

# Organic agriculture in the United States: A 30-year retrospective

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## Abstract

Since the early 1980s organic agriculture has undergone enormous growth and innovation in the US and throughout the world. Some observers have pointed to the US Department of Agriculture's 1980 *Report and Recommendations on Organic Farming* as having provided the catalyst for many of these developments. It is important, however, to understand how the evolving character of organic ideology during the 1960s and 1970s helped lay the foundation for moving organic agriculture onto the US governmental agenda in the early 1980s. We explore these and other contextual factors surrounding the USDA Report's release, including its methods, findings and recommendations, and both positive and negative reactions, as well as those factors that led to the Report's declining influence by the decade's end. The need for agricultural sustainability has played an important role in shaping, not only the path of organic agriculture in the US but also the overall politics of American agriculture. Legislative efforts to support organic agriculture have evolved along with this altered policy environment and are considered here within the broader context of the politics of sustainable agriculture. Next, we consider the organic industry's transition from a privately managed enterprise to the pivotal role now played by the federal government in the administration of the National Organic Program. Calls to move 'beyond organic' are also examined. Finally, we explore the impact of sustainable agriculture, agricultural research and farm structure upon the future of organic agriculture in the US. The politics within these three interrelated domains of public agricultural policy will likely bear heavily upon the future of organic farming and the organic industry as a whole.

**Key words:** organic farming, organic agriculture, sustainable agriculture, alternative agriculture, organic ideology, R. Rodale, US Department of Agriculture, agricultural research, agricultural policy, legislation, organic marketing, USDA Certified Organic, beyond organic

## Introduction

During the past three decades in the US, indeed, throughout much of the world, we have witnessed remarkable innovation and growth in the field of organic agriculture. Interestingly, however, few (if any) advocates, practitioners or analysts foresaw the magnitude of these impending changes. In 1976, for example, the editor of a leading organic monthly, *Acres U.S.A.*, had this to say about the future prospects for what he called ecogriculture: 'What you have here is a slowly evolving technology ... It will be at least a generation before the USDA [US Department of Agriculture] recognizes us ... We're off to a slow but sure start'<sup>1</sup>. Despite this forecast, most members of the organic farming community remained stubbornly convinced that they were on the right track, that time and circumstances were on their side, that chemically based, conventional agriculture was destined

to falter, and that they would keep 'fighting the battle,' as Walters put it, for however long it might take.

While the improving prospects for organic agriculture may have eluded the purview of agricultural observers during the 1970s, there was growing recognition among a small cadre of political scientists, rural sociologists and agricultural economists that important societal changes and new political demands were beginning to alter the agricultural policy landscape [pp. 129–255]<sup>2</sup>. Among those who saw these changes coming was Don Paarlberg, distinguished professor of agricultural economics at Purdue University, who served ably in USDA subcabinet positions in three Republican administrations. Paarlberg saw an expanding agenda for US agriculture and predicted that its proponents would marshal a significant challenge to the advocates and gatekeepers of the traditional farm policy agenda<sup>3</sup>. Declaring that '[t]he agricultural establishment has, in large measure, lost

control of the farm policy agenda,' Paarlberg pointed to such policy issues as food stamps, school lunch programs, environmental protection, rural development, land use, civil rights and collective bargaining for farm workers as matters 'placed on the agenda over the protests of the agricultural establishment' [p. 96]<sup>4</sup>. According to Paarlberg, the agricultural establishment included 'the farm organizations, the agricultural committees of the Congress, the Department of Agriculture, and the land-grant universities' [p. 95].

Many of these 'new agenda' issues overlapped with the ideological orientation and policy objectives of organic farmers and their supporters. Paarlberg, however, in his otherwise prescient observations regarding the evolving character of US farm policy, failed to include organic farming in his portrayal of the new agricultural agenda. At the time when agricultural policy analysts, such as Paarlberg, had begun to recognize the broad outlines of a new agricultural policy agenda, the organic farming movement was quite small and its core ideology was conspicuously apolitical. In terms of national policy, the organic community was unorganized, politically inactive, and thus virtually undetectable in the national policy arena. Moreover, with Secretary of Agriculture Earl Butz proclaiming an anti-organic message to a receptive conventional agriculture community—asserting that 50 million Americans would starve to death if the country were to switch to organic farming techniques<sup>5</sup>—it would have been difficult for any analyst to predict that organic agriculture would soon achieve a measure of recognition and influence within national agricultural policy circles.

In the 1970s, conventional agricultural science, ideology, and policy largely reflected and promoted the specialized, chemical-intensive, high-tech, export-oriented industrial agricultural model that had emerged, and then quickly accelerated, in the post-World War II period. That model, when combined with conventional agriculture's negative critique of organic farming, sent a clear message to the organic farming community: organic systems would have no place in the future of American agriculture. Given this political and ideological context, organic farmers largely avoided the policy process, choosing to withdraw from a system of agricultural politics and science that appeared to be uniformly opposed, even hostile, to them, both philosophically and scientifically. Other features of the movement's overall ideology—anti-materialism, anti-corporatism, a general distrust of large public and private organizations, and a preference for personal and political independence—reinforced its apolitical stance, particularly at the level of national policy.

Given this evolving admixture of politics, economics and technology, organic farming, when viewed through the lens of conventional agriculture in the 1970s, seemed trivial and out of touch, trapped in the grip of its own ideology, hampered by symbols of the past that it seemed to represent, and overwhelmed by the tides of change sweeping through American agriculture. Only in

retrospect can we see how its ideology and technology would soon place organic farming solidly within the framework of an expanding and increasingly influential new agricultural policy agenda.

## Organic Farming and the New Agricultural Agenda: The Convergence of Ideology and Politics

The new food and agricultural policy agenda identified by Paarlberg, and other analysts, during the mid- to late 1970s [pp. 129–255]<sup>2</sup> evolved alongside a complicated mix of broader societal reform movements that had begun in the 1960s and continued to gain momentum during the following decade<sup>6</sup>. The durability of the new agricultural agenda can be explained, at least in part, by its ideological convergence with these broader, largely non-agricultural, reform movements. The new agenda also gained strength from various concerns that arose from within the ranks of the conventional agricultural establishment itself. These traditional gatekeepers of agricultural policy could no longer ignore such troubling externalities as soil erosion, ground and surface water pollution, threats to human and animal health from excessive use of agricultural chemicals, the demise of small farms and rural communities, and a growing chorus of criticism, from both internal<sup>7</sup> and external<sup>8</sup> voices, regarding public agricultural research priorities and funding mechanisms.

This combination of an expanding and politically astute coalition of supportive new agenda groups; growing concerns from within conventional agriculture itself regarding the negative impacts of modern production agriculture; a large and somewhat bewildering array of broad societal reform themes, issues and new ways of thinking; and, finally, a bold and unexpected USDA organic farming study launched in 1979<sup>9</sup>, helped pave the way for organic farming to move onto the national agricultural policy agenda in the early 1980s. In order to show how these developments helped clarify the relevance of organic farming to the goals of the new agenda—and to the challenges of American agriculture—we turn first to the ideology and politics of the organic farming movement.

### *The ideology of organic agriculture*

During the 1960s and 1970s, organic farmers held a decidedly dim view of conventional farming trends and technologies, objecting to the increasingly heavy reliance of these systems on petroleum-based production inputs, especially in the form of pesticides and synthetic nitrogen fertilizer. Organic farmers were also concerned about ever-larger farms, larger and more expensive farm machinery, corporate farm ownership, specialized production schemes [such as crop monocultures and large confined animal feeding operations (CAFOs) and increased use of

animal drugs], water resources, food quality and safety, personal health and safety, and the gradual decline of family farms, small rural communities, and localized food marketing and processing facilities. These concerns were not unique to organic farmers but were widely shared, in varying degrees, by most new agenda participants, some elements of the larger reform movement, and a growing number of consumers<sup>10</sup>.

Having a clear sense of what could be done to help address these growing concerns would distinguish the organic farming movement from other elements of the new agricultural agenda. When consumers expressed concern about pesticide residues on food, organic farmers offered pesticide-free food; when the conservation community voiced concern over soil erosion and compaction, water pollution or loss of wildlife habitat, organic farmers insisted that their production systems minimized these impacts; when rural development advocates called for the revival of small rural communities, organic farmers noted the connections between small farms and viable rural towns. It would be decades before agricultural scientists and policy makers would begin to seriously explore the validity of these and other claims. However, many new agenda participants (and other reform groups) did come to accept and promote organic farming and its potential for addressing these problems and concerns.

**Ideological leaders.** In the debates surrounding the future direction of American agriculture during the 1960s and 1970s, proponents of organic agriculture drew upon a rich ideological heritage. It would be hard to overstate the importance of this ideology in sustaining the work of organic farmers and their supporters during this uncertain period. As Robert Lane, a noted authority on the subject of ideology, wrote some 50 years ago, most ideologies ‘have a body of sacred documents (constitutions, bills of rights, manifestoes, declarations), and heroes (founding fathers, seers and sages, originators and great interpreters)’ [p. 15]<sup>11</sup>. The history of organic agriculture produced many such heroes and sacred documents<sup>12,13</sup>. Here, only a few of the more prominent American and European organic ‘seers and sages’ are highlighted, particularly those who appear to have exerted the most direct influence upon the debates of the 1960s and 1970s.

The late Robert Rodale, long-time editor and publisher of *Organic Gardening and Farming* magazine, arguably, was the leading voice for the organic farming community up until his untimely death in 1990, the tragic result of an automobile accident. Throughout his career, Rodale drew upon a well-formed set of underlying philosophical themes. His father, J.I. Rodale, founder of *Organic Gardening and Farming* magazine, exerted enormous influence over his son. Further, according to Rodale’s own words, three additional ‘sages’ greatly influenced his thinking [pp. 14–16]<sup>14</sup>. First, Rodale regarded Charles Darwin’s book, *The Formation of Vegetable Mould, through the Action of Worms, with Observations on Their Habits*, published in 1881<sup>15</sup>, as a classic in the field of

organic agriculture. Second, F.H. King, former chief of USDA’s Division of Soil Management, according to Rodale, made ‘even more direct contributions to the origins of organic farming theories and practices ...’. Dr King was ‘extremely impressed by the careful handling of organic materials by all Oriental farmers—a direct contrast to the wasteful and destructive methods of many American farmers.’ King’s book, *Farmers of Forty Centuries* (1911), dealing with intensive agriculture in China, Japan and Korea<sup>16</sup>, was regarded by Rodale as a major contribution to the organic farming movement. Finally, Rodale cited Sir Albert Howard, ‘who is considered the father of organic farming.’ From his classic book, *An Agricultural Testament* (1940)<sup>17</sup>, to his so-called Indore method of composting developed while serving as director of the Institute for Plant Industry at Indore, India, and his work as associate editor of *Organic Gardening and Farming*, Howard had earned a hallowed position in the history of organic agriculture. As he stated in 1976, Rodale believed that ‘the organic farming and gardening idea thrives as a continuation of [the] ideas’ of these three men<sup>14</sup>.

While some observers viewed Rodale’s ideas as overly purist and thus unrealistic, these charges subsided in the early 1980s when the Rodale Research Center unveiled a series of long-term, comparative cropping trials that attracted considerable attention from within the conventional agricultural science community<sup>18</sup>. These trials, designed by Richard Harwood, a well-known conventionally trained scientist, conformed to conventional scientific protocols and were aimed at addressing a number of agronomic questions pertaining to the performance of organic cropping systems and the informational needs of larger-scale organic farmers. *The New Farm* magazine also contributed substantially to the Rodale image as spokesperson for the full spectrum of organic growers, including large-scale conventional farmers wishing to transition to less chemically intensive and expensive approaches. These and other initiatives ensured that Rodale himself, and the entire Rodale enterprise, would constitute the single most influential political and intellectual force within the organic agriculture movement of the late 20th century.

With the death of Rodale in 1990, however, and the emergence of scores of supportive new agenda nonprofit groups, legislators, industry leaders, marketing associations, food writers, nutritionists, film documentarians and farm journalists; expanding numbers of organic producer and certification organizations; and a growing contingent of agricultural researchers and administrators, the Rodale organization gradually assumed a somewhat lesser, though still significant, role within the overall organic farming movement.

E.F. Schumacher’s influence during this period was enormous, not only among organic farmers, but just as importantly, among other reform elements—such as the 1970s back-to-the-land movement—that would come to

practice and support organic agriculture. With publication in 1973 of *Small is Beautiful: Economics as if People Mattered*<sup>19</sup>, Schumacher became an instant celebrity in both academic and nonacademic circles. The similarities among Schumacher's ideology and the ideologies of various new agenda groups were unmistakable. It was also apparent that he himself was, in turn, influenced by the thinking of various reform groups, as well as such religious philosophies as Zen Buddhism and Christianity, plus Gandhi and Thoreau, to highlight just some of the more prominent ideological themes appearing in *Small is Beautiful*.

Dr William Albrecht, long-time professor in the Department of Soils at the University of Missouri, stands out as one of the earliest and most influential academic spokespersons for organic farming ideas. Although he retired in 1959, he continued to write about the connections between soil quality and human and animal health nearly up until his death in 1974. His role from the 1940s through the 1960s was vitally important at a time when the organic farming movement and its technologies lacked academic support and credibility.

Albrecht's work would be chronicled and popularized by Charles Walters, Jr.<sup>20</sup>, who, as editor and publisher of *Aces U.S.A.*, would himself become an influential figure among a certain segment of larger-scale organic producers (or as Walters preferred to call them, eco-farmers), and the newly emergent organic farming production input and supply industry: companies that manufactured and sold various kinds of natural soil amendments and crop protection technologies. Walters was a staunch supporter of these companies and technologies.

This brief review of organic agriculture's more influential 'seers and sages' would not be complete without mentioning the contributions of Jim Hightower and Wendell Berry. Their major works of this period, Hightower's *Hard Tomatoes, Hard Times* (1973)<sup>8</sup>, and Berry's *The Unsettling of America* (1977)<sup>21</sup>, influenced the thinking of individual citizens and the leaders of major agricultural research institutions. Hightower's critique of land-grant university research priorities would set off a contentious debate over the impacts of these priorities on small farms and farm workers. Berry's more poetic yet powerful review of agricultural and farm structure trends also represented a challenge to land-grant university priorities. For thousands of new agenda participants and ordinary citizens, these writers helped 'connect the dots' between agricultural research and other areas of public policy, and the environmental and societal effects of conventional agriculture.

Finally, the philosophical underpinnings and public policy goals of both organic farmers and their ideological spokespersons converged with, and benefited from, the broad-based, powerful, even transformational, ideas and reform agendas of the 1960s and 1970s<sup>6</sup>. This was an era, for example, that saw: the emergence of modern environmentalism; Rachel Carson's influential critique of the

negative effects of synthetic pesticides<sup>22</sup>; the Civil Rights and Women's Liberation movements; calls for participatory democracy ('power to the people'), and a loss of faith in large organizations, both public and private, energized, in part, by the anti-war movement; Earth Day, with its plea for a broad societal commitment to addressing a host of emerging environmental threats such as global warming and ozone depletion, and for new technologies and programs such as recycling and solar energy that could help alleviate our dependence on fossil fuels; the introduction of new terms such as ecological economics, deep ecology, ecological accounting and industrial ecology; and, finally, the first opportunity to look back at Earth from outer space and behold its seeming fragility.

These and other broad reform themes supported the very idea of change, and the need for new ways of conducting society's business. The new agricultural agenda groups, and likewise the organic farming movement, would benefit politically from this larger, unprecedented wave of reform and the new ways of thinking that it engendered.

### *Basic ideological concepts and core beliefs*

**Nature is capital.** Organic farmers during the 1960s and 1970s believed that modern man had lost touch with nature, that he had become insensitive to nature's intricate, delicate and immutable laws. As Schumacher put it, man no longer sees 'himself as a part of nature but as an outside force destined to dominate and conquer it. He even talks of a battle with nature, forgetting that, if he won the battle, he would find himself on the losing side' [p. 13]<sup>19</sup>.

Organic farmers agreed with Schumacher's assessment of the problem. According to Schumacher, man's failure to see the difference between income and capital and to recognize the importance of the capital nature had provided (and which was being consumed at a rapid rate) had created a tragic illusion—the 'illusion of having solved the problem of production' [p. 13]. Schumacher used fossil fuels to illustrate the difference between capital and income, as well as to emphasize the importance of 'natural capital':

First of all, and most obviously, there are the fossil fuels. No one, I am sure, will deny that we are treating them as income items although they are undeniably capital items. If we treated them as capital items, we should be concerned with conservation; we should do everything in our power to try and minimize their current rate of use; [but] ... far from being interested in studying the possibilities of alternative methods of production and patterns of living ... we happily talk of unlimited progress ... [p. 14].

**Soil is the source of life—feed the soil, not the plant.** Developing and maintaining soil quality with proper balances of organic matter, beneficial microbial and biological activity, and micro- and macronutrients has long

been a central activity and objective of organic farmers. Indeed, many argue that soil quality is the ‘key’ to long-term sustainable agriculture<sup>9,23</sup>. Organic farmers believed that synthetic chemical fertilizers and pesticides (and the monocultural cropping systems that these materials permit) disrupted these sensitive balances, thus requiring ever-larger applications of artificial compounds. There was also the widely held belief that food produced in artificially fertilized soils had less nutritive value, and was likely to have toxic pesticide residues that were linked to cancer, birth defects and various forms of antisocial behavior (such as crime), as well as psychological depression and hyperactivity, even gradual declines in mental acuity. Continued reliance on farm chemicals, it was alleged by some advocates of organic technologies, would lead to greater human suffering, more widespread illness, further declines in soil quality, and ultimately, the fall of modern civilization.

**The organic ethic—additional precepts.** Soil quality was the foundation that supported a number of additional core beliefs, not only about such matters as the proper way to structure a farm enterprise so as to optimize soil health, the health of farm crops and animals, and the health of those families who lived on the farm, but also about how to evolve appropriate values and lifestyles in keeping with the realities and limitations presented by Mother Nature. These wider concerns were critical parts of the total organic ethic or model.

According to Robert Rodale, organic ideology went beyond the simple matter of building and maintaining soil quality:

Organic farmers and gardeners not only wish to avoid the use of many pesticides that can cause damage to wildlife, and create toxic effects in a variety of ways but they also are very much concerned about the prevention of erosion, the adding of humus and other organic matter to soil to improve fertility, the preservation of small family farms, localized marketing of food, energy conservation, and proper nutrition. It is a rare organic grower who does not share those concerns, or pursue those activities [p. 4]<sup>14</sup>.

The precept of anti-materialism—one of the pillars of organic ideology—appealed to a growing segment of the American public. The popularity of *Small is Beautiful* can be explained, in part, by Schumacher’s eloquence in describing this issue. ‘There can,’ he said, ‘be ‘growth’ towards a limited objective, but there cannot be unlimited, generalized growth’ [p. 31]<sup>19</sup>. Schumacher’s economics of ‘peace and permanence,’ with its people-centered focus on anti-materialism, non violence, ecological sensitivity and conservation, appealed to organic farmers and their supporters. The ideology of making-do-with-less, or as one observer put it, ‘living lightly on the earth’<sup>24</sup>, captured much of what organic farmers believed in, and were trying to do.

Finally, the quest for a greater degree of independence formed a critical part of organic ideology. Many organic

farmers found the growing specialization and interdependence of society’s large organizations both repugnant and a threat to personal and national security. This belief fostered numerous features of the organic farming movement: local marketing cooperatives, it was argued, would help free people from large, impersonal, and interdependent marketing and distribution systems; better health, a by-product of eating organically grown food, would increase one’s independence from a costly and sometimes indifferent healthcare system; the use of organic fertilizers and other on-farm resources would enable farmers to produce healthy crops with little or no reliance on the wasteful, expensive and unreliable petrochemical industry. Renewable sources of energy were sought for the same reasons. To be independent, Rodale explained, ‘means that you have a basic liberty of existence . . . The person who is truly independent will live well no matter what happens to the rest of society’<sup>25</sup>.

Thus, organic ideology included not only a set of convictions about farming techniques and agronomic principles, but also ideas for how to live in a resource-constrained world. The failure of conventional agriculture to investigate the technology of modern organic farming, or to grasp the durability and widening appeal of its ideology, may help to explain how it could have so easily dismissed organic farming as being out of touch with the realities and requirements of contemporary American agriculture, not to mention the desires of a growing segment of American society.

