

Agroecology as innovation

By [Timothy A. Wise](#)

11 Jul 2019

Recently, the High Level Panel of Experts of the U.N. Food and Agriculture Organisation (FAO) released its much-anticipated report on agroecology. The report signals the continuing shift in emphasis in the UN agency's approach to agricultural development.

As outgoing FAO director-general, Jose Graziano da Silva has [indicated](#): "We need to promote a transformative change in the way that we produce and consume food. We need to put forward sustainable food systems that offer healthy and nutritious food, and also preserve the environment. Agroecology can offer several contributions to this process."



Markus Winkler via [Unsplash](#)

The commissioned report: [*Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition*](#).

Two years in the making, the report makes clear the urgent need for change. "Food systems are at a crossroads. "Profound transformation is needed," the summary begins. It stresses the importance of ecological agriculture, which supports "diversified and resilient production systems, including mixed livestock, fish, cropping, and agroforestry, that preserve and enhance biodiversity, as well as the natural resource base."

It is not surprising, of course, that those with financial interests in the current input-intensive systems are responding to growing calls for agroecology with attacks on its efficacy as a systematic approach that can sustainably feed a growing population. What is surprising is that such responses are so ill-informed about the scientific innovations agroecology offers to small-scale farmers who are being so poorly served by "green revolution" approaches.

One [recent article](#) from a researcher associated with a pro-biotechnology institute in Uganda was downright dismissive, equating agroecology with "traditional agriculture," a step backwards toward the low-productivity practices that prevail today. "The practices that agroecology promotes are not qualitatively different from those currently in widespread use among smallholder farmers in Uganda and sub-Saharan Africa more broadly," writes Nassib Mugwanya of the Uganda Biosciences Research Center. "I have come to conclude that agroecology is a dead-end for Africa, for the rather obvious reason that most African agriculture already follows its principles."

Nothing could be further from the truth. As the new expert report shows, and as countless ecological scientists around the world can attest, agroecology brings much-needed innovations to prevailing smallholder practices. With a long track record of achievements in widely varying environments, the approach has been shown to improve soil fertility, increase crop and diet diversity, raise total food productivity, improve resilience to climate change, and increase farmers' food and income security while decreasing their dependence on costly inputs.

The failing policies of the present

The predominant input-intensive approach to agricultural development can hardly claim such successes, which is precisely why international institutions are actively seeking alternatives. The Alliance for a Green Revolution in Africa (AGRA) is the poster child for the promotion of input-intensive agriculture in Africa. At its outset 13 years ago, AGRA and its main sponsor, the Bill & Melinda Gates Foundation, set the goals of doubling the productivity and incomes of 30 million smallholder households on the continent.

There is no evidence that approach will come anywhere near meeting those worthy objectives, even with many African governments spending large portions of their agricultural budgets to subsidise the purchase of green revolution inputs of commercial seeds and synthetic fertilisers. [National-level data](#), summarised in the conclusion to my book *Eating Tomorrow*, attests to this failure:

- Smallholders mostly cannot afford the inputs, and the added production they see does not cover their costs.
- Rural poverty has barely improved since AGRA's launch; neither has rural food insecurity. Global Hunger Index scores remained in the "serious" to "alarming" category for 12 of the 13 AGRA countries.
- Even in priority crops like maize and rice, few of AGRA's 13 priority countries have seen sustained productivity increases.
- Production increases for maize in Zambia have come as much from shifting land into subsidised maize production as from raising productivity from commercial seeds and fertilisers.
- There is no evidence of improved soil fertility; in fact, many farmers have experienced a decline as mono-cropping and synthetic fertilisers have increased acidification and reduced much-needed organic matter.
- Costly input subsidies have shifted land out of drought-tolerant, nutritious crops such as sorghum and millet in favour of commercial alternatives. Crop diversity and diet diversity have decreased as a result.

A [recent article](#) in the journal Food Policy surveyed the evidence from seven countries with input subsidy programs and found little evidence of sustained—or sustainable—success. "The empirical record is increasingly clear that improved seed and fertiliser are not sufficient to achieve profitable, productive, and sustainable farming systems in most parts of Africa,"

wrote the authors in the conclusion.

Agroecology: Solving farmers' problems

Branding agroecology as a backwards-looking, do-nothing approach to traditional agriculture is a defensive response to the failures of Green Revolution practices. In fact, agroecological sciences offer just the kinds of innovations small-scale farmers need to increase soil fertility, raise productivity, improve food and nutrition security, and build climate resilience.

Do these innovations sound backwards looking to you?

Biological pest control – Scientist Hans Herren won a World Food Prize for halting the spread of a cassava pest in Africa by introducing a wasp that naturally controlled the infestation.

Push-pull technology – Using a scientifically proven mix of crops to push pests away from food crops and pull them out of the field, farmers have been able to reduce pesticide use while increasing productivity.

Participatory plant breeding – Agronomists work with farmers to identify the most productive and desirable seed varieties and improve them through careful seed selection and farm management. In the process, degraded local varieties can be improved or replaced with locally adapted alternatives.

Agro-forestry – A wide range of scientists has demonstrated the soil-building potential of incorporating trees and cover crops onto small-scale farms. Carefully selected tree varieties can fix nitrogen in the soil, reduce erosion, and give farmers a much-needed cash crop while restoring degraded land.

Small livestock – Reintroducing goats or other small livestock onto farms has been shown to provide farmers with a sustainable source of manure while adding needed protein to local diets. Science-driven production of compost can dramatically improve soil quality.

These innovations and many others are explored in-depth in the new U.N. report, the full version of which will be available in English in mid-July, other FAO languages in September. Those advocates of industrial agriculture would do well to read it closely so they can update their understanding of the sustainable innovations agroecological sciences offer to small-scale farmers, most of whom have seen no improvements in their farms, incomes, or food security using Green Revolution approaches.

Many farmers have concluded that the Green Revolution, not agroecology, is a dead-end for Africa.

Originally Published on Food Tank.

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