

AGROECOLOGY

PROOF IS IN: WE KNOW HOW TO GROW ENOUGH FOOD
WITHOUT HARMFUL CHEMICALS



AGROECOLOGY APPLIES ECOLOGICAL SCIENCE TO THE STUDY AND PRACTICE OF FOOD AND FARMING. IT LINKS ECOLOGY, CULTURE, ECONOMICS, AND TRADITIONAL KNOWLEDGE TO CREATE HEALTHY, PLENTIFUL FOOD, ENRICH SOIL, COMBAT CLIMATE CHANGE, AND CONSERVE WATER AND OTHER RESOURCES.

WHAT AGROECOLOGY CAN PRODUCE

Agroecology could produce enough food, reports a University of Michigan study, to sustain the current human population (and expected increases) without expanding the land farmed.¹ A study of ecological practices in the Global South analyzed 286 projects in 57 countries involving 12.6 million farmers using area the size of Germany. It found a mean relative yield increase of 79%.² Agroecology farms are typically small and on average produce more food per acre than large farms, in part by planting multiple crops in the same field.³

HEALTHY COMMUNITIES

Knowledge-intensive agroecological farming eliminates the need to buy synthetic fertilizers, pesticides and commercial seeds — reducing farmers' costs and indebtedness.⁴ Because in the Global South, women farmers often cannot access credit, they benefit especially from not having to purchase inputs.⁵ Agroecology also often involves farmers' experimenting and learning with neighbors, which can lead to then forming marketing cooperatives that keep more of the return from farming in the hands of the farmers.⁶

AGROECOLOGY MEETS FUTURE CHALLENGES

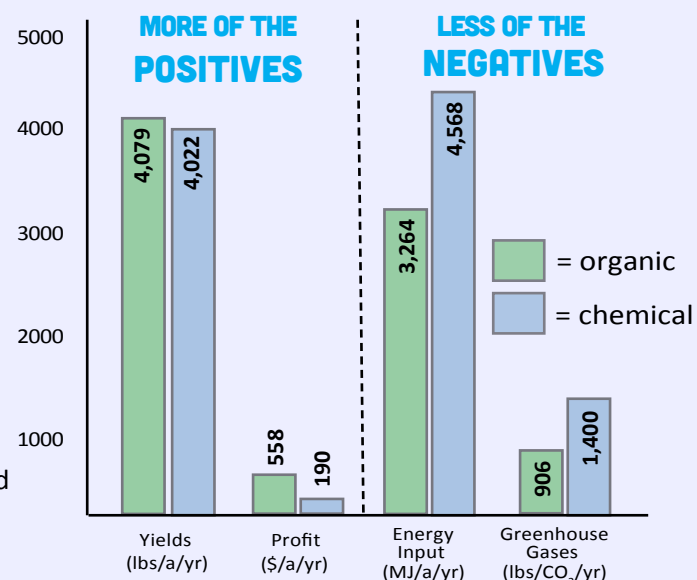
With little or no chemical fertilizers or pesticides, agroecological farms help move food production away from a reliance on fossil fuels.⁷ Instead, these farms use compost, water conservation, and beneficial crop interactions to increase production per acre. In fact, compared to industrial farming, organic methods generate one-half to as little as one-third as many greenhouse gas emissions.⁸ Agroecology increases biomass - biological material derived from living, or recently living organisms, which can be used as compost. Moreover by storing carbon as soil organic matter, agroecology helps combat climate change and reduce erosion.⁹ Agroecology's greater on-farm plant and animal diversity also enhance resistance to disease, pests and adaptation to climate change.¹⁰

AGROECOLOGY SOUNDS GREAT! BUT WHERE IS IT BEING USED, AND WHAT ARE THE RESULTS?

INDIA: One type of agroecology called System of Rice Intensification — using less water and chemicals and fewer seeds than was believed necessary — increased yields up to 68% in India. SRI results in stronger plants and healthier soil, while lowering production costs and increasing the farmers' net profit. In the southern Indian state of Andhra Pradesh, SRI produced an average 50% increase in yields over traditional irrigated rice cultivation.

AFRICA: In West Africa, 3,500 farmer field schools' training of 147,000 farmers on agroecological methods and sustainable farming techniques resulted in increased yields, less pesticide use, and the expansion of new crops. In Zimbabwe, 8,000 farmers have adopted conservation agricultural methods, resulting in a 67% increase in maize yields. In Niger, farmers using agroforestry have revitalized degraded area the size of Costa Rica, which now feeds 2.5 million people.

