

Agroecology and the Narrowing Yield Gap

**- Diversification practices reduce organic to
conventional yield gap**

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Organic yields are lower than conventional yields, but the gap is smaller than previously reported (19.2% (+/- 3.7))

Diverse organic farms *already* produce nearly as much food as conventional. 70% of the food produced in the world comes from small holder farms on 24% of the land.

Signs point to bias in the dataset, suggesting that the yield gap may actually be lower

The bottom line

Today's well-managed sustainable agriculture yields nearly as much as conventional equivalents, suggesting that it is possible to farm sustainably without sacrificing yields and, therefore, profits All in all, this study provides more evidence that agroecological approaches can help the world feed itself without the significant threats to environmental and public health posed by today's dominant industrial-style approaches

Principles for the Agroecological Transition Process

- Shift from through-flow nutrient management to a nutrient recycling model, with increased dependence on natural processes such as biological nitrogen fixation and mycorrhizal relationships.
- Use renewable sources of energy instead of non-renewable sources.
- Eliminate the use of non-renewable off-farm human inputs that have the potential to harm the environment or the health of farmers, farm workers, or consumers.
- When materials must be added to the system, use naturally-occurring materials instead of synthetic, manufactured inputs.
- Manage pests, diseases, and weeds instead of “controlling” them.
- Reestablish the biological relationships that can occur naturally on the farm instead of reducing and simplifying them.

-Make more appropriate matches between cropping patterns and the productive potential and physical limitations of the farm landscape.

- Use a strategy of adapting the biological and genetic potential of agricultural plant and animal species to the ecological conditions of the farm rather than modifying the farm to meet the needs of the crops and animals.
- Value most highly the overall health of the agroecosystem rather than the outcome of a particular crop system or season.
- Emphasize conservation of soil, water, energy, and biological resources.
- Respect local knowledge and experience in agroecosystem design and management.
- Incorporate the idea of long-term sustainability into overall agroecosystem design and management.

Agroecological Principles for Food System Sustainability

- have minimal negative effects on the environment and release insignificant amounts of toxic or damaging substances into the atmosphere, surface water, or groundwater;
- minimize the production of greenhouse gases, work to mitigate climate change by increasing the ability of managed systems to store fixed carbon, and facilitate human adaptation to a warming climate;
- preserve and rebuild soil fertility, prevent soil erosion, and maintain the soil's ecological health;
- use water in a way that allows aquifers to be recharged and the water needs of the environment and people to be met;

- rely mainly on resources within the agroecosystem, including nearby communities, by replacing external inputs with nutrient cycling, better conservation, and an expanded base of ecological knowledge;
- work to value and conserve biological diversity, both in the wild and in domesticated landscapes;
- guarantee equality of access to appropriate agricultural practices, knowledge, and technologies and enable local control of agricultural resources;
- eliminate hunger, ensure food security in culturally appropriate ways, and guarantee every human being a right to adequate food; and
- remove social, economic, and political injustices from food systems.

