Conventional Versus Alternative Agriculture: The Paradigmatic Roots of the Debate

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NOTE

Conventional versus Alternative Agriculture: The Paradigmatic Roots of the Debate*

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ABSTRACT Analysts have described conflict between the economically dominant industrial sector of society and the environmental movement as representing competition between two opposing worldviews or social paradigms. There appears to be a similar schism developing in agriculture. The conventional paradigm of large-scale, highly industrialized agriculture is being challenged by an increasingly vocal alternative agriculture movement which advocates major shifts toward a more "ecologically sustainable agriculture." Some have suggested that alternative agriculture represents a fundamentally new paradigm for agriculture. This paper seeks to clarify and synthesize the core beliefs and values underlying these two approaches to agriculture into a "conventional agriculture paradigm" and an "alternative agriculture paradigm."

The writings of six major proponents of alternative agriculture are compared with those of six leading proponents of conventional agriculture to document the major components of the two agricultural paradigms. The two sets of writings reveal dramatically divergent perspectives on a wide range of agricultural issues. The competing paradigms can be synthesized into six major dimensions: 1) centralization vs. decentralization, 2) dependence vs. independence, 3) competition vs. community, 4) domination of nature vs. harmony with nature, 5) specialization vs. diversity, and 6) exploitation vs. restraint. The emerging controversy over "low-input, sustainable agriculture" (LISA) illustrates the paradigmatic gulf between alternative and conventional agriculture, as well as the pitfalls facing alternative agriculturalists as they attempt to replace conventional agriculture as the dominant paradigm.

Introduction

The productivity and efficiency of the U.S. food production system has become a source of national pride for many Americans, especially

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farmers, agricultural scientists, and politicians. The superiority of modern industrial agriculture in the United States has been (and still is for many) beyond question or debate (see e.g., Heady 1976; McMillen 1981). Today, however, U.S. agriculture has become the target of increasing criticism, despite the fact that food is cheap, abundant, and an important element in offsetting a lopsided international balance of trade. U.S. farmers, food processors, agrichemical suppliers, agricultural scientists, agricultural policymakers, and others are increasingly coming under fire from a number of sources.

The U.S. agricultural industry has lost favor in the eyes of many, largely because of the perceived deleterious side effects often associated with modern industrial agriculture. Among the often-cited negative effects are groundwater contamination, soil erosion and degradation, chemical residues in food, and the demise of family farms and rural communities (National Research Council 1989). While most critics recognize the benefits that stem from the current U.S. agricultural system, they also argue that when all of its hidden costs are considered, modern industrial agriculture is not the bargain it appears to be. Many critics see the problems of modern agriculture as fundamental flaws inherent in its structure, policies, and practices. They believe a complete revamping of the U.S. agricultural system is necessary. Advocates of modern industrial agriculture, on the other hand, believe the system is generally working well. They view its negative effects as temporary problems which can and will be corrected through continued scientific and technological progress. On the surface it appears that these two camps—critics and advocates of modern U.S. agriculture—are miles apart in their perspectives on the status of the agricultural industry. Their views of the industry's impact on the environment, the longterm sustainability of current practices, and the policies needed to maintain a productive agriculture and viable rural America appear to be very nearly antithetical (Dahlberg 1986).

The purpose of this paper is to examine the current debate in agriculture, paying particular attention to the underlying themes or basic roots of the debate. We will argue that the debate between adherents of "conventional" and "alternative" agriculture represents a conflict of fundamentally divergent paradigms. After clarifying our use of "paradigm," we will define what we mean by "conventional" and "alternative" agriculture. We will then briefly review the work of several other analysts who have also argued that a debate of paradigmatic portions is being waged in U.S. agriculture. Finally, the bulk of the paper will present an analysis of the key elements of the two competing perspectives in agriculture, relying on the results of an in-depth analysis of the writings of key participants in agricultural debates. We believe that current debates over agricultural issues can be better understood by clarifying the beliefs and values that constitute the underlying paradigms from which the two camps argue.

Sociocultural paradigms and the alternative-conventional agriculture debate

The concept of "paradigm" was originally used to explain the nature of scientific debates (Kuhn 1970) and is still used to convey the implicit assumptions underlying and guiding scientific inquiry. Increasingly, however, the concept has been extended to the societal level in an effort to describe fundamental currents of social change (Oates 1989). Pirages and Ehrlich (1974:43) popularized the notion of a sociocultural paradigm by describing it as a "prominent worldview, model or frame of reference through which individuals, or collectively, a society interpret the meaning of the external world." They also introduced the concept of a "dominant social paradigm" or "DSP" to describe a society's most fundamental and pervasive "worldview." Pirages and Ehrlich argued that Americans' belief in progress, growth, and prosperity; faith in science and technology; commitment to a laissez-faire economy and private property rights; and view of nature as something that must be subdued and made useful are among the core elements of our society's DSP.

As the environmental movement grew and matured in the 1970s, many Americans took issue with key elements of the DSP, and in the mid-seventies Dunlap and Van Liere (1978, 1984) suggested that a "new environmental paradigm" (NEP) appeared to be emerging. Based on the assumptions of "limits to growth" and human threat to the "balance of nature," the emerging NEP also rejected the idea that nature exists primarily for human use. By the end of the decade it was becoming apparent that the core beliefs and values embodied in environmentalism represented a broader and deeper challenge to the DSP than the nascent NEP discerned by Dunlap and Van Liere. Cotgrove (1982) suggested that in addition to challenging the DSP's core values of economic growth and domination of nature, the NEP also challenges the free-market economy, hierarchical political structures, centralized social organization, large-scale technological developments, and the legitimacy of scientific knowledge as the basis for social decision-making (see also Milbrath 1984).

Cotgrove and Milbrath found, not surprisingly, that environmental activists strongly endorsed the NEP, while industrialists strongly supported the DSP. Their analyses of the fundamentally divergent worldviews of these two polar groups provide insight into a wide range of current economic and environmental controversies. In particular, they clarify the difficulties involved in establishing communication and acceptable compromises between the two camps. As Cotgrove (1982:34) puts it, "Industrialists and environmentalists, we suggest, inhabit different worlds. . . . What is rational and reasonable from one perspective is irrational from another." These analyses of societal debates over environmental issues clearly demonstrate parallels between sociocultural conflicts and Kuhnian debates and conflicts within

scientific disciplines. Not only do societal and scientific debates often seem analogous, but particularly in the case of ecological issues, they are frequently highly intertwined with one another (Oates 1989).

