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To:

Editorial board of
Nature Climate Change

Dear Editors,

We are pleased to submit our manuscript, "**Deforestation Reduces Downwind Precipitation and Soybean Yields in Brazil**," for consideration as an Article in Nature Climate Change.

A key research question lies in understanding the extent to which agricultural expansion into forests impacts crop yields beyond the immediate deforestation frontiers[1]. Here we quantify the teleconnection impacts of deforestation on Brazilian soybean agriculture through a combination of Lagrangian moisture tracking and statistical crop modeling. Our study demonstrates that forest evaporation contributes ~30% of precipitation for soybean growth, but deforestation has decreased seasonal precipitation by 171–326 mm (9–16%). Cumulatively, these deforestation-driven precipitation declines have resulted in approximately 900 kiloton soybean production losses in Brazil (~3% of national output), with the largest loss (288 kilotons) occurring in remote southern regions, where soybean is more sensitive to water availability.

These findings highlight a self-reinforcing feedback where agricultural expansion into forests reduces crop yields across broader spatial scales, potentially driving demand for further deforestation[2]. This challenges the conventional view that forest clearing necessarily increases net food production by showing hidden economic costs extending far beyond deforestation areas. Under continued deforestation and climate change[3], this feedback will likely intensify, highlighting the urgent need for integrated land management decisions.

Given the critical importance of understanding forest-climate-agriculture interactions in a warming world, and the alignment of our study with Sustainable Development Goals (SDG) such as Zero Hunger (SDG 2), Climate Action (SDG 13), and Life on Land (SDG 15), we believe this work addresses core themes of Nature Climate Change.

Our manuscript follows the journal's formatting guidelines, with approximately 2,200 words and 4 figures in the Main Manuscript. We confirm that this manuscript has not been published elsewhere and is not under consideration by another journal. All authors have approved the manuscript and agree with its submission to Nature Climate Change.

Thank you for considering our manuscript. We look forward to your response.

Yours sincerely,

Dr. Hao Li (on behalf of all coauthors)
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[1] Lawrence & Vandecar. Effects of tropical deforestation on climate and agriculture. Nat. Clim. Chang. 5, 27-36 (2015).
[2] Oliveira et al. Large-scale expansion of agriculture in Amazonia may be a no-win scenario. Environ. Res. Lett. 8, 024021 (2013).
[3] Rattis et al. Climatic limit for agriculture in Brazil. Nat. Clim. Chang. 11, 1098-1104 (2021).