REGENERATIVE AGRICULTURE:
Ready To Save The Planet From Catastrophic Climate Change: We Can Do It, Governments Won't

"We are faced not with two separate crises, one environmental and the other social, but rather with one complex crisis which is both social and environmental. Strategies for a solution demand an integrated approach to combating poverty, restoring dignity to the excluded, and at the same time protecting nature." Pope Francis in the encyclical Laudato Si

"Agriculture that sequesters carbon is also agriculture that addresses our planetary water crisis, extreme poverty, [public health] and food insecurity while protecting and enhancing the environment now and for future generations." From: *Regenerative Organic Agriculture and Climate Change: A Down-to-Earth Solution to Global Warming* paper by The Rodale Institute

The Problem

The most pressing need in turning the tide of climate change is to reduce atmospheric levels of Carbon (CO_2,) which in May 2016 rose to a new record of 400 parts per million (ppm). According to the magazine Scientific American, scientists regard 450 ppm as the point of no-return for inducing catastrophic climate change. CO_2 accounts for over 80 percent of the so-called "Greenhouse Gases" which are causing global rises in temperature which upset climatic balance and disrupt eco-systems which are the foundation of all life on earth. The industrial food system, including animal feed, fertilizers, pesticides, processing, transportation, refrigeration and animal waste accounts for 30% or more of total annual global greenhouse gas emissions.

Sadly, efforts over the past 30 years by governments and businesses the world over to reverse rising emissions have failed: target limits have already been surpassed. In the decades it will take to "decarbonize" the economy via conversion to renewable energy resources etc., disastrous levels of warming will have set in with consequences that will take over a hundred years to level out.

The Solution

Thus, starting with the Paris Climate Summit in 2015, the paradigm shifted from an emphasis on cutting emissions, to drawing down the CO_2 already in the atmosphere and "sequestering" it in the earth. Sequestration means maximizing the carbon dioxide pulled from the atmosphere by plant growth and minimizing the loss of that carbon once it is stored in soil. The goal would be to reduce CO_2 levels from 400 ppm to 278 ppm, i.e., the levels present in the pre-industrial era circa 1750.

Soil can store up to 1,000 kgs of the CO_2 per hectare. Recent data from farming systems and pasture trials around the globe show that **more than 100% of current annual global CO_2 emissions could be withdrawn from the atmosphere by large-scale adoption of inexpensive organic management practices**, broadly termed "**regenerative organic agriculture**."

These practices are traditional methods used by famers and gardeners from many cultures across the globe until the advent of the industrial revolution and economy of scale, chemically based agriculture. They are now being scientifically verified to draw carbon from the atmosphere into the earth, whence it is used to produce healthy food plants.

What is Regenerative Agriculture?

"There is an urgent need to move beyond agricultural systems defined as sustainable and beyond degenerative industrial agriculture and move forward toward regenerative processes." (Regeneration Int'l: Cool the Planet, Feed the World)

Core practices include:

Conservation Tillage – various methods include 'no-till', which has been shown to increase soil organic carbon by nine percent after two years and 21 percent after six years.
Cover Crops –to maintain soil integrity and the presence of "roots and shoots" to ensure continuity of carbon-sequestering biomass
Enhanced Crop Rotations –Poly-culture rather than mono-culture allows fields to "rest" without laying fallow.
Residue Retention—"living mulches" naturally suppress weeds and ensures that the earth is not left bare, which damages the humus and allows carbon to escape into the atmosphere.
Compost -- increases soil biodiversity and microbial life which increases nutrient cycling, reduces disease, and enhances soil structure, improving productivity while reducing water and fertilizer needs.
Complexity—this points to the need for a holistic approach rather than selecting one or two techniques. The whole is greater than the sum of its parts, and each individual farm or garden must be approached as a unique entity.
Mycorrhizal Fungi Protection-- fungi are predominantly responsible for fixing soil carbon, and over long time periods-- to such an extent that it is consequential to the global carbon cycle; fungal hyphae actually increase in abundance under elevated atmospheric CO 2 conditions.

Biodynamics: Forerunner and Exemplar of Regenerative Agriculture

Biodynamics is a method of agriculture developed by Rudolf Steiner in the early 1920's. Its goal is "to heal the planet through agriculture," but on a level surpassing that so far embraced even by the regenerative agriculture movement.

