

Changing Technologies and Changing Values

Proceedings of the Sustainable Agriculture Conference for
New England Cooperative Extension System and USDA
Agency Personnel and Farmers

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Introduction

Changing Technologies and Changing Values: New England Extension Sustainable Agriculture Training Program

The New England Sustainable Agriculture Training Program began in 1994 and is a collaborative project between New England Extension systems and farmer organizations. The program is funded by the Northeast Region of the USDA Sustainable Agriculture Research & Education (SARE) Chapter 3 National Training Program.

Cooperating organizations include the Extension Systems of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont, the New England Cooperative Extension Consortium, the Maine Organic Farmers & Gardeners Association, and the Northeast Organic Farming Association of Vermont. Other collaborators involved with the project include the Natural Resources Conservation Service, Soil Conservation Districts, and other non-profit agriculture education or advocacy organizations.

The purpose of the New England project is to increase the ability of the Extension System, other USDA agencies, specifically the Natural Resources Conservation Service (NRCS) and the Farm Services Agency (FSA), and farmers to develop and maintain sustainable agricultural systems that protect the natural environment, and strengthen rural communities. The first year of this regional educational process culminated in the participatory conference on sustainable agriculture held on March 28-29, 1995 in Waterville Valley, New Hampshire.

Conference Purpose and Objectives

USDA has defined sustainable agriculture as a system that is economically viable, environmentally sound and socially responsible. The conference sought to build capacity to promote sustainable agriculture. Conference objectives formulated by the planning committee were as follows.

- Increase our knowledge about sustainable farming practices.
- Provide a forum for farmers and agency personnel to interact as educational collaborators.
- Identify specific information needs that will lead to more sustainable farming.
- Use innovative educational methods suited to dealing with complex community issues.

During the preliminary stages of the project and in planning for the conference, the organizing committee sought to formulate a new model for working to preserve and enhance agriculture in the region. The premise of the committee and many involved in the SARE National Training Program is that the long standing model of using technology transfer and scientifically-based knowledge to solve agricultural problems is no longer sufficient. There is a growing recognition that the model needs to be expanded in order to cope with the complex challenges facing farming in New England and elsewhere. Agencies must do a better job utilizing experiential knowledge of producers and building interactive networks to share such information. It is essential to recognize the role of individual values and social issues in agricultural decision-making. The workshop themes of the conference were developed accordingly.

In this new model, scientists, extension educators and agency personnel have a critical role to play as collaborators and facilitators, in addition to their traditional roles as experts and advisors. The format of the conference attempted to emphasize these new roles. There was a particular focus on a participatory learning approach to understand, analyze, and identify strategies to address the comprehensive and vital task of developing a sustainable agricultural system. The most unique aspect of this conference was the use of study

circles, a simple yet powerful method of participatory learning. Study circles actively involve group members in discussing topics and issues by calling upon members' own experiences, understanding, and knowledge rather than solely relying on information provided by "experts."

During the conference, extension and other agency personnel and farmers learned together through technical presentations on topics such as farm production methods, community involvement and environmental policies, followed by study circle group discussions. Conference planners hoped that the study circles would help participants develop a broader understanding of sustainable agriculture by capitalizing on the regional expertise of the 250 people who attended the conference. They also anticipated that this method would be used after the conference to stimulate community discussions on agricultural issues throughout New England.

Action Agendas

During the last 20 minutes of each study circle, participants were asked the question, "*What concrete actions would you propose that farmers, Extension and USDA personnel, and community members take on the issues which have been raised in your study circle discussion?*" The action steps which resulted from the discussions are included in these proceedings following the summaries from each workshop.

State Caucuses

At the end of each of the two days of the conference, a session was held for participants from each state to consider the suggestions for action from the study circle discussions. The state caucuses gave participants an opportunity to formulate their own list of realistic action steps that could be initiated at the state or local level. The recommendations from each state caucus are also listed in these proceedings following the workshop summaries.

In retrospect, the planning committee felt that the original objectives for the conference were achieved. Although there was tension and disagreement among the participants about some of the presentations and the discussions, the conference did provide a forum to start discussing new ways to solve increasingly complex problems in New England agriculture. All agreed that change is never easy but, through continued communication, we can all move toward our desired goal of sustaining agriculture in the region. The New England committee hopes to continue to ask the hard questions and strive to find ways, one step at a time, to promote sustainable farming systems and enhance the vitality of rural communities.

Acknowledgments

We would like to acknowledge the following people who helped make the conference possible.

Our funding source for the conference and for the entire New England Sustainable Agriculture Training Program is the Northeast Region USDA Sustainable Agriculture Research and Education Chapter 3 National Training Program.

Members of the program planning committee devoted many days of time and effort to make this program a success:

Connecticut:	Paul Stake, Roy Jeffrey - University of Connecticut Cooperative Extension
Maine:	Tim Griffin, University of Maine Cooperative Extension Eric Sideman, Maine Organic Farmers & Gardeners Association
Massachusetts:	Stephen Herbert, Cathy Roth - University of Massachusetts Cooperative Extension
New England:	Carol Giesecke - New England Cooperative Extension Consortium
New Hampshire:	Bill Zweigbaum - University of New Hampshire Cooperative Extension
Rhode Island:	Will Reynolds - University of Rhode Island Cooperative Extension
Vermont:	Sid Bosworth, Vern Grubinger - University of Vermont (UVM) Extension System Kate Duesterberg, Deb Heleba - UVM Center for Sustainable Agriculture Enid Wonnacott, Northeast Organic Farming Association of Vermont

Study Circle facilitators participated in a two day training in December 1994 and were an integral part of achieving the conference goals:

Connecticut:	Paul Stake, Roy Jeffrey, Dawn Pindell, Rich Meinert
Maine:	Tim Griffin, Vern Pierce, Barb Murphy, Russ Libby, Stephanie Gilbert, John Jemison
Massachusetts:	Stephen Herbert, Cathy Roth, Tom Akin, John Howell, Vicki Van Zee, Alex MacPhail, Ed Maltby
New Hampshire:	Bill Zweigbaum, Rick Estes, Lorraine Merrill, Jean Conklin, Mary Ellen Cannon, Judith Lonergan
Rhode Island:	Will Reynolds, Joetta Kirk, Sue Sosnowski, Alyson McCann, Mike Merner, Jeff Hall
Vermont:	Vern Grubinger, Kate Duesterberg, Ann Ingerson, Camilla Roberts, Brian Pillsbury

Keynote Speeches

Two keynote speeches were given at the conference by Fred Kirschenmann and Greg Watson. The following is a transcript of their presentations.

