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Multi-decadal expansion of intensive cropland land use in South America

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Zalles, V.; **Hansen, M.**; **Potapov, P.**; **Lima, A.**; **Adami, M.**

The agricultural sector plays an enormous role in global financial markets, economic development, natural resource management, and human health. The South American continent is a key player within this sector - it is one of the breadbaskets of the world, producing a significant portion of globally traded soybean, corn, sugarcane, and other crops. Crop expansion is enabled due to the vast areas of natural land cover that have been and continue to be converted to agricultural land uses. The appropriation of natural land cover constitutes a challenge, given the ecosystem services they provide concerning climate change mitigation, hydrology, and biodiversity. Despite the evident need for detailed information tracking the expansion of agricultural land uses in South America and its impact on natural land covers, such data are still not available at an annual scale at the continental level. Here, we seek to fill this gap by using freely available Landsat data to maps and estimate area of crop expansion from 1985 forward. By using established remote sensing methods and best practices for area estimation using probability-based sampling methods, we are able to provide unbiased estimates of cropland expansion. Quantification of this dynamics is indispensable for a better understanding of drivers and consequences of these land cover and land use changes.