

UNDERSTANDING AND MANAGING THE MULTI-DIMENSIONS OF SUSTAINABLE AGRICULTURE

John Ikerd*
University of Missouri

Sustainability is a goal. The goal of a sustainable agriculture, quite simply, is agricultural sustainability. Most definitional disagreements stem from differing opinions concerning the "means" by which the goal of agricultural sustainability can or should be pursued. Few people question the nature or worthiness of the "goal" to be achieved. No one wants an unsustainable agriculture.

How will we know when agriculture is sustainable? The answer: we won't. "Sustainability is a question rather than an answer," as the late Robert Rodale was fond of saying. Sustainability is a direction rather than a destination, like a star that guides the ships at sea but remains forever beyond the horizon. But sustainability can still be an important guiding principle. The "question of sustainability" can be asked of any ongoing activity or process. It can be asked of "conventional" agriculture and of any proposed "alternative" agriculture: Is it sustainable? It should not be presupposed that questioners have, or even think they have, the answer simply because they ask the question. But asking the right question can greatly improve the odds of finding the right answer and making the right decision.

Agreement on the goal of sustainability may not be as clear-cut as it might at first seem. First, we must agree on what is to be sustained, for whom, and for how long? If we can agree on the answers to these questions we should be able to move forward toward the common goal. There is not universal agreement, but most who are concerned about sustainability seem to agree that we are working to sustain *agriculture*, for the benefit of *humanity*, *forever*.

Some argue that agriculture is the problem rather than the solution, but most seem to agree that we need to sustain, rather than replace or abandon, agriculture. Agriculture, by its very nature, involves efforts to shift the ecological balance so as to favor humans relative to other species in production of food and physical protection. Thus, if we sustain *agriculture* we are sustaining it for the ultimate benefit of *humankind*. A general consensus also seems to exist that agriculture should benefit people *of this generation and for all generations to follow*. Among the many definitions of sustainable agriculture, none places a time horizon on how long agriculture should be sustained.

The Dimensions of Sustainability

We cannot prove through empirical studies that one approach to agriculture is sustainable or that another is not. It would quite literally *take forever* to collect the data for such a study. Thus, we must rely on the science of logic to answer the question of sustainability. What are the *logical prerequisites* for agricultural sustainability? An answer can be found in a growing consensus: a sustainable agriculture must be (1) ecologically sound, (2) economically viable, and (3) socially responsible. Furthermore, these three dimensions, in so far as they relate to sustainability, are inseparable. All three are essential, and thus, all are equally critical to long run sustainability.

If there are no ecological limits to growth, there is no legitimate question of sustainability. Thus, the sustainability issue presumes an interconnectedness of humanity with the other biophysical elements of our natural ecosystem. Through agriculture, we may tip the ecological balance in our favor. But if we attempt to tip it too far or too fast, we will destroy the integrity of the natural ecosystem, of which both we and agriculture are parts. If we degrade our natural resources and poison our natural environment, we will degrade the productivity of agriculture and ultimately will destroy human life on earth. Nearly everyone seems to agree that a sustainable agriculture must be ecologically sound.

There may be less agreement regarding the contentions that a sustainable agriculture must also be economically viable and socially responsible. The social sciences of economics and sociology are fundamentally different from the physical sciences of agriculture and the natural science of ecology. However, agriculture, by its nature, involves self-conscious attempts by humans to change or "manage" natural ecosystems. Humans are unique among species in that we make purposeful, deliberate decisions that can either enhance or degrade the health of the ecosystems of which we are a part. Thus, the question of sustainability must take into account the purposeful, self-conscious nature of individual and collective human actions which are driven by the economic and social motives of people.

Sustainable systems must be economically viable, either by nature or through human intervention. In many cases, farmers have economic incentives to adopt ecologically sound systems of farming. A healthy agroecosystem tends to be a productive and profitable agroecosystem. However, inherent conflicts exist between short run interests of individuals and long run interests of humanity. In such cases, society must find ways to provide economic incentives for individuals to act in ways consistent with long run societal interests.