Frederick Kirschenmann

Frederick Kirschenmann was born and raised on the farm he now manages: Kirschenmann Family Farms, located in south central North Dakota. After earning a doctorate in philosophy from the University of Chicago in 1964, he entered academic life as a teacher and administrator and ultimately became academic dean at Curry College in Boston, Massachusetts. In 1976, Dr. Kirschenmann returned to the family farm to convert the 3,100 acre grain and livestock operation into an organic farm. It is now one of the largest certified Biodynamic farms in North America. Dr. Kirschenmann has been active in numerous sustainable and organic agriculture movements. He helped found "Farm Verified Organic," a private organic certification agency and now serves as its president. He serves on the USDA National Sustainable Agriculture Advisory Council and the Science and Education National Research Initiative Advisory Council. Dr. Kirschenmann also serves on the North Dakota Board of Higher Education Agricultural Consultation Board and is a founding member of the Northern Plains Sustainable Agriculture Society.

It is a great pleasure and honor to be invited to share this event with you. I, for reasons that I'm not going to get into, have found myself in the last ten years of my life on a speaking circuit in the winter months. I have my own rotation. I farm in the summer and speak in the winter. And so I've had occasion to experience a lot of conferences and I have gotten to a point now where I have sort of a built in radar about whether a conference is well organized or not. And it's always a pleasure to speak at those that are well organized, and you owe a strong debt of gratitude to the folks that have organized this one because from day one, from the first phone call I got, it's been very clear that a lot of energy and time and good planning has gone into this. And so, with the possible exception of the keynote, I expect you'll have a very successful conference.

Over the years as I've attended conferences and talked with people and tried to do as much reading as I can, I've quite lost track a long time ago of the number of different definitions for sustainable agriculture that we've all come up with. As I've reflected back on that in recent years, it seems to me that one of the reasons that we've had this confusion is that we've sort of started off on the wrong track. I think we started off thinking that sustainable agriculture was something that we could define very specifically in terms of a set of practices that we could all take home to our farms and institute and then we would be the good guys. We would be the sustainable farmers. I think that was the wrong approach. I think sustainable agriculture isn't the kind of reality that we can easily define or that we can easily describe. I think there are analogies in our society that we ought to think about as we think about sustainable agriculture and how we want to talk about it.

One of those analogies is health. Health is also one of those things you can't define very precisely. And it changes from place to place in the country. It changes in terms of the kind of relationship you have with your doctor or other health professionals. It changes in terms of how you see yourself and what you want out of life, out of your body, and out of the health setting in which you are located. So I think that might be a useful analogy for us to think about.

Now there are however, with respect to health and I think with respect to sustainable agriculture even though there's not a precise specific definition, some criteria or principles that we can identify and perhaps agree on. So what I'd like to do this morning is start by putting up a list. The list that I'm going to put up here is by no means inclusive or complete, but it's a sort of starting point that I'd like to suggest. These are also not original with me.

The first three were articulated by Meadows, Meadows, and Randers in their recent book Beyond the Limits,¹ and they suggest these, not specifically with respect to agriculture, but with respect to a sustainable society. And I think they apply to agriculture as well. As I have talked to people about these, I've not found anybody yet that wants to take issue with these three. Everybody has pretty much agreed, "yeah, those are three criteria that we need to take seriously if we want to have a sustainable agriculture." The three items are: 1.) That we cannot use non-renewable resources any faster than we can find substitutes. 2.) We can not use renewable resources any faster that nature can regenerate them. 3.) And, we cannot pollute any faster than natures planetary sinks can absorb, dissipate or disperse them. So, those are three criteria I think that, in terms of the agronomic piece of this, probably we can all agree. If we don't, I would like to know what disagreement anyone might have with it.

The fourth one, which I think was first articulated by George Bird who was for a number of years the director of the SARE² Program at USDA, is that we count the safeguard of intergenerational equity. What George means by that is, for example, if I use more non-renewable resources than substitutes can be found in my generation, it's going to be much more difficult for the next generation to be able to meet that same criteria. So we have to give some attention to the intergenerational equity to abide by these criteria in a generation to generation kind of setting. So the fourth principle is probably one that we may want to debate more but ultimately I think that it's one that we have to take seriously.

And then the fifth one, which I value but is not original with me, one that Wendell Berry, among others, has been stressing for a long time is that we need to maintain an adequate people to land ratio to ensure competent ecologically sound ecosystems management. Now, what I mean by that is we're going to be talking about managing a natural ecosystem. And you can't manage a natural ecosystem in quite the same way that you manage a factory.

One of the really interesting things that's happening right now in the literature of conservation biologists as they look at managing natural ecosystems in our national parks and forests, for example, is that they are coming to the same conclusion. Edward Grumbine, in a wonderful book entitled, Ghost Bears,³ articulates this principle very clearly. He says that based on the experience we've had in trying to manage our national parks and forests, we now have come to the conclusion that we cannot manage them from Washington. And the reason is very simple: we are managing local ecosystems and local ecosystems that are always changing. And secondly, they're very site-specific. And for those two reasons, you cannot manage them in the abstract. You can't manage from a front office in Washington. They can only be managed, as Ed Grumbine says, by people who have been living in that ecosystem long enough and intimately enough to know how to manage it in a sustainable way. And I would suggest the same thing is true of farms. In the long term, I think we cannot manage our farms in a sustainable way without enough people who are involved intimately and long enough to know how to manage that farm in an ecological, sustainable way.

