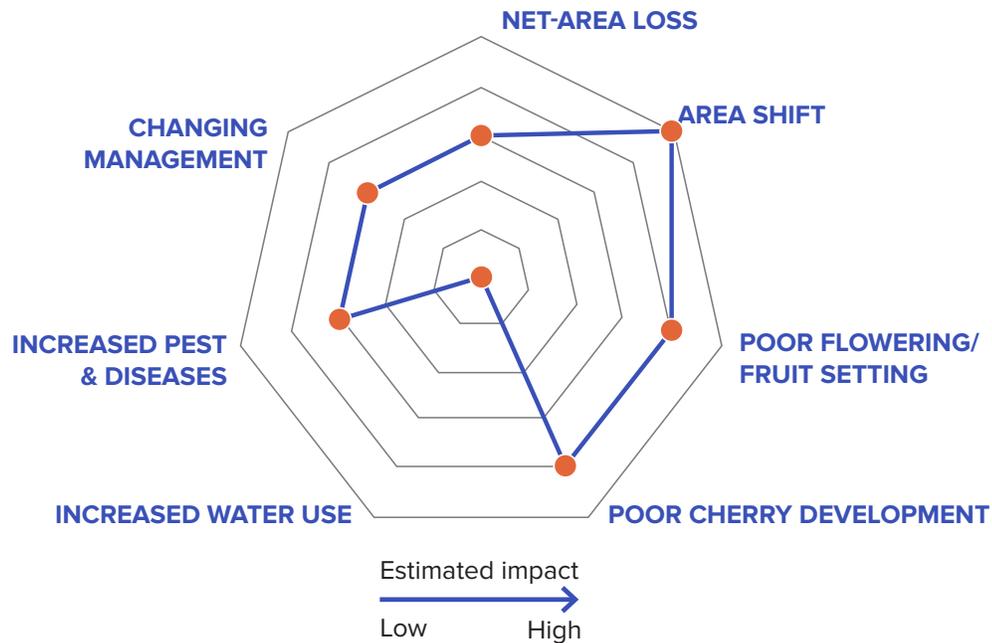
Farms

- 1.5 million smallholders (~ 1ha) manage > 95% of coffee plantations
- Only an estimated 0.5 million farmers are considered "active"

Importance in the national economy

- Coffee:
- Is the 4th largest foreign exchange earner
 - Generates 0.2% of gross domestic product

LIKELY IMPACTS OF CLIMATE CHANGE ON COFFEE PRODUCTION



- The predicted temperature rise allows additional life cycles of the coffee berry borer, increasing losses. The altitudinal range of the borer is expanding upwards (from previously 1,000m to 1,200m currently), affecting additional coffee plantations (Arabica).⁽¹³⁾
 - Yields are expected to decline, due to:
 - Decreasing rainfall on southern Sumatra and Java
 - Heavy rain and wind damaging flowers⁽⁶⁾
- Intermittent rainfall throughout the year, leading to continuous flowering and fruit setting, and interruptions in sun drying, requiring:
 - Adjustments to farm management
- Investments (e.g. storage capacity to aggregate the lower quantities of beans before selling, drying kilns)

PRODUCTION STANDARDS AND PRACTICES



CERTIFIED PRODUCTION

- About 7% of exported coffee is certified with sustainability standards: UTZ, 4C, Rainforest Alliance and Fair Trade.⁽⁴⁾



FARM PRACTICES

- Ageing coffee stock is common. Rejuvenation and access to improved planting material is limited.⁽⁷⁾
- Adoption of good practices such as pruning and integrated pest management is low.^(3,6)
- Commonly, coffee is grown under (dense) shade.⁽⁶⁾



FARM ECONOMY

- Low yields: < 800kg/ha on average ^(3,5)
- Low cost/input system with high reliance on family labor.⁽³⁾
- Coffee contributes to livelihoods, but is often not the main source of income.⁽⁵⁾
- Arabica growers have access to higher value specialty coffee markets.⁽⁶⁾
 - Farmers receive about 80% of export price⁽⁴⁾

CLIMATE CHANGE ADAPTATION:

STRENGTHS

Technical aspects

Coffee is often grown under shade and in combination with other tree and annual crops, i.e. in agroforestry systems. This ensures a basic resilience of farm systems and households against climate change.

Comprehensive manuals for good agricultural practices for Robusta and Arabica have been developed by experts. Feedback from users can be incorporated over time, making the manuals suitable for all user groups.

The Indonesia Coffee and Cocoa Research Institute (ICCRI) has developed planting material for Arabica and Robusta with a stronger rooting system (suitable for drought-prone areas and resistant against Nematodes), different Robusta varieties adapted to drought and rainfall throughout the year, as well as varieties with higher disease resistance.⁽¹⁴⁾

Economic aspects

Indonesian farmers in northern Sumatra produce different specialty coffees (Arabica). These coffees generate substantially higher revenues and are an incentive to invest in better farm management.

The government in cooperation with local banks offers “farmer business credits”. Some of the existing financial institutions customize their products to cater to coffee farmers’ needs.

Organizational aspects

Certification with international sustainability standards is well established in the core Arabica production areas in northern Sumatra.

The coffee sector in Indonesia is fully liberalized, permitting direct trade linkages between farmers and exporters/processors. Such linkages are an important condition for private sector driven extension services.