Human nature, fundamentally, is a part of *nature*. Even when our physical survival is ensured and our basic needs are met, the nature of we humans is to act in our own self-interest. The whole of self-interest is not captured in dollars and cents. Thus, we need not *maximize profit* to maximize our self-interest. But people cannot persist in actions inconsistent with their economic survival, regardless of their personal preferences, values, or principles. Enterprises that lack economic viability will lose control over use of ecological resources to their economically viable competitors. In other words, farmers who can't survive financially ultimately will lose their farms to their economically viable *neighbors*. However, agriculture cannot be sustained over the long run if the only economically viable *neighbors* are those who degrade the agroecosystem in pursuit of short run profits.

A fundamental purpose of public policy is to resolve conflicts between the short run interests of individuals and the long run interest of society as a whole. Ecologically sound systems of farming can be made economically viable through the policy making process. However, society ultimately must pay the economic costs of such policies, either through availability and prices of food and fiber, or through government taxing and spending. By one means no another, farming systems must be made economically viable as well as ecologically sound if they are to be sustainable. Neither is more important than the other; both are necessary and neither is sufficient.

A consensus that sustainable agriculture must be socially responsible is still emerging. However, to argue that an economically viable and ecologically sound system of agriculture can be sustained in the absence of social justice is to ignore the fundamental nature of humans. At their very core, such arguments beg the question of sustainability for whom, or at least for how many and at what level? No set of ecological possibilities can sustain the maximum population that humankind might possibly choose to procreate on this earth. Nor is it ecologically possible to sustain even the current human population at any level of per capita resource consumption we might choose.

Some argue that economic development is the key to reducing population growth rates and ensuring long run sustainability. However, if rates of population increases can be held in check only by increasing per capita resource consumption, economic development simply shifts the balance from over-population to over-consumption. The history of human civilization provides little evidence to support a hypothesis that either regional or global population and consumption will automatically adjust to optimum sustainable levels. To the contrary, over-population and unrestrained greed seem more likely to result in destruction and degradation of the natural resource base. Evidence suggests that this degradation will continue to a point where only a fraction of the population can be sustained.

Human societies that lack economic equity and social justice are inherently unstable, and thus, are not sustainable over time. Such systems will be characterized by reoccurring social conflicts which may do irreparable damage to both the economic and ecological systems that must support them. In an age of nuclear weapons and other forms of mass destruction, one instance of societal failure can destroy the ecosystem of an entire region. Even without war, deserts, droughts, floods, and famines are more frequently the ultimate result of failed social systems than of any naturally occurring ecosystem phenomena alone. Agriculture is a creation of human society that can be destroyed by human society. An agriculture which fails to sustain a society will not be sustained by that society. A socially responsible agriculture -- one that equitably meets basic human food and fiber needs, provides economic opportunity, supports self-determination, and ensures social equity -- is no less critical to long run sustainability than is an ecologically sound and economically viable agriculture.

Questions concerning what is socially responsible and what is not ultimately must be answered by society, by families, communities, and others collectively affected by agricultural decisions. Science provides no definitive answers to such questions. However, it is logically imperative that we recognize ecological soundness, economic viability, and social responsibility all as essential and thus equally critical to the sustainability of agriculture.

We must have social incentives to create economic rewards for ecological protection. An important dimension of human nature is our ability to learn, discover new options, and to choose new and different responses. This ability to change our stimulus-response patterns is unique to the human species. Sustainability is not possible unless we develop our *collective* will to exercise this uniquely human social trait -- unless we *choose* to share *our* resources with others of this generation and of all generations to come.

Some may question the wisdom of placing the burdens of global sustainability on American agriculture. One might logically conclude that American agriculture is but one part of global agriculture, and that agriculture is but one small part of the larger global ecosystem. If risks arising from lack of sustainability within American agriculture can be counteracted elsewhere within global agriculture, or within the rest of the global ecosystem, the system as a whole can be sustainable. This conclusion is valid, but only within limits. When one part of a system places stress on the other parts, the sustainability of the entire system may be threatened.

It is important to monitor and control the social stress an agricultural system places on farm families and others in rural communities, the economic stress agriculture puts on food and fiber consumers, and the ecological stress agriculture puts on its natural environment. A system that destroys any critical element of its agroecosystem system will degrade the other elements as well, and eventually, will destroy the system as a whole.