So those are five criteria that I think at least might provide a starting place for us as we try to deal with the issue of what it means to farm sustainably.

¹ Meadows, Donella H., Dennis L. Meadows, Jorgen Randers. Beyond the Limits: Confronting Global Collapse. Envisioning a Sustainable Future. Chelsea Green Pub, Post Mills, VT. 1992.

² Sustainable Agriculture Research and Education Program.

³ Grumbine, R. Edward. Ghost Bears : Exploring the Biodiversity Crisis. Island Press, Washington, D.C. 1992.

Now, if we do that, what kind of choices do we have? Well, I think there are emerging essentially two schools of thought today as to how we're going to do that. The one school of thought suggests that what we need to do is fix the present system, but that, basically, the present system of agriculture is best in the world. It's really good, it's efficient, it's producing what we want to produce. However, there are a few things that we've overlooked and we know we've got to make some changes. And most of those changes that I think people are suggesting finally boil down to four.

We need to reduce our pesticide use so we suggest integrated pest management. We're suggesting other kinds of pesticides which are going to reduce the impact on the environment. So that's one of the things that this school of thought is saying we have to accomplish.

The second is we have to be much more precise in our nutrient placement. And so we now have the farming-by-the-foot movement with satellites hooked up to computers on our planters, on our applicators to place nutrients much more specifically and much more precisely in terms of what's actually needed in the soil on a foot-by-foot basis.

The third is what Tom Urban of Pioneer Seed Company refers to as the final stages of the industrialization of agriculture. And what he means by that essentially is we need to complete the top-down vertical integration of agriculture, vertically integrated agriculture, all the way from the farm to the table so that the efficiencies of industrialization will be introduced throughout the whole agricultural system, and to utilize what is now being referred to as the fourth revolution in agriculture, to utilize the new wave of technology which is being made available through genetic engineering. Not only can we further expand the productivity of agriculture, but also utilize the biological control systems which are available to us and the genetic engineering technology to open up a whole new range of possibilities for controlling the vagaries of nature which are plaguing farmers, and to do that in a more efficient way.

You've all heard the scenarios for how we're going to do that. A couple of weeks ago, I met with a couple of representatives from Monsanto in North Dakota who wanted to talk to the Commissioner of Agriculture about introducing seed potatoes next spring that will have *BT* genetically engineered into them to control the Colorado potato beetle. And all of this in the interest of more sustainable agriculture. It is designed specifically to control the Colorado potato beetle and not control other insects, so it will create an environment for other insects to thrive. All of these things were part of the Monsanto presentation. This is part of the new sustainable agriculture movement.

And then of course, the fourth and final, Global Free Trade so that agriculture production and consumption can flow freely throughout the planet without any inhibitions. This is one model of sustainable agriculture that's being proposed in our society today. Fix the present system.

The second approach, the second school of thought, says, "no, there really are some fundamental flaws in the present agriculture model," what I would call the "industrial agriculture model." And what we really need to do is to rethink the whole system. What we are talking about here is a conceptual revolution. Paul Thagard, who published a book called Conceptual Revolutions,⁴ refers to this kind of change in our society as an alternative edifice versus simply modifying the parts. So what we're not talking about here, when we are talking about a conceptual revolution, we are really not talking about simply changing/fixing the system. We are not talking about changing a few parts. We are really talking about rethinking the whole edifice of how agriculture is put together, how we do agriculture. What we are talking about for this school of thought is something in the order of a Darwinian or Copernican revolution. We are really talking about a different way of thinking about agriculture, a different way of doing agriculture, a different way of seeing nature in relationship to agriculture. And increasingly, I think that those of us in this school of thought are talking about an ecological model of agriculture versus an industrial one. This is really a different way to farm. And

⁴ Thagard, Paul. Conceptual Revolutions. Princeton University Press, Princeton, N.J. 1992.

I want to declare my bias at this point. I am in the second school of thought. As a farmer who has tried to wrestle with these issues, as one who's tried to study the issues and talk to as many people as I can, it seems to me that trying to correct the present system ultimately will not lead us to meeting the five criteria that I mentioned at the start of my talk.

So, what I want to do with the rest of our time here this morning is to try to distinguish these two different ways of looking at agriculture. We are talking about two different paradigms here. And so I've tried a little to pick through what some of the differences are and as I tried to think this through, it occurred to me that we are, in many ways, talking about almost diametrically opposed approaches to agriculture. So let's look at this for a bit.

First of all, the ideology, the way of thinking that drives these two different models of agriculture, are quite different. The industrial model of ideology is clearly production. It is a productionist ideology--to produce as much food as cheaply as possible, period--that is the goal of industrial agriculture. It's the social mandate which has driven agriculture for certainly the last fifty years, one might argue for at least the last eighty or hundred years.

In the ecological model of agriculture, we are talking about an ecological ideology. We are not just interested in producing as much food at an affordable price as possible, but doing so in a way that protects the environment, preserves the resource base, and treats animals properly. There is a whole list of connections. In other words, it is not enough just to produce a lot but to figure out whether or not, in meeting the goals of production, we are also meeting these other inextricably connected factors and contingencies. Every time we produce a bushel of corn we also affect a whole lot of other things. In the ecological model we are saying, "the way we affect all those other things that are connected are equally important to what we produce." And so it's a different way of thinking about agriculture. There's also a different kind of food ethic which underlies these two paradigms of agriculture.

In the industrial model, food really is pretty much a commodity. It is foodstuff, and you treat it as a commodity like you would any other commodity. The primary concern in the industrial model is, "can you make money on it, will stockholders be happy, can you do this in a way that can best utilize the infrastructures that are available to move the food from one place to another, can you move the food from its point of production to its point of consumption in an efficient and convenient way." It is very much a commodity kind of approach to food.