It appears that the current conflict in agriculture exists at both levels of paradigmatic debate, societal and scientific. Some debate relatively narrow, technical issues dealing primarily with the scientific and production aspects of agriculture (see e.g., Crosson and Ekey 1988; Lockeretz et al. 1984), while others describe the current agricultural debate from a broader sociocultural perspective similar to the DSP-NEP debate (see e.g., Conviser 1984; Dahlberg 1986). At the broader level, the debate deals with fundamentally philosophical and value-laden issues not easily resolvable via empirical research (Buttel et al. 1986). Our analysis will attempt to incorporate both levels of the debate. We do this because it is impossible to separate clearly the practices and technologies which make up agriculture from the beliefs and values that underlie them.

The current conflict between the advocates of modern U.S. agriculture and its critics, like the DSP-NEP debate, appears to be fraught with misperceptions, acrimony, and charges of irrationality on both sides. The advocates and critics of the current U.S. agricultural system seem to hold such diametrically opposing positions that they find it difficult, if not impossible, to communicate. A classic example of this occurred in 1977 when former Secretary of Agriculture, Earl Butz, and poet-farmer, Wendell Berry, squared off in a debate. In his rebuttal Butz remarked, "I've got a feeling that Dr. Berry and I haven't met here tonight. Perhaps we won't." Berry later commented, "We may never meet because he's arguing from quantities and I'm arguing from values" (CoEvolution Quarterly 1978:56–58). They were acknowledging the void between them which is not dissimilar to Cotgrove's description of supporters of the DSP and the NEP as inhabiting "different worlds."[1] Does this experience in the Butz vs. Berry debate reflect a schism in agriculture similar to the larger paradigmatic conflict described earlier? We believe it does.

Conventional agriculture

To facilitate discussion it is necessary to define modern industrial agriculture, realizing that any simple definition will of necessity be

[1] Wojcik (1989:85) finds a similar case in discussing the essays of three conventional agriculturalists. "What is remarkable," says Wojcik, "about all three writers is that none of them appear to imagine that there is anything worth listening to in any criticism of their practice; their adversaries are 'against' them mindlessly." He suggests that advocates of conventional and alternative agriculture not only fail to communicate effectively, but also find it nearly impossible to see the weaknesses of their own positions and the strengths of the opposing positions. Wojcik's (1989) book deals extensively with these fundamental differences in the ways individuals and groups view and practice agriculture.

somewhat incomplete. The term "conventional agriculture" has come into relatively common use and will be used throughout the rest of this paper to refer to mainstream U.S. agriculture. Conventional agriculture has been defined as "Capital-intensive, large-scale, highly mechanized agriculture with monocultures of crops and extensive use of artificial fertilizers, herbicides and pesticides, with intensive animal husbandry" (Knorr and Watkins 1984:x). Our discussion of conventional agriculture as presented in this paper will include the agribusiness suppliers of farm inputs and the marketers of farm output. This is done because of the integral interdependence between the production sector and the supply and marketing sectors of modern agribusiness (Martinson and Campbell 1980).

Alternative agriculture

Defining the type of agriculture espoused by critics of conventional agriculture is difficult due to the tremendous diversity of this group. Their "alternative approaches" include organic agriculture, sustainable agriculture, regenerative agriculture, ecoagriculture, permaculture, bio-dynamics, agroecology, natural farming, low-input agriculture, and others (Buttel et al. 1986). Although there are differences among these various agricultural approaches, they nonetheless appear to have much in common including a shared underlying philosophy (Lockeretz 1986; Youngberg 1984). For this reason and for the sake of clarity the term "alternative agriculture" will be used in this discussion to represent collectively these various types of agriculture.

At the heart of any definition of alternative agriculture is an emphasis on organic or near-organic practices. Essentially, all alternative agriculturalists favor significantly reduced use of synthetic farm chemicals. Most alternative agriculturalists, however, see their goals as much broader than merely reducing agricultural chemical use. Additionally, alternative agriculturalists advocate smaller farm units and technology, reduced energy use, greater farm and regional self-sufficiency, minimally processed foodstuffs, conservation of finite resources, and more direct sales to consumers (Buttel et al. 1986; Lockeretz 1986; Youngberg 1984). This is not an exhaustive list, nor does it completely define alternative agriculture, but it does illustrate some of the fundamental differences between alternative and conventional agriculture. These two approaches to agriculture will be elaborated in more detail as we describe the agricultural debate below.

Historical roots of the current agricultural debate

The description of alternative agriculture given above reveals that some of the goals of alternative agriculturalists are the same as those sought by agrarian reformers throughout U.S. history (e.g., emphasis on small farms, decentralized distribution of farm products, etc.). It

may thus appear that the current "alternative agriculture movement" is just the latest manifestation of the ongoing struggle between agrarianism and industrial concentration that has been an integral part of American history (McConnell 1969). However, alternative agriculture adds a critical element that was not part of past agrarian movements—an urgent concern over the ecological aspects of agriculture (Buttel et al. 1986). The environmental movement and publications such as Carson's *Silent Spring* (1962) have undoubtedly contributed to the dramatically increased awareness of the ecological impacts of agriculture in recent decades. Early pioneers in alternative agriculture such as Sir Albert Howard, William Albrecht, E. F. Schumacher, J. I. Rodale, and his son, Robert Rodale, began to research and write about more ecologically benign agricultural methods. Thus, while some of the goals advocated by alternative agriculturalists are similar to those of past agrarian movements, it appears to be this core environmental grounding which has given alternative agriculture the momentum needed to emerge as a legitimate movement, thereby transcending another periodic surfacing of the Hamilton-Jefferson debate.

Paradigmatic conflict in agriculture

Several agricultural analysts have characterized the current conflict in agriculture in terms of competing "models" or "paradigms." Some believe that it represents the first stage of a "paradigm shift" occurring within agriculture. Although it is much too early to predict whether the alternative agricultural paradigm will significantly modify or even replace the conventional paradigm, the recent creation of alternative agriculture programs by the U.S. Department of Agriculture (USDA) (most notably the Low-Input Sustainable Agriculture Program or LISA), the California Legislature (the Sustainable Agriculture Program), and other governmental bodies and academic institutions indicates that the current movement is beginning to gain some legitimacy in official circles (Youngberg 1984).

