



# Demonization of Science, Sanctification of Poverty

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One of the marvels of modern society is the general adoption of technologies that only a few decades ago were not only unknown but unthinkable. Advances have come with dizzying rapidity. Innovations in medicine such as knee and hip replacement have become routine and we are at the cusp of personal genomic analysis for medical forecasting. Nowhere is this technology more visible than in information technology. In the last 20 years we have seen the almost universal adoption of the personal computer, the expansion of the Internet, and the universal use of the cell phone. We are seeing the replacement of the library by internet information services such as Google and Wikipedia. Manuscripts for scientific journals are now sent and edited electronically and the entire scientific literature may soon be available online. Some of these technological advances have resulted in the leapfrogging of established technologies in the developing world such as standard telephone lines and hard copy.

Despite this embracement of technology in our everyday lives there appears to be one area where scientific progress is often rejected and scorned. We refer specifically to the adoption of agro-biotechnology despite its widespread use throughout the world, e.g. over 80% of the maize, soybean, and cotton grown in the US are genetically transformed and adoption is high in Argentina, Brazil, China, India and South Africa. Despite the progress obtained by plant breeding and the Green Revolution, despite the technology of climate controlled agriculture, despite the progress of mechanical harvest, agricultural innovation has been promoted as something to fear and reject. Transgene technology and genomics, perhaps the greatest achievements of modern biology are considered anathema by many, especially when they relate to food and agriculture. In fact, many now treat the entire paradigm of agricultural science with skepticism and scorn, e.g.

“The Green Revolution strategy integrated Third World farmers into the global markets of fertilizers, pesticides and seeds. It disintegrated their organic links with soils and communities. The progressive farmer of Punjab became the farmer who could most rapidly forget the ways of the soil and learn the ways of the market. One

outcome was environmental degradation – violence to the soil resulting in waterlogged or salinated deserts, diseased soils and pest-infested monocultures. Another outcome was violence in the community, especially to women and children. Commercialization, linked with cultural disintegration, created new forms of addictions and new forms of abuse and aggression.” (Shiva, 1993)

Synthetic fertilizers, long considered one of the gifts of chemistry, are now seen as soil poisons, and pesticides rather than treated as plant medicines are considered instruments of death. Even traditional plant breeding is scorned with a call to return to traditional landraces or heirloom cultivars, an attitude that is not far from Johnny Appleseed’s rant against grafting “They can improve the apple in that way, but that is only a device of man, and it is wicked to cut up trees that way. The correct method is to select good seeds and plant them in good ground and God only can improve the apple.” (Fedoroff and Brown, 2004). Hybrids that increased average maize yields by a factor of seven are considered inappropriate for areas that are food deficient such as sub-Saharan Africa. The fact of the matter is that science and especially science in agriculture is being demonized. The scientist has been transformed from the gentle Jonas Salk in a white lab coat eliminating polio, to the misguided and ethically-challenged Dr. Frankenstein creating a monster. For the most fervent activists, science and technology are not only capitalist, reductionist or inadequate – they are liabilities rather than solutions and even murderous (Yapa, 1993).

At the same time, traditional peasant agriculture and subsistence slash-and-burn farming, instead of being considered backwards and poverty inducing, are touted as culturally positive with benefits to be treasured and emulated. Poor struggling farmers are represented as joyful peasants in native costumes – picturesque locals, in a sort of simple paradise. Primitive cultures are considered not only essential to preserve, but disrespectful to contaminate with modern technology. Often improvement in their agriculture is considered a loss of culture and in a new twist, these populations instead of being urged to develop now need to be saved from develop-

ment. Poverty instead of being a scourge has been sanctified! The constant toil and the threats of famine are ignored while extolled as a life supposedly rich with ritual and tradition. “Sustainable” small farming solutions assume that farmers or indigenous people would or should be content with a little more than subsistence and that their little farms should be world enough for them. In this view, subsistence farmers are not economic agents who can legitimately seek profit from their activity by applying the best technology and management techniques but are cast as guardians of seeds, biodiversity, and natural wisdom.

The leaders of the movement to demonize science in agriculture, with perfectly good intentions, have been powerful in turning public opinion as they jet around the world and communicate via their iPods, laptops or netbooks while extolling a peasant agriculture. Their disdain of technology in agriculture is clearly one dimensional. What is disturbing is that the demonization of science has encouraged a new anti-progress drive. Instead of being considered “red in tooth and claw” and feared as unpredictable wild, and dangerous, nature is considered benign, warm and nurturing as typified in the term Mother Nature. Interfering with nature is considered criminal violence. In this view, the past is always preferable to the future. The struggle of frontier life is cast as the *Little House on the Prairie*; the monotony of salt pork and grits is considered the lost world of healthy country cooking; traditions are reinvented as the fear of milk fever and tuberculosis is conveniently forgotten when practitioners of natural and holistic medicine return to organic food, meditation, yoga, and herbal cures. Famine and despair from crop-loss at the end of a year of labor and the gloom portrayed in Van Gogh’s painting *The Potato-eaters* are ignored in the narratives of traditional peasant farming. Their struggles are poignantly described by an ancient Egyptian scribe: “Dost thou not recall the picture of the farmer when the 10th of his grain is levied? Worms have destroyed half the wheat, and the hippopotami have eaten the rest; there are swarms of rats in the fields, the grasshoppers alight there, the cattle devour, the little birds pilfer” (Durant, 1954).