These are issues the ecological model people are interested in as well, but they are interested in more. I hear people who are involved in this new food agriculture system talking a whole lot more about nutrition and about the pleasure of good eating; about where the food comes from and how it was handled along the way. People are more invested. In other words, in the ecological model, it seems to me that the people who are committed to this kind of agriculture are saying, "Food is one of the most intimate acts that we perform. It is what we take into our bodies and we want to know more than just the commodity end of it, such as how much it cost at the supermarket." There is much more involved here and I think this is one of the reasons we are seeing an explosion of interest, although still very small, but never-the-less an explosion of interest. What some people have called the "quiet revolution" in subscription agriculture, in farmers' markets and local food economies is this food ethic that's been a driving force.

The models for these two kinds of agriculture seem to me to be quite different. In the industrial paradigm, the model is really the factory model. It's an input/output model--what kind of inputs do I need in order to achieve the outputs I want to achieve? Very little attention is paid to what happens inside the farm. It is what you bring in and what you push out. And so the emphasis obviously is on the off-farm inputs.

In the ecological model, it seems to me, the farm is viewed more as an organism. It is viewed more in terms of the natural cycling systems which are farms. Clearly, there are also some influences which come into the farms trying to farm ecologically. I buy diesel fuel for my farm. I buy equipment. But the amount of

inputs which I use are pretty dramatically reduced, because I pay a whole lot more attention to what happens inside the farm. Where are the nutrients that I need in a specific place at a specific time? How can I cycle it from where they are to where I need them? How can I keep moving them around? I spend a whole lot more time and energy and thought on the inside of the system. I, for example, don't do soil tests anymore because I don't really need them. From managing my farm, I know where the nutrients are, and what I need to do to get them from where they are to where I need them. And once I've done that, I know that the fertility is going to be there. So, more emphasis is placed on nutrient recycling, on interrupting natural cycles, on predator/prey relationships. These are all the kinds of strategies that evolve out of this model of doing agriculture.

And then, the operating principle is different. The operating principle for industrial agriculture is controlling nature. The emphasis is on conquest. How do we conquer, how do we control what we're trying to accomplish? How do we control the pests? How do we control the weeds? How do we control the nutrient system?

In the ecological model, the emphasis is more on harmony with nature. How do you fit agriculture into nature? And so the difference is one between conquest and adaptation. Now, I think that this is one of the reasons that I've decided to throw my weight behind the second, the ecological model. Because this is where it really begins to become interesting economically, when you're involved in this system.

Earlier today, Fred Magdoff talked about treadmills. I think farmers are actually on three treadmills. There is the technology treadmill that Willard Cochrane identified some twenty or thirty years ago, where you buy new technology and then the new technology gives you an advantage for a while. Pretty soon, you produce more with the new technology so the price goes down and you're back where you started. And then you've got to buy new things. That's the technology treadmill.

There is also an ecological treadmill in this system and anybody who knows anything about resistance knows about that ecological treadmill. You find a technology which you use to control nature. Nature adapts, as it always will in the evolutionary process, and then you've got to find a new technology and you keep going on that treadmill.

The third one is the economic treadmill, which Stewart Smith has articulated so well, so I'm not going to go into that. I am assuming here that you've read Stewart Smith. If you haven't, you should. Basically, the economic treadmill is that as long as we keep cutting a smaller and smaller piece of the pie in the farm sector, we're spending more and more in the input sector and giving more and more away to the market sector. So we've raised more and more wheat, retaining less and less of the income. That's the third treadmill. So the operating principles are dramatically different.

The tools we choose as our primary tools are different in these two paradigms. In the industrial model, we primarily rely on hard technologies which are, for the most part, based on non-renewable resources. In the ecological model, our first tools of choice are the soft technologies which are based primarily on renewable materials.

The way in which we define efficiencies is different. In the industrial model, the efficiencies are defined primarily as labor efficiency. You have all heard the USDA justification for this being the most efficient agriculture in the world. Back in the 1930's, farmers used to feed themselves and three other people. Today, farmers are feeding themselves and 174 (I don't know what the current figure is). Labor efficiency is the sole measurement, the sole criteria for the efficiency of modern agriculture. And those efficiencies have been achieved primarily through specialization--growing one crop and becoming really good at it and raising as much of it as you possibly can--through uniformity, through standardizing your

operations so that you can grow on a large scale, through maximizing production, and, of course, through the economies of scale. That is the way to achieve labor efficiency.

In the ecological model, we are beginning to say, "wait a minute, labor efficiency is fine, but there's other efficiency that we have to pay attention to as well." We're going to look at the other things that are connected to the system. And that is land efficiency and energy efficiency. We tend to look at achieving those efficiencies in, again, an almost diametrically opposed way. We try to achieve it through diversity; through symbiosis; through finding ways to put things together that are mutually beneficial for which you need diversity in order to accomplish; and by optimizing production--for it is not enough to simply produce 200 bushels of corn in 1993 and have a good year-end bottom line if you look at the overall reduction of a whole range of nutrients over at least a decade long period--of the whole system. So it is a different way of looking at the activity.

And then finally, economies of scope are at least as important as economies of scale. How do you take the wastes of one system to feed another system? Turn around and take the waste from that system to feed the first system? Farmers in this category are saying that these are at least as important, if not more important, than economies of scale. And I will testify to that on our part. We are now feeding our livestock almost exclusively on the wastes from our cropping system and about fifty percent of our cropping system is fed from the nutrients from the waste from the livestock system. I'll tell you, you really start seeing some economies when you start adding those kinds of economies of scope.

The nature of success I think is also somewhat different when you see this system. In the industrial paradigm, the major success is, of course, in labor efficiency--on the quantity of production, producing the most bushels of corn in the county. That is the goal. And the portion of earned income that we spend on our food. We have all heard the fact that, in the United States, citizens spend less of their earned income on food than any other nation in the world. Now I think it's around or less than ten percent. And that is a measure of success.