Callicott and Lappé (1986:20) believe that the "model of industrial agriculture" is being challenged by a coalition of "political progressives" and "ecological visionaries" who are attempting to replace the values of industrial agriculture with the values of "agroecology."[2]

[2] Callicott (1990:47) has more recently referred to the current interest in alternative agriculture as the beginnings of "a paradigm shift in the metaphysics of agriculture—from the Newtonian to the Eltonian, from the mechanical to the ecological." Cobb (1984:210) similarly believes that agriculture is "in the early stages of a shift of thinking from that which is based on a mechanical model to that which is based on an ecological model." Callicott and Cobb call into question the very epistemological roots of modern agriculture and agricultural science by claiming that they are based on a scientific worldview that is outmoded. While couched at a more philosophical level than our analysis, their description of the competing agricultural paradigms complements our portrayal of the two paradigms.

Canadian ecophilosopher and naturalist Alan R. Drengson (1985:17) sees a shift from "industrial paradigms" to "natural patterns" occurring in agriculture. "In the philosophy of agriculture," he says, "this is a shift from industrial agriculture (agribusiness) to post-industrial, eco-agriculture." Paddock et al. (1988:175) likewise discuss a shift from "old paradigm factory-model" agriculture to what they term "ecoculture." And Osborn (1984:75) similarly sees the potential for a shift from a "large-scale, high technology" paradigm to a "new small farm paradigm" in the USDA/land-grant university complex. He suggests that, "Traditional research institutions now turning to alternate technologies may provide the critical mass needed for rapid development of the small farm paradigm."

In describing what he sees as necessary to develop a new agricultural paradigm, Wes Jackson (1980:148) says, "We need to stare hard at America's fields—for a long time—and then reach into the vast literature in evolutionary biology and ecology to learn the rules and laws at work on the land before we got here, and out of this new knowledge, put together a new synthesis, a truly new paradigm for agriculture." More recently, Jackson (1987:85) has described the development of this new paradigm for agriculture as part-in-parcel of a "cultural battle," between what he terms "the human cleverness folk" and "the nature's wisdom people." Jackson's recent work places increasing emphasis on the sociocultural aspects of the current conflict in agriculture, as when he writes that "Our cultural values will be paramount in determining the outcome of the conflict" (1987: 85).

Finally, Freudenberger (1985:26) explicitly discusses a "paradigm shift" from an agriculture that "looks upon the land in modern, industrialized terms . . . [and measures everything in] terms of production efficiency and profit generation . . . [to an agriculture that contributes to the] beauty, health and integrity of the biotic community." Freudenberger (1986:357) further suggests that "New paradigms can help in the search to revitalize political, economic and scientific analysis by pointing to ethical and societal goals that flow from emerging values underlying the new paradigm. . . . These values also provide a focal point for criticism of the industrial agricultural model."

Alternative agriculturalists' departure from the accepted principles of conventional agriculture has earned many of them reputations as unscientific "radicals" and "sentimentalists" who know very little about farming, economics, and the "real world" (Wojcik 1989). Conversely, many alternative agriculturalists feel equally strong that most farmers and agribusinesses are interested only in the "bottom line" and care little for the natural resources and people they "exploit." These opposing positions have unfortunately led to more heat than

light in the attempt to understand and possibly reconcile the differences inherent in the debate.

Even within objective scientific circles, comparative studies of alternative and conventional agricultural systems have come up with significantly different findings. Not surprisingly, proponents of alternative agriculture predict mostly positive results in a conversion to alternative agricultural methods. Conventional agriculturalists have conversely found that switching to alternative agricultural systems would have extremely detrimental effects. Buttel et al. (1986) suggest that these contradictory results are due to methodological problems, faulty inferences and the political sensitivity of the debate. It thus appears that even those who debate scientifically the efficacy of alternative agriculture are affected by their underlying beliefs and values or "agricultural paradigms."

In short, all indications are that the contemporary debate in agriculture seems to have the makings of a true paradigmatic conflict. Proponents of the dominant, conventional agricultural paradigm appear determined to defend their position against the as yet relatively unorganized alternative agriculture movement, which in turn appears determined to establish its perspective as a new foundation for agriculture. A prerequisite to understanding this conflict is the identification of the key elements (core beliefs and values) underlying these two competing agricultural paradigms.

Key elements of the agricultural paradigms

Table 1 is an attempt to represent the two agricultural paradigms in a fashion similar to that used by Cotgrove (1982:27) and Milbrath (1984:22) in comparing the broader NEP and DSP.[3] The table is designed to represent as much as possible the polar positions of conventional and alternative agriculture. As with the DSP and NEP, it is not suggested that all or even most individuals fit totally and neatly into one or the other paradigm. The characterizations are, rather, ideal types or constructs useful for clarifying opposing positions, facilitating comparisons, and sharpening the focus of the debate. Yet, understanding the polar positions associated with the two paradigms should prove helpful in understanding agricultural debates, since most debating occurs between staunch proponents inclined toward the competing polar positions (the Butz-Berry debate being an example).

[3] Although Dahlberg (1986) describes the "goal positions" of the "dominant" and "alternative" groups in agriculture, his analysis, while insightful, does not clearly present the contrasting elements of competing paradigms in the manner of Cotgrove (1982) and Milbrath (1984).

Table 1. Key elements of the competing agricultural paradigms

Conventional agriculture	Alternative agriculture
Centralization	**Decentralization**
•National/international production, processing, and marketing	•More local/regional production, processing, and marketing
•Concentrated populations; fewer farmers	•Dispersed populations; more farmers
•Concentrated control of land, resources and capital	•Dispersed control of land, resources and capital
Dependence	**Independence**
•Large, capital-intensive production units and technology	•Smaller, low-capital production units and technology
•Heavy reliance on external sources of energy, inputs, and credit	•Reduced reliance on external sources of energy, inputs, and credit
•Consumerism and dependence on the market	•More personal and community self-sufficiency
•Primary emphasis on science, specialists and experts	•Primary emphasis on personal knowledge, skills, and local wisdom
Competition	**Community**
•Lack of cooperation; self-interest	•Increased cooperation
•Farm traditions and rural culture outdated	•Preservation of farm traditions and rural culture
•Small rural communities not necessary to agriculture	•Small rural communities essential to agriculture
•Farm work a drudgery; labor an input to be minimized	•Farm work rewarding; labor an essential to be made meaningful
•Farming is a business only	•Farming is a way of life as well as a business
•Primary emphasis on speed, quantity, and profit.	•Primary emphasis on permanence, quality, and beauty
Domination of nature	**Harmony with nature**
•Humans are separate from and superior to nature	•Humans are part of and subject to nature
•Nature consists primarily of resources to be used	•Nature is valued primarily for its own sake
•Life-cycle incomplete; decay (recycling wastes) neglected	•Life-cycle complete; growth and decay balanced
•Human-made systems imposed on nature	•Natural ecosystems are imitated
•Production maintained by agricultural chemicals	•Production maintained by development of healthy soil
•Highly processed, nutrient-fortified food	•Minimally processed, naturally nutritious food
Specialization	**Diversity**
•Narrow genetic base	•Broad genetic base
•Most plants grown in monocultures	•More plants grown in polycultures
•Single-cropping in succession	•Multiple crops in complementary rotations
•Separation of crops and livestock	•Integration of crops and livestock
•Standardized production systems	•Locally adapted production systems

