

## 'Regenerative' agriculture: Organic farming buzz word, or the path to sustainable food production?

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egenerative” agriculture is suddenly hot among the organic crowd and those soured by what they see as the excesses of conventional agriculture. It is so hot that Rep. Alexandria Ocasio Cortez is using it in her “[Green New Deal](#)” plan, automatically making it the man-bun or frayed skinny jeans of agriculture.

Regenerative agriculture has gotten a big boost lately in part because of increasing criticism of what some call the ‘cult of organic agriculture,’ which may be showing signs of flagging as scientists examine its many sustainability claims which fall far short of its reputation. [Regeneration International](#), a booster organization formed by some of the leading opponents of conventional agriculture, including Vandana Shiva, Organic Consumers Association’s Ronnie Cummins and Steven Rye of Mercola.com, envision regenerative agriculture in part as an attack vehicle against agricultural biotechnology:

Organic agriculture practices are often blamed for being unsustainable and not able to feed the world. In fact, several high-profile advocates of conventional agricultural production have stated that the world would starve if we all converted to organic agriculture. They have written articles for science journals and other publications saying that organic agriculture is not sustainable and produces yields that are significantly lower than conventional agriculture.

Thus, the push for genetically modified organisms, growth hormones, animal- feed antibiotics, food irradiation and toxic synthetic chemicals is being justified, in part, by the rationale that without these products the world will not be able to feed itself.

### But what is regenerative ag?

screen shot at am

If you read the literature generated by Regenerative International and many organic advocates, it’s a lot like a rebranding of organic farming but with more grandiose claims, akin to the replacement of the term ‘corporate social responsibility’ with ‘sustainability’ in the late 1990s, which allowed the concept to go mainstream. Its supporters in the organic community make a multitude of immodest representations about what organic/regenerative agriculture can do, including ‘reversing global warming’ and ‘ending world hunger,’ along with preserving the world’s top soil.

But among scientists, ‘regenerative’ has a more serious, if contradictory side and a long history, and it’s not much like what many organic proponents claim. The term once described a scientific line of inquiry, akin to conservation agriculture and “agroecology,” a movement that started in the 1980s, (we’ll get to explaining that term) and with which it’s often linked. But regenerative agriculture has a far older history. Its roots are in the 1930s and have since expanded into “agricultural practices and a social movement for culturally sensitive, socially fair and economically viable farming systems,” writes Bertrand Dumont, a livestock researcher with the University of Clermont, France.

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Regenerative and agroecology have come to mean different things to different groups. One area all agree on (for the moment) is that these practices/philosophies focus on keeping carbon in the soil and out of the atmosphere (read more about what agroecology [is here](#)). The practices seem to distill down to these:

- Minimize tillage and plowing
- Use cover crops as much as possible
- Rotate crops and livestock across fields
- Increase biodiversity in agricultural settings

[According to Andrew McGuire](#), an agronomist at Washington State University, “there are multiple versions of these principles, each with a different flavor. Rodale and partners offer their strictly [organic version](#) with a new certification program attached. Project Drawdown includes regenerative ag in its plan to reverse global warming, and California State University at Chico has their [regenerative ag initiative \(PDF\)](#).

Here is a link to a [YouTube video of Gabe Brown’s TEDx talk](#) in Grand Forks, North Dakota. Brown’s farms near Bismarck, ND, are often cited as the prototypical American face of regenerative agriculture in the past decade. Brown’s principles/practices compared to these other versions, and to [conservation agriculture](#).

## **Grounded in opposition to ‘Big Ag’**

Academics are debating the differences among types of agroecology and regenerative and sustainable intensification, as well as trying to differentiate all that from organic or sustainable, and of course, conventional agriculture. It’s being touted as a third way to feed the planet while keeping it livable, which proponents of these ideas say isn’t possible with conventional agriculture. Many focus on issues like small farms in the developing world or “food sovereignty” as central parts of the movements.

Many proponents of the new regenerative practice have cited companies that are somehow making a switch to regenerative agriculture, whatever that may mean. General Mills, for its part, [calls on organic](#) and conventional farmers to join in on regenerative practices. This is the same General Mills that, while acknowledging that some people are uncomfortable with the idea of [genetically modified](#) ingredients,

admits that the technology has been determined safe, in existence for decades, and fulfills many of the same goals of greenhouse gas reductions, soil preservation and productivity as regenerative ag.

Regeneration International, and groups opposed to large-scale farming, have tried mold the terms to suit their interests. In part that's because it's taking on the trappings of a social movement, an ideology, more than a science. It owes its current popularity largely to efforts by Robert Rodale, head of the pro-organic Rodale Institute, who in the late 1980s decided that "[sustainable](#)" was a self-limiting, insufficient term and advocated agroecology and subsequently [regenerative](#) to replace it.

As University of Wyoming scientist Robin Groose wrote in a seminal work in the the early 1990s, about the origins of the movement:

The word [agroecology] is a hybrid between "agronomy," the science of crops and soils, and "ecology," the branch of biology concerned with interrelationships among organisms and their environments.

Agroecology strives to pull the components of crop production into a more complete picture and to view the agroecosystem as a whole – and in the context of today's global economy and environment.