In the ecological model, we are saying we need to look more at total efficiency--labor efficiency is not enough. In the Northwest Area Foundation Study, which will be released from Iowa State University Press in a matter of days or weeks, in part of the North Dakota piece of that study, we compared organic farms, no-till farms, and conventional farms to undisturbed prairie sites. When we looked at total energy flows, the organic farms were more efficient by a considerable extent. When you look at those same three farms purely from the point of view of quality of production, they were pretty much equal. When you look at them from a point of view of labor efficiency, it was the conventional farms that were more efficient. So when you start talking about efficiency, it depends on how you define efficiency. What kinds of questions are we asking? And I think again, in terms of long-term sustainability, that we have to look at the total efficiency equation. If you want a concrete example of how that works out specifically on the farm, the Carrington Research and Extension Center in North Dakota has now, I think, about eight years of study and research on the use of legumes and farming systems for dealing with their cover crops and for soil conservation, etc. Since they've started that program, they have had on average fifty phone calls a year about the program from farmers. In the spring, when the cost of fertilizer shot up, they are now getting fifty phone calls a week. So all you have to do was to change the equation of the cost of energy that was required for the system they were using. So, you can't look at efficiency purely in terms of labor efficiency; you've got to look at it in terms of the whole system in order to be sustainable.

This is the third and final set of the distinctions. I think the market focus is also different. The market focus and the conventional trend in the industrial paradigm is pretty much the global market. We are being told, and have been now for at least five or six years, we've got to get ready for the global market. This is the new market that we've got to be prepared to function and survive in. More and more, the notion is that food products are going to be traded throughout the planet and everybody is going to have to be a part of this global trade community.

Well, as I listen to people who are connected to the ecological model, I am hearing a different kind of scenario. I'm hearing people talk about regional food systems and the importance of regional food systems, and the efficiency of regional food systems. The terminology which is coming out of this now is "community

food security.” And a number of nutritionists now are talking about the concept of food sheds, the way we have water sheds. It is a defined regional community. They are asking a very simple and, I think, profound question. And that is, “What would agriculture look like if our first order of priority was to produce all of the nutrient requirements that are in the USDA food pyramid--to produce all of those nutrients from within the food shed for the people that live in the shed? How does that change agriculture?” And only then trade out the surplus and bring in the things that the community indicates that they want to bring in.

Now, when I talked to them about this concept they said, “No, we can’t raise oranges in North Dakota.” True, but we can raise Vitamin C in North Dakota. Maybe oranges aren’t a vital part of the USDA food pyramid. If we really start looking seriously at what we can produce in North Dakota, maybe the food shed in the Great Plains shouldn’t be North Dakota. Maybe it should be North and South Dakota and Minnesota. Those are things we begin to think about creatively. But if you start thinking about long-term sustainability, the local food shed concept becomes, I think, much more attractive--especially as our energy costs go up (as they almost certainly will) because, unless somebody comes up with a silver bullet that no one has thought about yet, we continue to transport our food on an average of 1300 miles in the United States as it is today from production to point of consumption. And as people in the food ethic who are more concerned about where the food comes from and whether or not they have some say in that, I think this concept begins to become more and more attractive. And again, I think the reason we’re seeing an expansion of subscription agriculture and farmers markets and those kinds of direct marketing arrangements people are creating in their communities, this is no longer an idea of a few that don’t know what they’re talking about. This is beginning to become a serious concept that, as I say, some people are referring to as the quiet revolution.

The research focus also is different. A man by the name of Juan Escuarda of the Food and Agriculture Organization in the United Nations has suggested that what we need to do if we want agriculture to be sustainable, is to shift the focus of our research from what he calls, “vertical crop improvement” to “horizontal crop improvement.” What he means by that is, in our industrial agriculture paradigms, we have looked at the focus of research in terms of eliminating defects and introducing desired traits in single organisms. For example, now you take your corn plant and you figure out what’s wrong with it and what prevents it from producing as much as possible. You try to breed that trait out and you try to breed other traits in that will make it produce as much as possible. That’s the vertical crop improvement model. And that is the model we’ve been on, at least since the beginning of the green revolution.

Escuarda is saying that essentially that model has failed and again, the reason for it is because of the ecological treadmill. The forces of evolution are always going to work to adapt to the changes that we make in an organism in order for it to fit in and adapt to the larger surroundings of the connection of organism that it is part of.

In the horizontal crop improvement system approach, we need, says Escuarda, to diversify the genetic mosaics of the plant. In other words, do not make them a narrower gene pool but in fact a more complex gene pool and include all organisms in the growing system that will again be neutral and beneficial to another one, to one another.

So, what we have done in this approach is that the research has been primarily reductionist, has been focused on mono-culture or mono-cropping. It has been focused on specialization that’s been done primarily in the laboratories. If we are going to move to a research focus that’s going to serve the ecological model, I suggest we’re going to need to go to whole systems research, because if we are going

to look at more diverse genetic mosaics and more complex arrangement of growing things, we’ve got to look at the whole system and how they interact with one another.

We are going to need to look at managed diversity, managed by the diversity rather than mono-culture. How do we manage these diverse systems? What kind of crop rotation will work in North Dakota on a farm where the rainfall is about 17 inches a year and the growing seasons is roughly from the 15th of May until the

15th of September? How do you manage the biodiversity in that system? The research, I think, will be increasingly participatory. A person talked already this morning about farmers being involved. I think the kind of research we are going to have to look at if we really want to be good ecological farmers is research that is going to be interdisciplinary. It can't be the agronomists doing the work by themselves or even the agronomists and the entomologists. It has got to be sociologists. It's got to be economists. Maybe even some artists. And certainly farmers have to be at the research table as full participants because farmers are ultimately the professionals that are going to make these systems work at the local level.

We have had within extension, a terminology that's been a little sacrosanct and that's the terminology of "technology transfer." I think that language has got to go when you start talking about these systems. And we need to replace it with something like "information exchange." Everybody in this kind of research is going to have a vital piece of the information that everybody else in the research community is going to have to be privy to. And so in some ways, this notion of ideas being generated in a university and carried to the farmers by extension is simply not going to work. It has got to be all of us working together in a research community. And that is going to be a real challenge, because we can develop new research methodologies that are sound and are going to give us reliable information. We don't know how to do that very well yet, but some models are starting to emerge. John Ikerd has been writing about this, and we will figure this out. It's not going to be perfect right off, but I think that's the kind of thing we need to think about.