The Social Forestry Program will improve land tenure, providing an incentive to invest in the rehabilitation of deforested land (e.g. establishing coffee agroforestry systems) while protecting natural forests.⁽¹⁷⁾

OPPORTUNITIES

Technical aspects

Yields can be raised significantly by rejuvenating coffee trees and the adoption of good agricultural practices, with the potential to more than double profits.⁽³⁾ The required technical and financial support can be provided in public-private partnership building on (and improving) the existing government initiatives and the interest of the private sector to secure future supply.

Organizational aspects

Coffee farmers can market their coffee more profitably jointly, i.e. through farmer organizations. Such farmer organizations constitute viable entry points for private and public sector extension services promoting sustainable management practices.

The Social Forestry Program provides an entry point to coffee industry players to secure future supply. The industry can support the establishment (or rejuvenation) of coffee on suitable community land, provide technical assistance and supply value chain financing.⁽⁶⁾

Political aspects

Indonesia could maintain its production in a sustainable manner by designing and implementing policies that:

- Help farmers to increase productivity in areas which will remain suitable
- Support farmers in the transition from Arabica to Robusta where applicable
- Guide farmers to select areas for coffee cultivation which (i) are currently not used for coffee and (ii) will remain or become suitable and (iii) do not compromise the integrity of natural ecosystems regardless of their protection status.

WEAKNESSES

Technical aspects

The successful participation of communities in the Social Forestry Program requires substantial support from the public for planning, throughout the application process, and implementation. Government is not able to provide sufficient support to roll out the program as planned.

Economic aspects

Productivity and income of coffee farms are low. Causes are the aged coffee trees, poor farming practices, and very low input use. As a result, coffee is not perceived as a lucrative land use.

Coffee is a side business for many farmers, especially those growing the lower value Robusta coffee. The limited disposable income is more likely to be used for investments into other crops or business activities, affecting the adoption rate of good agricultural practices and implementation of adaptive measures.

“Farmer business credits” catering specifically to coffee farmers are available in southern Sumatra and East Java only. The credit scheme is poorly communicated, seeing little uptake by farmers. Affordable, longer-term credits would be crucial for investments into the rejuvenation of aged stock and more expensive inputs such as fertilizer.

Organizational aspects

With few exceptions, coffee farmers are not organized. The dispersed coffee farms, low production levels and poor infrastructure make investments in sustainable production unattractive for downstream private sector actors.⁽⁴⁾

Responsibilities in the coffee sector are divided between several national institutions. A national body specific to the coffee sector does not exist, making coordination of sector stakeholders inefficient.

Political aspects

The development of the coffee sector is not a strategic priority of the Indonesian government. As a result service provision to coffee farmers is low in comparison to other crops (extension, research, inputs, access to finance).

THREATS

Technical aspects

Coffee production in Indonesia is highly variable depending on weather conditions, in particular, heavier than usual rainfall. Climate change may emphasize the year to year variability of productivity further, reducing the economic viability of coffee.

Economic aspects

Replacing old coffee stock with new, more suitable planting material is often not affordable for farmers due to the multi-year gap in production. Likely, only farmers directly supported by projects will make the transition to coffee adapted to the effects of climate change.

Political aspects

The expected upwards shift of land suitable for coffee production may lead to the conversion of forest to compensate for areas lost.⁽¹⁵⁾ While Indonesia has committed to REDD+, the country has not yet a good track record in protecting its forests.⁽¹⁸⁾



CAN INDONESIA'S SOCIAL FORESTRY PROGRAM CONTRIBUTE TO A SUSTAINABLE COFFEE SECTOR?

Many of the current and future potential coffee growing areas are located on designated forest land. Hence, the potential displacement of coffee cultivation to higher altitudes may become a driver of deforestation in the future.⁽¹⁵⁾ Government policies play an important role in guiding the relocation of coffee farming to suitable areas. The Social Forestry Program has the potential to support this process.

Social forestry, commonly known as community forestry, was established in Indonesia in 1999. However, only with the start of the Social Forestry Program in 2016 has community forestry become truly important in Indonesia. In the framework of the program, the Indonesian Government intends to allocate 12.7 million hectares of land to communities. Important aims of the program are to reduce deforestation and reverse land degradation, contributing to REDD+.

Land can be allocated to whole communities, community groups or cooperatives, or individual families. Agroforestry management systems can be implemented on land classified as production forest (which is often heavily degraded forest or deforested). Such agroforestry systems must include a minimum of 400 timber or native fruit trees per hectare.

Communities decide together with the authorities how to manage the allocated land, i.e. where to restore and protect forest, and where to set the focus on production. The private sector can partner with communities and groups, supporting them to implement sustainable production systems.

Coffee is already part of community-based forestry programs in Indonesia. Experiences from social forestry schemes initiated before 2016 show that communities and households were able

to improve their incomes and food security, and increased their investment in land rehabilitation. An example of the positive impacts of Social Forestry is documented for Lampung in southern Sumatra.

However, the implementation of the Social Forestry Program faces several challenges:

- Adequate verification of the permit areas and management plans by local government
- Provision of technical and financial support to restore degraded land and for business development
- Need to strengthen local institutions and capacity of communities to manage land sustainably and to distribute benefits equitably.

The community forests established successfully to date were supported by civil society organizations. Similar support will be needed in the future, but can and should include private sector driven initiatives.

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