We should be willing to ask of any agricultural technology, enterprise, or activity: Is it ecologically sound, economically viable, and socially responsible? We can never know for sure whether our conclusions or decisions are right or wrong. Sustainability is about "forever." However, we will at least be asking the right questions. And, by focusing our efforts on gathering the right information and pursuing the right knowledge, we should at least improve the odds of finding the right answers.

The Pursuit of Sustainability: A Question of Paradigms

Disagreements concerning alternative means of pursuing sustainability will not likely be resolved, at least not in the foreseeable future. However, the sustainability issue is causing many people to question the prevailing paradigm for economic development and human progress -- the industrial model. Some of the most challenging questions of sustainability are linked directly to either the consequences or failures of the industrial model -- environmental degradation, reliance on non-renewable resources, disappearing opportunities for productive employment, and growing social inequities, just to name a few. In their search for answers to these questions, a growing number of people are turning to fundamentally different developmental models for the future.

Joel Barker, in his book Paradigms, defines a paradigm as a set of rules that do three things: (1) establishes or defines boundaries, (2) sets standards for success, and (3) defines rules of behavior within the boundaries. He uses the game of tennis as an analogy to illustrate these concepts. Tennis courts are standard in size and out-of-bounds are clearly marked. The ball must hit within these bounds to "stay in play." The ball must be struck with a tennis racket, not a baseball bat, a hand, or anything else, and the ball is allowed to bounce only once before it is returned over the net.

Paradigms may be simple, as in the case of games, or extremely complex, as in the case of a model for economic development. However, the industrial model has some clearly defined boundaries. The natural environment is considered to be "external," or out of bounds, by industrial managers. Society likewise is considered to be an "external" factor which constrains or sets bounds on what industrial firms can do. Success for an industrial firm is measured in terms

of profits and growth. Within the limits allowed by nature and society, industrial firms may take a wide range of actions to maximize short run profits and longer run growth. Almost anything that is possible and legal is encouraged if it leads to profits and growth. The dominant paradigm of U.S. agriculture, following the rest of the U.S. economy, has become the industrial paradigm.

Paradigms become dominant because they are found to be capable of exploiting new opportunities or solving problems that previous paradigms could not solve. The industrial era was fostered by a host of interrelated and complex developments. But among the most important of the past century was accessibility to large supplies of fossil fuels. The industrialization of agriculture was brought about to support the industrialization of the economy as a whole. People had to be freed from the tasks of producing food and fiber to provide workers for the factories and offices of the growing industrial society. Food and fiber costs had to decline if consumers were to have discretionary income to buy the things that the factories and offices would produce. U.S. agriculture was mechanized, specialized, and routinized. The agricultural sector has been among the last to become fully industrialized. But the driving forces of modernization have been to make farms perform as factories without roofs with fields to produce as factory assembly lines.

The industrial paradigm succeeded in exploiting the opportunities of cheap fossil energy. It freed farmers and others from the subsistence living that characterized earlier times and reduced the claim of food and fiber on consumer incomes. However, fossil energy supplies are being quickly depleted. In addition, most of the benefits to be gained from agricultural industrialization have already been realized. Today less than two percent of the people are left on farms. Only a penny of the dime of each dollar of disposable income the average consumer spends for food goes to pay the farmer. There is little left for society to gain from having fewer farmers or further *squeezing the farmer's penny*.

In addition, industrialization has generated a whole new set of environmental and social costs that may soon, if not already, outweigh its declining benefits. Champions of industrialization are searching desperately to find industrial solutions to problems caused by industrialization. Others, see such efforts as futile and are searching for something fundamentally different. They are searching for a new paradigm capable not only of solving the problems created by industrialization but of realizing a whole new set of opportunities for human progress in a post-industrial era. The sustainable agriculture issue is characterized by this fundamental conflict between those who are trying to *fix* the industrial model of farming and those who are seeking a new paradigm for farming in the post-industrial era.