There are key terms used by anti-scientists who lead this new Luddite movement. The benign



ones are green, ecologically-friendly, natural, organic, participatory, pesticide-free, pro-poor, holistic, indigenous, local; the inflammatory ones are GMO, monster, frankenfood, mad scientist, multinational. Names become symbols (Fig. 1) and labeling has consequences. Monsters must be executed, witches burned, and vampires staked through the heart. It is no wonder that anti-science radicals have resorted to uprooting experiments and burning laboratories. There have been "cremate Monsanto" campaigns in India and Haiti. Perhaps worse, fear of science has generated a new anti-intellectualism that has found outlets in various mass movements such as the fear of inoculation or fluoridation, which erupt as political obsessions; recent manifestations are the present concerns over teaching of evolution, acceptance of creationism, and disregard for the evidence for global warming. Various non-scientific theories of food and human nutrition that spring up without rigorous testing have divided the population and turned it against modern agriculture and food production. Appealing

holistic theories claim that each and every single element of reality is connected to the whole in mysterious ways. Thus, the best way to understand reality is not through science, and the best foundation for our decisions or opinions is not scientific rationality. A more 'authentic' relation to everything in the "real world" is easier mediated by sympathy or resentment, for instance. Nothing is therefore neutral; everything requires us to take a stance, to become activists: the eucalyptus is bad and the earthworm is good, corporations are bad and subsistence farmers are good, cow nitrogen fertilizers are bad and cow dung is good, copper sulfate is good while glyphosate is bad. And all bad things must be fought in order to preserve the mythical equilibriums of Mother Nature. We recall that in 1953 (the year Watson and Crick described the structure of the DNA), Martin Heidegger famously delivered a lecture now titled *The Question Concerning Technology* where he showed that the essence of modern technology is the "enframing" of nature as a "standing reserve" of exploitable resources.

Somewhere else, he also said that exploiting nature through modern agriculture is equivalent to nothing less than "genocide":

"Agriculture is now a motorized food-industry – in essence, the same as the manufacturing of corpses in the gas chambers and the extermination camps, the same as the blockade and starvation of the countryside, the same as the production of the hydrogen bombs." (Fariás, 1989)

Horticulture is in the center of this controversy. Our own Society would seem to be schizophrenic as we have outlets for both biotechnology and organics. While the core value of ISHS is indeed science, horticulture still uses an ancient set of technologies such as grafting and pruning, and has an esthetic and cultural side. In general, professional horticulturists are pragmatic and reasonable. We know that unwise and indiscriminate use of pesticide is harmful and we rue the previous use of arsenicals and mercurials but we are also aware of the problems of epidemics and epizootics. We know that over-fertilization can reduce quality and contaminate aquifers but we are aware that micronutrients may be required and that applied nitrogen, potassium and phosphorus is often essential to sustain and increase crop yields. We revere some of the qualities of landraces and heirloom cultivars but recognize there is a reason they are no longer grown on a large scale. Most of us do practice organic horticulture in our backyard vegetable gardens as practical on a small scale but we are quick to use herbicides on our lawns to eliminate crabgrass and dandelions.

The goals of science-based horticulture and organic agriculture are not different. Both long for food safety, healthy and nutritious diets, and equitable returns to all parties. The difference is that the organic movement has morphed into a religion with an ethos that many find difficult to understand. For example, the protest against tissue culture, claiming that plants need to fulfill their life cycle, is incomprehensible to agricultural scientists. The edict that organic fruit trees must be based on organically-produced rootstocks seems weird to pomologists. The diatribes against pesticides is strange since the organic movement accepts spraying with copper and lime sulfur; their unwillingness to use inorganic fertilizer is also odd since applications of rock phosphates are considered acceptable. The proponents of these systems are much less doctrinaire when their health is concerned. Pesticides are bad for plants but medicines for humans are good. Ionizing radiation for pest control is anathema but acceptable for the control of cancers. Scientific horticulture works to minimize pesticides, appreciates the biological control of pests, and applauds the elimination of pesticides in greenhouses. We know that this technology involving a sophisticated role of moni-

Figure 1. Recurrent symbolic images in the agricultural biotechnology wars.



toring, raising of predators, use of complex pheromones, requires more not less science.

What is difficult to understand is that the organic movement, in spite of its laudable goals of eliminating dangerous pesticides, refuses to consider a viable alternative: namely, the use of biotechnology to exploit natural resistance in the living organisms. All plants have natural resistance and immunity to many pests and diseases. Some of our most prized plants, such as narcissus are pest free because of natural resistance. The fact of the matter is we are living in a world with a great and growing need for biotechnology, especially in poverty stricken areas. New devastating virus problems such as papaya ringspot, brown streak in cassava, bacterial wilt of bananas, and huanglongbing in citrus may only be controlled with biotechnology. Furthermore, the problems of malnutrition in the poorest areas of the globe might be addressed by improving the nutrition value of foods along with increasing yields, both with the aid of biotechnology. We love our home gardens but we are convinced that the feeding of enlarging populations will require factory production of food. We appreciate biodiversity but we know weeds constitute the greatest peril to agriculture in many parts of the world. We are aware that we must direct Nature by her methods to survive.

*Yet Nature is made better by no mean  
But Nature makes that mean; so over that art  
Which you say adds to Nature, is an art  
The Nature makes.*

Shakespeare, The Winter's Tale IV:iv

In the last analysis we are horticulturists...lovers of gardens, lovers of culture. But we are also scientists, the science based on the courage "to know." We revel in the search for the unraveling of Nature for the betterment of humankind.

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