

Organic Agriculture and the Global Food Supply

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Abstract

The principal objections to organic agriculture contributing significantly to the global food supply are low yields and insufficient quantities of organically acceptable fertilizers. We compared yields of organic versus conventional or low-intensive food production for a global dataset of almost 300 examples and estimated the average yield ratio in 10 food categories for the developed and the developing world. We also estimated the amount of nitrogen potentially available from fixation by leguminous cover crops used as fertilizer from studies in tropical and temperate regions. For most food categories, the average yield ratio was slightly <1.0 for studies in the developed world and >1.0 for studies in the developing world. With the average yield ratios, we modeled the global food supply that could be grown organically on the current agricultural land base. Our estimates indicate that organic agriculture has the potential to produce enough food on a global per capita basis to sustain the current human population without increasing the agricultural land base. In addition, estimates of nitrogen fixation from leguminous cover are sufficient to replace the amount of synthetic fertilizer currently in use. These results indicate that organic agriculture could contribute quite substantially to the global food supply, thereby reducing the detrimental environmental impacts of conventional agriculture. Here we present this analysis and discuss the changes needed to increase the contributions of organic agriculture to the global food supply.

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