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# The Truth about the Green Revolution

## Contribution to GTI Forum [Technology and the Future](#)

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We are surrounded on every side with evidence of a rapidly changing global ecosystem. The problem is that in our confusion and collective desperation to do the “right thing,” we often cling to past misunderstandings and deep-seated cultural delusions of what led to “our” seeming “success” in Earth’s unfolding evolutionary drama. In trying to re-enact or extend these misconceived scenarios of past “victories” over the constraints of nature, we fail to understand, in our system blindness and species arrogance, that we are all too often hastening our own demise.

Nowhere is this tragic tendency more apparent than in the rapidly developing realm of bioengineering. Deploying genetically modified organisms (GMOs) is no longer simply a theoretical possibility. GMOs have already been developed for a variety of purposes, from the production of animal feed for meat and poultry to boosting of production of bioethanol fuels. Moreover, the expanded adoption of GMOs to meet human food needs in the coming decades is being actively championed by some of the world’s most powerful petro-chemical corporations (like Monsanto) and the world’s richest people (Bill Gates, etc.). They often argue that it is only through the greater expansion of GMOs in the world’s production of human staples that the food needs of a burgeoning world population can possibly be met in the coming decades and centuries.

The difficulty with this argument is that it is based upon a two-fold mistake stemming from (1) a fundamental misreading of the ecological evolution of recent human food history and (2) a tragic yet pervasive ignorance of the role that humans need to play in building top-soil to foster sustainable agricultural systems for human survival.

Humans will depend on soil—not oil—for a sustainable food future system. Many institutions and a vast majority of individuals will need to understand the importance of this fundamental fact very quickly.

In the very near future, principles of sustainable agriculture will need to govern food production systems all over the world. There is no such thing as a post-agricultural civilization. Nor will there ever be. Humans do not photosynthesize. We cannot. We depend as an entire species on the photosynthesis accomplished by other organisms whose characteristics and requirements now determine our future.

We cannot transcend this circumstance through the further application of engineering technology. Our lives depend upon the lives of countless other species in a complex and continuously evolving ecosystem fueled by solar energy. It is time we pay attention to how we can provide for these other species with a sustainable supply of their requirements if we wish to survive.

The reason why we have failed to see this as our task is that we have fundamentally misunderstood the dazzling accomplishments of the so called “Green Revolution,” spurred by the insights and achievements since the 1940s of Dr. Norman Borlaug and his followers. Through selective breeding techniques and the massive application of nitrogen fertilizers and petro-intensive pesticides, herbicides, and fungicides as well as the significant expansion of irrigation systems and motorized tractor power, Norman Borlaug and his associates were able to achieve remarkable increases in the yields of maize, rice, wheat, and other human food staples in the post-war years of the 1950s and 1960s. Governments around the world were impressed by these accomplishments and sought to acquire and implement this new technology. In 1970, Norman Borlaug was honored with the Nobel Peace Prize for his work as a global “hunger fighter.”

Borlaug lived to age 95, and toward the end of his career, he became, with the support of Monsanto, an advocate for developing GMOs and their expanded introduction in human food systems. In this regard, he saw GMOs, or the “Gene Revolution,” as a natural extension of his earlier work in the “Green Revolution.”

Yet the global community now must confront some very sobering and challenging questions about the direction and sustainability of this technology for the future of human survival. While

in economic and political terms, the “Green Revolution” and its successor “Gene Revolution” have very clearly led to impressive short-run “success stories,” in ecological terms these technological interventions in the structure and function of agricultural systems worldwide are now being recognized as part of a longer-term ecological disaster for a sustainable future.

The so-called “Green Revolution” was, in effect, a “black revolution,” representing a massive transformation from solar-sustainable food systems toward an increasingly petro-subsidized system on a global scale. The impressive expansion of the “miracle crops” in the Green Revolution depended entirely upon the increased use of non-renewable fossil fuels for the development of the fertilizer, the pesticides, the herbicides, the expanded use of tractor power, and the construction of water management systems and pumping for the irrigation of vast tracks of land. In addition, the rapidly evolving system increasingly involved the development of post-harvest crop storage, preservation, long-distance bulk transport, and preparation systems, all of which expended the further combustion of fossil fuels.