Table 1. Continued

Conventional agriculture	Alternative agriculture
•Highly specialized, reductionistic science and technology	•Interdisciplinary, systems-oriented science and technology
Exploitation	**Restraint**
•External costs often ignored	•All external costs must be considered
•Short-term benefits outweigh long-term consequences	•Short-term and long-term outcomes equally important
•Based on heavy use of nonrenewable resources	•Based on renewable resources; nonrenewable resources conserved
•Great confidence in science and technology	•Limited confidence in science and technology
•High consumption to maintain economic growth	•Consumption restrained to benefit future generations
•Financial success; busy lifestyles; materialism	•Self-discovery; simpler lifestyles; nonmaterialism

The representation of the two agricultural paradigms in Table 1 is based on a thorough review of carefully selected literature. The writings (or speeches in the case of Earl Butz) of six prominent proponents of conventional agriculture and six leading proponents of alternative agriculture were reviewed in detail. The conventional agriculturalists selected are Earl Butz, Marion Clawson, Hiram Drache, Earl O. Heady, Wheeler McMillen, and Jamie L. Whitten; the alternative agriculturalists are William Aiken, Wendell Berry, C. Dean Freudenberger, Wes Jackson, Gene Logsdon, and Robert Rodale.[4]

[4] *Conventional Agriculturalists:* Earl Butz is former Dean of the College of Agriculture at Purdue University and former U.S. Secretary of Agriculture; Marion Clawson is senior fellow emeritus, Resources for the Future, Washington, DC; Hiram Drache owns a cattle feeding operation, is a professor of history at Concordia College, Moorhead, Minnesota, and has written several books about modern, mechanized U.S. agriculture; Earl O. Heady is C. F. Curtiss Distinguished Professor of agriculture and professor emeritus of agricultural economics at Iowa State University; Wheeler McMillen is past editor-in-chief and vice-president of the *Farm Journal,* author of numerous books on U.S. agriculture, and has spoken on the subject throughout the world; Jamie L. Whitten is chairman of the U.S. House of Representatives Committee on Appropriations, and chairman of the Subcommittee on Agriculture and Related Agencies. He is sometimes referred to as the "permanent secretary of agriculture."

Alternative Agriculturalists: William Aiken is associate professor of philosophy at Chatham College in Pittsburgh. His research interests include distributive justice and environmental ethics as they relate to agriculture; Wendell Berry is a small farmer, poet, essayist, and professor of English at the University of Kentucky; C. Dean Freudenberger is an agronomist and professor of international development studies, missions and rural church at the School of Theology, Claremont, California; Wes Jackson is a geneticist by training and operates the Land Institute in Salina, Kansas; Gene Logsdon operates a small traditional farm in Ohio and is a journalist for the Rodale Press and other publishers; Robert Rodale is chairman of the Rodale Research Institute and Rodale Press, Emmaus, Pennsylvania.

In both cases, individuals were selected because of wide recognition in their respective agricultural circles, their diverse backgrounds, and because they hold strong views regarding conventional or alternative agriculture.[5]

Specific statements which reflect the beliefs and values characterizing both conventional and alternative agriculture were identified for each individual. These findings were then synthesized to create Table 1. After considering several methods of organizing the information, it appeared that virtually all the components of the agricultural debate could be organized into six major dimensions: centralization vs. decentralization; dependence vs. independence; competition vs. community; domination of nature vs. harmony with nature; specialization vs. diversity; and exploitation vs. restraint. We will briefly describe these major dimensions of the agricultural debate, but due to space limitations, it will not be possible to elaborate on each of the subdimensions represented in Table 1.[6]

The first three dimensions of the paradigmatic representations in Table 1 are very much part of the recurring agrarianism-vs.-industrialism debate referred to earlier. Although there are some minor differences between the agrarian elements of the alternative agriculture movement and past agrarian movements, the core is essentially the same. What sets the alternative agriculture movement apart from past agrarian movements—a deep concern over the ecological aspects of agriculture—is primarily the elements contained in the last three dimensions in Table 1.

Centralization versus decentralization

As conventional agriculture has matured it has become thoroughly enmeshed in the nation's industrial complex. In so doing, it has developed to the point where, as Butz says, "It's big business to be sure" (CoEvolution Quarterly 1978:51). The growing concentration of power and control in the agricultural industry is seen by conventional agriculturalists as just part of the natural evolution of the industry (Drache 1978). Alternative agriculturalists, on the other hand, see this trend in an entirely different light as this statement by Aiken (1982:48) shows:

> I suggest that the overriding issue of "justice" in our era is the question of centralization versus decentralization. The trend in agriculture toward bigness, power, control, expan-

[5] The writings of the conventional agriculturalists typically are from the 1960s and the 1970s, while those for the alternative agriculturalists are more recent. This reflects the fact that conventional agriculture's formative years were the 1950s through the 1970s, while alternative agriculture has emerged primarily in the 1970s and 1980s.

[6] For a more in-depth discussion of the dimensions, including individual sections for each of the subdimensions in Table 1, see Beus et al. (1990).

> sion, "progressive technologies," and expanded markets (the trend toward multinational control of the production and distribution of agricultural commodities) is countered by a call for decentralization, local control, and diversity.

Conventional agriculturalists, for the most part, do not see this trend toward centralization in agriculture as problematic. In fact, they see it as one of the primary indicators of agricultural progress. Butz (1973a:1) says of the food processing and distribution system, "We have shifted from a high level of direct marketing to a very sophisticated processing and market structure, both at home and abroad. That system is highly specialized." Heady (1976:121) says of this sophisticated system, "The food-processing sector has in recent years come to represent a larger proportion of the total agricultural industry than farming itself." Conventional agriculturalists claim this large, complex food processing and distribution system is a major contributor to today's cheap and abundant food (Butz 1972a).