### *Organic ideology: A two-edged sword*

As organic farmers began to mobilize politically around the reassuring principles of their ideology (see below), conventional agriculturalists had begun to express a quite different set of reactions to the symbols and politics of organic farming. Many agricultural scientists and administrators, who were establishing professional careers and scientific reputations during the 1960s and 1970s, had been born and raised on farms much like those depicted in the expanding literature of organic agriculture. Memories of dawn-to-dusk work on these kinds of mixed crop–livestock farms collided with what they saw as little more than the romantic symbolism of organic farming. Armed with degrees from land-grant universities, schooled there in the latest scientific discoveries and engineering marvels, many agricultural scientists, understandably, were non-plused by the notion that these older, more diversified farm enterprise models deserved their support. Just as high technology was transforming other sectors of society, so too would it transform agriculture. The economic recession that began in 1974—and continued well into the 1980s—was widely attributed to the notion that the US had lost its competitive edge in high technology to Japan and West Germany. Instead of going back to an earlier farming model, US agriculture was being asked to help shore up America’s technological competitiveness

through the expansion of research in such fields as biotechnology<sup>26</sup>. There were also concerns about agriculture's ability to maintain productivity gains, which were showing signs of leveling off<sup>27</sup>. For these and other reasons, the conventional agricultural community believed that the age of specialized, high-technology, high-yield agricultural production had arrived, just in time to meet the needs of expanding US and world populations. The admonition to American farmers from Secretary of Agriculture Earl Butz, to plant 'fence row to fence row'<sup>28</sup>, was emblematic of the day's conventional ideology.

However, there was more to conventional agriculture's opposition to organic farming than these kinds of macro-economic and technical issues. Many agricultural scientists educated during the 1960s and 1970s now held leadership positions within the agricultural research system, achievements gained, in part, from their own peer-reviewed research on the very same technologies now being criticized by (what appeared to be) non-credentialed and overly zealous organic farmers, some of whom, it was believed, lacked previous farming experience or scientific training. Psychologically invested in the new technological paradigm, it was particularly difficult for such scientists and administrators to accept criticism from an agricultural constituency that, in their minds, simply lacked credibility. Moreover, the organic community's growing alignment with non-agricultural constituencies (i.e., 'new agenda' groups favoring a liberal political agenda)—that had begun to seek access to scarce research dollars—made their demands all the more difficult to tolerate, or even comprehend.

Thus, the ideology that inspired and sustained organic farmers caused most within conventional agriculture to reject both the technology of organic farming, and its new agenda supporters. Had the ideology of organic farming been less powerful, less comprehensive, and perhaps less strident and uncompromising, it might have been less threatening to conventional agricultural scientists and other agricultural policy gatekeepers. Under these conditions, it is conceivable that conventional agriculture would have been more willing to explore the technology, *per se*, of organic farming (something scores of agricultural scientists would later do), as well as the ways in which these technologies might contribute to a more sustainable agriculture. However, as we learned some 50 years ago from Edelman<sup>29</sup>, it is often the symbols—and not the reality—that guide our reactions to matters involving both public and private institutions.

## Organic Agriculture Moves onto the Governmental Agenda

### *USDA's 1980 Report and Recommendations on Organic Farming*

The organic farming community, in July 1980, received an unexpected boost from USDA with the release that month

of its much anticipated *Report and Recommendations on Organic Farming*<sup>9</sup>. Since June 1979, the USDA Study Team on Organic Farming, assembled earlier that year by Secretary of Agriculture Robert Bergland, had quietly conducted the first-ever USDA-authorized investigation of organic agriculture in the US. (The Study Team's methods and findings are discussed below.) Although the Study Team, chaired by Agricultural Research Service (ARS) soil scientist Robert I. Papendick, had kept a low profile throughout its year-long investigation, the Team's activities had been closely monitored by both the conventional and organic agricultural communities. Once the Report was released, most analysts, including members of the Study Team itself, would characterize it as cautiously supportive of organic techniques. Others in both these communities would exhibit polar-opposite reactions. The organic farming community expressed surprise, relief and incredulity, finding it difficult to believe that a USDA study of organic farming would conclude that organic systems displayed a number of positive agronomic and conservation characteristics. The conventional community would also express surprise and disbelief, but certainly not relief—it reacted negatively to the Report, as well as to the very idea that such a study would have been sanctioned, funded and conducted by USDA<sup>30,31</sup>.

These initial reactions to the Report would trigger an intensified debate, not only on the merits of organic farming but also on the consequences of conventional, chemical-based farming for the long-term sustainability of American agriculture. Ironically, the intensity of conventional agriculture's negative critique of the Report would prompt some leaders of the organic farming community to suggest that the word organic (which seemed especially repugnant to the conventional community) be replaced with such terms as biological, ecological, alternative, sustainable, practical, regenerative and even independent. This deliberate strategy of defending and advancing the principles of organic agriculture by introducing less threatening and in some cases more scientific-sounding words would have substantial, unintended consequences, not only for the evolution of organic farming over the next three decades but also for the larger debate about the future of American agriculture. This aspect of the history of organic agriculture will be considered later in this retrospective.

**Secretary of Agriculture Bob Bergland.** Nominated to be Secretary of Agriculture by President-elect Jimmy Carter in December 1976, Bob Bergland brought both political and farming experience to the Office of Secretary. He had operated a 640-acre grass seed and small grains farm near Roseau, Minnesota, most of his adult life, was elected to Congress in 1970 on the Democratic-Farmer-Labor Party ticket, and served four terms in Congress from Minnesota's northern 7th District. In the mold of a Midwestern, politically progressive, northern agricultural tier Democrat, Bergland had long championed the causes of ordinary workers and small-scale

farmers. Despite his politically progressive philosophical predilections, it would be a powerful yet somewhat unusual combination of issues and circumstances that led to Bergland's decision to launch a study of organic farming.

Bergland assumed the Office of Secretary at a time of severe financial stress and political turmoil in farm country. The newly formed American Agriculture Movement and other traditional general and commodity farm groups lobbied Bergland for increased government assistance to farmers in the wake of collapsing commodity prices. The dramatic tractorcades through the streets of Washington, DC, in the late 1970s dramatized the pain and frustration of many American farmers during this era's protracted farm crisis. Although much of the financial squeeze being felt by many of these farmers was the result of having borrowed heavily in prior years during a period of sharply higher prices—brought on by a series of crop failures and expanded exports—the reality of escalating fuel and fertilizer costs also played an important role in creating the cost-price squeeze of this period. While sharply higher energy prices, alone, may not have produced a financial crisis for America's farmers of the kind that developed in the late 1970s and 1980s, concerns over the cost and availability of energy needed to operate a conventional farm certainly were important and worrisome issues for farmers and farm policy makers.

Shortly after becoming Secretary, Bergland received the National Resources Inventory (NRI) report detailing a host of alarming problems and trends concerning the nation's soil and water resources on private lands<sup>32</sup>. This report served as a rallying cry for soil, water and wildlife groups throughout the country, who demanded that these natural resources issues be addressed more aggressively despite growing federal deficits and calls for restraints on government spending.

This would also be a period marked by heightened concerns over structural trends in US agriculture, particularly the continuing decline in numbers of mid-sized family farms, increasing concentration of land ownership, rising land prices, absentee farmland ownership, and degradation of soil and water resources (trends caused in part by incentives in commodity policy), and many other issues<sup>33</sup>. In response to these mounting concerns, in 1979 Bergland commissioned a formal review of US farm structure. The findings and recommendations of this review were published 2 years later<sup>34</sup>.

While attempting to deal with these and other concerns, Bergland was reminded of the success of his neighbors back in Minnesota, Paul Billberg and his son Dale, who had been farming organically for some 6 years. The Billberg's 1500-acre farm included about 1000 acres of cash grains such as wheat and barley, and sizeable herds of cattle and sheep. Bergland was impressed by the Billberg's operation and likewise that Paul Billberg was 'a prominent, politically conservative farmer and active Farm Bureau member ...' [p. 255]<sup>35</sup>. When he returned to Washington, DC, after the Christmas holidays in

1978—which had included a lengthy visit with Billberg—Bergland asked his staff what the Department knew about organic agriculture. Upon learning that the Department had very little information, Bergland turned to Anson R. Bertrand, Director of USDA's Science and Education Administration (SEA), directing that he undertake immediately an investigation of organic farming in the US. Bergland wanted to know to what extent organic systems might help to address the environmental, structural and financial problems that were now plaguing American agriculture.

**USDA Study Team on Organic Farming.** As Director of SEA, a newly formed super agency designed to foster improved communication and coordination among USDA's science and education agencies, Bertrand had access to the Department's top scientists and policy analysts. Within weeks after receiving Bergland's directive, Bertrand had named Robert I. Papendick as chairman of the Study Team. Working with Bertrand, Papendick and other top-level SEA administrators moved quickly to name the remaining team members and make other administrative arrangements to undertake the study. At the initial team meeting in April 1979, held in James F. Parr's Biological Waste Management and Organic Resources Laboratory on the Agricultural Research Service (ARS) campus in Beltsville, MD, it was quickly agreed that the study would be conducted using the highest possible standards of scientific objectivity. (There would be no 'quick and dirty' treatment, as one SEA administrator had counseled.) Given the controversial nature of organic farming, there was considerable professional risk for those scientists who agreed to serve on this Study Team. Honing steadfastly to the canons of scientific research was the surest possible way for these scientists to avoid staining their respective reputations among their professional peers, as well as producing a credible research report.

**Methods.** Given the intense criticism of the Report's findings and recommendations from the conventional agricultural community (discussed below), it is important to briefly review the methods used by the Study Team in gathering and assessing the data. The following summary of the methods used relies heavily upon the Report's own words [pp. 3–5]<sup>9</sup>.

*On-Farm Interviews.* Credible information on organic farming in 1979 was quite limited. Thus, to gain an overall understanding of the latest organic farming technologies, levels of economic success, and factors affecting the adoption and productivity of organic systems throughout the US, the Study Team elected to conduct a series of on-farm case studies. Ultimately, 69 such case studies were conducted, some in each of the ten US agricultural production regions, using a standard interview schedule. Because there was no national database of organic farmers available in 1979, the farms were selected through contacts at [l]and-grant universities, the State Cooperative Extension Service, organic producer associations, publishers of organic literature, and commercial

companies that deal with organic growers [p. 3]<sup>9</sup>. According to the Report:

Information was obtained on the background and attitudes of the farmers, farm composition, soil resources, types of crops and livestock grown, crop sequences, tillage methods, production inputs and management practices, and marketing procedures. During each interview, visual observations were made of crop conditions, including stands, growth, and degree of weed and insect infestations [p. 3]<sup>9</sup>.

*Survey of New Farm Subscribers.* During the data collection process, Rodale Press provided the Study Team with the results of its survey of subscribers to *The New Farm* magazine. This survey, sent to 1000 randomly selected subscribers, yielded a 70% response rate. Respondents self-identified as 'conventional' (112), 'organic' (95) and 'combination conventional-organic' (204) farmers; those remaining were nonfarmers. Information generated by this survey, which was similar to the Study Team's on-farm interview schedule, provided valuable comparative and contextual data.

*Literature Review.* The Study Team conducted a comprehensive review of the scientific, economic and sociological literature pertaining to organic agriculture. Information gathered through this process helped the Team to not only assess the contemporary character of organic farming but also to place its current status in historical perspective.

*Organic Farming in Europe and Japan.* To assess the scientific and practical status of organic agriculture in Europe, where interest in organic farming appeared to be growing rapidly, four Study Team members toured research facilities in Germany and Switzerland, as well as a number of organic farms and organic food processors, and one farm-implement manufacturer specializing in machinery for organic production. One team member spent time in Japan touring organic farms and studying the production and marketing of organically grown fruits and vegetables.

**Findings and recommendations.** Some 30 years after its publication, it may be difficult for those reading the Report today to understand why its findings and recommendations would have caused such a commotion within agricultural circles. Within the context of today's organic agriculture world, the Report's principle findings may seem unremarkable, its recommendations quite reasonable, even restrained. Findings (such as the fact that organic farming can be practiced on large acreages) have now been well documented and are no longer disputed. Many of the recommendations (such as the call for holistic, systems-oriented research) are now part of the standard organic agriculture research lexicon. Indeed, except for the more historically oriented or those old enough to have either observed these events or directly participated in them, the Report overall has been somewhat forgotten or simply overlooked. The 2010 National Research Council (NRC) report<sup>36</sup> on sustainable

agriculture, for example, which includes information not only on organic farming but also on other subjects (such as mixed farming systems) covered in the 1980 Report, fails to mention the prior study. The literature dealing with organic farming and its underlying principles has simply exploded over the past 30 years, albeit most of it under the rubric of sustainable agriculture. Astonishingly, the NRC report includes some 68 pages of references, roughly two-thirds as many pages as comprised the 1980 Report in total.

Before exploring the Report's controversial history, we summarize its major findings and recommendations. (The full report is online at <http://www.nal.usda.gov/afsic/pubs/USDAOrgFarmRpt.pdf>.) The Report's summary briefly describes 12 major findings [pp. xii–xiii]<sup>9</sup> that are here condensed and collapsed into eight.

- (1) Organic farmers fall along a spectrum from the utterly pure (i.e., those who would not use any chemical fertilizers or pesticides under any circumstances) to those who would use these materials, especially synthetic fertilizer, but only infrequently and sparingly as a last resort. Regardless of where they fell along this continuum, these respondents considered themselves to be organic farmers.
- (2) The vast majority of organic farmers had not regressed to the farming practices and technologies of the 1930s, nor were these operations limited by scale. Among the 69 case study farms, respondents were using 'modern farm machinery, recommended crop varieties, certified seed, sound methods of organic waste management, and recommended soil and water conservation practices' [p. xii]. The scale of operations included some farms, especially in the Northeast, of only several acres, and some, especially in the heartland, ranging from 100 to as high as 1500 acres. Regardless of size, the farms in the survey were 'productive, efficient, and well managed' [p. xii]. Some of the larger-scale farmers had switched from chemical to organic practices.
- (3) Study respondents expressed a range of motivations for electing to farm organically. These included: '... concern for protecting soil, human, and animal health from the potential hazards of pesticides; the desire for lower production inputs; [and] concern for the environment and protection of soil resources' [p. xii].
- (4) Most of the surveyed farms fell within the broad parameters of mixed crop/livestock operations. Legumes and other cover crops were rotated with various cash crops such as corn, wheat or soybeans, depending upon geographic location. Animals comprised an essential component of the overall farm enterprise, with substantial amounts of grain and hay crops fed to animals on the farm, then recycled back onto the land as manure. In most cases, this system produced enough nitrogen (N) and other nutrients for crop yields acceptable to the farmer. The Study Team was impressed by the ability of these types of systems 'to



control weeds in crops such as corn, soybeans, and cereals without the use (or with only minimal use) of herbicides ... [and instead with] timely tillage and cultivation, delayed planting, and crop rotations' [p. xiii].

- (5) Some of the respondents complained about the lack of interest in their operations from USDA and their respective land-grant universities, and the lack of technical information available from these institutions.
- (6) Although the Study Team was generally impressed with the management, production levels, economic performance and conservation characteristics found on most of the survey's 69 farms, it did conclude that some of these farms were probably 'mining' residual supplies of potassium (K) and phosphorus (P), and that at some point these operations would be forced to supplement these two nutrients.
- (7) Farm labor requirements, energy use, and net economic returns are important variables used to assess total farm performance. On these measures, the Study Team found that these 69 organic farms, on balance, required somewhat more labor, but used less energy, than conventional farms. The economic models developed by the Team 'showed that the economic return above variable costs was greater for conventional farms (corn and soybeans) than for several crop rotations grown on organic farms' [p. xiii]. The need to devote a large portion of the acreage on organic farms to legumes and other green manure crops largely accounted for these findings.
- (8) The Study Team concluded its summary of major findings with the following statement: 'There are detrimental aspects of conventional production, such as soil erosion and sedimentation, depleted nutrient reserves, water pollution from runoff of fertilizers and pesticides, and possible decline of soil productivity. If costs of these factors are considered, then cost comparisons between conventional (that is, chemical-intensive) crop production and organic systems may be somewhat different in areas where these problems occur' [p. xiii].

Clearly, these findings and conclusions lent official governmental legitimacy to the proposition that organic farming systems exhibited an impressive assortment of positive agronomic and environmental characteristics, and therefore were deserving of increased support from USDA and the land-grant university system. It was this new reality, this aspect of the Report, which drew the most attention, and generated the most heated reactions, from within conventional agricultural institutions and interests, both public and private. Within this political context, the Report's research, education, extension and policy recommendations, though important, failed to achieve a correspondingly high level of attention and scrutiny.

As the likelihood of USDA support, including additional new funding, quickly waned under the Reagan

Administration (see below), there was little incentive, initially, for agricultural scientists and educators to embrace these recommendations or to begin formulating new programs. In retrospect, however, we can see how many of the Report's recommendations [pp. 86–94]<sup>9</sup> have become important elements of contemporary organic research, education and extension activities. The Report's call for holistic, interdisciplinary research; study of the transition from conventional to organic systems; research on nutrient cycling for crop production, soil improvement through enhanced utilization of organic wastes, biological weed, insect and disease control, and biological nitrogen fixation; development of crop varieties adaptable to organic systems; and many of its other recommendations, continue to be among those critical research questions and challenges facing today's organic investigators and educators (e.g., see Sooby et al.<sup>37</sup> and Francis<sup>38</sup>).

Finally, the Study Team reported the following most frequently cited concerns by farmers and the general public regarding the extensive and sometimes excessive use of chemical fertilizers and pesticides, and the large energy inputs required of conventional agricultural systems [p. xi]:

- Increased cost and uncertain availability of energy and chemicals.
- Increased resistance of weeds and insects to pesticides.
- Decline in soil productivity from erosion and accompanying loss of organic matter and plant nutrients.
- Pollution of surface waters with agricultural chemicals and sediment.
- Destruction of wildlife, bees and beneficial insects by pesticides.
- Hazards to human and animal health from pesticides and feed additives.
- Detrimental effects of agricultural chemicals on food quality.
- Depletion of finite reserves of concentrated plant nutrients, for example, phosphate rock.
- Decrease in numbers of farms, particularly family-type farms, and disappearance of localized and direct marketing systems [pp. 1–2]<sup>9</sup>.

**Organic farming defined.** The definition of organic farming developed by the Study Team arose directly out of the empirical findings and observations gleaned during the course of the study. The Team had no preconceived notion of how to define organic farming. It was aware, however, that for marketing purposes, formal definitions existed in several states, most notably Maine and California, and that a number of other state and regional organic producer associations were in the process of developing formal definitions. Since many of the respondents in the USDA study would not have qualified as organic under these definitions (but, nonetheless considered themselves to be organic farmers), the Study Team developed a less-than-pure definition that simply reflected the spectrum of practices actually found on the 69 survey

farms. Thus, for purposes of the 1980 Report, the following definition was used:

Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds, and other pests [p. 9]<sup>9</sup>.

This less-strict definition was never intended to serve as a guide for certification and marketing of organic foods. It was intended to reflect the essential agronomic components and characteristics of organic farming technology discovered over the course of the survey. The Department's principle motivation was to learn as much as possible about how organic practices might be incorporated into conventional agricultural production systems as a means to help alleviate some of the problems that had begun to plague American agriculture (such as soil erosion, water pollution and increasing energy costs), not to address directly the needs of the organic certification process.

There is, in fact, nothing in the Report's definition of organic farming, its research results or commentary, or in the Recommendations for Action [pp. 86–94]<sup>9</sup>, to imply that agricultural chemicals should be completely eliminated from American agriculture. To the contrary, the specific language of the Report, as well as its overall tone, suggests a quite different and much broader agenda: restoring balance and choice to American agriculture. Nonetheless, in the Study Team's view, if achieving organic certification appealed to certain segments of the farming population, those farmers deserved a reasonable measure of technical assistance and research support from USDA and the land-grant universities. As one top USDA administrator who had originally opposed the organic farming study would later say in its defense: 'Organic farmers pay taxes, too.'