Finally, I think that the accounting is different in these two systems. The accounting in the industrial model is primarily short-term accounting. What does it cost me to raise that 200 bushel an acre corn? And what's the bottom line going to look like at the end of the growing season? That's the accounting system. All of your other costs are externalized.

In the ecological system we are saying, "no, that doesn't work because if I use a pesticide to control the corn borer in 1993 and that created some resistant strains of the corn borer and killed other beneficial insects, that is part of the cost." And ultimately that's going to screw up the groundwater--that is part of the cost. And, ultimately, it's going to create health care problems--that is part of the cost. And finally, even if it drives rural people out of the rural community into over populated cities, which increases crime and all these other things--that is part of the cost. So we have to look at those costs if we really want long-term sustainable agriculture.

Greg Watson

Greg Watson brought to the conference his experience in the arenas of agriculture and the environment. Mr. Watson served as the Commissioner of the Massachusetts Department of Food and Agriculture from 1990 to 1993, where he worked on a number of initiatives to further sustainable agriculture in the state, including a set of groundwater protection regulations that encouraged farmers to adopt IPM strategies and a dairy pricing order designed to keep dairy farmers on the land by providing them with a fair price for their milk. In 1993, Mr. Watson was appointed the Director of The Nature Conservancy's Eastern Regional Office, where he worked to preserve plants, animals and natural communities by protecting the land and waters. Mr. Watson recently resigned this post to consult on issues of sustainable economic development for the Conservancy and other organizations. Mr. Watson also serves on the Board of Directors for the Henry A. Wallace Institute for Alternative Agriculture.

It really is a pleasure to be here with you this evening. Some of you are probably tired of seeing my face up here. I think we're going to try to find a replacement, pretty soon, before you start lip synching, and as I start to go to some of my remarks, I promise I'll try to throw in a few curve balls so that doesn't happen tonight.

I do want to talk a lot about the need to continue to bridge the gap between the environmental community and the farming community as we pursue, I think jointly--I really want to make this point very clear--this goal of sustainable agriculture. I think that more and more, at least in my experience, we have some real potentially powerful allies within the environmental community. I know there are still many out there, in this audience and certainly in the larger farming community, who view the environmental community with some degree of suspect. I want to sort of see if I can't couch some of my remarks in ways that really try to describe why I feel that many within the environmental community are rapidly coming to the conclusion that sustainable agriculture is very critical to their agenda, as well as ours.

I thought I'd start tonight with a quote. I don't normally do this, but I promised to be very interesting. The quote goes as follows. "The earth is the mother of us all--plants, animals and men. The phosphorus and calcium of the earth build our skeletons and nervous systems. Everything else our bodies need except air and sun comes from the earth. Nature treats the earth kindly. Man treats her harshly. He over-plows the crop land, over-grazes the pasture land and over-cuts the timber land. He destroys millions of acres completely. He pours fertility, year after year, into the cities which, in turn, pour what they do not use down into the sewers and into the rivers and the oceans. The social lesson of soil waste is that no man has the right to destroy soil even if he does own it in fee simple. The soil requires a duty of man, which we have been slow to recognize."

I often read that and sometimes I ask people, "Where do you think that quote comes from?" And in many cases their responses have been, "it must have been from the Sierra Club, the Audubon Society, or maybe even my organization, The Nature Conservancy." But in reality, that is a quote from Henry A. Wallace, Secretary of the United States Department of Agriculture in The 1938 Yearbook of Agriculture. And Wallace goes on to say that these conditions would be deplorable in an uncivilized world but certainly could not be justified in the United States in the year 1938. I think we would agree with that statement and also agree that certainly it's not acceptable in the United States in the year 1995. I think we have come a long way. It's amazing to me that that was the sentiment, or at least those were the words that introduced The 1938 Yearbook of Agriculture. And also, as you can understand some of the contents, for a lot of the farm policies that exist in the country today are a result of the government's attempt to address two things: certainly some of the environmental concerns that were expressed by Mr. Wallace in that introduction, but also a declining farm economy throughout the Great Depression.

I want to build a little bit on Fred's remarks earlier today when someone makes a comment about the probability of the industrial model of agriculture or the ecological model of agriculture prevailing. What are the conditions or what are the circumstances that might give us a clue as to which one will prevail? One of the issues that Fred did touch on was farm policy. I think a lot of that policy was certainly triggered by one of the acts in effect during the Great Depression as part of the New Deal, and, right now, many of them are being rethought. I am not going to belabor this, but I hope that those of us in New England and the Northeast who maybe heretofore have felt that a lot of the issues surrounding the Farm Bill may not be relevant to our concerns here in the Northeast take another look at that. And take a look at what is going on with organizations like the Campaign for Sustainable Agriculture, which is doing a lot to build new coalitions. Those coalitions include environmentalists, they include certainly farmers, and they include consumers. To me, that tripartite--that three legged stool of environmental community, farming community and consumers, which includes us all--is going to be critical, I think, to the success of what we're calling the "sustainable agriculture movement."

Now Fred was a lot braver than I was because he actually sat down and came up with a criteria that came close to defining what sustainable agriculture means in some concrete terms. I've always avoided that, primarily because I really don't know. For me, sustainable agriculture has been as much of a process as a viable cause. I'm not sure we ever will actually achieve sustainability--sustainable agriculture. But I think we certainly will continue to move towards it, perhaps never achieving it because the conditions that exist will continue to change and we may have to continue to change our strategies as to what we mean by sustainability.