A new post-industrial paradigm for agriculture is emerging under the conceptual umbrella of sustainable agriculture. The emerging paradigm may not be widely understood for some time to come. However, this post-industrial approach to farming is fundamentally different from the industrial paradigm in several ways. The new paradigm clearly considers ecological and social impacts to be *within* rather than *outside* of its boundaries. The new goal is sustainability with its inseparable ecological, social, and economic dimensions. Healthy ecosystems and healthy societies are goals rather than constraints to profits and growth. The new rules are the *laws of nature*, including those of human *nature*.

Industrialization is based on an economic model designed for optimum resource *use*. Under optimum conditions, a free enterprise economy optimizes the rate at which resources are *extracted or used up*. Industrialization *uses up* natural or ecological resources as well as human and social resources, but it does nothing to regenerate or replenish the *stocks* of either. Society and the environment are *outside or external*. The sustainability paradigm brings natural ecosystems and human communities into the decision making process. The new paradigm deals directly with decisions for regenerating the natural resource base and rebuilding stocks of social capital -- both of which may have been seriously depleted by decades of industrial extraction. The new boundaries are *natural* limits to economic growth and *natural* requirements for human progress.

Success in the new paradigm is measured against the goal of sustainable economic, ecological, social progress, rather than profits and growth. The ultimate objective is to sustain a desirable quality of life, which requires a balance of economic, social, and ecological success. Quality of life is unique to the individual, has elements common to the human species. For example, all humans need air, food, and water -- most would agree. But humans also are a social species. A baby may live longer without love than without milk, but ultimately must have both to survive. Our perception of our image in the eyes of others is inseparable from our image of ourselves. Humans are spiritual as well as physical and social. Most of us believe our lives have meaning and purpose that transcends ourselves and goes beyond even other people around us. For example, the rewards that motivate acts of true resource stewardship are spiritual rather than economic or social.

The rules of the new paradigm are laws of nature. The underlying assumption is that humanity must conform to nature rather than dominate nature. Thus, the laws of nature, including human nature, hold the keys to sustained productivity. Nature is biological as well as physical. The sustainable paradigm is a biophysical or organistic model, whereas industrialization is a geophysical or mechanistic model.

Every organism (or organization) is a whole -- each has a definable purpose or function. Organisms must be managed holistically. But, every organism is made up of smaller organisms and is a component of larger organisms. A unique challenge in holistic management is to comprehend the complexities of the whole under management, the purpose and functioning of the organism, rather than attempt to reduce wholes to their more simple and easily understood elements. The essence of a whole is in its interconnections, not in its component parts.

Each person, family, or community is a unique whole with a unique set of individual, collective, and spiritual goals and aspirations, and thus, has a unique quality of life. Each person, family, or community has a unique set of ecological, social, and economic resources, and thus, requires a unique resource management strategy. Holistic management is a complex process. In fact, the human mind may be the only mechanism capable of coping with the multitude of complexities implied by this new paradigm for agriculture. Success of the new paradigm for farm decision making may well depend on success in empowering people with the information and knowledge needed to manage holistically.

Despite their uniqueness, each organism or whole is subject to the same set of universal laws of nature -- including human nature. These laws define the rules of what we can and can't do, or should and shouldn't do, both in the short run and over the long run. The industrial paradigm, on the other hand, considers nature as something to be conquered through human ingenuity. Any constraint represented by nature is simply a temporary obstacle to be overcome. *The impossible just takes a little longer* -- so the industrial paradigm boasts. Thus, the scientific community has given little attention to defining those laws of nature that cannot be defied without threatening long run sustainability. A major challenge to the scientists under the new paradigm is to begin to define those laws of nature to which our decisions and actions must conform.

Strategies for Agriculture Sustainability

One might assume the task of managing for sustainability to be so complex and difficult that that no one would be willing to accept the challenge. However, many have already accepted the challenge. The trails toward agricultural sustainability already have been blazed by the visionaries who see the emergence of a new post-industrial society, of which an agriculture managed for sustainability will be but one part. Peter Drucker, the time honored business scholar and consultant to industrial corporations, is among those visionaries.