In a critique of this system, alternative agriculturalists such as Rodale (1976b:47) claim that "Eating bread in America today is an act of faith in the smooth functioning of one of the most complex food-supply systems ever conceived." And Berry (1981:118) similarly suggests,

> Another weakness of industrial agriculture is its absolute dependence on an enormous and intricate—hence fragile—economic and industrial organization. . . . That this population can continue to eat through shortage, strike, embargo, riot, depression, war—or any of the other large-scale afflictions that societies have always been heir to and that industrial societies are uniquely vulnerable to—is not a certainty or even a faith; it is a superstition.

Alternative agriculturalists advocate consuming food much closer to its point of origin and greatly reducing the complexity of the food supply system (Aiken 1984; Rodale 1976b). This, they say, would reduce energy consumption, enhance local awareness and control of food production, and make the food supply system less vulnerable to disruption.

Conventional agriculturalists have long advocated decreasing the number of farms and farmers as a necessary step in the development of U.S. agriculture. Heady (1967:21) notes that although agriculture has made "mammoth adjustments" in this respect, "it still has a long way to go." More recently, Drache (1985:222) claims that for agriculture to continue to progress, "the number of farms will have to continue to decline." As the number of farms has steadily declined, the average farm size has, of course, increased greatly. Former Secretary of Agriculture Earl Butz is often remembered for his advice

to farmers to "Get big or get out." As recently as 1984, when asked after a speech "what hard-pressed farmers could do in these trying times, his answer was: 'Get bigger—or increase production on the same amount of land. Or get a job in town' " (Gilles 1984). Conventional agriculturalists contend that increasing farm size is necessary so the individual farmer can "have a chance to grow into an economic unit that keeps up with the times" (Butz 1971b:5). This, of course, raises the question, "How big is big enough?" A large farmer interviewed by Drache (1978:110) answered this question by saying that "if management desires, there are no limits." And Drache (1978: 260) himself says "there is no evidence as to how large a farm can become before it is uneconomical."

Conversely, the increasing concentration of agricultural resources in the hands of fewer and fewer individuals, be they large family farms or agribusiness corporations, is seen by many alternative agriculturalists as a threat both to democracy and to agriculture's sustainability. Berry (1981:121) believes that "In any given region there is a farm size that is democratic, and a farm size that is plutocratic or totalitarian. A great danger to democracy now in the United States is the steep decline in the number of people who own farmland—or landed property of any kind." Aiken (1984:283) suggests that "the type of stewardship and care required to farm ecologically is not compatible with large size." Likewise, Jackson (1987:37) says that as too few farmers try to farm very large acreages the "eyes to acres ratio" becomes distorted and the land inevitably suffers from lack of proper attention and care.

Dependence versus independence

This push toward ever-increasing farm size in conventional agriculture is coupled with a drive toward the development of ever-larger farm machinery; as Drache (1978:109) says, "big machines justified big farming." Large farms and large equipment require greater amounts of capital to operate than was necessary in the past. Conventional agriculturalist Clawson (1960:268) observes, "The capital required to obtain enough land and equipment has risen to the point that discourages would-be farmers or keeps them out." In addition to highly capitalized farms and equipment, conventional agriculture depends heavily on numerous farm inputs, energy sources, and services provided by agribusiness sources. McMillen (1981:370) says of farmers and agribusiness, "Behind the farmers a staggering array of people labor to provide agriculture's necessities. They toil to build the machines each farmer buys, to supply the tires and fuels for his machines, to make his fertilizers and pesticides, and to supply his countless other needs." Butz (1972a:5), like most conventional agriculturalists, says of this farmer/agribusiness relationship, "Anybody

who tries to say that one part can get along without the other is off base."

To enable farmers to purchase large farms, large machinery, and numerous inputs, conventional agriculturalists also advocate extensive use of credit. Butz (1975a:9), in addressing a group of bankers stated, "The kind of agriculture we're talking about calls for heavy financial commitment." McMillen (1981:365) says that "With expensive machinery required, money needed for seeds, fertilizers, chemicals, and other essentials on a scale far beyond the levels common when farms were much smaller, the business farmer considers credit as one of his essential costs." And Drache (1985:226), in looking to the future, predicts that "Capital inputs will be immense by today's standards. . . . Multi-million-dollar operating loans will be commonplace."

Alternative agriculturalists, however, see this trend toward ever larger farm units and technologies and greater reliance on purchased inputs as ultimately leading to an unsustainable agriculture. Freudenberger (1982:623) says that sustainable agricultural technologies "are ones which are smaller, capital-saving, less rapacious in their demands on raw materials, are environmentally non-violent, and lead toward an environmentally non-violent and sustainable lifestyle." Aiken (1984:229) claims that "An agriculture heavily dependent on inputs from scarce nonrenewable resources (for example, fossil fuels) is not sustainable without constant substitution." Berry (1987), Logsdon (1986), and Jackson (1987) all identify the Amish as the prime example of farmers who have eschewed the conventional wisdom of modern agriculture and who have generally prospered during a period of agricultural recession. This, they say, has been possible because the Amish have kept their farms small and have remained relatively *independent* of the agribusiness complex upon which most farmers rely.

Alternative agriculturalists feel that a major reason so many farms continue to fail is that they abuse the use of credit. Logsdon (1984: 9) succinctly expressed the belief of many alternative agriculturalists when he said, "to be crisis-proof, don't borrow large sums of money." Most conventional agriculturalists view the continuing trend toward greater use of purchased inputs and borrowed capital by farmers as evidence of progress in the agricultural industry. Alternative agriculturalists, on the other hand, see the trend toward ever-increasing use of inputs and credit as primarily benefiting nonfarm agribusiness interests, and inimical to farmers' interests. Berry (1984:24) summarizes the position of many alternative agriculturalists: "The overloaded mind tries to solve its problems by oversimplifying itself and its place—that is, by industrialization. . . . It gives up the complex strategies of independence . . . for a simple dependence on industrial suppliers (and on credit)."

