

## A Call for a Truly Sustainable Agriculture

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Ernest Schusky, in *Culture and Agriculture: An Ecological Introduction to Traditional and Modern Farming Systems* (1989) states that we are likely to enter a fourth era of feeding ourselves as a species. Initially we fed ourselves as hunter-gatherers. Then about 10,000 years ago we became food producers, domesticating plants and animals and initiating slash and burn agriculture, in the Neolithic era.

In the early 20<sup>th</sup> century we began the current “neo-caloric era”, driven by non-renewable inputs including fossil fuels, fossil water and synthetic minerals. This era will be a very short period of time in human history because non-renewable calories are being rapidly depleted. This premise is supported by Ugo Bardi’s analysis in *Extracted: How the Quest of Mineral Wealth is Plundering the Planet* (2013), adopted as a Club of Rome report, which details the many inputs upon which we have become dependent for our current industrial economy, including our food and agricultural system.

The current era includes an economy focused on maximum, efficient production for short-term economic return, accompanied by a decline in public sector funding of research and more corporate investment in proprietary technologies, including licensing of Land Grant University innovations, developed with public funds, to corporations rather than releasing them in the public domain as had been the custom for decades (Pardey *et al.* 2013, Fuglie and Toole 2014).

While technologies focused on maximizing returns have vastly increased labor and land productivity, they are also depleting petroleum reserves, polluting the air, and warming the planet. Chemical fertilizers and pesticides have boosted yields, but at the expense of human health, soil health and air and water quality (Erisman *et al.* 2008, 2007; Galloway *et al.* 2008; Sutton *et al.* 2011, Udeigwe *et al.* 2015). The loss of soil organic matter has contributed to carbon releases into the atmosphere (Erisman *et al.* 2011). Fertilizers and pesticides have leached into groundwater and run off into surface water (Dubrovsky *et al.* 2010; Toccalino *et al.* 2014; Oelsner *et al.* 2017).

Short-term, incremental improvements such as more efficient light bulbs, more renewable fuels, integrated pest management (IPM) and organic agriculture are delivering benefits, however we will not adequately address the challenges we face by these alone. IPM reduces the environmental impacts of chemical controls by more efficient use. Organic agriculture relies on IPM techniques as well as the substitution of many petrochemical inputs with inputs made from renewable resources, with a few exceptions. However, neither approach necessarily avoids the use of inputs that result in unsustainable external costs, or relies fully on natural processes.

### **A regenerative, resilient fourth era**

In addition to incremental improvements, we must address the bigger picture, and develop our economy including our food and agriculture systems to achieve “regenerative”, “resilient” production. This must be done through largely self-renewing and self-regulating systems that provide a truly sustainable livelihood for the human species. John Ehrenfeld and Andrew Hoffman, in *Flourishing: A Frank Conversation About Sustainability* (2013), suggest “sustainability is not about windmills, hybrid cars and green cleaners; it is . . . about our relationships with nature, with each other, and with ourselves”. It is about relating to nature in a way that everything we use gets regenerated in the process of using it, and relating to each other in ways that increase quality of life for all, enriching us spiritually instead of fostering dependence on a “technical solution or some kind of magic efficiency”. This perspective reflects the

pioneering work of Aldo Leopold and others on land, conservation and environmental ethics, i.e., “the case for obligations to the land going beyond economic self-interest” (Flader 1987).

W.J. Lewis and his colleagues, in *A Total System Approach to Sustainable Pest Management* (1997) concluded “single tactic, therapeutic intervention” strategies “to eliminate an undesirable element by applying a direct external counterforce against it” were “not sustainable.” Based on experience and observations of similar strategies in medicine, social systems and business, they concluded that this was not only an ineffective way of dealing with pests, but a failed way of relating to nature. Furthermore, they concluded it also made the farmer more dependent on the supplier of the intervention.

“Application of external corrective actions into a system can be effective only for short-term relief. Long-term sustainable solutions must be achieved through restructuring the system . . . The foundation of pest management in agricultural systems should be an understanding and shoring up of the full composite of inherent plant defenses, plant mixtures, soil, natural enemies, and other components of the system . . . The use of pesticides and other ‘treat the symptoms’ approaches are unsustainable and should be the last rather than the first line of defense. A pest-management strategy should always start with the question ‘Why is the pest a pest?’ and should seek to address the underlying weaknesses in ecosystems and/or agronomic practices that have allowed organisms to reach pest status.”

These on-the-ground results led Lewis and his colleagues to conclude that the transition we needed to make, not only in pest management, but in our whole approach to solving problems, was to transition to “natural systems management” instead of “single tactic, therapeutic intervention” strategies. At the very end of their article they conclude that

“If we will but understand and work more in harmony with nature’s checks and balances we will be able to enjoy sustainable and profitable pest management strategies, which are beneficial to all participants in the ecosystem, including humans.”

Accordingly, we need to move beyond choices between “organic” or “IPM” strategies to achieve our design goals. Both organic and IPM practitioners need to do a better job of learning from nature how to better adapt to nature’s functions and properties.

Just as there is an imperative to transition to regenerative agricultural systems, economic systems must also evolve. As John Thackara articulates in his new book, *How to Thrive in the next Economy*, 2015, there are new social economies in many parts of the world grounded in “bioregionalism.” People work together within their own ecological regions nurturing new economies in which “unlimited economic growth” -- enabling each member to extract the maximum wealth for his or herself-- are totally discarded, in favor of a concepts of growth focused on “regenerating life on earth.”

All of this makes it clear that developing more “sustainable” economies and agriculture for our future is not just about redesigning economics and agriculture. It is about rethinking our relationship to nature, to each other and to ourselves.

Our Working Group will begin to address the inter-relationships between organic and IPM from the perspective of these social, ecological and economic transformations, taking lessons from efforts already taking place on the ground. These are among the transforming initiatives we need to address if we are truly to design flourishing food systems for a truly sustainable future.

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