**The immediate aftermath.** The Department's rationale for following up on the Report failed to reassure its detractors, particularly many federal agricultural agency research leaders, land-grant university scientists and administrators, and personnel of private firms involved in the manufacture and sale of agricultural chemicals. As late as 1984, long after some members of the conventional agricultural community had begun to understand and accept the potential benefits of at least some aspects of organic farming, the remarks of Terry B. Kinney, administrator of USDA's Agricultural Research Service, reflected how dismissive of organic agriculture many within conventional agricultural circles continued to be. When asked by a reporter about the 1980 USDA organic farming report, Kinney replied: 'What do you mean by organic farming? I refuse to think

about organic farming *per se*. I grew up on a farm, and I know what wormy apples and corn decimated by bugs are like'<sup>39</sup>.

With the election of Ronald Reagan in November 1980 (4 months after the Report's release) and the appointment of John Block, a large-scale hog and grain farmer from Illinois, as Secretary of Agriculture, those who opposed the Report—and the Department's fledgling organic program—had acquired a powerful political ally. Within months after taking office, Secretary Block assured conventional agriculture that there would be no follow-up to the previous administration's 'dead end' organic farming initiative<sup>30</sup>. In the spring of 1981, the Department's newly designated Organic Farming Coordinator was told to spend only half his time on follow-up activities related to the 1980 Report. The Coordinator position would be eliminated a year later as part of a Reduction in Force.

These reactions stood in stark contrast to those of organic farmers, other elements of the new agricultural agenda, the farm, science, and general press, substantial numbers of agricultural scientists, and a small contingent of members of Congress. These and other observers viewed the Report as a reasonable and measured attempt to learn how organic farming systems worked, and how these practices might be brought to bear on the problems of US and world agriculture. They did not perceive the Report as representing a wholesale assault on conventional agriculture.

A review of the Report in the July 11, 1980, issue of *Science* magazine—several days before its official release—reflected these typically moderate reactions. Luther J. Carter, author of the *Science* article, was quick to point out, for example, that the Report did 'not suggest that a sweeping conversion of farmers to organic methods is either likely or desirable. But it suggests that many farmers can, and perhaps should, adopt organic farming practices, combining them with conventional practices if necessary or desired' [p. 254]<sup>35</sup>. According to Carter, Secretary Bergland had told *Science*: 'We think it is an important report—the first recent report to look at organic farming as a legitimate and promising technique . . . We now depend on imported oil and exported wheat, and farmers are worried about these forces over which they have no control. People are looking for ways to reduce their fuel-related inputs' [p. 254]<sup>35</sup>. The USDA Report had specifically recommended research on various combinations of conventional and organic practices in order to reduce chemical/energy inputs in US agricultural production systems [p. 92]<sup>9</sup>.

Certainly, reducing the use of these inputs was a major factor motivating Bergland's neighbors, Paul and Dale Billberg, who told Carter they had lowered their fertilizer costs by switching to legume-based rotations, and by adopting shallow tillage methods instead of using the more energy-intensive mold board plow that inverts the soil profile, requires more tractor fuel, and

depletes soil organic matter through increased oxidation and erosion. ‘The life and tilth of the soil were just not there any more,’ said Dale Billberg [p. 254]<sup>35</sup>. The Billbergs also insisted that since adopting organic methods their animals were healthier and their veterinary bills were reduced.

Carter’s review concluded with these words: ‘Farmers tend to be set in their ways, but when there is as much trouble down on the farm as there is today, they can be amenable to change. Many may soon be taking a look at organic farming practices that can perhaps ease some of their problems, such as loss of topsoil to erosion and loss of income to escalating fertilizer costs’ [p. 256]<sup>35</sup>.

Although the USDA Report may have fallen on hard times within the Department that produced it, the message it conveyed could not easily be contained. Within 2 years the Report was translated into seven foreign languages, and thousands of individuals and organizations were requesting copies. Its impact spread quickly to Capitol Hill, academia, dozens of grassroots organic producer and advocacy organizations, international forums, and a plethora of Washington, DC-based environmental, food safety, nutrition, wildlife, social justice and rural development groups (all elements of the new agricultural agenda coalition) that would, for the first time, take up the banner of organic agriculture. These new agenda groups championed organic agriculture with legislative initiatives, symposia, in-house studies and reports, on-farm demonstrations, and many other research and education outreach programs. Many in the print and broadcast media would continue to report on shifting attitudes among farmers, scientists and legislators.

There also would be scores of scientific conferences and symposia devoted to extensive and detailed examinations of the character and implications of organic farming and its potential role in a sustainable agriculture. Many colleges and universities established special courses and curricula (a few even created prestigious faculty chairs and centers) devoted to the exploration of organic methods and principles<sup>40,41</sup>. Most of these initiatives, however, for reasons discussed below, were labeled ‘sustainable’ by the end of the 1980s.

### *The Report’s impact and life cycle*

The 1980 USDA Report was a precipitating event for many of these developments, not the only causal factor. With or without it, the Zeitgeist of the era likely would have caused many of these changes to have evolved in some form. While the Report may have provided support for some new agenda demands, it did not create those demands; nor did it create the organic farming movement. Similarly, the problems and concerns associated with conventional agriculture, while noted in the Report, certainly were not caused by it. Clearly, however, the USDA imprimatur on the 1980 Report did help to catalyze, encourage and strengthen many of these initiatives.

For the new agenda groups, other reformers and a growing number of agricultural scientists (especially those trained in the more traditional agronomic sciences, as contrasted with the newer agricultural science fields of biochemistry, molecular and cell biology, and biotechnology<sup>26</sup>), the Report provided the outlines of a positive alternative agricultural model. Opponents and skeptics of conventional agriculture were no longer placed in the awkward position of simply criticizing conventional technologies, they could now mobilize around the findings and recommendations of the Report, and do so with an added measure of knowledge, confidence and legitimacy. A commentary in *Countryside* magazine in October 1980 seemed to reflect this new-found hope: ‘... [I]n view of the ideas and insights of the USDA report, one cannot help being more optimistic that, as U.S. agriculture seeks to solve its problems of soil depletion and excessive chemical use, it will turn to the answers offered by organic agriculture as a means of building a sustainable agriculture’<sup>42</sup>.

In fact, pro-organic groups initially would rely heavily upon the USDA Report for ideas, and as a source for scientific legitimacy in support of their policy proposals. Over the next several years, however, its influence waned. Countless new reports and scientific conference proceedings, even several new peer-reviewed journals, would provide credible, more current and much more diverse sources of information in support of these policy activities. The substitution of the word sustainable—in place of the word organic—over the decade of the 1980s also would hasten the Report’s declining visibility and influence. Even those scientists and policy makers who felt comfortable using the word organic could no longer ignore the liabilities of its negative scientific and political symbolism. Finally, the definition of organic agriculture set forth in the Organic Foods Production Act of 1990 (and implemented in 2002, see below) effectively denied any use of the word organic except for the purposes set forth in that legislation. Once the word organic had been legally defined in federal law (to facilitate and encourage the marketing of organically grown food), its continued use as a descriptive term for the more general agronomic and environmental meanings and purposes discussed in the USDA Report would have been disruptive and confusing. Thus, by the end of the decade, the 1980 Report would be eclipsed by these multiple developments and the new language they fostered. Despite its declining role, many of the activities highlighted below—for the most part, under the banner of sustainability—continued to reflect elements of the Report’s findings and recommendations, not to mention the ideology of organic agriculture.

### **Sustainable Agriculture: Interest Group Strategies in an Altered Policy Environment**

As noted previously, from the moment the 1980 USDA Report on organic farming was released there were

indications that the word organic would constitute an important barrier to acceptance of the Report's findings and recommendations, particularly within USDA, the land-grant university system, and among many private-sector conventional agricultural leaders and organizations. One need only trace the public evolution of the word organic in order to gauge how conventional agriculture's aversion to the word itself, to the 1980 Report, and to organic farming generally, affected conventional agricultural science, Capitol Hill and the organic farming community.

At about this time, coincidentally, the word sustainable would begin to emerge in both popular and scientific literature as the word of choice for denoting the most critical, overriding goal for US and world agriculture, especially among those groups and individuals who contended that conventional systems were not sustainable. Many attribute the formal emergence of this term within the context of contemporary agriculture to its use by Wes Jackson in his 1980 book, *New Roots for Agriculture*<sup>43</sup>, and even earlier to arguments presented in his less well-known 1978 essay, 'Toward a Sustainable Agriculture'<sup>44</sup>.

In response to conventional agriculture's negative and increasingly shrill critique of organic farming, and to the USDA's 1980 Report, organic advocates quickly seized upon the word sustainable as a means of defending and promoting the value of modern organic systems. Associating the goal of sustainability with organic farming, and likewise the 1980 Report, was seen as a way of imbuing both with a modern, more scientific, and more urgent purpose and image, thereby countering the negative symbolism of the word organic for conventional farmers, scientists and policy makers (Eliot Coleman, personal communication, December 2010). It should be noted, however, that the goal of sustainability has long been an important element of organic ideology. Lord Northbourne, for example, considered by many to have first used the term 'organic farming' in his 1940 book, *Look to the Land*<sup>45</sup>, envisioned 'the farm as a sustainable, ecologically stable, self-contained unit ...' [p. 1]<sup>46</sup>. His concerns, according to Scofield, including soil erosion, soil health, 'the exhaustible nature of imported fertility,' and human health, remain part of the debate over agricultural sustainability [pp. 1–2]<sup>46</sup>.

Within conventional agricultural research circles, those scientists sympathetic to organic farming systems also would soon resort to use of the word sustainable as a strategy for legitimizing the investigation of organic technologies. The first major scientific exploration of organic farming following release of the 1980 Report took place in 1981 at the annual meeting of the American Society of Agronomy. This full-day symposium, sponsored by the Soil Microbiology and Biochemistry division of the Soil Science Society of America, was entitled 'Organic Farming: Current Technology and Its Role in a Sustainable Agriculture.' The agonizing search for

language acceptable to conventional scientists appears in the Preliminary Program. The organizers spoke of 'the need to make Society members aware of ongoing research in the area [of organic farming] and the possibilities of amalgamating high energy input agriculture with low energy input agriculture to provide sustainable cropping systems'<sup>47</sup>. The symposium was timely, according to the organizers, because of the potential of organic farming to lower energy inputs and develop a sustainable farming system.

Over the next several years the word organic would virtually disappear from scientific conferences dealing with sustainable agriculture. In 1988, for example, a major two-day conference at Ohio State University (OSU), entitled 'Sustainable Agricultural Systems,' would fail to include the word organic in material justifying the conference, or in the titles of any of the 40 formal presentations. This, despite the fact that the Preface to the published proceedings would use these words to help explain the importance of the conference:

There is a growing awareness about the need to adopt more sustainable and integrated systems of agricultural production that depend less on chemical and other energy-based inputs. Such systems can often maintain yields, lower the cost of inputs, increase farm profits, and reduce ecological problems [p. xiii]<sup>48</sup>.

Clearly, by the late 1980s, the scientific community had largely abandoned the word organic, even though the actual technologies under consideration at this conference and other similar events included techniques and systems long associated with organic farming. At the OSU conference, nutrient cycling was presented as a key element of a sustainable agriculture. In the USDA's 1980 Report, nutrient cycling was seen as a key feature of organic systems. In less than a decade, sustainable agriculture had become the linguistic repository not only of agriculture's long-term goals but also of the technologies needed to achieve those goals as well.

A somewhat different (but no less revealing) example of efforts to find substitute language for organic technologies which was acceptable to both political and scientific audiences occurred within USDA. In a July 1981 memo from Anson R. Bertrand, Director of USDA's SEA, to the Department's Organic Farming Coordinating Committee, we find these words: 'Since the USDA Report and Recommendations on Organic Farming was published in July of 1980, *interest in low energy-biological farming systems continues* [emphasis added]<sup>49</sup>. Within the Department, signals from Secretary Block and other opponents of organic farming had successfully stifled use of the word organic, but not necessarily its ideology and technology.

The chilling effects of USDA's attitude toward organic farming would ripple through some parts of the nonprofit sector as well. In Iowa in 1985, for example, a group of organically oriented farmers, as well as some farmers

simply searching for ways to survive the financial crunch of the 1980s farm crisis, would organize a small producer organization that they chose to call The Practical Farmers of Iowa (PFI). The group's organizers were primarily interested in learning more about how organic-type methods and other low-chemical approaches could help reduce input costs, improve net farm income, and begin to address the growing issues of soil and water quality in Iowa and throughout much of the Midwest. The group's organizers reasoned that researchers at Iowa State University (ISU) might feel comfortable working on 'practical' solutions to these and other problems, thus avoiding the potentially divisive politics and symbolism of such words as organic and sustainable. PFI has been remarkably successful, its field days and on-farm cooperative research with ISU attracting national and international attention. Given the anti-organic ideology of conventional agriculture during the early 1980s, the decision of these farmers to be 'practical' would seem to have produced enormous dividends. There is, of course, no way of knowing how this group's history might have evolved with the word organic in its name.

Clearly, disputes over the symbolic uses and meanings of language have greatly influenced the history of organic agriculture in the US, especially in the more than three decades since publication of the 1980 USDA Report. Nowhere is this more evident than in the history of congressional efforts to craft legislation supportive of organic farming.

### *Capitol Hill and organic farming: The early push for legislation*

Led by Representative Jim Weaver of Oregon and Senator Patrick Leahy of Vermont, a small contingent of Congresspersons responded quickly to the legislative opportunities created by the 1980 USDA Report on organic farming. Initially, these supporters took steps to ensure the inclusion of organic farming language in the 1981 Farm Bill. That language called for establishing 'integrated multidisciplinary organic farming research projects designed to foster the implementation of major recommendations of the US Department of Agriculture's *Report and Recommendations on Organic Farming*, July 1980'<sup>50</sup>.

The following February, Weaver introduced his initial organic farming bill, the Organic Farming Act of 1982 (H.R. 5618)<sup>51</sup>. Weaver hoped his bill would become the legislative vehicle for implementing the authorizing language included in the 1981 Farm Bill. According to Weaver, expanded research on organic farming was justified by 'the skyrocketing cost of energy, petrochemically-based fertilizers, and pesticides. More importantly, there is a growing concern about the dramatic soil erosion and nutrient depletion often associated with many conventional farming practices'<sup>52</sup>. Weaver's bill required the Secretary of Agriculture to 'establish 6 pilot projects,

taking into consideration the *Report and Recommendations on Organic Farming*, United States Department of Agriculture (July 1980) ...' (H.R. 5618, Sec. 4, (a))<sup>51</sup>. These pilot projects were to develop science-based information on a range of organic farming methods such as crop rotations, green manures, and other technologies and management techniques needed 'in making the transition from conventional chemical-intensive methods of farming to methods of organic farming' [H.R. 5618, Sec. 4, (a) (1) & (2)]<sup>51</sup>.

In April 1982, Senator Leahy introduced companion legislation in the US Senate. After months of internal staff debate, Leahy opted to call his bill the Innovative Farming Act of 1982 (S. 2485)<sup>53</sup>. The Senator and his staff had concluded that using the word organic in the title would not only have guaranteed the bill's defeat, but denied it a fair hearing as well. With the exception of a different title, however, Leahy's bill mirrored the Weaver legislation, defining organic farming precisely in the same way it had been defined in the 1980 USDA Report. Despite the bill's 'innovative' title, the purpose of Leahy's legislation was clear. The USDA opposed this legislation<sup>54,55</sup>, and neither bill would pass.

These defeats marked the beginning of a 7-year hiatus in early congressional efforts to advance organic farming legislation using the word organic. Not until 1989, when Senator Leahy introduced a bill dealing with a national certification program for marketing organic products (see below), would the word organic headline any congressional legislation. The search for more creative language to advance organic methods would now challenge the supporters of organic agriculture on Capitol Hill.

### *The political landscape: New (organic) realities*

By 1983, 3 years after publication of USDA's organic farming report, political reality had replaced the climate of optimism among organic farmers and the new agenda groups which had accompanied its release. While the agricultural community could no longer ignore the negative externalities of conventional agricultural production practices, or the early 1980s groundswell of accelerating demands for changes in food, agriculture and environmental policy—circumstances that might have opened new pathways for promotion and use of organic methods—opposition to organic farming from conventional agriculture and the Reagan Administration was unyielding. Despite accumulating evidence of ground and surface water contamination from agricultural chemicals<sup>56,57</sup>, increased levels of soil erosion and declines in soil productivity<sup>58-60</sup>, adverse effects of technology and farm policy on trends in farm structure<sup>61</sup>, increasing pest resistance to pesticides<sup>62</sup>, links between human illness and routine use of antibiotics in animal feed<sup>63</sup>, rising energy prices, and the continuing severity of the farm economic crisis, Secretary Block's USDA could see no role for organic farming in American agriculture.

Instead, the conventional agricultural community insisted that these issues were being addressed through modification of existing technologies, and development and adoption of new ones. Biotechnology, precision agriculture, conservation tillage, improved soil tests, integrated pest management (IPM), best management practices (BMPs) and better ways to handle environmental threats from CAFOs were among the solutions offered by conventional agriculture. The Administration, agribusiness, most farmers and most agricultural scientists appeared to be solidly in agreement with this set of prescriptions. By 1983 the organic community had come to realize that it would need a new legislative strategy if it hoped to include its voice and its technologies in the national debate over the future of US agricultural policy.

Against this backdrop, in the spring of 1983, Weaver and Leahy jointly introduced the Agricultural Productivity Act of 1983 (H.R. 2714<sup>64</sup>; S. 1128<sup>65</sup>), legislation that called for a number of familiar-sounding, organic-type program initiatives. While the word organic was conspicuously absent in this legislation, it nonetheless authorized twelve 5-year-long on-farm studies ‘for the purpose of examining the effects of the transition from—(A) farm practices which rely on synthetically compounded fertilizers, pesticides, growth regulators, livestock feed additives, and tillage practices which fail to control erosion; to (B) farm systems which rely on legume and other sod based rotations, the efficient use of crop residues, green manures, off-farm organic wastes and . . . nonchemical or biological methods of weed and pest control’ [H.R. 2714, Sec. 5, (a)]<sup>64</sup>. Both bills also called for data collection on 12 farms that had used alternative systems for five or more years. Other provisions authorized cost-share payments for intercropping of legumes, and directed USDA to assess the availability of extension materials related to alternative methods and to recommend research that would help farmers better understand low-energy farming methods. Sponsors and supporters were cautiously optimistic about the prospects for passage of this creatively worded organic legislation.

An August 3rd House subcommittee hearing on H.R. 2714, chaired by Rep. Weaver, reinforced this sense of optimism: the only formal testimony in opposition to the bill came from USDA. According to Clare Harris, Acting Administrator of Cooperative State Research Service, the Department was ‘sympathetic to the purposes’ of the legislation, but could not support it because ‘much of this work is currently underway; the bill would impose overly restrictive requirements on the conduct of such research and the costs are excessive’ [p. 48]<sup>66</sup>. This would be the Department’s essential argument against the bill, and other later versions, for the next several years.

Witnesses testifying in favor of H.R. 2714 gave a variety of predictable reasons for supporting the bill. However, the testimony of Patrick Madden, the Penn State agricultural economist who 5 years later would become the first coordinator of USDA’s Low-Input Sustainable

Agriculture (LISA) program, seems especially telling. Madden called the bill’s objectives ‘admirable, well worth pursuing, and attainable’ [p. 78]<sup>67</sup>, which he had prefaced by the following: ‘I am pleased that the term organic farming does not appear in the act, because the term is laden with emotional content that gets in the way of useful discussions and actions’ [p. 76].

That a prominent supporter of organic farming would publicly acknowledge that the word organic had itself become an obstacle to progress on low-input farming illustrated just how sharply the political climate surrounding organic agriculture had deteriorated in just 3 years. What was not known in 1983, however, was that any national policy effort designed to support the investigation of organic technologies—regardless of the language used—would be met with determined opposition from various elements of the conventional agriculture community, including major input suppliers and commodity organizations<sup>55</sup> [pp. 140–146]<sup>68</sup>. This pattern can be seen in the legislative and administrative history of the USDA’s LISA program, authorized in the 1985 Farm Bill, as well as in the Sustainable Agriculture Research and Education (SARE) program, authorized in the 1990 Farm Bill<sup>69</sup>, and in the controversy surrounding a major NRC report released in 1989, entitled *Alternative Agriculture*<sup>70</sup>.