Competition versus community

Many of the dramatic changes in agriculture, such as the decline in the farm population and the heavy dependence on purchased inputs and borrowed capital, stem, at least in part, from the intense competition in agriculture. Heady (1966:113) says of modern agriculture, "With growing commercialization and specialization and with growth in the productive and supply capacity of agriculture, competition has become intense." This intense competition is viewed by conventional agriculturalists as having mostly positive effects on agriculture and society as a whole. Clawson (1968:366), for example, suggests that this intense competition in agriculture drives farmers to

> accept and use new technology even when the effect upon all farmers may be negative. . . . This type of technological change is, in the value system of this author, good and desirable in the broad social sense of the term. . . . Man will increasingly be freed to do other things, to produce other goods and services that he wants, rather than be so closely chained to the production of food and fiber.

Many conventional agriculturalists believe that agricultural and social progress can be measured partly in terms of the exodus of people from the agricultural industry. As recently as 1984, Earl Butz stated that times would be getting rougher for farmers and that more of them would be leaving the industry, but that this would be good for agriculture (Gilles 1984). A common theme of conventional agriculturalists is that society will benefit as the number of farmers declines, since those who are released from the task of food production can then produce other goods and services that improve the quality of life (Butz 1975b). This also allows many farm children to "avoid the drudgery of farming" (Drache 1976:430) and avoid being "sentenced to a life of menial labor in the fields" (Butz 1975b:211). This stance on reducing agricultural labor by transferring human resources from agriculture to other industries stems in part from the conventional agricultural belief that agriculture is a business like any other. As Drache (1976:430) puts it: "Modern farming, like any other business, is a matter of mechanization, money, and management."

Statements such as the last one bring harsh and immediate rebuttal from alternative agriculturalists. Aiken (1982:51–52) counters such statements by saying, "Agriculture is, more than any other industry, directly linked to human biological well-being. It is the noblest and most ancient of the arts—the very basis for civilization. It is demeaning to treat it like any other consumer industry churning out, for example, toilet seats or pimple cream to meet the fickle fluctuations of consumer demand." Alternative agriculturalists adamantly oppose the continued decline of the farm population and view farm

labor, when done cooperatively, as a necessary and meaningful activity which should not be looked upon as just another input or expense to be minimized (Berry 1977).

Most conventional agriculturalists acknowledge that the continued decline in the farm population has had dramatic adverse effects on rural communities (Heady 1976). Although concerned about the decline of rural communities, they see this as part of the price that must be paid for agricultural progress. For example, Clawson (1972:109) says that a "byproduct of the agricultural revolution has been the social and economic decline of rural communities and small towns dependent upon agriculture. . . . This has been part of the revolution in way of life and part of increasing affluence of the American people—inevitable, perhaps, and mostly good in my scale of values." Clawson (1968:84) also suggests that the "abandonment of many small rural towns should be planned for and given assistance." Although not all conventional agriculturalists advocate abandoning small, struggling rural communities, most agree that their decline is part of the inexorable march of agricultural progress.

Alternative agriculturalists, on the other hand, vehemently oppose what they see as an implicit policy, not only to reduce the number of "excess" farmers, but also the number of "unnecessary" small rural communities. A question asked by Berry (1977:137) illustrates this position: "If competition is the appropriate relationship, then why, after generations of this inpouring of rural wealth, materials, and humanity into the cities, are the cities and countryside in equal states of disintegration and disrepair? Why have the rural and urban communities *both* fallen to pieces?" Jackson (1984:213) is concerned that if the number of farmers continues to decline, rural communities may suffer irreparable damage, and suggests, "Perhaps a 'critical mass' is necessary before the emergent qualities for a sustainable agriculture can appear. For our purposes, the implication is that sustainable agriculture will need rural communities if it is to survive and flourish." Berry (1977:44) is even more ominous in his outlook and says of small rural communities, "If we allow another generation to pass without doing what is necessary to enhance and embolden the possibility now perishing with them, we will lose it altogether. And then we will not only invoke calamity—we will deserve it."

Domination of nature versus harmony with nature

Perhaps no other element of the current agricultural debate is as fundamental as the issue of how humans should relate to their natural environment. Both conventional and alternative agriculturalists realize that interaction with nature is essential to their success, but here the similarity seems to end.

Conventional agriculturalists frequently use the analogy of war in their discussions of agriculture and its relationship to the environment. Butz (1972b:5), for instance, says, "We are achieving progress, but we must battle with Mother Nature, to unlock more of her secrets and to adapt more of her assets to mankind's benefit." Similarly, McMillen (1965, 1981) and Whitten (1966) describe insects, weeds, and other pests as "enemies" or "adversaries" upon which humans must "wage war" if we are to survive. McMillen (1965:199) also states that as long as pests "subtract from our economy" we do not have adequate control over them; therefore, "We should proceed to master our environment." Likewise, Whitten (1966:15) believes that the development of pesticides is "merely one more forward step in [man's] steady progress towards controlling his environment for his own well-being and comfort."

In sharp contrast, alternative agriculturalists see this kind of adversarial relationship with nature as ultimately futile and self-defeating. Rodale (1981:24) expresses this alternative agricultural view by saying, "Mother Nature bats last." Rodale (1981:24) goes on to explain how elements, including wastes, flow into, through, and out of human bodies. "In short," says Rodale, "we and Nature are inseparable." The interconnectedness of humans and the environment is probably one of the most common themes of alternative agriculturalists and a major reason why they view "battling" with nature as self-defeating. It is also why they advocate "natural" methods and products rather than "synthetic" chemicals and fertilizers.

Industrial metaphors are also often used by conventional agriculturalists. Butz (1973b:466) refers to agriculture as a "machine" which we should operate at "fuller capacity." Drache (1976:96) describes how many large farmers have adopted the methods of the factory and how one large wheat producer even introduced himself as a "manufacturer of wheat." Alternative agriculturalists, on the other hand, believe that agriculture can never be standardized like manufacturing (Berry 1977). The following statement by Freudenberger (1986:355) is typical of alternative agriculturalists' views of how farms should relate to the natural environment: "Stating it bluntly for the purpose of clarity, it has become quite obvious to me that humans must choose to be in harmony with natural integrities if they are to survive. Somehow, tomorrow's farming systems must become analogues of forests and prairies."

Specialization versus diversity

As most industries develop they tend to become more specialized, and agriculture, though a relative latecomer to the industrial revolution, has been no exception. Conventional agriculturalists attribute much of agriculture's "success" to the trend toward specialization

both on and off the farm. In discussing why the development of U.S. agriculture has been so successful, Heady (1976:115) suggests that part of the reason was because "Farms became larger and more specialized, handling either crops or livestock instead of both." Similarly, Drache (1976:8) says, "By specializing on one crop, real efficiency of operation was established and farms grew to many thousand acres."

