Matches and mismatches between the global distribution of major food crops and climate suitability

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Résumé

Over the course of history, humans have moved crops from their regions of origin to new locations across the world. The social, cultural, and economic drivers of these movements have generated differences not only between current distributions of crops and their climatic origins, but also between crop distributions and climate suitability for their production. Although these mismatches are particularly important to inform agricultural strategies on climate change adaptation, they have, to date, not been quantified consistently at the global level. Here, we show that the relationships between the distributions of twelve major food crops and climate suitability for their yields display strong variation globally. After investigating the role of biophysical, socio-economic and historical factors, we report that high-income world regions display a better match between crop distribution and climate suitability. In addition, although crops are farmed predominantly in the same climatic range as their wild progenitors, climate suitability is not necessarily higher there, a pattern that reflects the legacy of domestication history on current crop distribution. Our results reveal how far the global distribution of major crops diverges from their climatic optima and call for greater consideration of the multiple dimensions of the crop socio-ecological niche in climate change adaptive strategies.

Mots-Clés: climatic niche, global agriculture

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