With respect to the Agricultural Productivity Act itself, opponents of this legislation would hold it in abeyance until 1985 when some of its features were incorporated into the 1985 Farm Bill in Subtitle C, Title XIV, as ‘Agricultural Productivity Research’<sup>71</sup>. It would be three more years before any funds were appropriated to implement this provision as USDA’s LISA program. By then, some 8 years would have elapsed since release of the 1980 USDA Report on organic farming, the initial impetus for this protracted legislative effort. The word organic was not included in Subtitle C, and the LISA appropriation in 1988 was for a mere \$3.9 million, a tiny fraction of total federal agricultural research funding. Still, most supporters of organic/sustainable/low-input farming considered LISA a noteworthy step in the right direction. They were already planning for the 1990 Farm Bill fight, the next major legislative opportunity to advance what many were now calling sustainable agriculture.

### *Organic/sustainable agriculture in the 1990 Farm Bill*

As preparations for the 1990 Farm Bill began, organic producer and certification associations, along with the quickly expanding organic wholesale, retail, processing and distribution industries, were focused on the creation of a national certification program for organic foods and other products. The Organic Foods Production Act (OFPA) (S. 2108)<sup>72</sup>, introduced by Senator Leahy in early 1990, provided for establishing a USDA ‘organically produced’ label for products meeting a strict set of national standards and guidelines. As Leahy said when

this legislation was initially introduced in late 1989 (S. 1896)<sup>73</sup>: ‘Since goods labeled organic often sell at premium prices, the temptation to misuse the word is great ... A national organic certification program will ease problems in interstate commerce’ and ‘give farmers a commercial incentive to alter the way they farm’<sup>74</sup>. Not since 1982 had national legislation dealing with organic farming actually used the word organic to denote its character and purposes. To avoid consumer confusion, the bill prohibited all other uses of the word organic. Ultimately, the OFPA became part of the 1990 Farm Bill; however, disputes between the organic industry and USDA, and disagreements within the industry itself over the meaning of specific provisions of the bill, would delay its implementation until 2002 (see the following section on Organic Certification).

Meanwhile, as use of the word organic shifted toward legally defined, commercial purposes, other supporters of organic technologies had begun to use words such as sustainable, alternative and low-input when promoting the use of organic methods to address issues such as soil erosion and water quality, and to lower farm production costs. Groups supporting organic-type technologies for these more traditional purposes had reason to be optimistic as the 1990 Farm Bill rolled into view. Bolstered by the growing popularity of the 2-year-old LISA program (LISA had faced strong opposition from agribusiness and some land-grant university scientists and administrators during its startup phase<sup>69</sup>), its supporters were determined to broaden and refine its scope and impact. Since passage of the 1985 Farm Bill with its historic swampbuster, sodbuster, conservation compliance and conservation reserve measures<sup>75</sup>, a number of new ideas for incorporating various organic-type methods (such as crop rotations) into conservation and commodity policy had been advanced, some in the form of legislative proposals<sup>76,77</sup>. Moreover, since passage of the 1985 Farm Bill, there had been a constant flow of articles and reports documenting the need for a more environmentally sound agriculture, as well as evidence that low-input methods could contribute to the goal of sustainability.

When the 1990 Farm Bill<sup>78</sup> had (finally) passed both houses of Congress, sustainable agriculture supporters were pleased—although not entirely—with the results. Those who had fought for the expansion of programs featuring organic-type technologies could point to the following successes. The LISA program had been re-authorized, along with a companion federal-state matching grant program to help states expand sustainable agriculture. Additional authorization was included for extension agent training and development of technical publications designed to help farmers adopt sustainable practices. The Bill also authorized research on ‘integrated management systems’ aimed at developing environmentally sound crop and livestock systems.

Beyond these research and education provisions, the 1990 Farm Bill allowed farmers, for the first time, to plant

environmentally beneficial, nonprogram crops on up to 25% of their commodity crop base acres, without losing any of the farm’s historic commodity crop base. Also, a pilot Integrated Farm Management Program Option was included under which farm program participants could develop 3- to 5-year sustainable farm plans that authorized planting of resource-conserving crops on their commodity base acres, as well as the right to use a portion of that set aside for commercial haying or livestock grazing. Calls for incorporating these kinds of flexible, environmentally friendly practices into commodity policy had been a major goal of organic and sustainable agriculture advocates for many years.

### *Sustainable agriculture and public policy: Competing definitions and agendas*

Yet despite these noteworthy organic/sustainable agriculture policy accomplishments (as outlined above), close observers of the 1990 Farm Bill process had reason to be concerned. Within the Bill’s overall context, with exception of the organic certification measure, these policy gains could best be described as marginal: most traditional agricultural research priorities and price support policy remained in place, and some within the low-input, sustainable agriculture community were beginning to wonder if use of the word sustainable for advancing organic-type technologies had begun to backfire. As the Farm Bill debates unfolded, it had become increasingly clear that multiple definitions of sustainable agriculture had confused and frustrated lawmakers. Early efforts by Representative George E. Brown, Jr, Chairman of the Research Subcommittee of the House Agriculture Committee, and many others, to make the low-input, organic-type version of sustainability the overarching organizing principle of the 1990 Farm Bill<sup>79</sup> had fallen far short of expectations. Brown’s notions of sustainable agriculture would have to compete with those of USDA and agribusiness. By 1990, conventional agriculture had staked a firm claim on its own version of the symbolically powerful notion of sustainability.

Throughout the debates on the 1990 Farm Bill, sustainable agriculture became a political football on the largest stage in agricultural policy. Groups that would have been urging adoption of organic policy options 10 years earlier were now using the word sustainable to push in that direction. Meanwhile, other elements of the organic community seemed poised to create a popular and highly visible national certification program for organically grown food and other products. While this initiative may have seemed misguided and somewhat threatening to conventional agricultural interests, these traditional policy gatekeepers simply could not allow the organic community to claim sole ownership of ‘sustainability,’ a term laden with implications for the future of US agricultural policy. This struggle for control of the symbolic uses of sustainability for political purposes was not new,

its broad outlines had been evolving throughout the 1980s. The 1990 Farm Bill debates simply provided a public venue for exposing how this issue would play out in the face of specific policy disputes, not merely in symposia and conferences—settings where sustainable agriculture had often provided the language needed to gloss over policy differences, and seemingly reduce tensions, between conventional and organic communities.

The 1990 Farm Bill debates over how best to define sustainable agriculture were not new. The history of agriculture includes many thoughtful perspectives offering valuable insights and guidance for understanding the importance of sustainability and addressing its multifaceted characteristics<sup>80–82</sup>. While these commentaries have a long, important history, growing signs of agriculturally induced environmental degradation and rapid changes in farm structure—trends that had become increasingly evident by the late 1970s—made the search for more precise definitions of agricultural sustainability, and better understanding of its parameters and requirements, seem increasingly urgent. Over the past 30 years there has been a commendable response to this challenge from the academic community<sup>68,83–85</sup>. Despite the scope of these and other efforts, however, to this day there remain large areas of ambiguity and disagreement, both with respect to definitions, and even more importantly, to the actual technologies and systems best suited for achieving sustainability<sup>36</sup>. No wonder that the US Congress, in the throes of trying to pass a hotly contested farm bill, would become frustrated with these definitional ambiguities and be forced to compromise over a number of key provisions<sup>86</sup>.

### *Sustainable agriculture gets two definitions*

When the farm bill process began in early 1990, proponents of reduced-input, organic-type technologies fell in line behind the definition of sustainable agriculture included in the bill as reported by the Senate Agriculture Committee, a definition that borrowed heavily from the 1989 NRC report, *Alternative Agriculture*<sup>70</sup>. According to the NRC Committee:

Alternative agriculture is *not* a single system of farming practices. It includes a spectrum of farming systems, ranging from organic systems that attempt to use no purchased synthetic chemical inputs, to those involving the prudent use of pesticides or antibiotics to control specific pests or diseases. Alternative farming encompasses, but is not limited to, farming systems known as biological, low-input, organic, regenerative, or sustainable [p. 4].

Not surprisingly, USDA, commodity groups and agribusiness firms strongly opposed the Senate Agriculture Committee's definition of sustainable agriculture, which sounded eerily similar to the definition of organic farming developed by the 1980 USDA Study Team on Organic Farming [p. 9]<sup>9</sup>. Conventional agricultural groups had

managed to derail legislative support for organic farming in the early 1980s and were not pleased to see those ideas re-emerge, first in the guise of an NRC report on 'alternative' agriculture, and now once again as the centerpiece of sustainable agriculture in the 1990 Farm Bill. Using the word organic for certifying foods produced for the niche organic market—quite small in 1990—was an entirely different matter than allowing notions of organic agriculture to infiltrate and influence major farm bill provisions with the potential to affect the broader outlines of US agricultural policy and practice. Conventional agriculture would insist upon use of the definition of sustainable agriculture promoted by USDA: an agriculture that is 'environmentally, agronomically, and economically sound over long and short periods' [p. 304]<sup>86</sup>, but which did not embrace the notion of reducing the use of purchased inputs. Much of the farm bill debate would revolve around the differences between these two definitions.

Ultimately, the definition of sustainable agriculture—a mere paragraph of text in an enormously complicated, 700-page bill—'became one of the most significant and controversial issues of the 1990 Farm Bill. The definitional dispute fueled weeks of debate and, ultimately, a battle on the floor of the Senate that required every Senator to record his or her vote on which definition should become the law of the land' [p. 304]<sup>86</sup>. On one side were those who argued that purchased, synthetic inputs could and should be reduced, and that doing so would benefit farmers, the environment and the general public. Opponents of this view contended that agricultural chemicals had been of enormous benefit to American production agriculture, and that the goal simply should be their more careful and efficient use. When agreement on a single definition for sustainable agriculture could not be reached, Congress would be forced to settle the matter by including both definitions in the bill's research title, authorizing research programs under each definition.

### *Organic agriculture in 1990: A look at its altered status*

By 1990, organic agriculture in the US—as evidenced by the politics and provisions of the new farm bill—had reached a crossroads. One road was labeled 'certified organic,' an approach to farming and marketing that seemed to be gaining visibility, acceptance and support, especially from the consumer community. The goals of those taking this road were clear: most producers had accepted the definition of organic farming included in the OFPA, and were hoping for better and more predictable economic returns; organic foods processors, wholesalers, retailers and certifiers were on the cusp of creating a whole new industry, one modeled along the broad outlines of the conventional food industry that many on this road had come to reject. While no one on this road could have envisioned precisely where it would lead, or how difficult it would be to resolve the many disputes that lay ahead,



most travelers were filled with a sense of hope, excitement and accomplishment. At long last, organic agriculture had arrived: it had achieved governmental agenda status; it would now be certified; it was becoming an important, legitimate, national and international industry; its role and purpose in society had been resolved; it would soon be given a seal of approval from USDA, its staunchest critic just a few short years before. Travelers on this road now had sole, legal possession of the word organic. While some had accepted federal standards reluctantly—warning that a single set of formal national standards would accelerate the industrialization of organic agriculture, water down its agronomic principles and erode its basic philosophical tenets—overall the future looked clear and bright. For most of the travelers on this road, it was a heady, albeit somewhat unsettling, moment in the history of organic agriculture.

Meanwhile, travelers on the other road—now labeled ‘sustainable’—comprised of those farmers, scientists, policy makers, new agenda groups, and other organic advocates who had come to embrace and support a less-pure form of organic agriculture, were left to ponder how this new, legally defined, market-focused organic program would affect the many traditional issues of concern more broadly throughout US agriculture: soil and water quality, soil erosion, wildlife habitat, social justice, farm worker safety, energy conservation, efforts to improve net farm income, and rural community development and family farms. These were the issues, after all, that had energized large segments of the expanding organic farming advocacy community throughout the 1980s. Now such advocacy would be conducted largely within the framework of sustainable agriculture, even though there seemed to be a great deal of confusion about what that word meant. Many of these travelers were quick to recognize, for example, that there were large-scale farmers—using heavy amounts of purchased inputs and monocultural cropping systems—traveling with them on this same road. Moreover, there were disquieting indications that promoters of agricultural chemicals and the newly emerging field of agricultural biotechnology would be traveling with them as well. They also noticed that this road was much wider and more crowded than the one labeled ‘certified organic.’ These proponents of organic-type technologies worried that their own beliefs would be overlooked amid these competitive, confusing and crowded conditions.

In fact, in a single decade, the politics of agriculture had greatly altered the definition, meaning and purposes of organic farming. The earlier idea that organic farming techniques might be incorporated into conventional systems, thereby reducing costs and helping to address various environmental concerns, was no longer widely discussed. Apart from their use on certified organic farms, organic technologies were now labeled sustainable and obliged to compete for recognition and support with an impressive and expanding collection of conventional

agricultural technologies. Organic agriculture was now traveling exclusively on a road labeled certified organic. While this was, in many ways, an enormously positive and widely supported accomplishment, it did not greatly alter the overall agricultural political, environmental or structural landscape. Proponents and practitioners of organic farming—both certified and non certified—would still need to compete for scarce public resources (e.g., research, education, marketing and promotional support) with a myriad of emerging conventional technologies, all now claiming the mantle of sustainability, a powerful political symbol no longer reserved for use by organic, ecological and other low-input farming adherents. Proponents of conventional agriculture were now well positioned to continue propelling agriculture along the same energy-intensive, high-technology and high-cost structural trajectory it had been on since World War II, only now with the added advantage of being ‘sustainable.’ The consequences of these new institutional, definitional and political dynamics would soon become obvious to the supporters of organic agriculture, regardless of which road they had chosen—or had been forced to choose.

### **Organic Certification at the Federal Level: A Long and Bumpy Road**

When the 1990 Farm Bill was signed into law and the OFPA became part of official USDA policy, few within the organic community could have imagined that it would be 12 difficult, exhausting years before this legislation would be implemented and shoppers would first notice the now familiar green and white label, ‘USDA—Organic,’ on organic products in an expanding array of retail outlets. (For the OFPA’s formal provisions, see below.) Since the mid-1970s, when several nonprofit organic producer groups had established organic certification programs, participants in these efforts had known of the inherent complexities of defining certified organic farming in a way that would be acceptable to producers (and other elements in the organic supply chain) and be understandable and reassuring to consumers. Finalizing the federal rule under the OFPA simply elevated the matter of organic certification to another level of technical and political complexity. This brief retrospective is not the place to fully recount the history of this protracted and painful political process. Instead, we trace its broad outlines, including the sociopolitical and financial motivations of the major constituencies involved in these debates, as well as the impacts of a national program of organic certification upon broader notions of organic agriculture and its role in fostering agricultural sustainability.

#### *Organic farming and marketing: The early years*

As noted previously, the ideology of organic agriculture, even as late as the 1960s and most of the 1970s, had little to

do with certification and marketing of organically grown products. While organic farmers of this period did, in fact, sell some of their products as ‘organically’ grown, these transactions were mainly based upon relationships of personal knowledge and trust between farmers and consumers situated in what sociologists call dense local networks, not upon legally defined certification criteria. These early producer–consumer connections were the forerunners, at least in part, of what many now refer to as ‘civic agriculture,’ a term popularized by the late Tom Lyson a number of years ago<sup>87</sup>. Organic farmers of this era were motivated more by ideological factors—respect for nature, enhancing soil quality, improved health, environmental concern, community development, personal independence and the like—than by the desire for price premiums or other forms of financial gain. Well into the mid-1980s, many organic farmers continued to sell their products into conventional marketing channels, due largely to the lack of suitable and conveniently located organic wholesale and retail outlets, and a poorly developed certification and processing infrastructure. According to the results of *The New Farm* survey conducted by Rodale Press in 1979, in connection with USDA’s organic farming report, ‘... only 20 percent of the organic and combination respondents received a premium price for organically grown products. Only 6 percent of the totally organic farmers reported receiving a premium price on all of their organic products’ [p. 18]<sup>9</sup>.

Beginning in the early to mid-1970s—largely in response to increasing consumer demand for pesticide-free food, and the enhanced marketing potential represented by this trend—the number of organic grower associations expanded rapidly. The Maine Organic Farmers and Gardeners Association was organized in 1971 and claims to be the oldest such group in the US. Formed in 1973 as an information and support group for organic farmers, the California Certified Organic Farmers, one of the nation’s first certification organizations, began to certify organic farms in the mid-1970s. In the Northwest, a group called Regional Tilth with chapters in Oregon, Washington, Idaho and Northern California, was formed in 1974 as a farmer support and information organization, but did not launch a formal certification program until 1982 when the Willamette Valley chapter of Oregon Tilth began to certify organic growers. By the early 1980s there were estimated to be some 35 such grower support and information groups active in 29 states [p. 18]<sup>9</sup>. A handful of these largely grassroots, grower-based organizations either had certification programs in place or were beginning to consider developing them.

By the mid-1980s a number of private firms also were beginning to enter the field of organic certification. The entry of private, for-profit firms, coupled with the steady growth of not-for-profit, grower-based certification programs and the involvement of a handful of state-sponsored programs, had, by this time, begun to create

numerous problems for the fledging organic marketplace. According to DiMatteo and Gershuny, by then ‘there were multiple state laws and differing definitions of organic, conflicting standards among the handful of certifiers, and frustration among processors in finding consistent, reliable sources of organic products’ [p. 254]<sup>88</sup>. This *ad hoc* assortment of programs was ill designed to serve the certification and marketing needs of an industry that seemed poised for a period of relatively rapid growth. Indeed, organic agriculture had reached the point where it needed a more formal, recognizable, nationwide organizational structure acceptable to the disparate and increasingly contentious farmer and business interests within the overall organic community<sup>88</sup>.

The Organic Foods Production Association of North America (OFPANA) was formed in 1985 to address these needs. (The group’s name was changed to Organic Trade Association in 1994.) However, due to continuing distrust among certification organizations, farmer-based groups and various business interests, OFPANA’s overall goal of creating a national certification program with increased reciprocity among individual certification programs would fail. The frustration associated with this unsuccessful, multi-year, private-sector effort to establish a national organic standards and accreditation program, coupled with the surge in demand for organic food following the 1989 Alar incident (highlighted on the CBS television program, ‘60 Minutes,’ February 26, 1989), set in motion the prospect of turning to the federal government as the venue of last resort with the authority and resources to create and enforce a comprehensive national program of organic certification and accreditation.

### **Defining and Regulating ‘Organic’: Policy Making at the Federal Level**

By the late 1980s, as we have seen, the organic agriculture movement was rapidly evolving into a national industry. Remarkably, within the span of a single decade, organic farming had largely shed its primitive, back-to-the-land image; had been featured in two major scientific reports<sup>9,70</sup>; was being studied (often under the rubric of sustainable agriculture) by a growing number of USDA and land-grant university scientists; had been the focus of numerous university and nonprofit on-farm research demonstrations and field days; had provided the grist for a great deal of congressional attention, including the launch of the LISA and SARE programs; had attracted the interest of many small- and mid-scale conventional farmers; and had begun to register impressive gains in the organic marketplace as consumers began to more aggressively seek out organic foods and other organic products. In all of this, there had been precious little time for the various stakeholders within the organic community to digest such rapid and significant changes. Many newer entrants into the field of organics (including

otherwise conventional food companies) welcomed the accelerating pace of change, and seemed eager to move ahead with the institutionalization (even the industrialization) of the industry. Some members of OFPANA (the so-called ‘suits’) earlier had reflected this impulse [p. 260]<sup>88</sup>. Meanwhile, other members of the organic movement, especially those with deep philosophical attachments to the kinds of agrarian ideological precepts outlined earlier in this retrospective, had already begun to voice concerns about the future of organic agriculture within a more highly industrialized and regulated model.

Passage of the 1990 OFPA—and the rule-making process that followed in the wake of that historic legislation—would play out amid these politically contentious, polar-opposite organic world views. To a large extent these debates involved the meaning of organic, as though there is one singular, knowable organic essence. Yet, within the 30-year span encompassed in this narrative, much of the conflict has revolved around simple, predictable financial and political agendas. While many of these disputes existed long before passage of the OFPA, the establishment of federal organic certification standards drew considerable public attention to organic food and farming, raised the financial stakes for most participants in the organic industry, transferred control of the legal definition of organic to the federal government, and inadvertently created a larger and much more visible stage upon which to contest a range of key organic policy issues.