But I want to look at it from two different perspectives. One is policy. The other is tools. Tools and practices. I spent a number of years in a place called The New Alchemy Institute on Cape Cod. I was attracted to New Alchemy in the early 1970's because I was interested in the environment. People often asked me why and how I got interested in the environment and my quick answer to that is, "because I grew up in Cleveland, Ohio." And the only natural bodies of water that I had any familiarity with were Lake Erie and the Cuyahoga River. Lake Erie had eutrophied to the point where it was declared the first of the dead Great Lakes when I was growing up there. And the Cuyahoga, many of you probably remember was made famous by Randy Newman in his song, "Burn on Big River." And the Cuyahoga really did occasionally catch on fire because of all the flammable pollutants that were going into it or deposited there, and someone's cigarette from a passing barge would be thrown overboard and the surface of the waters would actually catch on fire. Cleveland has been the brunt of many jokes, but that was one of the toughest ones to live down. I often say that was what really got me interested and involved in the environment. In the early to mid 70's, I was attracted to the New Alchemy primarily because it was one of the first organizations that not only was pointing to what they considered to be problems and pointing to what was going on and was wrong with the world, but it was one of the first that said, "we're going to try to develop some tools and technologies that address those."

The concern of the New Alchemy Institute the researchers and the staff were saying, "we do not necessarily think that technology is a culprit, so the options of the technologies are made available to us." In their opinion, society was not presented with a full menu of options available for wise and environmentally sound ways of producing food, energy and shelter. And so they set out to show that it could be done. They took one of the extremes. Fred made a very good point--sustainable agriculture is not synonymous with organic necessarily but organic obviously, I think, is really one of those important subsets of sustainable agriculture. And the New Alchemists decided that they would pursue the feasibility. We need to know that these things are possible. Even before we get into all the economics which are really vitally important--probably one of the aspects of sustainability that we haven't addressed at all and need to put more emphasis on--in the beginning, we need to know that these things can be done. We need to know that it is possible to reduce our use of chemical inputs dramatically and still maintain the yields. We need to know, in many cases, that we can cut our dependence on fossil fuels and that agriculture in New England and the Northeast really can be made viable despite some real disadvantages.

We discussed this in one of our groups this morning. Someone wise once said that, "if this country was settled from the west coast to the east instead of the way it was, all of New England probably would have been one state." Someone else jumped up and said, "Hell, it wouldn't have been a state, it would have been turned into a National Park!" No one in their right mind that had time to think about it would have turned these six states into states. We don't have the natural resources. We don't have the climate that makes it possible. Think about it. It would make a beautiful National Park. Vermont's Green Mountains down to Cape Cod. It would be a great place to visit, but who would want to live here. But we do because we were settled the other way and we have to deal with those vagaries that, once again, Fred mentioned, of climate and poor soil, or not the best possible soil. And that the technologies that have been developed, and the tools and the practices, our first step--really important step--is, can we develop the tools and practices that show that this is feasible? We haven't done everything that we need to do. And as a matter of fact, I think many of those tools and practices are still being developed.

By the tools, I mean concepts like the organic garden, the raised beds, the composting techniques, the greenhouses, the passive and active solar greenhouses--some of the things that were developed at New Alchemy, which are very important. Many of those have been adopted, expanded upon and are being developed by what I consider to be the new breed of food producing entrepreneurs in New England, particularly in Massachusetts. People who are now raising hydroponic produce, lettuce and others, who are now integrating aquaculture and agriculture in greenhouses, and demonstrating that it is possible and economically feasible to produce fish inside of greenhouses in the Northeast and that's going to be a very important niche. Aquaculture is a part of agriculture, this fish farming. And given what's happening, obviously if you look at this region in this part of the country, if we are going to continue to consume fish as I hope we all will because it's a good source of protein, we probably are not going to be harvesting it much longer. We aren't harvesting very much of it right now, but clearly fish are going to be farmed. And they aren't all necessarily going to be farmed and kept as farms in the Southeast. They are going to be farmed here in the Northeast in places like Aqua-Future where you've got striped bass and talapia being raised inside facilities that look like traditional warehouses. But those are tools. Those are very important tools. And I think that we've come very far with the development of those tools. I think Fred was right on the mark this morning when he said that, "We've now got to go one step further." This is the challenge where, I think, (and we'll get to the environmental part in just a second) we need to make systemic changes.

The system doesn't work; it is not serving us the way that it could. We really need to be honest and courageous enough to take a look at that system and say, "We really need to make some fundamental changes in the way we grow food in this country." And we need to go beyond looking at it just from the perspective of isolated categories of production and marketing and realize that it is a food system. This is a systems approach. And this is what New Alchemy grew out of--a philosophy that says, "You know, there is a different way to look at the world. There's a different way to solve problems." It goes beyond--I don't want to offend any of the scientists in the room--the reductionist linear approach to solving problems and takes a broader view. Look at it systemically. Understand that the way things happen in this world, the cause and effect, is not necessarily linear. It is not like A, B, C, D, linear. It is more circular. It will get more complex, but as Einstein said, "Nature is subtle, but not malicious." So there's a subtlety there. There's a beauty there. There's a harmony that we need to understand if we are really going to solve these problems and do it in a meaningful way.

That's one of the things that the New Alchemy Institute, the Rodale Institute (I know we have some folks from Rodale here) began to do. Let's take a look at this systemically. We can do the same thing policy-wise. Again, as John and others pointed out, as we began to look at this systemically, we realize that, if we do this right, the by-products of some of our agriculture systems can become the raw inputs of others. That is the beauty of what was developed in places like New Alchemy. So you walk into a passive solar greenhouse. On one level, you'd see tanks of fish, talapia or striped bass, being produced. And in those tanks, you'd have what previously, from a linear reductionist point of view, would have been fish waste. But now, all of a sudden, you say, "wait a minute, let's come up with another system to attach to this." Let's come up with a symbiotic system that we can now link with this fish tank. And that symbiotic system is now a system of

hydroponic, in this case, let's say basil. You've got this basil now on the second tier and, with a slow couple of horsepower pumps, you'd slowly pump the water from the first tank through the root systems of the basil--not supported by soil, just being supported just by vermiculite or some other substrate. Now only fish waste flows through that substrate. The plants pick it up and use it as food. So what we have now in the systems point of view, we no longer have fish waste or waste water, we have nutrient rich water. It is now a resource. It is now feeding the plant. And as the plants feed upon the nutrient rich water, they serve another function. Every system of plants and organisms in nature never do just one thing. They perform multiple tasks. So as these plants take up the fish nutrients as use them, not as waste, use the nutrients as water and grow, provide us with food, they perform another function. They purify the water. They are living purifiers. The water can trickle back into the tank. You've got pretty much a semi-closed system, which is what you've got in vital Bioshelters, Inc., in Sunderland, Massachusetts, that John Reed has developed. It is a beautiful system. It's an elegant system. It is a system, by-and-large, that we said, "All we really did was make an assumption." And that assumption is, "the earth works."