Greater reliance on monoculture, less crop rotation, and the separation of crops and livestock are among the conventional agricultural practices most criticized by alternative agriculturalists (Logsdon 1984). Berry (1981:122) says of the need to include both plants and animals in agricultural systems: "In this balance of plants and animals the fertility cycle is kept complete, or as nearly complete as possible." Logsdon (1984:8) gives an economic rationale for increasing diversity: "The greater the variety of crops and livestock, the less vulnerable the farm; the more specialized, the greater the vulnerability." And Jackson (1984:221) advocates greater diversity simply because "Natural integrities are dependent upon diversity." Alternative agriculturalists also sharply criticize conventional agriculture for narrowing the genetic base of many plants and animals. Jackson (1980:30) argues that the narrow genetic base of conventional agriculture is a "time bomb" with a "short fuse."

Conventional agriculturalists, for the most part, contend that only by specializing at all levels of production can agriculture remain efficient and productive enough to meet the ever-growing demand for food (Butz 1973a). Alternative agriculturalists disagree with this stance and argue that only by adopting practices that encourage diversity at all levels of the production system can agriculture build soil fertility; decrease its susceptibility to weather, diseases, and pest problems; and decrease its vulnerability to wide swings in agricultural market prices and other disruptions, thereby creating an agriculture that can sustain production in the long run[7] (Jackson 1980).

Exploitation versus restraint

Throughout the development of American agriculture and especially during the period before the western frontier closed, there developed a feeling among farmers that land, soil, water, and other resources were virtually unlimited commodities (Cochrane 1979). Most conventional agriculturalists recognize that the development of U.S. agriculture has had a negative impact on soil and water. Clawson (1963: 69), for example, explains how "Throughout our history, as colonies

[7] Although this dimension of "Specialization versus Diversity" could possibly be considered as part of the previous one, "Domination of Nature versus Harmony with Nature," it is discussed so frequently and is so central to the arguments of both conventional and alternative agriculturalists that a separate treatment is warranted.

and as a nation, we have been lavish—perhaps profligate is a better word—in our use of land. . . . Some land has been ruined for further crop production, at least at economic costs." Although he acknowledges that progress has been made in the area of soil conservation, Clawson (1972:103) says that "there are still millions of acres from which soil losses are relatively great, and the steady erosion not only downgrades the land but causes both immediate and long-term damage to streams and other water bodies." Even with this understanding, however, Held and Clawson (1965:314), like many other conventional agriculturalists, suggest that "erosion must be considered in relation to the costs of controlling it and the returns which an erosion-controlling land use makes possible."

Alternative agriculturalists such as Jackson (1980:18) claim that this type of economics "discounts the future" and "is inherent in the environmental problem." Rodale (1972:31) likewise suggests that conventional agriculture "is a perfect example of the all-too-human trait of putting short-term profits before the obligation to maintain resources for long-term use." Alternative agriculturalists claim that in addition to the obvious factors (such as soil erosion) other external costs of food production (such as the decline of rural communities and the growing need for energy inputs) are more or less completely ignored by conventional agriculturalists. Berry (1986:54) rejects the economic statistics which demonstrate how "fantastically productive" American agriculture has become, claiming instead, "That American agriculture is also fantastically expensive is less well known, but it is equally undeniable, even though the costs have not yet entered into the official accounting." Aiken (1984) similarly contends that if all its "hidden costs" were considered, conventional agriculture would be shown to be not only inefficient, but unethical as well.

Conventional agriculturalists often suggest that the affluence enjoyed by many in the United States and other industrialized countries has largely been achieved because of advances in agricultural productivity. Butz (1973a:2), for example, credits modern agriculture with making possible the "fabulous standard of living in this nation. Our mere six percent of the world's population uses an overwhelming—and certainly disproportionate—share of the goods and services most often sought after and most symbolic of good living." Butz (1972a:6) also states that his goal is for farmers to "earn as much as city people are making." Clawson (1968:368) similarly notes that "Farm people are generally as eager as urban people to have new comforts and luxuries."

In contrast, many alternative agriculturalists view materialism as one of the driving forces behind conventional agriculture's goal of ever-increasing production. Logsdon (1984:18) suggests that "Farmers must derive happiness and humane satisfaction from a life that eschews the kind of consumerism, leisure, and delirious pursuit of

novelty that characterizes our society." By living a life of "voluntary simplicity," alternative agriculturalists believe that both farmers and nonfarmers can find greater satisfaction while, at the same time, conserving resources for today's needy and tomorrow's increasing population. The importance of this position to many alternative agriculturalists is captured in this statement by Rodale (1976a:59): "I see no alternative to a massive, intensive search for a simpler way of life—without wasting much time."

Conventional agriculturalists argue that only by fully utilizing available resources with the most sophisticated technologies available can today's and tomorrow's food needs be met. They are not exploitative in the most pejorative sense of the word, they simply act according to their imperative of putting to productive use otherwise idle resources so humanity can stay one step ahead of global food shortages. As Drache (1985:224) says, "If we allow technology to run its course we will have ample supplies of both fuel and food." Conventional agriculturalists see any significant conversion to alternative agricultural methods as a sure-fire catastrophe. This conviction is evident in a statement by Earl Butz (1971a:19): "We can go back to organic agriculture in this country if we must. . . . However, before we move in that direction, someone must decide which 50 million of our people will starve!" Whereas alternative agriculturalists contend that there are limits to what agricultural technology can and should attempt to produce from the earth (Berry 1977), many conventional agriculturalists, such as Whitten (1966:214), suggest that "We must get the public to accept the fact that man's ingenuity seems limitless." With continual improvements in science and technology, many conventional agriculturalists believe future food production will not be a concern. As Clawson (1963:61) puts it, "We hazard the judgement that the country can feed 10, or 20, or even more times its present population. . . . The ultimate food productive capacity is so far above the present level that we think nothing is gained from trying to estimate just how large it is."

Conclusion: the implications for LISA

The writings we have reviewed suggest that there is a large chasm reflecting fundamentally divergent paradigms between alternative and conventional agriculturalists. Their views of what constitutes "good" agriculture are, to say the least, at odds with one another. The clarification of the two competing agricultural paradigms which we have endeavored to present may prove useful in analyzing this conflict, especially as the debate between them works its way into policy arenas and becomes institutionalized to varying degrees. The recently established "Low Input Sustainable Agriculture" or "LISA" program offers an early case in point.