The organic farming movement in the US has long been, and remains, an incredibly diverse and dedicated entrepreneurial community of strong willed and often colorful individuals. The agricultural geography of the nation with its highly variable soils, ecosystems and micro-climates, and local and regional sociopolitical histories and traditions, reinforces the organic community’s agronomic, ideological and political diversity. The inherent tensions within this complicated national constituency, represented by multiple sizes and types of farms, individual life experiences and philosophies, and personal and organizational agendas, were apparent when these stakeholders came together to fashion the OFPA, and later to make recommendations to USDA for the national organic rule.

In retrospect, given these complexities and the enormous risks and uncertainties associated with such a fundamental shift in how the rules of the organic industry would be established, administered and enforced, it is somewhat remarkable that this effort to create a federal organic certification scheme did not die aborning. Although most members of the organic community may have recognized and accepted (begrudgingly in many cases) the notion that structural changes were needed in order to eliminate fraud and to facilitate the industry’s growth in interstate and international commerce, the system in place today owes much to those individuals who chose to see the rule-making process through to the end.

Even now, some 20 years after passage of the authorizing legislation, and a decade after the program was fully implemented, participants continue to deal with a multitude of difficult issues and disparate philosophical points of view. The efforts of these pioneering policy makers, though by no means universally praised, form an important part of organic agriculture’s history over the past 30 years. One can only speculate about what the organic foods marketplace might look like today in the absence of this pivotal page in the history of organic agriculture. It is easy to forget that the private sector had tried and failed to erect a national-level program of organic certification and accreditation.

### *Organic Foods Production Act: Formal provisions and some key issues*

The OFPA of 1990, Title 21 of the 1990 Farm Bill<sup>78</sup>, provided for establishment of the National Organic Program (NOP) to be housed in USDA’s Agricultural Marketing Service. The Bill also provided for creation of the National Organic Standards Board (NOSB), composed of 15 industry representatives to be appointed by the Secretary of Agriculture and charged with ‘development of standards for substances to be used in organic production,’ the so-called National List. The NOSB was also authorized to ‘provide recommendations to the Secretary regarding implementation’ of the legislation. NOSB membership represents a cross-section of industry and consumer interests, including farmers, processors, retailers, environmentalists, consumers, the science community and one certifying agent. The OFPA required the development of national standards for organically grown agricultural products in order to assure consumers that products labeled organic, both raw and processed, would conform to the standards proscribed in the legislation and rules, and would have been certified as such by third-party certification agencies, accredited by USDA. The Act stipulates that the NOP is a marketing program, and that neither the Act nor its regulations are intended to address issues of food safety or nutrition. Producers and processors of organic products with less than US\$5000 in sales per year are exempt from certification. The law provides for civil penalties against persons who knowingly sell or label products as organic that do not conform to NOP regulations<sup>89</sup>.

When these deliberations began in the late 1980s—under the leadership of Senator Leahy and his key staffer (on the issue of organic agriculture), Kathleen Merrigan—most participants were hopeful, but also wary of where this process might lead<sup>90</sup>. Some questioned the entire enterprise. The notion of transferring formal control over the sensitive matter of organic production standards to the federal government, especially to USDA, which had long championed high-tech conventional production systems, seemed misguided if not totally unthinkable. While many taking this view may have recognized

the potential benefits of national standards, they simply could not support shifting control over the meaning of organic to an institution that had often ridiculed organic systems. For some, psychologically, this alone made the move to a USDA-controlled standard a ‘tough pill’ to swallow. Moreover, many feared that lodging authority for the meaning of organic within USDA would provide the so-called ‘big boys’ (those who often had little sympathy for the established characteristics and philosophical tenets of organic agriculture) with undue access to the reigns of conventional power, thus fostering a ‘slippery slope’ to weaker standards and the erosion of time-honored organic principles.

On the eve of the program’s implementation, one such dissenter, Eliot Coleman, long-time organic farmer and advocate, expressed his opposition to federal standards with these words:

Now that the food-buying public has become enthusiastic about organically grown foods, the food industry wants to take over. Toward that end the U.S. Department of Agriculture-controlled national definition of ‘organic’ is tailored to meet the marketing needs of organizations that have no connection to the agricultural integrity organic once represented. We now need to ask whether we want to be content with an ‘organic’ food option that places the marketing concerns of corporate America ahead of nutrition, flavor and social benefits to consumers . . . The food giants that are taking over ‘organic’ want a simplistic list of ingredients so they can do organic-by-the-numbers. They are derisive about what they label ‘belief systems,’ and they are loath to acknowledge that more farmer commitment is involved in producing real food than any number of approved inputs can encompass [p. 1]<sup>91</sup>.

While Coleman’s sharp-edged assessment almost certainly reflected a minority view within the organic community (after all, details of the NOP and the National List had been thoroughly debated and approved by the NOSB, a panel representing a cross-section of the organic industry), his perspective, nonetheless, illustrates the policy orientation and emotional intensity of a substantial segment of organic participants at that time. In his article entitled ‘Beyond organic,’ Coleman argued that the federal definition of organic, and the regulations promulgated to implement it, no longer represented the fundamental characteristics of organic agriculture. Thus, it would now be incumbent upon those who did understand and respect those principles to redefine organic, and thereby reclaim and perpetuate its true meaning and value. ‘I encourage all small growers who believe in exceptional food and use local markets to use the word “authentic” to mean “beyond organic.” With a definition that stresses local, seller-grown and fresh, there is little likelihood that large-scale marketers can appropriate this concept’ [p. 3]<sup>91</sup>.

Later in 2001, the phrase ‘beyond organic’ would be popularized by Michael Pollan in a *New York Times* article in which he questioned the nature and direction of

the so-called Big Organic (industrialized) version of the organic industry, while extolling the virtues of the more traditional, Little Organic (small-scale) version of organic farming<sup>92</sup>. Several years later, in his popular book, *The Omnivore’s Dilemma*, Pollan further developed these themes, describing favorably, for example, the farming methods and philosophy of a well-known small-scale organic farmer from Virginia, Joel Salatin, while painting a somewhat less-than-flattering image of Whole Foods, as well as of Gene Kahn, who in 1990 had sold his company, Cascadian Farms, to Welch’s (acquired later by General Mills where it would become Small Planet Foods), and as a result had become the ‘poster child’ for those organic pioneers who had chosen to embrace the industrialized version of organics over its more traditional forms<sup>93</sup>.

Kahn had been among the 69 farmers interviewed in 1979 by members of the USDA organic farming Study Team. At that time, Kahn’s farming and marketing operation fell squarely into the ‘Little O’ version of organic farming. Given Kahn’s role within the organic farming movement of the 1970s and 1980s, many found it hard to accept his decision to become part of ‘Big O’ organics. Kahn defended his actions by arguing that the benefits of organic agriculture (e.g., reduced use of synthetic production materials, cleaner food and improved farm worker safety) were so important that no opportunity to extend its reach and impact should be overlooked, even if that meant allowing large corporations to enter the field.

### *Big O, Little O, and Beyond Organic: The evolving structure of organic agriculture*

The accelerating growth in the sale of organic foods and other organic products<sup>94</sup> over the past two decades has been accompanied by equally dramatic shifts in the structure of organic farming and marketing, including the emergence of many new product labels. These changes appeal in varying degrees to the multiplicity of producer and consumer sectors that comprise the overall organic community. Clearly, for example, there is a great deal of consumer and producer support for the ‘Little O’ version of organic agriculture in the US. The dramatic rise in numbers of farmers’ markets and various types of community supported agriculture (CSAs) over the past decade or so confirm the growing popularity of these largely traditional marketing structures, and the familiar farmer–consumer connections that they and other local marketing arrangements afford. Data collected by Adams and Salois<sup>95</sup> would seem to suggest a rising tide of consumer interest in simply buying more farm products directly from local producers, whether or not these local operations are certified organic. These researchers contend that this ‘locavore’ trend correlates strongly with passage of federal organic standards, and indicates a growing desire among consumers for a return to a time when organic was more closely associated with small

farms, community support and deeper notions of sustainability. Data reviewed in their study show that organic is no longer as strongly linked to these traditional notions as it once was, and for that reason many consumers have come to favor local over organic<sup>95</sup>.

While the data and analysis presented by Adams and Salois<sup>95</sup> are persuasive, the fact remains that even a casual stroll through any Whole Foods Market (or any Walmart or Costco, for that matter) reveals a great deal of support for 'Big O' organics as well. Indeed, the meteoric rise of 'Big O' (industrialized) organic agriculture over the past 10–15 years, coupled with the simultaneous surge in the more traditional, smaller-scale forms of 'Little O' organic farming and localized marketing discussed by Adams and Salois<sup>95</sup>, suggests an even larger point: the once mono-structural and ideologically homogeneous character of organic agriculture, including its practitioners, advocates, consumers and other adherents, has evolved into a highly pluralistic and complicated system of agronomy, marketing, economics, politics and consumption.

While more in-depth studies are needed to sort out the causes and implications of these alterations in the structure of organic agriculture (and consumer responses to them), this much seems relatively certain: many of these changes are the product of broad socioeconomic influences and would likely have occurred with or without the introduction of federal organic standards. Current tensions between and among advocates of 'Big O,' 'Little O,' and 'Beyond Organic' systems of farming and marketing may well be unavoidable at a time when the organic industry faces the challenges of establishing its role and configuration within the broader context of a rapidly changing society, especially one inclined to welcome (if not demand) ever greater and more specialized consumer product choices. While structural transformations of the kind occurring presently within organic agriculture will produce individual winners and losers, overall, as organic agriculture (regardless of its multiple forms) continues to attract support among consumers and the broader public, the collective good is likely to be substantial. As that process unfolds, the ideological and institutional diversity characteristic of today's organic agriculture (though painful for many organic participants) may prove to have been an essential element in the long-term growth of the overall organic industry.

### **Organic Agriculture Today: Recurring and Emerging Issues and Themes**

As noted at the outset of this retrospective, over the past 30 years organic agriculture has undergone enormous innovation and growth in the US and throughout the world. During this period, the science, politics, symbolism and institutional underpinnings of organic agriculture in

the US have been largely transformed. Today, for example, unlike three decades ago:

- many conventional scientists now conduct research on organic agriculture, acknowledging and even promoting the ecological and environmental benefits of organic systems<sup>38,96</sup>;
- other members of the academy have described and extolled the social and economic characteristics and advantages of small farms and localized marketing systems, often giving special attention to organic operations<sup>87,97</sup>;
- the federal government now provides the institutional framework for administration and enforcement of national standards for certified organic foods production, manufacturing and marketing;
- many large conventional food manufacturers, distributors and retailers now proudly display and promote a wide variety of certified organic products;
- farmers' markets, CSAs and other localized marketing arrangements have grown in number and popularity, and together with organizations such as Chef's Collaborative and a number of high-end restaurants have helped create and sustain a vibrant, dedicated and growing locavore movement; and
- a number of foundations have provided financial support for both organic and sustainable nonprofit organizations.

While these institutional alterations all help to fortify and enhance organic agriculture's political and scientific credibility, a number of closely related developments bear even more directly upon the industry's overall capacity to mobilize, focus, and deliver political messages and public policy proposals. To wit:

- consumers have responded enthusiastically to the organic foods marketplace, producing double-digit sales growth for organic foods and other products over the past 10–15 years<sup>94</sup>, and in the process have made an important political statement to policy makers;
- organic producer associations, certification organizations, specialized organic retailers, and organically oriented nonprofit organizations have grown steadily in size, number and influence;
- many environmental, consumer, farmland preservation and rural development groups now include organic farming policy work in their respective portfolios, thus broadening the political base of support for organic agriculture;
- the interests and perspectives of organic and sustainable agriculture are now skillfully represented in national policy debates by various industry and nonprofit groups and coalitions;
- books, popular articles and peer-reviewed journals provide a continuous flow of credible information and commentary on organic agriculture to both scientific and lay audiences; and
- sympathetic press accounts dealing with the benefits of organic and sustainable farming operations appear

frequently in both local and national media outlets, often with catchy titles, enticing story lines and suggestions for how consumers can support farmers practicing various alternative production and marketing methods and strategies. (A recent article in *The Denver Post*, for instance, entitled ‘How now, sustainable cow?’, typifies this popular genre<sup>98</sup>.)

As these selected developments illustrate, organic agriculture in the US today is far different than it was during the 1960s and 1970s<sup>1</sup>. Throughout this early period, the core elements of the organic farming movement consisted, essentially, of a fledgling but intrepid grassroots contingent of pioneering farmers; a modest number of small, mostly rural, largely voluntary nonprofit organizations; a handful of supportive writers, publishers, retailers and academics; and a small, but slowly expanding, community of interested consumers. With the exception of research conducted at the Center for the Biology of Natural Systems at Washington University in St. Louis, a non-land-grant institution<sup>99,100</sup>, and the University of Nebraska<sup>101</sup>, formal research programs on organic farming were nonexistent prior to the early 1980s.

Much of organic agriculture’s growth over the past 30 years (as noted previously) has related to mounting scientific and societal concerns associated with conventional agriculture, particularly its heavy dependence on nonrenewable, and increasingly expensive, petroleum-based resources, and the potentially adverse impacts of many conventional technologies on the natural resource base, human and animal health, rural communities and the structure of American agriculture. These and other factors, including growing concerns about food quality and safety, caused many scientists, policy makers and ordinary citizens to begin reassessing the benefits and costs of conventional agricultural production systems, and to begin exploring how organic farming methods might, at least to some extent, be incorporated into conventional systems. These concerns and reassessments, combined with the determination and skill of organic farmers and their supporters, slowly allowed organic agriculture to play an increasingly influential role in the contentious, protracted and divisive debates of the past three decades over how to achieve a more sustainable agriculture in the US, and around the world.

Today, despite these impressive achievements, efforts to expand organic agriculture’s footprint in the US must address a number of recurring and emerging issues. While there seems little doubt that organic agriculture will continue to occupy a prominent place on governmental, societal and personal agendas, its future character and direction are by no means certain. It is possible that the issues and battles that lie ahead may prove to be even more daunting for advocates of organic agriculture than those encountered over the past three decades. What are these issues, and how will they influence the future of organic agriculture?

## *Sustainable agriculture*

The word sustainable did not appear prominently in early debates regarding the costs and benefits of either organic or conventional agriculture. Instead of claiming that organic farming deserved governmental support because it was sustainable, the 1980 USDA *Report and Recommendations on Organic Farming* simply characterized organic systems as having the potential to help conserve ‘soil resources and the environment’ [p. v], or possibly to address ‘energy shortages, food safety, and environmental concerns’ [p. iii]<sup>9</sup>. In summarizing the basic tenets of organic agriculture, the Report concluded that ‘... organic farmers seek to establish ecologically harmonious, resource-efficient, and nutritionally sound agricultural methods’ [p. 9]. In the period surrounding its publication, the notion of sustainability had not yet become agriculture’s dominant verbal endgame, and the word sustainable had not yet emerged—as it soon would—as one of the most coveted, ubiquitous, symbolically powerful and politically charged words in the agricultural lexicon.

It was not until the word organic became the target of elevated and sustained attacks from the conventional agricultural community that organic proponents began to substitute other terms (including sustainable) in place of the word organic, to make organic farming more palatable to the agricultural scientific and policy-making communities. During this linguistic transition, it is important to remember that it was the terminology that changed, not the technology. Throughout much of the 1980s, as the labeling of organic technologies shifted toward the word sustainable, advocates of organic farming and those members of the science community sympathetic to organic approaches seemed relatively comfortable using these words more or less interchangeably. By the end of the 1980s, however, the science community, facing mounting peer pressure and continuing USDA and industry criticism of organic methods, had gravitated almost exclusively to use of the word sustainable. Meanwhile, the organic community began to focus its attention more heavily on organic certification and other aspects of the organic foods marketplace, with sustainability becoming only one of several reasons why consumers chose to support organic farming. Thus, throughout much of the 1980s, but especially during the first half of that decade, use of the words sustainable and organic, two of agriculture’s most symbolically powerful terms, were viewed as somewhat synonymous by members of the organic community and those agricultural scientists and policy makers most concerned about the negative externalities of conventional agriculture.

These developments did not go unnoticed within conventional agricultural circles. Once the organic farming community—and a distinct minority of scientists and policy makers—began to suggest that organic technologies were sustainable, and that conventional technologies

were not sustainable, proponents of conventional approaches vigorously entered the sustainability debate. The specter of organic technologies emerging as one of agriculture's best hopes for achieving sustainability represented an even larger threat to conventional agricultural interests than did the expanding organic foods marketplace, which remained quite small prior to passage of the OFPA in 1990.

By the late 1980s, the conventional community had begun to marshal its considerable resources in defense of chemical production inputs, precision agriculture, reduced tillage, biotechnology, large specialized farms including CAFOs, and other conventional methods. Proponents insisted that these technologies were now more necessary than ever in the quest for sustainability, which, under the conventional definition, emphasized the challenge of feeding a rapidly expanding world population. The launch of USDA's LISA program in 1988 added to these tensions. The idea of linking sustainability with low inputs was repugnant to conventional agriculture. The phrase, 'Low inputs mean low outputs,' became a common refrain as conventional agriculture sought to associate its high-input technology with sustainability. This issue, as noted earlier, came to a head in the 1990 Farm Bill debates. Efforts by the conventional agricultural community to discredit organic and other low-input approaches, and to emphasize the importance of 'efficient and prudent' use of farm chemicals, biotechnology and other conventional practices in achieving a sustainable agriculture, has been a central theme in agricultural policy debates for most of the past three decades.

Meanwhile, the organic community has sought to expand the meaning of sustainability to include not only environmental, ecological and nutritional benefits, but also issues such as social justice, farm worker safety and security, animal welfare and a more balanced farm structure, emphasizing the role of small farms and healthy rural communities. Much of the impetus to move 'beyond organic' revolves around these kinds of issues, and may be seen in the growth of new certification programs and product labels<sup>102</sup>. For example, a five-step animal welfare rating system for meat and other livestock products, announced in 2010 by Whole Foods Market and developed in coordination with the nonprofit Global Animal Partnership, would allow consumers to better understand where and how farm animals are raised. The highest rating would go to those producers whose animals spend their entire lives on the same farm<sup>103</sup>.

The NRC recently characterized agricultural sustainability as 'a complex, dynamic, and political concept that is inherently subjective in that different groups in society place different emphasis ...' [p. 5] on the various goals typically used to help define it<sup>36</sup>. According to the NRC, these goals include:

- Satisfy human food, feed and fiber needs, and contribute to biofuel needs.

- Enhance environmental quality and the resource base.
- Sustain the economic viability of agriculture.
- Enhance the quality of life for farmers, farm workers and society as a whole [p. 4].

Unfortunately, broad, goal-type statements such as these invite multiple arguments in defense of almost any combination of agricultural production methods, leaving the critically important concept of sustainability at the mercy of competing political, ideological and market forces. Thus, from a purely political perspective, organic agriculture (along with other low-chemical approaches) has lost its early, and nearly exclusive, claim on sustainability, a word that may at some point—if it does not already—hold even greater symbolic appeal to the broader agricultural community, and perhaps even to society in general, than the word organic.

The importance attached to sustainability by the conventional agricultural community may be seen in its determination to include conventional production technologies in various efforts to develop a certified label for sustainable agriculture. In late 2010, for example, the conventional agricultural groups involved in a 2-year-old process to develop a national standard for sustainable agriculture, convened by The Leonardo Academy, resigned from the Committee. In explaining the resignations, the American Soybean Association (ASA) cited 'serious systemic limitations and chronic biases that are inherent in the structure that The Leonardo Academy has set up for this initiative'<sup>104</sup>. The ASA further alleged that ... 'the Committee is dominated by environmental groups, certification consultants, agroecology and organic farming proponents. These groups have neither the vision nor desire to speak for the farmers of mainstream agriculture who produce more than 95 percent of the food consumed in or exported by the United States.' The Association further noted that it '... supports developing a progressive definition of agriculture sustainability that encompasses profitable, intensive production and encourages consumer acceptance of biotechnology enhanced products and satisfies food, feed, fiber and biofuel needs'<sup>104</sup>. Should conventional agricultural interests be successful in shaping and promoting into the marketplace a sustainable label (54 commodity and other conventional farm groups also withdrew from the Academy process<sup>104</sup>), it would represent an enormously important public relations achievement, enhance the image of conventionally produced foods (that would be labeled sustainably produced), reassure conventional farmers, confuse policy makers and consumers, and pose an important barrier to the expansion of organic foods and farming.

