



Plant coffee in a food forest

Coffee bushes require shade, and all the more so in the face of global warming. This is why trees should be planted on coffee plantations, says Lucas de Carvalho Gomes. His conclusion confirms previous Wageningen research findings.

Over half the coffee acreage in the Atlantic coastal zone of Brazil will no longer be suitable for coffee cultivation in 2050, De Carvalho Gomes concludes on the basis of model research. He assumes that the temperature in the region will rise by two degrees as a result of climate change. The Arabica coffee variety is particularly sensitive to such temperatures. Agroforestry, planting trees on coffee plantations, provides the coffee bushes with shade. Three quarters of the coffee farming in the Atlantic coastal area could then continue, concludes the Brazilian PhD candidate, who obtained his PhD in Wageningen last week.

This conclusion is not new. An international team of scientists, which includes Wageningen's Milena Holmgren Urba, presented a study on agroforestry in coffee cultivation in 2019. They recommended farmers plant fruit-bearing trees such as cocoa trees on coffee plantations, as these trees resist drought and higher temperatures.

While most coffee plantations in Brazil are monocultures, the international study which Holmgren Urba took part in focuses on Central America, where coffee is traditionally grown in agroforestry systems. However, even in these systems, the Arabica plant suffers from climate change, explains Holmgren, mainly because unstable weather leads to an increase in diseases. Coffee leaf rust disease, for example, is now affecting about 70 per cent of the coffee bushes in Central America.

REPLACEMENT

The international study, in which the World Agroforestry Centre is involved, recommends an adjustment of the current agroforestry systems. One of their recommendations is to replace a proportion of the coffee bushes with cocoa trees. Other crops affected by climate change include mango, guava



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The soil temperature in food forests was six degrees lower than in monocultures

and avocado trees, all of which grow in these food forests. Replacing some of these trees with climate-proof fruit trees would help food forests to adapt to the climate. But this is not the first WUR study on the value of agroforestry in Latin-American coffee production. In 2012, Wageningen soil scientists Ron de Goede, Mirjam Pulleman and Lijbert Brussaard collaborated with Brazilian colleagues in research on the effect of agroforestry on coffee cultivation in the Atlantic rainforest in Brazil. They compared eight food forests with coffee bushes, mainly on small, family-owned farms, with four

monocultures where the coffee bushes were exposed to full sun. In this study, 230 different tree species were found in the food forests, almost all of them indigenous. The soil temperature in the food forests was an average of six degrees lower than in the monocultures. These researchers concluded that agroforestry serves both coffee production and biodiversity during climate change.

TREE LINE

De Carvalho Gomes has now further honed this conclusion. He states that it is already too warm to grow coffee in the coastal area below an altitude of 600 metres, and that in 2050, coffee cultivation in monocultures will only be possible above 800 metres. A shift to higher ground would cause conflicts between coffee farmers and nature conservationists, as many nature reserves in the Brazilian coastal area are located above 800 metres. **AS**