All of the practices mentioned above are included in the Biodynamic method-- in fact Demeter, the Biodynamic certification agency, is now performing soil tests at the annual certification visit to ensure that the farms' humus is sequestering increasing levels of carbon! But in addition, there are two other practices: livestock integration and Biodynamic preparations. A Biodynamic farm is designed to be a self-contained living organism, producing on-site all that is needed including cow manure for fertilizer. The 'preparations' are unique to BD practice, and capture the forces released by the planets to enhance the earth's vitality:

"Facts recognised as early as 1924-34 in bio-dynamic circles — the significance of soil-life [eg. biota like fungi], the earth as a living organism, the role played by humus, the necessity of maintaining humus under all circumstances, and of building it up where it is lacking — have become common knowledge…. It is not too much to say that the biological aspect of the bio-dynamic method is now generally accepted … but with a materialistic bias, whereas an understanding of …the whole question of …the transformation of cosmic sources of energy into chemical-material conditions and energies.…is still largely absent. Yet only through such restoration [is] it possible to re-energise those healthful and constructive [earth] forces capable of halting degeneration. [Dr. Steiner] said to me, 'Spiritual scientific knowledge must have found its way into practical life by the middle of the century if untold damage to the health of man and nature is to be avoided.' " Dr. Ehrenfried Pfeiffer, from introduction to *Agriculture: Spiritual Foundations for a Renewal of Agriculture* by Dr. Rudolf Steiner.

It is evident that the climate crisis is in fact a moral and spiritual crisis, a tragic tale of human greed, aggression, ignorance, and selfishness swelled to such an extent as to cause massive—even self—extinction. Steiner taught that it was the degradation of the soil and the resultant food plants which in turn weakened the human faculty of bridging thought and feeling to will and

action. Hence, Biodynamics not only presents the most comprehensive extant model of regenerative agri-culture, but also of regenerative soul-culture.

What You Can Do: GO VEG, Join a CSA, & Buy the Produce of Farms Practicing Regenerative Agriculture

"[There is] a great need for a sense of social responsibility on the part of consumers… Purchasing is always a moral – and not simply economic – act… The issue of environmental degradation challenges us to examine our lifestyle." Pope Francis in Laudato Si

Undoubtedly the most critical step any reader can take is to stop consuming meat, as well as factory farmed dairy and packaged foods. Quitting meat will reduce your carbon footprint far more than would quitting driving. Industrialized livestock contributes to roughly 75% of deforestation. 26% of the world's arable land is used to graze livestock, including 1.5 billion cows which consume 45 billion gallons of water and 135 billion pounds of food **every day**. Producing a one pound hamburger requires about 2,500 gallons of water (or up to 12,000 gal according to a recent new estimate). Manure lagoons are the number one source of water pollution in the U.S. For the air, the oceans, the earth, and starving people all around the world, becoming vegetarian is the simplest, most effective way to stand in solidarity and promote justice and healing.

The second most important step is to support small farmers who are using the methods outlined in this article, especially Biodynamic farmers. For top quality, healing food key in Biodynamic and CSA - directories exist at localharvest.com, greenpeople.org, csacenter.org. (Information for this article came from a CSA based in Bethesda, MD.)

By joining a Community Supported Agriculture Program (CSA), you will also help free your farmer from predatory market forces that cause the loss of over 40 acres of U.S. farmland **every hour**. A season's share of produce is paid for upfront, granting food security to the consumer--and better health that comes with eating fresh organic vegetables-- while the farmer is guaranteed a fair income. (CSA is another brain child of Rudolf Steiner's *Anthroposophy* movement.)

But beware because just as big-ag has sabotaged the eco-friendly movement of organic agriculture, a new layer of companies are cashing in on the growing popularity of CSA's and are out-competing small producers with cheap, lower standard produce and door-to-door deliveries losing sight of the principles that gave birth to the movement, namely:

- *New forms of property ownership*: the idea that land should be held in common by a community through a legal trust, which leases the land to farmers.
- *New forms of cooperation*: the idea that a network of human relationships should replace the traditional system of employers and employees.
- *New forms of economy*: the idea that economics should not be based on increasing profit, but on meeting the actual needs of the people and the earth involved in an enterprise.

Ultimately, the regenerative agriculture movement will only thrive if enough people decide to buy the produce of the farms leading the r(e)volution.

<u>Sources:</u>

E-mails and articles by Regeneration International: http://regenerationinternational.org/

Andre Leu, President, Ifoam, Organics International:
https://permaculturemag.org/2016/07/regenerative-agriculture-reverse-climate-change/

Jim Fullmer: For Farmers: Demeter USA to Begin Soil Carbon Testing on Biodynamic Farms
http://www.demeter-usa.org/for-farmers/

Regenerative Organic Agriculture and Climate Change: A Down-to-Earth Solution to Global Warming paper by The Rodale Institute: http://rodaleinstitute.org/assets/WhitePaper.pdf

Pope Francis, encyclical Laudato Si as cited by Regeneration International:
http://regenerationinternational.org/the-pope-digs-in/