The result is that in a remarkably short period of human history, the world’s agricultural systems have been transformed from being net energy capturing systems to becoming instead “energy sinks.” That is, they have become systems wherein more energy was expended in the sum total of the steps involved in delivering food to humans than is currently “captured” by the photosynthesis itself. Briefly put, the energy expended in our current world food system is greater than the energy captured in the photosynthetic process itself. Indeed, out of every 10 Kilocalories represented in the food consumed by humans, 9 were supplied by fossil-fuel subsidies.<sup>1</sup>

The path for moving beyond the “energy sink” of our increasingly precarious global food system is already known. The lifelong work of Herman Daly on steady-state economics and his insights on “economics for a full world” has provided the fundamental insights for how we need now to proceed.<sup>2</sup>

In ecological terms, practical models for creating solar-sustainable agricultural and food systems are becoming more accessible. The predictable opposition to these much-needed transformations has been clearly signaled in the cumulative work of Frances Moore Lappé and Anna Lappé and other analyses of agribusiness corporations.<sup>3</sup> On an international level, the cumulative work of Dr. Vandana

Shiva on “Soil Not Oil” and the recent victory of the Indian Farmers’ Movement deserve extended attention as the human community devises new strategies for survival.<sup>4</sup>

In principle, bioengineering technologies could be deployed to create GMOs that would restore and enrich natural soil fertility and promote water conservation, but the corporations that own the patents on GMOs are more likely to be motivated by the short-term profits to be made of expanding immediate human food supplies in the Borlaug tradition. This will not be a survivable direction in the long run.

Our main problem is *not* one of “running out” of fossil fuels. The problem instead is not being able to adjust human agricultural practices and institutions fast enough to anticipate changes in temperature, drought, and flood conditions while accommodating the devastation wrought by extreme and unpredictable weather events. All of this needs to be accomplished at the same time that we need to move agriculture beyond its global fossil-fuel addiction toward a solar-based sustainable food system. The reason is simply this: by definition, a global food system dependent upon non-renewable energy supplies will, over time, simply not be renewed.

## Endnotes

1. Tim Weiskel, “The ‘Green Revolution’ Its Essence, Achievements & Aftermath,” *Transition Studies*, <https://environmentaljusticetv.wordpress.com/the-green-revolution-essence-achievements-aftermath/>; Richard Manning, *Against the Grain: How Agriculture Has Hijacked Civilization* (North Point Press, 2005).
2. Herman Daly, “Economics for a Full World,” *Great Transition Initiative* (June 2015), <https://greattransition.org/publication/economics-for-a-full-world>.
3. Frances Moore Lappé, “Farming for a Small Planet: Agroecology Now,” *Great Transition Initiative* (April 2016), <https://greattransition.org/publication/farming-for-a-small-planet>. See also the work of Food MythBusters at <https://realfoodmedia.org/programs/food-mythbusters/>.
4. Learn more about the Soil Not Oil coalition at <https://soilnotoilcoalition.org/>. See also Joseph Mercola, “Vandana Shiva: Bill Gates Empires ‘Must Be Dismantled,’” *Regeneration International*, April 5, 2021, <https://regenerationinternational.org/2021/04/05/vandana-shiva-bill-gates-empires-must-be-dismantled/>.

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## About the Author



Tim Weiskel is the founder of Cambridge Climate Research Associates and Transition Studies, an online video blog devoted to assisting organizations and individuals in understanding the transitions that must now be undertaken to enable the human community to move to a post-carbon world. Previously, he taught anthropology and history at Williams College, Yale University, and Harvard University. His principal field work was among the Baule peoples of the central Ivory Coast, focusing on the ecology of colonialism and post-colonial agriculture. A social anthropologist and historian by training, he holds a Graduate Diploma in Social Anthropology and a DPhil in Modern History from Oxford University, where he was a Rhodes Scholar.

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