



The shifting geographies of crop suitability and the implications for food and nutritional security

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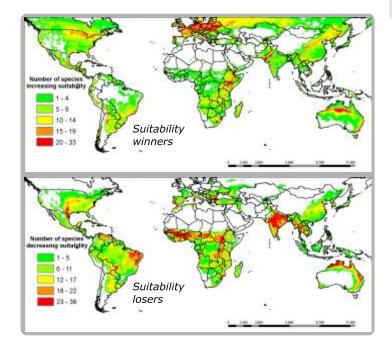
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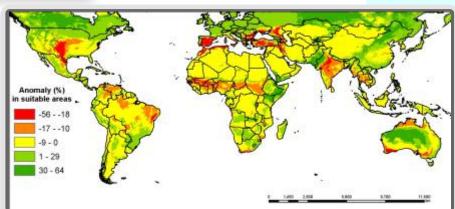
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Problem: Whilst a significant percentage of food intake per capita is accounted for by the world's ten biggest crops, food and nutritional security depends on a much wider range of crops. Most analyses of climate change impacts on agriculture have focused only on the major crops as they rely on detailed physiological knowledge and inclusion in mechanistic crop-models.

Solution: We have used the FAO Ecocrop database and model to examine the impacts of climate change on the broad geographic potential distribution for the top 50 crops of the world (defined using area harvested in FAOSTAT). These include cereals, fruits, vegetables and roots and tubers.

Zone	Average current suitability	Average 2050 suitability	Average change in area arable land (%)
Asia	15.7	18.9	4.5
Europe	7.3	21.7	17.8
North Africa	1.9	4.8	-1.8
Sub-Saharan Africa	38.3	38.6	-0.6
Caribbean	58.5	58.1	-1.4
Latin America	39.2	38.2	-2.5
Australia	22.1	29.4	11.2
North America	6.7	18.7	12.9
Pacific	25.4	24.4	-1.7





Average change in suitability for all 50 crops

Results

Globally, suitability for the top 50 crops of the world actually increases, with gains in high latitudes, and pockets of tropical regions.

However, hotspots exist at the regional level where significant problems are to be expected: eastern Brazil, Sahelian belt, south Asia, Mediterranean.

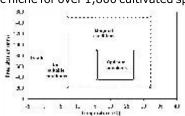
Localized issues of food security expected especially when a staple crop becomes unsuitable, but in many cases alternative crops are available.

Climate change brings opportunities and challenges, and policy must support adaptation to both capitalize on opportunities and minimize the negatives.

METHODOLOGY

What is Ecocrop?

Model developed by FAO through expert consultation that documents the broad climatic niche for over 1,800 cultivated species.



Why the Ecocrop approach?

- Simple to use and apply.
- Available for "minor" crops which are important components of food and nutritional security.
 - Captures the broad niche of the crop, including within crop genetic diversity.
- Fails to capture complex physiological responses.
- Only provides index of suitability not productivity.
 - Inferior model to those available for the "big" crops.

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Climate data: Worldclim database for 1960-2000 climate, and 18 empirically downscaled GCM predictions for 2050, all at 10 arc-minute spatial resolution.