Development of the LISA program within USDA and land-grant colleges of agriculture was recently mandated by Congress, largely due to pressure from alternative agriculture groups (Buttel and Gillespie 1988). Despite the newness and minor budgetary status of LISA, however, it has already generated vehement denunciation by conventional agriculture interests. A columnist for *Successful Farming* had this to say: "No matter how much they paint LISA up, I don't believe she's going to attract many suitors. They can even elect her queen of the 1989 USDA yearbook, but if all she stands for is replacing the mechanical and scientific advancements of the past 50 years with sweat and a lower standard of living, nobody is going to want to marry her" (Eftink 1989:17). Other critics have facetiously suggested alternative acronyms for LISA—A ConAgra executive suggests, "I'd call it FIDO, fewer inputs, declining outputs. A real dog" (Black 1989:23). And a representative of the International Minerals Corporation says, "Our worthless opponents are not constrained with the honesty that you and I feel is necessary—if they were, they wouldn't call it LISA, they would call it LILO—Low Input, Low Output" (Turner 1989:23). It is obvious, especially in the last statement, that these conventional agriculturalists view LISA supporters as "opponents" with whom they have little in common. This type of "name calling" is indicative of a fundamental paradigmatic rift.

While any degree of institutionalization of low-input agriculture, which LISA represents, is a direct threat to agribusiness industries, it seems clear that more than economic interests are at stake. Underlying the competing perspectives on LISA are fundamental differences, not only in perceptions of the feasibility of and need for major reductions in inputs, but even in the environmental impacts of conventional versus alternative fertilization practices (see e.g., Nowles 1989). The difference in perceptions was nicely captured by the editor of the *Farm Journal,* who wrote of LISA, "She's more confusing than enlightening. What is sustainable agriculture afterall? *The only sustainable agriculture is profitable agriculture*" (Ainesworth 1989:1, emphasis added). The substitution of economic for ecological sustainability captures a fundamentally different view of agriculture than that held by the alternative agriculture proponents of LISA.

Although LISA has received a less openly hostile reaction from land-grant universities (LGUs) than from agribusiness firms, which are more directly threatened, it has nonetheless been viewed with considerable skepticism within LGUs (see e.g., Holt 1989). Furthermore, while LISA clearly represents a victory for alternative agriculture in the sense of increased legitimacy, its treatment within LGUs cautions against assuming that it signals the demise of conventional agriculture. Buttel and Gillespie (1988) suggest that the growing interest in low-input agriculture within LGUs is just another in a long line of appropriations of progressive symbols by these institutions

when it is politically expedient to do so. They describe how the progressive ideas of "outsider groups" (farming systems, appropriate technology, and basic needs being prior examples) are redefined and relabeled by the LGUs in order to remove their radical critiques of dominant agricultural interests. Specifically, Buttel and Gillespie (1988: 4) argue that, "The notion of ecological agriculture in its 'low-input' version has accordingly been sanitized of the diverse critiques that undergirded its nurturing within the alternative agriculture movement."[8]

Basically, Buttel and Gillespie provide an insightful analysis of the dynamics whereby adherents of a dominant paradigm can defuse the threat posed by a competing paradigm—appropriating its positive imagery or, at most, accepting its least threatening components, while ignoring or even denying its radical implications—without appearing to be trying to defeat it directly. Certainly a common reaction within LGUs has been simply to relabel traditional research programs as being consistent with LISA, arguing that universities "have indeed been conducting useful research and educational programs on many LISA issues for decades" (Holt 1989:4). This tendency is facilitated by the ambiguity of sustainable agriculture and because its proponents are relatively unorganized, both of which make it difficult to counter the symbolic appropriation but limited implementation of LISA (Buttel and Gillespie 1988:7–8).

Buttel and Gillespie (1988) also note, however, that several factors have combined to make LISA a more viable position (at least symbolically) for LGUs to take. Chief among these factors are the economic crisis among farmers, the negative reaction against the increased emphasis on biotechnology research (epitomized by the controversy over bovine growth hormone), and the increased societal concern with environmental quality in general and the environmental impacts of agriculture in particular. While the severity of the economic crisis afflicting agriculture may have let up a bit in recent years, ambivalence toward biotechnology has continued and concern over environmental quality has increased dramatically (Dunlap 1990). Further, not only are environmentalists joining alternative agriculturalists in combating groundwater and other forms of agricultural pollution, but there has been a dramatic increase in concern over food safety (symbolized by the Alar incident). Both of the latter changes

[8] A reflection of the rapidity of change in agricultural debates is that Buttel and Gillespie see "low-input" as being the most acceptable label for alternative/ecological agriculture within LGUs, but in the past couple of years the LGUs have tended to embrace the "sustainable" component while rejecting the "low-input" component of LISA (see e.g., Holt 1989). We suspect this reflects their sensitivity to the heightened societal concern with ecological sustainability (to be discussed below), as well as their attempt not to alienate the agribusiness interests with which they are so intimately involved.

have made reductions in fertilizer and pesticide applications more politically attractive to farmers and LGUs, and "sustainable" an appealing label to farmers, LGUs, and even agribusiness.

In short, LISA, while still an important victory for proponents of alternative agriculture in their battle to supplant the conventional agricultural paradigm, may provide little more than a symbolic victory in the face of strong opposition from dominant agricultural interests. The ability of conventional farmers, LGUs, USDA, and even agrichemical interests to appropriate the politically attractive proenvironment image of alternative agriculture, while gutting the implementation of many of its core elements, should not be underestimated. On the other hand, unacceptable levels of environmental pollution and pesticide residues, as well as continuing economic and social problems in agriculture and rural America, pose real anomalies for conventional agriculture. To the extent that alternative agriculture is seen as a potential solution to these problems, it will pose an increasingly strong challenge to conventional agriculture.

It seems likely that each victory by adherents of alternative agriculture will put more pressure on the LGUs to take their claims seriously. We can therefore expect the paradigmatic conflict within agriculture to move increasingly from the social and political arenas to the research, teaching, and extension activities of these institutions. Having a clear understanding of the nature of the two paradigms will be vital as their validity and utility are evaluated and increasingly tested in these settings, especially keeping in mind the difficulties involved in developing acceptable empirical tests of such broad and value-laden perspectives (Buttel et al. 1986). We hope this article contributes to such understanding.

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