Every few hundred years in Western history there occurs a sharp transformation. Within a few short decades, society rearranges itself -- its worldview; its basic values; its social and political structure; its arts; its key institutions. Fifty years later, there is a new world.... We are currently living through just such a transformation." (Post-Capitalistic Society, by Peter Drucker)

Drucker believes the current transformation began in the early 1970s some 25-plus years ago. If Drucker is on target, we should look to ways of thinking that have emerged over the past two-to-three decades as clues to the dominant paradigm of the twenty-first century.

According to Barker, new paradigms emerge when it becomes apparent to some people, not necessarily many, that the old paradigm is not going to be able to solve all the relevant and important problems. Thus, a new paradigm emerges while the old paradigm seems to be doing quite well -- at least in the minds of most. Consequently, Barker claims, new paradigms typically are met with initial rejection. Therefore, we must be willing to consider ideas still *rejected* by most, but gaining a following, for insights into new paradigms. New paradigms are almost always championed from the *outside* rather than from *within*. We must be willing to look *outside* rather than *inside* for guidance in pursuit of the new paradigm of sustainability. The new territory of agricultural sustainability is just now being settled by the post-industrial pioneers.

Some of the visionaries from the outside include Drucker, Toffler, Naisbitt, Hock, Reich, Capra, and others. These visionaries are gaining a following that spans the political spectrum from Hilary Clinton to Newt Gingrich and the business spectrum from Tom Franzen (an Iowa family farmer) to the VISA Corporation. But the practical lessons of sustainability are being outlined by the *outside* pioneers which include Covey, Savory, Senge, Kriegel, Peters and others. These pioneers are teaching the day-to-day, nuts-and-bolts process of guiding the process of decision

making by fundamentally new and different paradigms -- paradigms consistent with the emerging paradigm of sustainable agriculture.

Those who are ready to learn and teach the principles of sustainable agriculture might do well to begin with the territory that has already been settled and to spread out conceptually from there. The following are but a few examples of readily available sources of uncommon wisdom, based on common sense, that is fundamental to the concepts of agricultural sustainability.

Allan Savory's approach to holistic resource management (HRM) is built on a set of four "ecosystem foundation blocks" -- water cycles, mineral cycles, energy flows and succession or community dynamics. These building blocks represent a down-to-earth, practical representation of the *laws of nature* -- rules of the sustainability paradigm. Savory contends that all *new wealth* is generated by *energy flow* -- the product of the solar chain which transforms solar energy into human-useful form. The water cycle and mineral cycle are essential elements in this solar chain. The process ultimately is dependent upon biological diversity and community dynamics or biological succession -- processes by which water and minerals are utilized in transforming solar energy.

The three-part, holistic goal of HRM is *sustainability* -- despite Savory's claims that HRM is fundamentally different from sustainable agriculture. The quality of life, production, and future resource dimensions of HRM goals are essentially the same as the social, economic, and ecological dimensions of sustainability. The HRM "whole under management" includes the land base, people, and money -- very practical terms for the ecological, social, and economic resources that must be managed to sustain agriculture over the long run. HRM is far stronger in practical ecology than either the social or economic dimensions. However, HRM recognizes explicitly that things economic, ecological, social are inseparable aspects of the same whole.

Steven Covey's "Seven Habits of Highly Effective People" is a principle-centered approach to life and relationships. Fundamental principles of human relationships are a practical representation of the *law of human nature* -- the other rules of the sustainability paradigm. Covey claims these natural laws of the human dimension are just as real, and just as unchanging, as laws such as the law of gravity of the physical dimension. He calls them "true north" principles -- not invented by individuals or society, but laws of the universe that pertain to all human relationships and human organizations. These principles surface in the form of values, ideas, norms, and teachings. But unlike values and norms, principles are objective, external, and unchanging.

Covey's "Seven Habits of Effective People" may be as good a place as any to start in understanding and teaching the laws of human nature within which a sustainable agriculture must be built. The seven habits begin with developing effective individuals -- (1) Be proactive, (2) Begin with the end in mind, but (3) Put first things first. These habits are designed to move beyond dependence to independence. But the next evolutionary step is to go beyond independence to interdependence -- to move beyond effective individuals to effective *relationships*. To develop effective relationships Covey suggests we must (4) Think win-win, (5) Seek first to understand and then to be understood, and (5) Synergize -- value

interconnectedness. Finally, success is a process, not an attainment, in that we must continually (7) Sharpen the saw.