As the organic community moves 'beyond organic' by broadening the definition of sustainability, similar claims by conventional agriculture can be expected to increase. Evidence of this emerging trend may be seen in the promotional literature and outreach of the relatively new Association for the Future of Agriculture in Nebraska

(A-FAN). This nonprofit organization was formed by a number of conventional agricultural groups in the state: Nebraska Cattlemen, Nebraska Corn Growers Association, Nebraska Farm Bureau, Nebraska Pork Producers Association, Nebraska Poultry Industries, and Nebraska Soybean Association. Its website stresses that A-FAN's purpose is 'to assist farmers seeking to make responsible changes to their farms to remain economically viable and environmentally and socially responsible, and to share with Nebraskans a truthful representation of farm life and the connection between it and Nebraska's economic and social well-being'<sup>105</sup>. A-FAN spokespersons, unveiling the group on RFD-TV, stressed repeatedly the commitment of its farmer members to animal safety and welfare, as well as to other commonly used indicators of agricultural sustainability<sup>106</sup>.

As long as the technologies and systems needed to foster a sustainable agriculture are debated and contested, American consumers will be left to sort out what is likely to be an ever more complicated marketplace of symbols, labels and certification programs, as well as competing claims regarding the sustainability of various products and technologies. Meanwhile, agricultural policy makers will face an equally confusing set of choices when considering how to apportion increasingly scarce dollars for agricultural research, education and other forms of support.

### *Public agricultural research*

**Support for organic systems research.** For the past three decades, the issue of public funding for research and education programs directly relevant to organic farming systems has been one of the most important recurring themes in the debates surrounding the character and potential of organic agricultural methods. Organic adherents have argued that conventional, disciplinary research programs fail to address the inherent ecological complexities and the physical, biological and chemical interactions occurring within organic systems. Organic farmers and their supporters have called for holistic, interdisciplinary, systems-oriented research programs designed to identify, measure and better understand these complexities. During the period covered in this retrospective, the USDA Study Team on Organic Farming was among the first to emphasize the need for such an approach, calling for programs designed to '[i]nvestigate organic farming systems using a holistic approach' [p. 88]<sup>9</sup>. The Study Team then explained why such programs were needed:

The USDA case studies revealed that many organic farmers have developed unique and productive systems of farming which emphasize organic recycling and the avoidance or restricted use of chemical fertilizers and pesticides. It is also likely that these systems are highly complex and involve unknown or poorly understood chemical and microbiological interactions. Much of the research conducted to date that

relates to organic farming has been somewhat piecemeal and fragmentary. A holistic research approach, which may involve the development of new methodologies, is needed to thoroughly investigate these interactions and their relationship to organic waste recycling, nutrient availability, crop protection, energy conservation, and environmental quality [p. 88].

Many of the Study Team's other recommendations, in varying degrees, reflected the need for new research approaches, including interdisciplinary efforts [pp. 86–94].

Nearly a decade later, the NRC, while reviewing the role of alternative farming methods in modern production agriculture (understood at the time to include organic methods), also appealed for expanded programs of interdisciplinary research. According to the NRC Committee, '... agricultural research at the land-grant universities and the USDA has been extensive and very productive' [p. 137]<sup>70</sup>. However, the Committee continued:

Most of the new knowledge has been generated through an intradisciplinary approach to research. Scientists in individual disciplines have focused their expertise on one aspect of a particular disease, pest, or other agronomic facet of a particular crop. Solving on-farm problems, however, requires more than an intradisciplinary approach. Broadly trained individuals or interdisciplinary teams must implement the knowledge gained from those individual disciplines with the objective of providing solutions to problems at the whole-farm level. This interdisciplinary problem-solving team approach is essential to understanding alternative farming practices ... [M]ost research has focused on individual farming practices in isolation and not on the development of agricultural *systems* [pp. 137–138].

More than two decades after this NRC appeal for expanded programs of interdisciplinary research on alternative farming systems (and over 30 years since the USDA Study Team on Organic Farming had reached a similar conclusion), many agricultural scientists, especially those who have actually studied organic farming, continue to argue that the unique features of organic systems require interdisciplinary approaches. According to Drinkwater, for example, conventional farming systems are based on a 'command and control' philosophy that 'has led to the development of practices and inputs aimed at simplifying and reducing variation in agricultural systems ... In contrast, the use of systems thinking and integrated management strategies is fundamental to organic agriculture ... [O]rganic production systems are intentionally multifunctional' [p. 21]<sup>107</sup>. As the science of organic agriculture has expanded over the past 30 years, these and other calls for more interdisciplinary research have acquired a heightened level of credibility and urgency, and, in recent years, would seem to have had a positive impact on organic research funding levels.

As late as 1997, however, investigators could find little evidence of progress. In a careful review of USDA's



Current Research Information System (CRIS) conducted in the mid-1990s, Mark Lipson, policy analyst at the Organic Farming Research Foundation, found that a mere 34 research projects out of some 30,000 could be classified as focusing directly on organic systems, within ‘an experimental setting consistent with conditions found on working organic farms’ [p. 7]<sup>108</sup>. Lipson further concluded that these 34 projects represented ‘less than one-tenth of one percent of USDA’s research portfolio, both numerically and fiscally’ [p. 7]. Some 267 additional projects were deemed to be ‘compatible with organic methods, but not explicitly placed in a context of organic agriculture’ [p. 7].

Faced with these persistently low levels of research support in the years following implementation of the OFPA in 2002 (which provided a legal definition of organically produced food), proponents of organic systems added the principle of ‘fair share’ to their ongoing funding strategies. Armed with statistical information regarding the amount of organic food sales—approximately 3.5% of the value of total food sales as of 2010<sup>109</sup>—organic advocates settled on the notion of equivalency, meaning that a fair share of research dollars devoted to organic research would be equivalent to the organic percentage of total food sales. The total appropriation in Fiscal Year 2010 for federal- and state-level public agricultural research, education, and extension was nearly US\$2.9 billion<sup>110</sup>. Thus, the equivalency or fair-share standard suggests that organic research funding annually should be approaching US\$100 million. In fact, organic research funding in 2010 was slightly less than half this amount. However, according to Kathleen Merrigan, Deputy Secretary of Agriculture, ‘Another \$41 million of ARS research is compatible with organic farming systems, but is not directed towards specific organic research objectives’ [p. 11]<sup>111</sup>.

**Political and institutional barriers.** Clearly, these recent estimates represent a substantial improvement in the level of funding for organic research and other forms of technical assistance for farmers wishing to transition to organic practices. It should be noted, however, that a substantial majority of these gains came recently, with passage of the 2008 Farm Bill<sup>112</sup>. Thus, some 30 years after organic agriculture moved onto the public agricultural agenda in the US<sup>9</sup>, it is important to ask why it has taken so long to achieve these minimal levels of funding when compared with conventional agriculture. Here we note briefly some of the more intractable political and institutional forces arrayed against proponents of organic agricultural research. As Hadwiger<sup>113</sup> demonstrated 30 years ago, the politics of agricultural research is complicated.

In the 2010 NRC report dealing with sustainable agriculture, the authors noted that agricultural research remains ‘largely organized by discipline ...’ and then offered the following explanation for the ‘slow movement of public scientists toward more holistic and

agroecological approaches to agricultural science and technology ...’ [p. 322]<sup>36</sup>. According to the Committee:

Aside from the influence of formal research program funding priorities, long-term cultural and cognitive routines of agricultural scientists generate assumptions about the current and future importance of different kinds of agricultural systems and influence their views of the viability of alternative approaches to scientific research<sup>114</sup>. Moreover, institutional and disciplinary reward mechanisms, publication opportunities, and increasingly specialized skill sets mitigate against the likelihood that young agricultural scientists will be successful pursuing careers using interdisciplinary, holistic, or alternative technological approaches<sup>115,116</sup> [p. 322].

Focusing initially on the Committee’s third and final point in the above passage, it would appear that 30 years after publication of USDA’s *Report and Recommendations on Organic Farming*, and despite the efforts, over this period, of organic and sustainable agriculture supporters to influence the research priorities of the USDA/land-grant university system, these institutions have yet to fully address the training, financial and professional incentives, and the psychic rewards, offered to both seasoned and aspiring agricultural scientists wishing to pursue interdisciplinary research.

In addition to the organizational disincentives for interdisciplinary research noted by the NRC Committee, it is equally important to focus on the Committee’s opening phrase in the above quotation: ‘Aside from the influence of formal research program funding priorities ...’ [p. 322]<sup>36</sup>. Here, the Committee seems to be acknowledging that the politics of establishing research priorities may also hinder the development of more interdisciplinary research. Indeed, there has long been substantial agreement among policy analysts that politically powerful agricultural commodity, trade and industry groups have consistently held sway in setting the overall priorities and direction of agricultural research policy<sup>117</sup>. These entrenched and politically experienced research policy subsystems consist generally of specialized commodity producer associations (and their industry counterparts), sympathetic House and Senate appropriators who may be aligned politically with such groups in their respective states and districts, and a supportive agricultural research bureaucracy organized largely by disciplinary categories corresponding to the needs and expectations of commodity, trade and industry clientele groups. The influence of these kinds of so-called political ‘iron triangles’ (sometimes referred to as sub-governments) has been well documented by policy researchers, and is not limited to the politics of agricultural research [pp. 71–74]<sup>117</sup>.

Most agricultural policy analyses, however, particularly those conducted prior to the ascending influence of the new agricultural agenda groups discussed earlier, have generally concluded that the American agricultural establishment ‘has comprised one of the most closely knit, impenetrable cadres of political decision makers in the

whole of American government<sup>118</sup>. Thus, while it would be difficult for any new claimant for limited agricultural research dollars to compete effectively against these specialized, commodity-based research policy subsystems—that often compete vigorously against one another for limited funds—it may be especially challenging for proponents of organic agriculture to alter the priorities of these established, often symbiotic, sub-governments. Not only does organic agriculture represent one more competitor for limited funds in an already highly competitive overall agricultural research system, the interdisciplinary, ecologically based nature of many of its funding requests also represents an organizational challenge to the manner in which that research would need to be planned, conducted and evaluated, thus disrupting established bureaucratic missions and routines.

The recent uptick in both authorized and mandatory funding for organic agriculture research and other support programs, as represented in the 2008 Farm Bill (see Lipson et al.<sup>112</sup>), would seem to indicate some degree of realignment within the agricultural research sub-government. Indeed, it may now be more accurate to think of the agricultural research sub-government as a ‘policy community’ that, according to Anderson, ‘... is broader and more open in participation than an iron triangle ...’ [p. 73]<sup>117</sup>. A more complete description of the agricultural research system as it has evolved over the past 30 years, and is presently configured, must await a thorough empirical analysis.

Finally, the NRC Committee drew attention to the notion that ‘long-term cultural and cognitive routines of agricultural scientists generate assumptions about the current and future importance of different kinds of agricultural systems and influence their views of the viability of alternative approaches to scientific research’ [p. 322]<sup>36</sup>. Presumably, in other words, scientists make personal judgments about the importance of larger societal and agricultural trends and needs, and the probable impact of those trends on the likelihood of financial and other forms of professional support—and personal rewards—likely to accompany their involvement in a variety of basic and applied research programs. Thus, the growing interest in organic farming among members of the conventional agricultural research community may well be tempered by both the symbolism and ideology of the high-yield, high-technology agricultural production systems that continue to dominate the world of agricultural science, and agriculture in general.

Today, for example, major agricultural media outlets, agricultural research institutions, private firms involved in the development and sale of conventional production input technologies, and major commodity organizations have all begun to stress the challenges facing American agriculture of feeding a worldwide population of 9 billion people by the year 2050, while at the same time being better stewards of the environment, honoring the family farm and its agrarian traditions, and improving animal

welfare. These stated challenges, in various iterations now appearing widely on conventional agricultural websites and in other media outlets, have been formalized under the name ‘Farmers Feeding the World’<sup>119</sup>. This campaign, unveiled in 2010 by Farm Journal Media, is an initiative of the newly formed nonprofit Farm Journal Foundation. Billed as an industry-wide, agricultural anti-hunger campaign, its goals have been embraced by Senator Richard Lugar, former chairman of the Senate Agriculture Committee. In a video clip endorsing Farmers Feeding the World, Lugar said:

Farmers everywhere are facing a big challenge: They will need to produce enough food to feed a population that is projected to grow to 9 billion by 2050. Their ability to do so will come largely from proper stewardship of scarce natural resources, like land and water, as well as making the best use of technology-based sustainable production practices. To meet that challenge, Farmers Feeding the World is rallying the United States agriculture industry to assist organizations on the front lines of the fight against hunger, while educating the general public about modern agriculture as an essential component of the solution. Farmers Feeding the World will highlight the history of tenacity, hard work, discovery and know-how that make American farmers uniquely qualified to help 925 million people suffering from food insecurity<sup>120</sup>.

This campaign, whose goals are highly laudable and whose membership includes nearly all major conventional agricultural producer and industry groups, illustrates conventional agriculture’s ability to shape the flow of information to the food and agricultural community, and even to some extent, to the larger society. It also demonstrates the determination of mainstream agriculture to control the agricultural policy agenda, including research, trade and development. It would be nearly impossible, given the origin, character and magnitude of this campaign, for most agricultural scientists to resist, or even question, its compelling and symbolically powerful goals and messages. In addition to extolling the benefits of modern, high-yield agricultural technology in support of efforts by US farmers to ‘feed the world,’ the campaign includes an appeal for individual and corporate financial donations to assist groups such as Heifer International in delivering food aid and helping farmers in the developing world become more self-sufficient in food production. According to the Foundation’s website, US\$20 million annually would be sought for these purposes<sup>121</sup>.

This humanitarian element of the overall campaign, no doubt sincere and certainly commendable, serves to reinforce the larger message of Farmers Feeding the World: namely, that feeding 9 billion people by 2050 can be achieved only through the continued development and adoption of modern farming techniques by US farmers and their counterparts in other developed countries. Visitors to the Farmers Feeding the World website are reminded, for example, in an animated video clip, that: ‘Yesterday’s agriculture cannot feed 9 billion people.’ Organic and other low-chemical farming methods are

conspicuously absent from the campaign's discussion of production technologies with the capacity to help address the global hunger challenge. The origin, tone, and powerful imagery of the Farmers Feeding the World campaign, coupled with its pervasive reach within agricultural institutions, including the research community, reminds us again to consider the second point of the NRC Committee's summary statement regarding reasons for the continuing disciplinary organization of agricultural research: '... [C]ultural and cognitive routines of agricultural scientists generate assumptions about the current and future importance of different kinds of agricultural systems and influence their views of the viability of alternative approaches to scientific research' [p. 322]<sup>36</sup>.

Despite the barriers to organic farming research posed by these and other ideological and political characteristics of our conventional agricultural institutions, over the past two decades or so many agricultural scientists have forged successful, even prominent, careers while focusing much of their research and teaching efforts on organic systems and publishing the results of their research in new peer-reviewed, interdisciplinary journals. Considering that the agricultural sciences, as we have seen, remain organized largely along disciplinary lines, including the publication of prominent disciplinary journals, the fact that a growing number of mainstream agricultural scientists would choose to place their work in these relatively new interdisciplinary journals demonstrates at least two important points: (1) disciplinary journals have tended to overlook the importance of interdisciplinary work, especially work focused on organic-type production systems; and (2) increasing numbers of agricultural scientists are gravitating toward the scientific challenges associated with exploration of ecologically based, organic-type farming systems. As these events have unfolded, more such work has appeared in traditional publication outlets, including some of the world's most prestigious journals (e.g., see Reganold et al.<sup>23,122,123</sup>).

These efforts have made important contributions to the science community's understanding and acceptance of organic farming systems, identified key knowledge gaps, elevated the scientific image of organic farming, and helped to legitimize the need for expanded, interdisciplinary research on organic farming as perceived by both political and scientific audiences. Proponents of organic agriculture are mindful of the increasing attention and respect shown to organic farming by some members of the conventional research and policy communities. Nonetheless, most continue to believe that current efforts fall far short of those needed to allow organic agricultural systems to reach their full potential, and for the ecological and environmental benefits associated with these systems to be more fully understood and more widely incorporated into farming systems both here and abroad.

Organic adherents, including a growing number of agricultural scientists and policy analysts, believe that the ecological, agronomic and production characteristics

of organic systems can and must play a larger role in the goal of feeding the world's population<sup>124</sup>. Unlike the Farmers Feeding the World campaign that, despite its humanitarian component, emphasizes the high technology and high yields associated with a US export-oriented strategy, proponents of organic farming argue that global efforts to reduce poverty and hunger should focus more attention on development of low-cost, organic-type technologies appropriate for small farms and localized marketing systems<sup>125,126</sup>. Moreover, it is important to note that the bulk of US grain exports go to the most highly developed countries, not to the poorest and least developed ones<sup>127</sup>.

For these and other reasons, organic ideology favors a multi-faceted strategy for food production, one that rests more heavily upon the diverse human and natural ecology of local soils, crops, climates, communities and cultures that exist throughout the world. Advocates argue that this approach would go a long way toward making it possible for more farmers everywhere to feed themselves and their communities. This strategy would, of course, require a prolonged and substantially greater investment in holistic, interdisciplinary and systems-oriented research conducted by teams of investigators representing the full range of agronomic, ecological, economic and policy sciences. As the foregoing discussion illustrates, however, given the politics of agricultural research, securing expanded levels of support for ecologically oriented interdisciplinary approaches represents a very tall order, indeed.

### *Public agricultural policy and farm structure*

For the past several decades, organic farming advocacy has been conducted against the backdrop of a larger debate over how American agriculture should be structured. Successful organic farming operations have long been associated with small- to mid-sized, family-type, mixed crop–livestock farms, particularly for farms located in the Midwest agricultural heartland. The intensive management required of organic farming operations largely accounts for the belief that smaller farms generally may be more compatible with organic systems. In sharp contrast to this farm enterprise model, however, trends in US farm structure—farm size expansion, specialization, intensification, and mechanization—especially since World War II, have combined to create a relatively 'non-organic' overall farm structure, one consisting of ever-larger, more specialized farms, reliance upon heavy and widespread use of synthetic fertilizers and pesticides, monocultural cropping systems, and separation of crops and animals<sup>128</sup>. One result of these trends has been the gradual decline in numbers of family, or mid-sized farms (numbers of small farms have increased during this period), in what many have called the 'disappearing middle' within the overall structure of US agriculture. These technological, economic, political and social forces

continue to drive American agriculture in the direction of an increasingly 'non-organic' farm structure.

These structural issues must be addressed at a time when some organic proponents have begun emphasizing the survival of mid-sized farms as both a technological necessity and an ethical imperative, not only for the future of organic-type systems, but for the future of the planet as well. Fred Kirschenmann, for example, argues that the industrial character of US farm structure, relying so heavily upon relatively inexpensive, nonrenewable resources, has overlooked the importance of social and human capital, resulting in ... 'a disastrous effect on the nation's "independent family farmers"' ... the kind of farmers needed to ... 'meet the challenge of sustaining a food system that can provide adequate amounts of food for an increasing human population in the face of peak global oil production, degraded soils, depleted fresh water supplies, and more unstable climates' [p. 331]<sup>129</sup>. The plea for preserving a solid core of mid-sized farms is not, he writes, a 'matter of "saving the family farm"' [p. 331]. Rather, it is because these are the kinds of farmers who possess the ... 'ecological and cultural wisdom and commitment required to restore the physical and biological health of our soils. They are the farmers who owned their land, lived on their land, were intimately related to their land, and planned to pass it on to future family members—all factors that nurtured a culture of caring for the land' [p. 330]. Despite the urgency attached to reversing (or at least stabilizing) the loss of mid-sized farms, by Kirschenmann and other proponents of organic farming, success in altering this and other interrelated trends in US farm structure is far from certain.

While many organic food consumers and other supporters of organic agriculture, including growing numbers of scientists and analysts, may view organic systems as a way to foster a more decentralized, less industrialized and more sustainable farm structure, others see the matter quite differently. A recent article in *Foreign Policy* magazine entitled 'Attention Whole Foods shoppers,' by Robert Paarlberg, a well-known analyst of food and agriculture policy at Wellesley College, undoubtedly reflects the views of many within the conventional agricultural community. According to Paarlberg, 'If we are going to get serious about solving global hunger, we need to de-romanticize our view of preindustrial food and farming. And that means learning to appreciate the modern, science-intensive, and highly capitalized agricultural system we've developed in the West. Without it, our food would be more expensive and less safe'<sup>130</sup>.