Agroecology attempts to meet many challenges: Environmentalists demand better conservation of natural resources; consumers demand safer food; taxpayers demand an end to government subsidies; and so on. The critics are sometimes correct, sometimes not. And often the criticism is not constructive, tendered with no suggestion for improvement – or with utterly unrealistic solutions. And indeed, we in agriculture are often our own harshest critics. We know that much of prevailing agricultural practice is economically and environmentally unsustainable. Agroecology seeks solutions.

What's not clear is how all of these somewhat contradictory and often grandiose farming concepts fit together — from pure locally sourced, organic fields serving people living very close by, to vast acreages that can rotate livestock and crops and feed tens of thousands. Rather than a scientific system, it's evolved into a philosophy looking for a clear set of practices. According to farmers and scientists who monitor the movement, there appears to be a lot of hype. Agriculture professor Tim Durham, whose family runs a farm on New York's Long Island, observed a recent video touting regenerative ag, and [expressed some doubts](#):

Regenerative ag is hailed as (seemingly) chemical free, easy to implement, basically low/no cost, and pays near immediate dividends. But what practices make it such a standout? Very few particulars are given. Soil health is mentioned in passing, but short of multispecies cover cropping (I know many local farmers who have mainstreamed this practice, but haven't adopted the regenerative brand), little else was mentioned. Earthworms got scant airtime, but their role in nutrient cycling and soil horizon "mixing" wasn't specified.

As McGuire [has written](#), “extraordinary claims require extraordinary evidence,” and by his analysis, it often falls far short of its hype. He tabulated some of the differences between sustainable and regenerative, also doubted some of the claims of soil health and other benefits of these farming practices. Reviewing farmer Gabe Brown’s TedTalk, [Maguire wrote](#):

During his talk, Brown offers the following slide showing the increase of his topsoil depth and soil organic matter over his 20-year transition from conventional farming to regenerative practices.

Topsoil depth increases from 3” to 14” while soil organic matter (SOM) increases from 1.7% to 11.1%. Increasing soil organic matter by a few percentage points is normally thought of as a long, difficult process, unless you use a lot of imported manure or compost. Here, however, Brown claims to have increased SOM by over 9 percentage points. How? According to the slide, by cover crops, multi-species cover crops, and livestock integration. Let’s do the numbers according to what current soil science tells us this would require.

Those who believe in the scientific process are skeptical of many of the claims, says McGuire. But as of now, there is little data to support them:

If the claims of regenerative agriculture are real and repeatable, then they are of such magnitude .... that they should be easy to measure. So here is a challenge to regenerative agriculture. Provide the extraordinary evidence. If it exists, let me know and I will post it here.

## **Does agroecology and regenerative agriculture reject biotechnology?**

Most ‘movement activists’ outright reject recent technological innovations in agriculture, especially, biotechnology, as a possibility for regenerative farming. But other, more science-based, definitions include technology, including biotechnology as part of the redirecting of agriculture’s future. “Fundamental aspects of agroecology, such as its collective capacity-building, and emancipating goals, integration of local and scientific knowledge, territorial dimension, mobilization by multi-actor networks and links with food sovereignty, might otherwise be neglected,” writes University of Louvain, Belgium, professor [Antoinette Dumont](#) and her colleagues.

Intensive agriculture that produces higher yields and biodiversity (a major part of sustainability and even regenerative ag) may not be mutually exclusive, after all. In a [recent paper](#), an international group led by computational landscape ecologist Michael Beckmann at the Helmholtz Center for Environmental Research in Leipzig, Germany, conducted a meta-analysis of research done on these comparisons, and found the field a bit lacking on the biodiversity front (“species richness,” as they called it, being a bit limited to describe the whole shebang). While a superficial look showed higher yields coming at the cost of diversity, a closer look at certain types of intensification actually produced higher yields and protected species.

Whether you call it regenerative, or agroecology, or sustainable agriculture, it doesn’t have to exist at the expense of science and technology, say agricultural scientists. As University of Wyoming weed scientist (and agroecology degree holder) Andrew Kniss has [written](#):

Most frustrating to me, is when agroecology is used in this context: ‘We don’t need [insert technology here], because we have agroecology!’

Technology, he wrote, including biotechnology, should go hand-in-hand with agroecology and other forms of what is becoming to be known as regenerative agriculture. The goal should be sustainability, not trying to advance an ideology.

[W]e teach that proper use of technology is an indispensable part of achieving sustainability. ... Technological innovations, in many cases, can help us maintain or increase production while minimizing the negative impacts of agriculture. This doesn’t mean that technological solutions should *replace* important traditional agricultural practices (like crop rotation, manure, appropriate tillage etc.). Technology is most certainly [not a substitute for good agronomy](#). By studying agroecology, we can determine how to best use technology to increase the sustainability of agroecosystems. It also allows us to maximize the benefit of traditional agricultural practices and minimize their negative impact. ... I think it is time that we reclaim this term for it’s original purpose, as one that describes the science of agriculture, viewed through an ecological lens.

**Jon Entine is the executive director of the Genetic Literacy Project. [Bio](#). Follow him on Twitter [@JonEntine](#)**

**Andrew Porterfield is a writer and editor, and has worked with numerous academic institutions, companies and non-profits in the life sciences. [BIO](#). Follow him on Twitter [@AMPorterfield](#)**

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