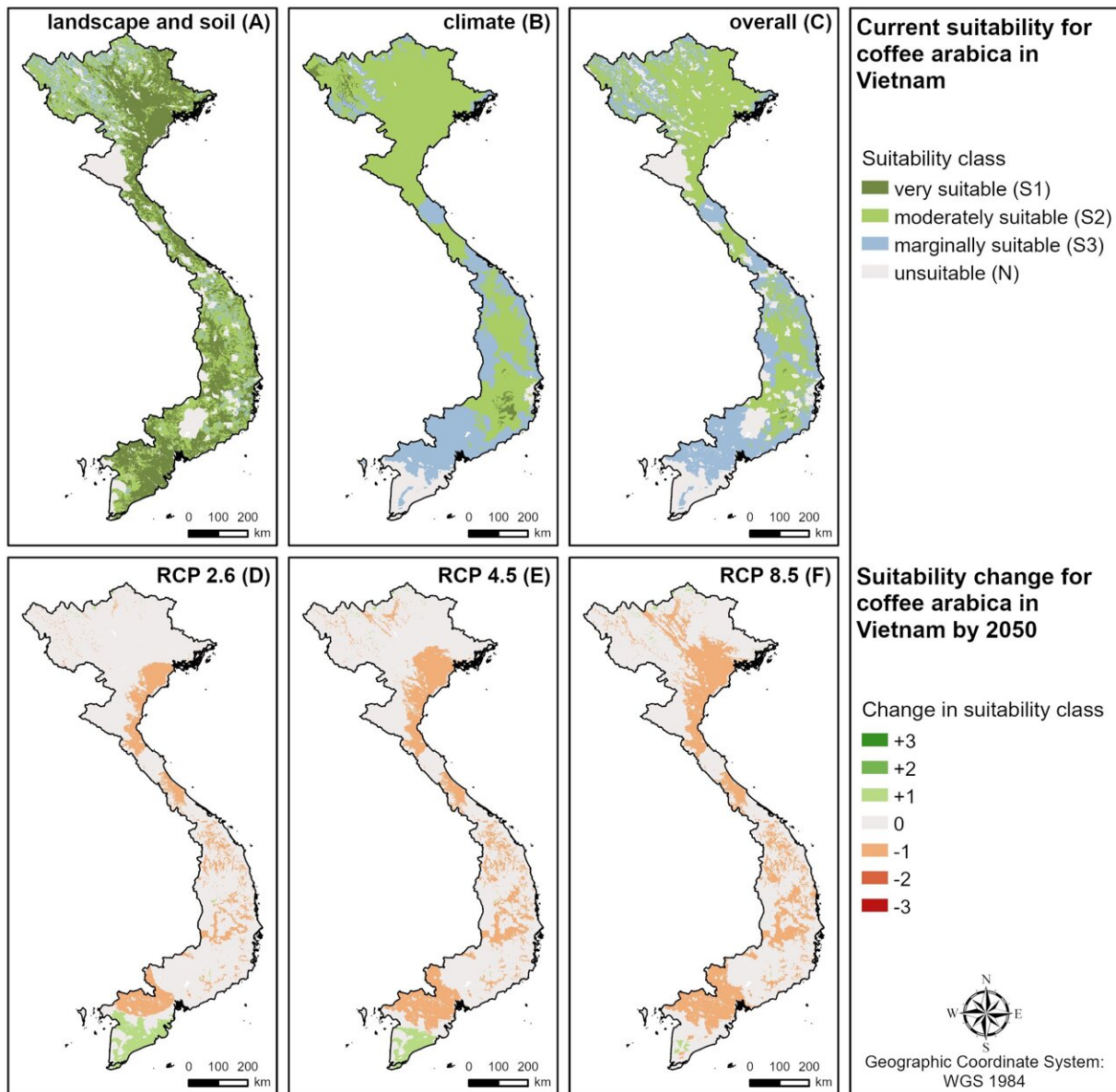


Suitable growing regions for coffee, cashews, and avocados predicted to shift as Earth warms

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A = current landscape and soil suitability, B = current climate suitability, C = current overall suitability, D = suitability change under representative concentration pathway (RCP) 2.6 (low emissions), E = suitability change under RCP 4.5 (intermediate emissions), F = suitability change under RCP 8.5 (high emissions). Credit: Grüter et al., 2022, *PLOS ONE*, CC-BY 4.0 (creativecommons.org/licenses/by/4.0/)

A new analysis predicts that, as climate change progresses, the most suitable regions for growing coffee arabica, cashews, and avocados will decline in some of the main countries that produce these crops. Roman Grüter and colleagues at Zurich University of Applied Sciences, Switzerland, present these findings in the open-access journal *PLOS ONE* on January 26, 2022.

Coffee, cashews, and avocados are important crops for consumers and for tropical small-scale farmers around the world. Extensive research suggests that climate change will reduce suitability for growing coffee arabica—the dominant coffee species—in most regions where it is currently grown. However, such studies have not considered land and soil characteristics that could also impact suitability. Meanwhile, no studies have addressed how climate change will impact avocado and cashew suitability at a global scale.

To address these knowledge gaps, Grüter and colleagues combined climate change projections and soil factors to computationally model and predict how suitable different regions worldwide will be for growing coffee, cashews, and avocados in 2050. They used projections from 14 global climate models under three different future emission scenarios and incorporated land and soil requirements for the crops, such as pH,

texture, and slope.

The analysis predicts that some regions will become more suitable and some less suitable for each crop. Coffee is the most susceptible of the three, with predicted declines in suitability in all major producing regions, including Brazil, Vietnam, Indonesia, and Colombia. For cashews, highly suitable regions are predicted to decrease in some major producing countries, including India, Côte d'Ivoire, and Benin. Suitable areas for avocados will also decline for some major producers, such as the Dominican Republic, Peru, and Indonesia.

Meanwhile, areas suitable for all three crops may expand at higher altitudes and latitudes, especially for cashews and avocados. Areas with greater future suitability are located in regions such as the United States, Argentina, China, and East Africa.

These findings suggest the need for [climate](#) change adaptations in major producing countries, such as breeding for varieties adapted to higher temperatures or drought. Strategies will also be needed to mitigate the environmental impact of any expansion to new locations.

The authors add: "The study presents the first global assessment of [climate change](#) impacts on cashew and avocado suitability. For both cashew and [avocado](#), areas suitable for cultivation are expected to expand globally while in most main producing countries, the areas of highest suitability may decrease."

More information: Grüter R, Trachsel T, Laube P, Jaisli I (2022) Expected global suitability of coffee, cashew and avocado due to climate change. *PLoS ONE* 17(1): e0261976.

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