Paarlberg is not alone. For most of conventional agriculture, the relatively 'non-organic' farm structure now in place throughout US agriculture represents a positive, even stunning, technological and policy achievement. Meanwhile, many supporters of the industrial model continue to view organic agriculture, as Paarlberg phrased it, as 'preindustrial food and farming'<sup>130</sup>. The many substantial efforts over the past three decades

to enhance the scientific understanding and image of organic production systems has failed to convince most conventional agriculturists, many of whom continue to regard organic farming in much the same way it was viewed (and dismissed) decades ago. The following passage captures this sentiment:

... [O]rganic food has garnered an extraordinary amount of attention from the media and, along with 'local' food, is a darling of foodies and environmentalists, who talk up its civic virtues and benefits to the environment. There's just one problem with this: agriculture has moved away from small-scale, local, and organic farming because these types of farms are land and labor-intensive and don't do a very good job of feeding lots of people. In addition, they are *not* definitively better for the environment, and their growth would lead to higher food prices than most Americans are willing to pay [p. 1]<sup>131</sup>.

The views of Paarlberg<sup>130</sup> and Haddad<sup>131</sup> illustrate a critically important point: The controversy that has raged around organic versus conventional agriculture for the past several decades transcends arguments about the benefits and costs of various technologies and farming systems *per se*; much of the debate revolves around the issue of farm structure itself. In fact, the structure of American agriculture produces winners and losers. The growing scale and specialization of US farm structure favors a wide array of chemical and farm machinery companies. The ability to capitalize farm program benefits into the value of farmland provides an economic advantage to large landholders. Monocultural cropping systems benefit those companies that manufacture and sell synthetic fertilizers and pesticides. Vertically integrated CAFOs benefit large-scale feeders, meat packers and poultry processors. A more 'organic' farm structure, on the other hand, one characterized by widespread use of legume-based crop rotations, integration of crops and animals, smaller and more decentralized processing and marketing facilities, smaller-scale machinery and larger numbers of small and mid-sized farms, would greatly alter the mix of winners and losers in US agriculture. The stakes are high for the beneficiaries of the current relatively 'non-organic' farm structure, and they can be expected to fight hard to keep in place those policies that have helped shape it.

US farm structure has evolved along with various socioeconomic and political issues, including but not limited to: agricultural commodity, tax, credit, and research and education policies. Relatively low energy prices (at least until recently), rapidly rising land prices and the competitive nature of farming have often exacerbated a cost-price squeeze for producers, adding to the pressures (and opportunities) to expand the size of their operations and improve margins through enterprise specialization, intensification and mechanization<sup>128</sup>. The broad outlines of these institutional and policy dynamics may be seen in the following highly abbreviated sketch.

Inflationary land markets have encouraged farmers (especially those well-capitalized with access to credit) to expand their operations through purchase of additional land. Attractive interest-deduction policies have also supported farm-size expansion. Mechanization, which has accompanied the trend toward larger farms, has been encouraged by investment tax credits and accelerated depreciation schedules. Enhanced mechanization has helped to reduce labor costs, while farm-size expansion has allowed the costs for fixed investments to be spread across more acres or other specialized production enterprises. The switch to more specialized monocultural cropping systems and the elimination of crop–animal forage systems, on most farms, is largely responsible for the intensified use of synthetic fertilizers and pesticides. Monocultural cropping systems such as corn, soybeans and wheat require use of these purchased inputs to provide crop nutrients and control pests. Taken together, these alterations in farm structure and management have helped to free farmers from the confining aspects of mixed crop–livestock operations, making current trends attractive to many farmers. As one Midwest wag put it several years ago: ‘Farmers around here work really, really hard—two months in the spring and two months in the fall.’ This comment by a large-scale producer in Illinois serves to reinforce the notion that current US farm structure enjoys widespread support among many, if not most, large-scale farmers, and from the input supply industry that supports them.

Agricultural commodity policy has also tended to favor larger farms specializing in monocultural cropping systems<sup>132</sup>. Although commodity policy is incredibly complicated and has undergone numerous changes since the ‘modern’ era of farm policy was first advanced during the New Deal, two recurring features of commodity policy, crop bases and crop yields, have endured (with some modifications) and often have influenced farmer decision-making regarding what crops to grow and how intensively to grow them. Essentially, the larger the crop base (on any eligible commodity crop such as corn, wheat or cotton), and the larger the proven per-acre yield of any such commodity crop, the larger the payment received by the individual producer. These two variables have acted as direct incentives for farmers to establish relatively large program crop acreage bases, to maintain those established bases at levels consistent with individual farm plans and farm program strategies, and to generate maximum yields on those acres, in part through intensive use of synthetic fertilizers and pesticides. Moreover, compared to crop–livestock operations, wherein at least a portion of certain commodity crops such as corn may be fed to farm animals, it is somewhat easier to prove crop yields per acre in monocultural cropping systems. In the latter case, crops are marketed through local elevators or other commercial outlets, thus providing farmers with weight slips as proof of yield.

Finally, the accelerating wave of farm consolidations and other changes in US farm structure in the years during

and following World War II<sup>133</sup> continue to have a negative impact upon contemporary debates regarding the nature of modern organic farming. During this transitional period, the number of farmers who left the farm in search of employment in nearby towns and villages (even large cities) increased sharply. Employment opportunities outside of agriculture expanded rapidly after the War, and the prospect of 40-hour work weeks, paid vacations and a regular pay check appealed to many farmers, especially when compared to the financial uncertainty and endless work associated with the small, confining, relatively primitive crop–livestock farming enterprises characteristic of that era in the US agricultural heartland. During this period, the now familiar corn–soybeans (and Miami) crop rotation, often the subject of light banter around today’s rural Midwestern coffee shops, would have seemed fanciful. The lingering images from this period of large numbers of small-scale farmers leaving the farm at a time when much of agriculture was still relatively ‘organic,’ when such systems were being replaced with the chemical technologies that later would come to dominate American agriculture, have continued to distort perceptions of modern organic farming. The reluctance of conventional agriculture to acknowledge the scientifically documented agronomic, ecological and performance characteristics of contemporary organic farming, or to consider ways in which these modern systems could be more widely and productively integrated into the overall structure of American agriculture, continue to pose an important political barrier to the expansion of organic farming in the US, as well as in many other regions of the world.

### **Closing Reflections on the Evolution of Organic Agriculture in the US**

As noted throughout this retrospective, organic agriculture in the US has changed dramatically over the past three decades. Thirty years ago few would have predicted that the meaning, image and practice of organic farming would have evolved so completely into a market-driven, legally defined production system, and that companies such as WalMart and Costco would be marketing certified, organically grown products. Furthermore, in 1980, predictions that these products would bear a certified label of authenticity from USDA would have been seen as delusional. Similarly, the development of formal research programs within USDA and the land-grant university system of direct relevance to organic agriculture—programs that, as discussed earlier, are now approaching fairly substantial levels of support—would have seemed equally unlikely. In the early 1980s a top USDA science administrator confidently predicted that there would never be an organic research program in the Department. Conventional agricultural scientists of the period apparently believed that both organic and conventional farmers

were well served by much past and current agricultural research [p. 28]<sup>134</sup>.

Successes of the kind noted throughout this account would seem to suggest that efforts by its opponents to halt the growth of organic farming have failed, and in some important respects, they did fail. Organic agriculture now represents a well-established, legally defined, and popular farming and food industry. That industry, however, bears only slight resemblance to the meanings and purposes attached to organic farming in the years surrounding publication of the 1980 USDA *Report and Recommendations on Organic Farming*<sup>9</sup>. Clearly, at that time, the emphasis among proponents of organic agriculture was focused primarily on the potential contributions of these systems to address the broad environmental, energy and financial pressures building throughout American agriculture, not upon the structure, growth and definition of certified organic farming systems. Certification programs then were in their infancy and the marketing infrastructure for organically grown food was only beginning to find its way into the mainstream. For many within conventional farming circles, the imagery of these fledgling institutions reinforced the belief that organic agriculture was irrelevant to the broader needs of US agriculture, and that organic technologies were best suited for backyard gardeners, roadside stands, and as some said disparagingly, ‘little old ladies in white tennis shoes.’ Overcoming this negative and distorted imagery may now be seen as one of organic farming’s most important achievements over the past three decades.

The successful commercial (and to some extent symbolic) transformation of organic farming notwithstanding, it seems important to ask why organic farming advocacy appears to have been far less successful in its efforts to foster the wider integration of organic technologies into conventional farming systems, the primary intent of many early proponents, including congressional sponsors of organic agriculture policy initiatives and participants involved in the two major scientific reviews of that period<sup>9,70</sup>. Roughly 1% of US farm and rangeland is managed using organic methods, according to the latest figures from USDA’s Economic Research Service<sup>109</sup>. What accounts for this strikingly low percentage?

Several possible explanations come to mind. First, these data regarding the percentage of US farm and rangeland under organic management refer only to certified systems. Second, as noted previously, major political, ideological and technological developments over the past several decades have clouded efforts to define what constitutes a sustainable agriculture. Three decades ago organic-type technologies (such as long-term rotations including legumes and other green manure crops, along with integrated livestock operations) were widely viewed as essential features of a sustainable agriculture. Improved soil, water and air quality, enhanced wildlife habitat, soil erosion control, energy conservation, safer food and rural economic vitality were often said to flow from these kinds

of reduced-chemical systems. Today, however, proponents of these traditional organic methods and systems can no longer lay exclusive claim to sustainability. Conventional agriculture has argued successfully that major features of its systems, such as conservation tillage, precision agriculture, biotechnology, less toxic pesticides and maximum yields, represent the modern elements of a sustainable agriculture. Clearly, the politics of sustainability have undermined efforts by proponents of organic farming to extend the reach of organic technologies more broadly throughout all of agriculture. As a result, organic agriculture has come to symbolize certified systems associated largely, if not exclusively, with the organic foods marketplace. In those locations and in those instances where organic farming techniques are being integrated into otherwise conventional farming enterprises, they will almost certainly be called something else, making it difficult, if not impossible, to determine the extent to which non-certified organic methods are being more widely used throughout US agriculture.

Third, as we have seen throughout this retrospective, symbolism and linguistics have often played crucial roles in the politics of organic agriculture, creating both positive and negative consequences for the industry. While many conventional agriculturists continue to reject and disparage organic farming, distorting its image and limiting its broader application, the American consumer has enthusiastically embraced organic products and much of its ideology. For most consumers of organic products, the symbolism and technology of organic farming are highly appealing, and while such consumers may not be steeped in the history and traditions of organic agriculture, the word organic itself has come to represent and project positive images and important personal meanings. Most consumers of organic foods and other organic products believe they know what organic means, and that is enough for most of them.

Finally, with respect to the issue of incorporating organic methods into conventional farming systems, proponents of organic agriculture may have had more success than is generally recognized. For example, analyses included in the 2010 NRC report on sustainable agriculture would seem to suggest the kinds of production alternatives seen as valid elements of a sustainable agriculture among the elite ranks of US agricultural scientists [Chapter 5]<sup>36</sup>. While devoting only 12 pages of this chapter to organic farming systems *per se*, the NRC Committee devoted an additional 16 pages to such topics as integrated crop–livestock systems, management-intensive rotational grazing systems and low-confinement integrated hog-producing systems (28 pages in total), all in a 48-page chapter (including 10 pages of references) entitled, ‘Examples of farming system types for improving sustainability’ [pp. 221–269]. Only the most determined opponents of organic agriculture are likely to argue that these system types do not represent legitimate production options long associated with idealized models of organic

farming systems. Meanwhile, as long as the science, ideology and politics of American agriculture tend to limit use of the word organic to certified, market-driven systems, organic adherents may have to accept the fact that other terms will be used to describe many of organic farming's long-standing agronomic methods and principles, and perhaps even some aspects of its ideology as well.

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## References

- Youngberg, G. 1978. Alternative agriculturists: ideology, politics, and prospects. In D.F. Hadwiger and W.P. Browne (eds). *The New Politics of Food*. Policy Studies Organization Series No. 19. Lexington Books, Lexington, MA. p. 227–246.
- Hadwiger, D.F. and Browne, W.P. (eds). 1978. *The New Politics of Food*. Policy Studies Organization Series No. 19. Lexington Books, Lexington, MA.
- Paarlberg, D. 1978. A new agenda for agriculture. In D.F. Hadwiger and W.P. Browne (eds). *The New Politics of Food*. Policy Studies Organization Series No. 19. Lexington Books, Lexington, MA. p. 135–140.
- Paarlberg, D. 1975. The farm policy agenda [address to the National Public Policy Conference, Clymar, New York, September 11, 1975]. *Increasing Understanding of Public Problems and Policies*. Farm Foundation, Oak Brook, IL. p. 95–102. Available at Website <http://ageconsearch.umn.edu/handle/17728> (verified December 20, 2012).
- Risser, J. 1984. As costs soar, more farmers going 'organic' [Part 1 of 5-part series, Organic farming]. *Des Moines Register* June 10:1A, 9A.
- McNeill, J.R. 2010. The environment, environmentalism, and international society in the long 1970s. In N. Ferguson, C.S. Maier, E. Manela, and D.J. Sargent (eds). *The Shock of the Global: The 1970s in Perspective*. Belknap Press of Harvard University Press, Cambridge, MA. p. 263–278.
- National Research Council. 1972. Report of the Committee on Research Advisory to the U.S. Department of Agriculture, National Research Council, Washington, DC.
- Hightower, J. 1973. *Hard Tomatoes, Hard Times: A Report of the Agribusiness Accountability Project on the Failure of America's Land Grant College Complex*. Schenkman, Cambridge, MA.
- USDA Study Team on Organic Agriculture. 1980. *Report and Recommendations on Organic Farming*. US Department of Agriculture, Washington, DC.
- Available at Website <http://www.nal.usda.gov/afsic/pubs/USDAOrgFarmRpt.pdf> (verified December 20, 2012).
- Knorr, D.W. and Watkins, T.R. (eds). 1984. *Alterations in Food Production*. Van Nostrand Reinhold, New York.
- Lane, R.E. 1962. *Political Ideology: Why the American Common Man Believes What He Does*. Free Press, New York.
- Heckman, J.R. 2006. A history of organic farming: transitions from Sir Albert Howard's 'War in the Soil' to USDA National Organic Program. *Renewable Agriculture and Food Systems* 21:143–150.
- Coleman, E.W. 2010. *The Other Side of the Tapestry: An Agrarian Understanding of the Natural World*. Paper prepared for the Agrarian Studies Colloquium, Yale University [New Haven, Connecticut], November 19. Available at Website <http://www.yale.edu/agrarianstudies/colloqpapers/11cole%26dam.pdf> (verified December 20, 2012).
- Rodale, R. 1976. Prepared statement made to Federal Trade Commission public hearings, Washington, DC, November 17, 1976, before W.D. Dixon, presiding officer, regarding proposed Trade Regulation Rule on Food Advertising (16 CFR Part 437). p. 1–64.
- Darwin, C.R. 1881. *The Formation of Vegetable Mould, Through the Action of Worms, with Observations on Their Habits*. John Murray, London.
- King, F.H. 1911. *Farmers of Forty Centuries or Permanent Agriculture in China, Korea and Japan*. Mrs. F.H. King, Madison, WI.
- Howard, A. 1940. *An Agricultural Testament*. Oxford University Press, New York.
- Peterson, C., Drinkwater, L.E., and Wagoner, P. 1999. *The Rodale Institute Farming Systems Trial—The First 15 Years*. Rodale Institute, Kutztown, PA.
- Schumacher, E.F. 1973. *Small is Beautiful: Economics as if People Mattered*. Harper and Row, New York.
- Albrecht, W.A. and Walters, C. Jr (ed.). 1975. *The Albrecht Papers: Vol. 1, Foundation Concepts; Vol. 2, Soil Fertility and Animal Health*. Acres U.S.A., Kansas City, MO.
- Berry, W. 1977. *The Unsettling of America: Culture and Agriculture*. Sierra Club Books, San Francisco, CA.
- Carson, R. 1962. *Silent Spring*. Houghton-Mifflin, Boston, MA.
- Reganold, J.P., Papendick, R.I., and Parr, J.F. 1990. Sustainable agriculture. *Scientific American* 262:112–120.
- Greene, W. 1976. *The New Alchemists: Cooking Up a Gentle Science for Survival*. *New York Times Magazine* August 8. [Reprinted in US Senate, 1978, *Priorities in Agricultural Research of the U.S. Department of Agriculture*, Appendix to Hearings before Subcommittee on Administrative Practice and Procedure, Committee on the Judiciary, 95th Congress, 1st Session; US Government Printing Office, Washington, DC. p. 1055–1060; Available at Website [HathiTrust Digital Library] <http://babel.hathitrust.org/cgi/pt?id=mdp.39015078640664> (verified August 30, 2012).
- Rodale, R. 1976. It's time for a new declaration of independence. *Organic Gardening and Farming* 23(9):46.
- Buttel, F.H. and Youngberg, G. 1985. Sustainable agricultural research and technology transfer: Socio-political opportunities and constraints. In T.C. Edens, C. Fridgen,