Savory and Covey both address organistic approaches to decision making through their emphasis on holistic management, synergism, and interdependence. However, neither goes as far toward developing a practical way of thinking about such issues as does Peter Senge, a MIT business professor and consultant. In his book the "Fifth Discipline," Senge proclaims that a new discipline is needed to integrate the other disciplines, to fuse them into a coherent body of theory and practice, to keep them from being separate gimmicks or fads. While his objective may be philosophical, his approach to developing this new discipline is very practical. For example he proposes a set of "laws of systems thinking."

1. Today's problems come from yesterday's "solutions."
2. The harder you push, the harder the system pushes back.
3. Behavior grows better before it grows worse.
4. The easy way out usually leads back in.
5. The cure can be worse than the disease.
6. Faster is slower.
7. Cause and effect are not closely related in time or space.
8. Small changes can produce big results -- but the areas of highest leverage are often the least obvious.
9. You can have your cake and eat it too -- but not all at once.
10. Dividing an elephant in half does not produce two small elephants.
11. There is no blame -- we and our problems are parts of the same system.

One could argue that today's questions of sustainability can be traced to the violation of nearly every one of the ten laws of systems thinking. This would seem to imply that a shift to systems thinking would be a logical approach to answering those questions. Thus, Senge's systems strategies for developing "learning organizations" may provide some practical, valuable insights into the organistic strategies needed to develop sustainable systems of farming.

Savory, Covey, and Senge are just three of the more popular authors and educators who are teaching fundamentally new paradigms of personal, professional, and community decision making. All have expanded beyond their original scope of dealing with farm, individual, or business decision making. They all seem to agree that the same paradigm of decision making is both necessary and sufficient at all levels of aggregation, from managing one's personal life to managing the resources of the biosphere. All have rejected mechanical-industrial models and have adopted organistic-sustainable approaches instead. All are based on the *beliefs* that there are limits to growth, that everything is interconnected, and that our decisions must be ruled by inviolate laws of nature.

Our beginning texts for understanding and teaching the fundamentals of sustainable agriculture already have been written. They have been written by Savory, Covey, Senge, and others *outside* of the agricultural mainstream. The ideas of the outsiders are rapidly gaining in acceptance among farmers and others while the agricultural establishment struggles to minimize the

necessity for change. Efforts continue, even among those committed to the goal of agricultural sustainability, to make sustainable agriculture a part of mainstream agriculture.

Should sustainable agriculture be brought into the mainstream? Not if it requires a fundamentally different paradigm of decision making. If sustainability requires a different paradigm, it must remain a separate stream of thought and action. Perhaps the sustainable and industrial paradigms of agriculture should coexist during a period of transition. But ultimately paradigms of decision making must be consistent with the goal of sustainability. The current economic paradigm, which drives industrial model, does not even recognize the legitimacy of sustainability as a question.

Robert Kriegel makes the case for abrupt, rather than gradual, change. He advocates using "unconventional wisdom" in his book "If it Ain't Broke... Break it." His unconventional wisdom includes:

- Believe in providence... Ride the waves of change.
- Light a fire in your heart... Passion is contagious.
- Keep the fire hot... Stoke it, don't soak it!
- Don't be realistic... Dreams are goals with wings.
- Speed kills! (slowly)... Try easy!
- The best time to change is when you don't have to... Always mess with success.
- Trying to "hold the fort" may bring it down on your head... Playing it safe can be dangerous.
- Competition encourages conformity... Don't compete. Break the rules and change the game.
- Sacred cows make the best burgers... Get in the habit of breaking your habits.
- Experts know too much to learn anything new... Think like a beginner.
- Expect the unexpected... Make exceptions the rule.
- If you don't make waves you may drown... The biggest risk is not taking risks.
- Expect to be afraid... But fear tells lies.. break the cycle, look beyond it.
- Mistakes are a good investment... The biggest mistake is not making any.
- It's not a mistake to fail.. Failure is the best place to start toward success.
- Trust the unexpected... Plan on changing your plans.
- If you strive to be well rounded, you will probably end up flat... Play your own best game.
- Thinking about what you don't want to happen increases the odds that it will... Don't look where you don't want to go.
- Celebrating past success is not wishful thinking... Like it?... Log it.
- Joy pays off... *Play* -- to win.
- Life begins outside the egg shell... You have to "break it" to begin.