NICARAGUA: Following Hurricane Mitch in 1998, a large-scale study of 180 smallholder communities found that farms using simple agroecological methods (rock dikes, crop rotation, terraces etc.) "had lost 18% less arable land to landslides" and had 69% less gully erosion than chemical farms.



**A 30-YEAR STUDY BY THE RODALE INSTITUTE
COMPARING ORGANIC AND CHEMICAL AGRICULTURE
ON SIDE-BY-SIDE FARMS.**

WHAT AGROECOLOGY CAN PRODUCE

¹ Badgley, C., et al., "Organic agriculture and the global food supply," *Renewable Agriculture and Food Systems* 22(2): 86–108. <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1110&context=agronomyfacpub>. See also: Rosset, P.M., "The multiple functions and benefits of small farm agriculture in the context of global trade negotiations," Institute for Food and Development Policy, Food First Policy Brief No. 4, 1999, 1. http://www.foodfirst.org/sites/www.foodfirst.org/files/pdf/pb4_0.pdf.

² Pretty, Jules et al., "Resource-conserving agriculture increases yields in developing countries," *Environmental Science and Technology*, 40:4, 2006, pp. 1114-1119. <http://pubs.acs.org/doi/pdf/10.1021/es051670d>. **Note:** The 79% figure refers to 360 reliable yield comparisons from 198 projects. There was a wide spread in the results, with 25% of the project reporting a 100% increase or more.

³ Altieri, M., Toledo, V.M., "The agroecological revolution in Latin America: Rescuing nature, ensuring food sovereignty and empowering peasants," *Journal of Peasant Studies*, 38:3, 587-612. http://www.agroeco.org/socla/pdfs/Altieri_Toledo_JPS_38_03_2011.pdf. **Note:** "Agroecologists have shown that small family farms are much more productive than large farms if total output is considered rather than yield."

HEALTHY COMMUNITIES

⁴ De Schutter, Olivier, "Seed policies and the right to food: Enhancing agrobiodiversity and encouraging innovation," FAO, 2009, 2. <http://www.farmersrights.org/pdf/RighttoFood-N0942473.pdf>. **See also:** Levidow, Les, "Agroecology in Europe: Conforming – or transforming the dominant agro-food regime?" *Agroecology for Sustainable Food Systems in Europe: A Transformative Agenda*, Brussels, 2013, 2. <http://www.ensser.org/fileadmin/files/Agro-EcologyTransformationSummary.pdf>.

⁵ "Organic agriculture and food security in africa," UNEP-UNCTAD Capacity-building Task Force on Trade, Environment and Development, United Nations, 2008, 15, http://unctad.org/en/Docs/ditcted200715_en.pdf.

⁶ "Agricultural cooperatives: Key to feeding the world," FAO, World Food Day, 16 October, 2012, http://www.fao.org/fileadmin/templates/getinvolved/images/WFD2012_leaflet_en_low.pdf.

AGROECOLOGY MEETS FUTURE CHALLENGES

⁷ De Schutter, Olivier, "Agroecology and the Right to Food", Report presented at the 16th Session of the United Nations Human Rights Council [A/HRC/16/49], 8 March 2011, http://www.srfood.org/images/stories/pdf/officialreports/20110308_a-hrc-16-49_agroecology_en.pdf.

⁸ Natural Resources Management and Environment Department, Organic Agriculture, Environment and Food Security (Rome: Food and Agriculture Organization of the United Nations, 2002), www.fao.org/DOCREP/005/Y4137E/y4137e02b.htm#96.

⁹ "Carbon sequestration in agricultural soils," Economic and Sector Work, The World Bank, report no. 67395-GLB, 2012, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:23188011~pagePK:210058~piPK:210062~theSitePK:336682,00.html>.

¹⁰ "Peasant and family farm-based sustainable agriculture can feed the world", Via Campesina Views, Jakarta, 2010, 11. <http://viacampesina.org/downloads/pdf/en/paper6-EN-FINAL.pdf>. **See also:** Altieri, M., et al., "Agroecologically efficient agricultural systems for smallholder farmers: Contributions to food sovereignty," INRA and Springer-Verlag, 2011. <http://www.agroeco.org/socla/pdfs/Altieri-Funes-Petersen-Palencia.pdf>.

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