- and S.L. Battenfield (eds). *Sustainable Agriculture and Integrated Farming Systems: 1984 Conference Proceedings*. Michigan State University Press, East Lansing, MI. p. 287–297.
- 27 Cochrane, W.W. 1979. *The Development of American Agriculture: A Historical Analysis*. University of Minnesota Press, Minneapolis, MN.
  - 28 Copley News Service. 1974. Food Prices: According to Earl Butz They're Still Going Up. *Beaver County Times* February 22:A7.
  - 29 Edelman, M.J. 1964. *The Symbolic Uses of Politics*. University of Illinois Press, Urbana, IL.
  - 30 Berg, G.L. 1981. The 'Organic' Trap [In Summing Up column]. *AG Consultant and Fieldman* May/June:50.
  - 31 Risser, J. 1984. Organic Farming [5-Part Series]. *Des Moines Register* June 10–14.
  - 32 US Department of Agriculture, Soil Conservation Service. 1982. Basic Statistics, 1977 National Resources Inventory. Statistical Bulletin No. 686. USDA, Washington, DC; Iowa State University Statistical Laboratory, Ames, IA.
  - 33 Daft, L. 1993. A look back at the USDA report on the structure of agriculture: A time to choose. *American Journal of Alternative Agriculture* 8:147–149.
  - 34 US Department of Agriculture. 1981. *A Time to Choose: Summary Report on the Structure of Agriculture*. USDA, Washington, DC.
  - 35 Carter, L.J. 1980. Organic farming becomes 'legitimate.' *Science* 209:254–256.
  - 36 National Research Council. 2010. *Toward Sustainable Agricultural Systems in the Twenty-First Century*. National Academies Press, Washington, DC.
  - 37 Sooby, J., Landeck, J., and Lipson, M. 2007. 2007 National Organic Research Agenda. Organic Farming Research Foundation, Santa Cruz, CA. Available at Website <http://ofrf.org/sites/ofrf.org/files/docs/pdf/nora2007.pdf> (verified December 20, 2012).
  - 38 Francis, C.F. (ed.). 2009. *Organic Farming: The Ecological System*. Agronomy Monograph No. 54. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Madison, WI.
  - 39 Risser, J. 1984. USDA, Chemical Firms Move to Trip Organics Bill [Part 5 in 5-Part Series, Organic Farming]. *Des Moines Register* June 14:1A, 10A.
  - 40 Sinclair, W. 1985. Organic Farmers Still Harvesting Profits: Bucking No-Till Trend and Shunning Chemicals, They Go Against the Government Grain. *Washington Post* September 1:A9, A10.
  - 41 Gates, J.P. and Bielenberg, K. 1989. *Educational and Training Opportunities in Organic, Low Input or Sustainable Agriculture*. 2nd ed. US Department of Agriculture, National Agricultural Library, Alternative Farming Systems Information Center, Washington, DC. Available at Website [University of Florida Digital Collections] <http://ufdc.ufl.edu/UF00082064/00001/15j> (verified December 20, 2012).
  - 42 Anonymous. 1980. Welcome, Nonetheless [Countryside Comment]. *Countryside* October: 33.
  - 43 Jackson, W. 1980. *New Roots for Agriculture*. Friends of the Earth, San Francisco, CA; Land Institute, Salina, KS.
  - 44 Jackson, W. 1978. *Towards a Sustainable Agriculture. Not Man Apart* (Friends of the Earth) Mid-November/December. p. 4–6.
  - 45 Northbourne, Lord 1940. *Look to the Land*. 2nd Rev. ed. Sophia Perennis, Hillsdale, NY.
  - 46 Scofield, A.M. 1986. Organic farming—The origin of the name. *Biological Agriculture and Horticulture* 4:1–5.
  - 47 American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. [undated]. Preliminary Program of the Annual Meeting, November 29–December 4, 1981, Atlanta, Georgia.
  - 48 Edwards, C.A. 1990. Preface. In C.A. Edwards, R. Lal, P. Madden, R.H. Miller, and G. House (eds). *Sustainable Agricultural Systems*. Proceedings of the International Conference on Sustainable Agricultural Systems, Ohio State University, Columbus, Ohio, September 1988. Soil and Water Conservation Society, Ankeny, IA. p. xiii–xiv.
  - 49 Bertrand, A.R. 1981. Memo to Organic Farming Coordinating Committee from Anson R. Bertrand, Director, USDA, Science and Education, Washington, DC, July 27.
  - 50 US Congress. 1981. *Agriculture and Food Act of 1981*. Public Law 97-98, Washington, DC.
  - 51 US House of Representatives. 1982. *Organic Farming Act of 1982 (H.R. 5618)*, introduced February 24, 1982. 97th Congress, 2nd Session. Washington, DC.
  - 52 Weaver, J. 1982. Weaver Introduces Organic Farming Bill. Press release February 26, Washington, DC.
  - 53 US Senate. 1982. *Innovative Farming Act of 1982 (S. 2485)*, introduced May 5, 1982. 97th Congress, 2nd Session. Washington, DC.
  - 54 Soth, L. 1982. USDA Policy on Organic Farming 'Shortsighted.' *The Register Mail* September 28:B10.
  - 55 Moyer, G. 1983. What Does An Organic Farmer Have in Common with A Field of Red Clover? They're Both . . . Soil Builders [Organic Agriculture: Has Its Time Come?]. *Nutrition Action (Center for Science in the Public Interest, Washington, DC)* October:5–11.
  - 56 US Congress, Office of Technology Assessment. 1984. *Protecting the Nation's Groundwater from Contamination*. 2 vols. Washington, DC.
  - 57 Hallberg, G.R. 1985. *Agricultural Chemicals and Groundwater Quality in Iowa: Status Report 1985*. CE-2158q. Iowa State University, Cooperative Extension Service, Ames, IA.
  - 58 US General Accounting Office. 1983. *Agriculture's Soil Conservation Programs Miss Full Potential in the Fight Against Soil Erosion: Report to the Congress*. GAO/RCED-84-48. Gaithersburg, MD.
  - 59 American Farmland Trust. 1984. *Soil Conservation in America: What Do We Have To Lose?* American Farmland Trust, Washington, DC.
  - 60 Gibbons, B. and Wilson, S.C. 1984. Do we treat our soil like dirt? *National Geographic* 166(3):350–389.
  - 61 US Congress, Office of Technology Assessment. 1986. *Technology, Public Policy, and the Changing Structure of American Agriculture*. US Congress, Office of Technology Assessment, Washington, DC.
  - 62 National Research Council. 1986. *Pesticide Resistance: Strategies and Tactics for Management*. National Academy Press, Washington, DC.
  - 63 Holmberg, S.D., Osterholm, M.T., Senger, K.A., and Cohen, M.L. 1984. Drug-resistant *Salmonella* from animals fed antimicrobials. *New England Journal of Medicine* 311:617–622.



- 64 US House of Representatives. 1983. Agricultural Productivity Act of 1983 (H.R. 2714), introduced April 21, 1983. 98th Congress, 1st Session. Washington, DC.
- 65 US Senate. 1983. Agricultural Productivity Act of 1983 (S. 1128), introduced April 21, 1983. 98th Congress, 1st Session. Washington, DC.
- 66 Harris, C.I. 1984. Statement of Clare I. Harris, Acting Administrator, Cooperative State Research Service. In *Agricultural Productivity Act of 1983: Hearing Before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, U.S. House of Representatives, 98th Congress, First Session, August 3, 1983*. Serial No. 98-50. US Government Printing Office, Washington, DC. p. 44–48.
- 67 Madden, J.P. 1984. Statement of J. Patrick Madden, Department of Agricultural Economics, Pennsylvania State University. In *Agricultural Productivity Act of 1983: Hearing Before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, U.S. House of Representatives, 98th Congress, First Session, August 3, 1983*. Serial No. 98-50. US Government Printing Office, Washington, DC. p. 73–83.
- 68 Beeman, R.S. and Pritchard, J.A. 2001. *A Green and Permanent Land: Ecology and Agriculture in the Twentieth Century*. University Press of Kansas, Lawrence, KS.
- 69 Madden, J.P. 1998. *The Early Years: The LISA, SARE, and ACE Programs: Reflections of the Founding Director*. Utah State University, Sustainable Agriculture Research and Education / Western Region, Logan, UT. Available at Website <http://www.westernsare.org/About-Us/About-Western-SARE/The-Early-Years> (verified August 30, 2012).
- 70 National Research Council. 1989. *Alternative Agriculture*. National Academy Press, Washington, DC.
- 71 US Congress. 1985. *Food Security Act of 1985*. Public Law 99–198, Washington, DC.
- 72 US Senate. 1990. *Organic Foods Production Act of 1990* (S. 2108), introduced February 8, 1990. 101st Congress, 2nd Session. Washington, DC.
- 73 US Senate. 1989. *Organic Foods Act of 1989* (S. 1896), introduced November 16, 1989. 101st Congress, 1st Session. Washington, DC.
- 74 Institute for Alternative Agriculture. 1990. *Organic foods certification act proposed by Senator Leahy*. *Alternative Agriculture News* 8(1):1.
- 75 Malone, L.A. 1989. Conservation at the crossroads: Reauthorization of the 1985 Farm Bill conservation provisions. *Virginia Environmental Law Journal* 8:215–233.
- 76 US House of Representatives. 1989. *Sustainable Agricultural Adjustment Act of 1989* (H.R. 3552), introduced October 31, 1989. 101st Congress, 1st Session. Washington, DC.
- 77 US Senate. 1989. *Conservation Enhancement and Improvement Act* (S. 1063), introduced May 18, 1989. 101st Congress, 1st Session. Washington, DC.
- 78 US Congress. 1990. *Food, Agriculture, Conservation, and Trade Act of 1990*. Public Law 101–624, Washington, DC.
- 79 US House of Representatives. 1990. *Hearing on Sustainable Agriculture and Farm Policy*, July 19, 1989. In *Formulation of the 1990 Farm Bill* (Research, Teaching, and Extension Programs): *Hearings Before the Committee on Agriculture, House of Representatives, 101st Congress, 1st and 2nd Sessions*. Serial No. 101-30, Part 11. US Government Printing Office, Washington, DC. Available at Website [Hathitrust Digital Library] <http://babel.hathitrust.org/cgi/pt?id=umn.31951d002910430> (verified December 20, 2012).
- 80 Bennett, H.H. and Chapline, W.R. 1928. *Soil Erosion: A National Menace*. US Department of Agriculture Circular No. 33. US Government Printing Office, Washington, DC. Available at Website [National Agricultural Library Digital Collections] <http://ddr.nal.usda.gov/dspace/handle/10113/33902> (verified December 20, 2012).
- 81 Faulkner, E.H. 1943. *Plowman's Folly*. University of Oklahoma Press, Norman, OK.
- 82 Leopold, A. 1949. *A Sand County Almanac*. Oxford University Press, New York.
- 83 Worster, D. 1979. *Dust Bowl: The Southern Plains in the 1930s*. Oxford University Press, New York.
- 84 Douglas, G.K. (ed.). 1984. *Agricultural Sustainability in a Changing World Order*. Westview Press, Boulder, CO.
- 85 Thompson, P.B. 2010. *The Agrarian Vision: Sustainability and Environmental Ethics*. University Press of Kentucky, Lexington, KY.
- 86 Youngberg, G., Schaller, N., and Merrigan, K. 1993. The sustainable agriculture policy agenda in the United States: Politics and prospects. In P. Allen (ed.). *Food for the Future: Conditions and Contradictions of Sustainability*. John Wiley, New York. p. 295–318.
- 87 Lyson, T.A. 2004. *Civic Agriculture: Reconnecting Farm, Food, and Community*. Tufts University Press, Medford, MA.
- 88 DiMatteo, K. and Gershuny, G. 2007. The Organic Trade Association. In W. Lockeretz (ed.). *Organic Farming: An International History*. CABI, Wallingford, UK. p. 253–263.
- 89 Johnson, R. 2008. *Organic Agriculture in the United States: Program and Policy Issues*. RL31595. US Congressional Research Service, Washington, DC. Available at Website <http://www.fas.org/sgp/crs/misc/RL31595.pdf> (verified December 20, 2012).
- 90 Fromartz, S. 2006. *Organic, Inc.: Natural Foods and How They Grew*. Harcourt, Orlando, FL.
- 91 Coleman, E.W. 2001. Beyond organic. *Mother Earth News* December/January. p. 1–3. Available at Website <http://www.motheearthnews.com/Real-Food/2001-12-01/Beyond-Organic.aspx> (verified December 20, 2012).
- 92 Pollan, M. 2001. *Naturally*. *New York Times Magazine* May 13. p. 1–24. Available at Website <http://www.nytimes.com/2001/05/13/magazine/naturally.html> (verified December 20, 2012).
- 93 Pollan, M. 2006. *The Omnivore's Dilemma: A Natural History of Four Meals*. Penguin Press, New York.
- 94 Dimitri, C. and Oberholtzer, L. 2009. *Marketing U.S. Organic Foods: Recent Trends from Farms to Consumers*. *Economic Information Bulletin No. 58*. US Department of Agriculture, Economic Research Service, Washington, DC. Available at Website <http://www.ers.usda.gov/publications/eib58/> (verified December 20, 2012).
- 95 Adams, D.C. and Salois, M.J. 2010. Local versus organic: A turn in consumer preferences and willingness-to-pay. *Renewable Agriculture and Food Systems* 25:331–341.

- 96 Lockeretz, W. (ed.). 2007. *Organic Farming: An International History*. CABI, Wallingford, UK.
- 97 Allen, P. 2004. *Together at the Table: Sustainability and Sustenance in the American Agrifood System*. Pennsylvania State University Press, University Park, PA.
- 98 Eng, M. 2011. 'How Now, Sustainable Cow? Demand for Organic, Grass-fed Meats Goes Mainstream. *Denver Post* January 26:12D. Available at Website [http://www.denverpost.com/food/ci\\_17186593](http://www.denverpost.com/food/ci_17186593) (verified December 20, 2012).
- 99 Lockeretz, W., Klepper, R., Commoner, B., Gertler, M., Fast, S., and O'Leary, D. 1976. *Organic and Conventional Crop Production in the Corn Belt: A Comparison of Economic Performance and Energy Use for Selected Farms*. Report No. CBNS-AE-7. Washington University, Center for the Biology of Natural Systems, St. Louis, MO.
- 100 Lockeretz, W., Shearer, G., and Kohl, D.H. 1981. Organic farming in the Corn Belt. *Science* 211(4482): 540–547.
- 101 University of Nebraska–Lincoln. 1975. *Organic Residues and By-Products in Crop and Animal Production: Workshop*, University of Nebraska Field Laboratory, Mead, Nebraska, December 10, 1975. University of Nebraska–Lincoln, Institute of Agriculture and Natural Resources, Lincoln, NE.
- 102 Consumers Union. 2011. *Greener Choices: Eco-Labels*. Consumers Union of United States, Yonkers, NY. Available at Website <http://www.greenerchoices.org/eco-labels/> (verified 20 December 2012).
- 103 Whole Foods Market and Global Animal Partnership. 2010. *5-Step Animal Welfare Rating [Store Brochure]* September. Whole Foods Market, Austin, TX; Global Animal Partnership, Washington, DC. p. 1–7. Available at Website <http://media.wholefoodsmarket.com/public/upload/files/general/5-StepAnimalWelfareRating.pdf> (verified December 20, 2012).
- 104 American Soybean Association. 2010. *ASA Withdraws from Leonardo Academy's Sustainable Ag Standard Development Process: Remains Committed to Advancing Ag Sustainability*. Press release October 19. St. Louis, MO. Available at Website [http://www.soygrowers.com/newsroom/releases/2010\\_releases/r101910.htm](http://www.soygrowers.com/newsroom/releases/2010_releases/r101910.htm) (verified December 20, 2012).
- 105 Association for the Future of Agriculture in Nebraska. 2011. *Who is A-FAN*. Lincoln, NE. Available at Website <http://www.becomeafan.org/about.php> (verified December 20, 2012).
- 106 RFD-TV. 2011. *Nebraska Agriculture Alliance Group (A-FAN) teams up with RFD-TV 'Live.'* Press release February 7. Nashville, TN; Omaha, NE. Available at Website [IANR Educational Media] [http://liferaydemo.unl.edu/c/document\\_library/](http://liferaydemo.unl.edu/c/document_library/) (verified December 20, 2012).
- 107 Drinkwater, L.E. 2009. *Ecological knowledge: Foundation for sustainable organic agriculture*. In C.F. Francis (ed.). *Organic Farming: The Ecological System*. Agronomy Monograph No. 54. The American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Madison, WI. p. 19–47.
- 108 Lipson, M. 1997. *Searching for the 'O-Word': Analyzing the USDA Current Research Information System for Pertinence to Organic Farming*. Organic Farming Research Foundation, Santa Cruz, CA. Available at Website [http://ofrf.org/publications/pubs/searching\\_for\\_o-word.pdf](http://ofrf.org/publications/pubs/searching_for_o-word.pdf) (verified June 30, 2011).
- 109 Greene, C., Slattery, E., and McBride, W.D. 2010. *America's Organic Farmers Face Issues and Opportunities*. Amber Waves (US Department of Agriculture, Economic Research Service, Washington, DC) June. p. 34–39. Available at Website <http://www.ers.usda.gov/AmberWaves/June10/PDF/AmericasOrganicFarmers.pdf> (verified December 20, 2012).
- 110 Monke, J. 2011. *Agriculture and Related Agencies: FY2011 Appropriations*. R41475. US Congressional Research Service, Washington, DC. Available at Website <http://www.nationalaglawcenter.org/assets/crs/R41475.pdf> (verified December 20, 2012).
- 111 Merrigan, K. 2010. *Statement of Kathleen A. Merrigan, Deputy Secretary, U.S. Department of Agriculture, before the Senate Committee on Agriculture, Nutrition and Forestry [Washington, DC], September 15, 2010*. Available at Website <http://www.ag.senate.gov/hearings/the-national-organic-law-at-20-sowing-seeds-for-a-bright-future> (verified December 20, 2012).
- 112 Lipson, M., Lerman, T., and Baker, Z. 2008. *2008 Farm Bill: After long haul, big wins for organic*. Information Bulletin (Organic Farming Research Association, Santa Cruz, CA) 16(Fall). p. 15–16. Available at Website <http://ofrf.org/publications/ib/ib16.pdf> (verified June 30, 2011).
- 113 Hadwiger, D.F. 1982. *The Politics of Agricultural Research*. University of Nebraska Press, Lincoln, NE.
- 114 Blattel-Mink, B. and Kastenholtz, H. 2005. *Trans-disciplinarity in sustainability research: Diffusion conditions of an institutional innovation*. *International Journal of Sustainable Development and World Ecology* 12:1–12.
- 115 Lattuca, L.R. 2001. *Creating Interdisciplinarity: Interdisciplinary Research and Teaching Among Colleges and University Faculty*. Vanderbilt University Press, Nashville, TN.
- 116 National Research Council. 2005. *Facilitating Interdisciplinary Research*. National Academies Press, Washington, DC.
- 117 Anderson, J.E. 2011. *Public Policymaking: An Introduction*. 7th ed. Wadsworth, Boston, MA.
- 118 Browne, W.P. 1978. *Introduction to Part 1: Agricultural policy changes and American political institutions*. In D.F. Hadwiger and W.P. Browne (eds). *The New Politics of Food*. Policy Studies Organization Series No. 19. Lexington Books, Lexington, MA. p. 3.
- 119 Farm Journal Foundation. 2011. *Farmers Feeding the World*. Cedar Falls, IA. Available at Website <http://www.agweb.com/farmersfeedingtheworld/> (verified December 20, 2012).
- 120 AgWeb.com Editors. 2011. *Senator Lugar endorses Farmers Feeding the World*. Farm Journal Foundation, Cedar Falls, IA. January 19. Available at Website [http://www.agweb.com/article/senator\\_lugar\\_endorses\\_farmers\\_feeding\\_the\\_world\\_campaign/](http://www.agweb.com/article/senator_lugar_endorses_farmers_feeding_the_world_campaign/) (verified December 20, 2012).
- 121 Farm Journal Foundation. 2010. *About us: Farmers Feeding the World: A campaign by American agriculture to fight global hunger*. Cedar Falls, IA. Available at Website [http://www.agweb.com/farmersfeedingtheworld/about\\_us.aspx](http://www.agweb.com/farmersfeedingtheworld/about_us.aspx) (verified December 20, 2012).

- 122 Reganold, J.P. 1989. Farming's organic future. *New Scientist* 122(June 10):49–52.
- 123 Reganold, J.P., Elliott, L.F., and Unger, Y.L. 1987. Long-term effects of organic and conventional farming on soil erosion. *Nature* 330:370–372.
- 124 Badgley, C., Moghtader, J., Quintero, E., Zakem, E., Chappell, M.J., Aviles-Vasquez, K., Samulon, A., and Perfecto, I. 2006. Organic agriculture and the global food supply. *Renewable Agriculture and Food Systems* 22:86–108.
- 125 Kiers, E.T., Leakey, R.R.B., Izac, A.-M., Heinemann, J.A., Rosenthal, E., Nathan, D., and Jiggins, J. 2008. Agriculture at a crossroads [policy forum]. *Science* 320:320–321.
- 126 Holt-Gimenez, E., Shattuck, A., Altieri, M., Herren, H., and Gliessman, S. 2012. We already grow enough food for 10 billion people . . . and still can't end hunger [editorial]. *Journal of Sustainable Agriculture* 36:595–598.
- 127 Olmstead, J. 2011. Feeding the World? Twelve Years Later, U.S. Grain Exports Are Up, So Too Is Hunger. Institute for Agriculture and Trade Policy, Minneapolis, MN.
- 128 Youngberg, G. and Buttel, F.H. 1984. Public policy and socio-political factors affecting the future of sustainable farming systems. In D.F. Bezdicek, J.F. Power, D.R. Keeney, and M.J. Wright (eds). *Organic Farming: Current Technology and Its Role in a Sustainable Agriculture*. ASA Special Publication No. 46. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Madison, WI. p. 167–185.
- 129 Kirschenmann, F. 2009. Farming in the middle: An ethical imperative. In C.F. Francis (ed.). *Organic Farming: The Ecological System*. Agronomy Monograph No. 54. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Madison, WI. p. 325–342.
- 130 Paarlberg, R. 2010. Attention Whole Foods Shoppers. *Foreign Policy* May/June. Available at Website [http://www.foreignpolicy.com/articles/2010/04/26/attention\\_whole\\_foods\\_shoppers](http://www.foreignpolicy.com/articles/2010/04/26/attention_whole_foods_shoppers) (verified December 20, 2012).
- 131 Haddad, A. 2008. The problem with organic food. *The American: Journal of the American Enterprise Institute* June 10:1. Available at Website <http://www.american.com/archive/2008/june-06-08/the-problem-with-organic-food> (verified December 20, 2012).
- 132 Dobbs, T.L. 1993. Enhancing Agricultural Sustainability through Changes in Federal Commodity Policy: Marginal Versus Radical Change. Policy Studies Program Report No. 2. Henry A. Wallace Institute for Alternative Agriculture, Greenbelt, MD.
- 133 Hurt, R.D. 2002. *American Agriculture: A Brief History*. Rev. ed. Purdue University Press, West Lafayette, IN.
- 134 Council for Agricultural Science and Technology. 1980. *Organic and Conventional Farming Compared*. Report No. 84. CAST, Ames, IA.