Kriegel's unconventional wisdom has as much or more relevance to researchers and educators as it has to farmers, business people, or members of the general public. Public institutions, including public universities, are notorious for defending the status quo. If we are to remain relevant during the great transition to a post-industrial era, we must be willing to *break it*.

American agriculture isn't broke... yet. But, if one believes in finite limits to growth, in the inherent interconnectedness of things, and in fundamental laws of nature and human behavior, then one must conclude that the industrial model of agriculture is not sustainable. It ain't broke, but ain't sustainable either. We must have the courage to *break it* while we still have an opportunity to fix it.

Susan B. Anthony once said that "cautious, careful people, always casting about to preserve their reputation and social standing, never can bring about reform. Those who are really in earnest must be willing to be anything or nothing in the world's estimation." Those who would bring about reform must be willing to "break it" even if it "ain't broke".. yet.

What if only a few are "willing to be anything or nothing in the world's estimation?" Margaret Mead has the answer: "never doubt that a small group of thoughtful, committed citizens can change the world. Indeed it's only thing that ever has." Why shouldn't a small group of thoughtful, committed advocates of sustainability expect to go out and change the world? Indeed it's the only thing that ever has.

REFERENCES

Barker, Joel. 1993. Paradigms: The Business of Discovering the Future, HarperBusiness, a Division of HarperCollins Publishing, New York, New York.

Capra, Fritjof. 1982. The Turning Point: Science, Society, and the Rising Culture, Simon and Schuster, New York, New York.

Covey, Stephen. 1989. Seven Habits of Highly Effective People, Simon and Schuster, New York, New York.

Drucker, Peter. 1989. The New Realities. Harper and Row, Publishers, Inc. New York, New York.

Drucker, Peter. 1994. Post-Capitalist Society, HarperBusiness, a Division of HarperCollins Publishing, New York, New York.

Hock, Dee W. 1995. "The Chaordic Organization: Out of Control and Into Order," World Business Academy Perspectives, Vol. 9, NO.1, Berrett-Koehler Publishers (pp. 5-21).

Naisbitt, John and Patricia Aburdene. Megatrends 2000. 1990. Avon Books, The Hearst Corporation, New York, New York.

Peters, Tom. 1994. The Pursuit of WOW!, Vintage Books, Random House, Inc. New York, New York.

Reich, Robert B. 1992, The Work of Nations. Vintage Books, Random House Publishing, New York, New York.

Savory, Alan (1988), Holistic Resource Management, Island Press, Covelo, CA.

Senge, Peter M. 1990. The Fifth Discipline. Doubleday Publishing Co. New York, New York.

Toffler, Alvin. 1990. Power Shifts. Bantam Books: New York, NY.

* Presented at the Southern Region Sustainable Agriculture Professional Development Program Workshop, SARE Regional Training Consortium, Gainesville, FL, January 15, 1997.

copyright © 1996-1997 by University of Missouri

Definitions, concepts and dimensions of sustainability and sustainable development; sustainability as a process; stakeholders and driving forces; introduction to methods of sustainability assessment; multi-, inter- and transdisciplinarity; basics of land use and supply chain systems; sustainable agroecosystems; people and team skills; time management; presentation skills; giving and receiving feedback; academic reading and academic writing. Intended learning outcomes. On successful completion of this module, students should.Â Â be able to relate their knowledge about sustainability and sustainable development to agriculture and their own life2. Â apply methods of self, time and project management individually and in groups3. Sustainable agriculture is farming in sustainable ways, which means meeting society's present food and textile needs, without compromising the ability for current or future generations to meet their needs. It can be based on an understanding of ecosystem services. There are many methods to increase the sustainability of agriculture. When developing agriculture within sustainable food systems, it is important to develop flexible business process and farming practices.