



Variability, drivers and interactions of key environmental stressors from food production worldwide.

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Agriculture feeds us and provides many other benefits, but its use of land, water and fertiliser as well as its emissions of greenhouse gases cause significant environmental degradation. While food demand is projected to increase, it is urgent to mitigate the negative environmental outcomes of food production. Here we provide the first consistent, high-resolution (5 arc minute) global estimation of resources used for, and greenhouse gases emitted by, food production; covering 85% of human calorie intake. Importantly, our results provide comparable estimates of land, nitrogen, phosphorus, potassium (fertilisers), soil-, surface- and ground-water use, and greenhouse gas emissions for a range of crops and animal products, considering animal feed and its geographical origin. We identify areas and foods with particularly high resource or greenhouse gas emission-intensity, quantify the role of international feed trade in these intensities, and reveal synergies or trade-offs between different environmental stressors of food production worldwide.