The planet works. When the astronauts, I'm not going to drift too far here, I'm going to come back down to earth in just a second. But it is important to understand from our perspective, because I think we are dealing with natural resources. When the Apollo astronauts made their way to the moon and they were fixated on the moon and taking a bunch of pictures out there, it took a while for the NASA engineers to alert them and say, "Folks, do something here we've never done before. Turn the camera around. Take a look at the earth." We had never seen the earth from that perspective. We'd never seen this sphere as a whole, floating out there in space. And this was a beautiful system that, for billions of years, has basically only had solar energy coming in as energy input and everything else has been recycled. So there is a model out there for understanding how we can begin to do this.

So we developed those tools. And now we're starting to implement those tools. We are starting to think that some of these really can work. We're looking at the issues now. Are all of them or some of them economically viable? Many of them, or some of them, are proving not to be because, unfortunately, we now have a context. The context is not appropriate for a lot of what we're trying to do with sustainable agriculture. By context I mean the policy context. We've got a system. Every five years, you've got this thing called the Farm Bill that comes up, that basically sets the agenda for how we farm in this country. And whether we want to acknowledge it or not, or whether we want to confront it or not, or whether we want to deal with it or not, the reality is that this Farm Bill does include a bunch of incentives--that I call perverse incentives--that encourage farming practices that are about as unsustainable as you can imagine. If you drafted something that said, "We want to ensure that sustainability will not take root in this country," well take a look at that Farm Policy and you'll understand why, in many cases farmers are forced into it. Maybe not so much farmers in the Northeast, but certainly farmers throughout the Midwest and the Great Plains and throughout the West are forced into farming practices that are about as unsustainable as you can get.

And right now that Farm Bill is being reassessed. It is being reassessed and reevaluated by folks like the Campaign for Sustainable Agriculture, but also the new leadership. As we get into the deficit spending and budget cuts, we're beginning to look at, can we really justify the subsidies that exist within the Farm Bill? I'd like to say that I think that this provides us with an opportunity, not so much to do away with all of these programs, but to restructure them; to redesign them; to redesign them in ways that actually support sustainability. The concepts that we've already seen, like the Conservation Reserve Program, those programs, I think, are the sort of examples of what we might be able to do. Green Support Payments--another area, again. Can we and should we (these are areas that need to be debated) provide incentives for farmers to adopt environmentally sound practices? Could we take some of that CRP money, that Conservation Reserve money (maybe is not appropriate here in Massachusetts and New England because generally we don't have the serious erosion problems they have in other parts of the country) and use that to support more Farm Land Protection Programs. Those are opportunities that exist. We're not going to find that in 1995. But I do think that we need to really examine that piece of legislation that is the context that provides the policy and political context for so much of what we do, that in many cases throws up obstacles,

in many cases it's visible, that we're not aware of it. So we need to kind of keep that in mind as we pursue our goal and our strategy for sustainability.

And finally, when I was in my Massachusetts caucus today, I asked if they would give me some advice about what to say tonight. They told me to keep it brief so I'm going to keep that in mind. But I do want to touch on this notion and this really important part of sustainability, especially as we talk about changing the context and look in the future, about the environmental community. And again, I've gone state after state and region after region (as have many folks here I'm sure in this audience) to conferences and to the workshops, and the theme is similar--whether it is in West Virginia, whether it's in New Jersey, whether it's in Pennsylvania, whether it's in Massachusetts, whether it's in California. All of the themes begin with trying to bridge the gap, the chasm between the environmental community and the farming community. For a while, when I was in New Alchemy, I always hated to have to say "farming community" and "environmental community" as if they were two distinct communities. Because, in my view, farmers were to me the original stewards. Somehow, we've lost sight of that and somehow we got this division, this bifurcation, where now we have got the environmentalists and we've got the farmers, each of us distrust the other vehemently. Well, maybe not vehemently, but they certainly distrust each other. In some cases, it does escalate to vehemence. So you begin to wonder why and how that happened. We do know how it happened, because in many cases farmers equate environmentalists with regulations and only regulations. So they're going to regulate us out of the business. And, in many cases, environmentalists regard farmers as people who plunder the earth and who would do anything to make a buck. And it's not just farmers, it's harvesters of all kinds. The environmentalists find themselves pitted now not only against farmers, but against fishermen and against loggers as well. There is just real tension that really at some point is going to have to get resolved. I'm sort of confident (and I'm an optimist at heart) that there are some things that have been happening to me that suggest that that kind of alliance and that kind of collaboration is going to be forced upon both communities very soon.

I spent some years at the Nature Conservancy, one of the largest conservation organizations in the country. The Nature Conservancy's goal is to protect endangered species--protect biodiversity throughout the country. And its strategy for doing that, for many years, as one of the most successful conservation organizations in the country, has been very straightforward. That's been part of its appeal. What it does is this: when we see a species as endangered, on the endangered list, we look and try to see if we can't protect its habitat. The best way they said, the most effective way clearly to protect habitat, when possible, is to buy it--to buy it and then to protect it. And to protect it normally meant, we're going to leave this land undisturbed. We'll put a fence around it, or we'll put "No Trespassing" signs as a way managing it, but we're going to let nature do its thing. And, over a number of years, the Conservancy, with an annual budget of somewhere around \$250 million dollars has, since 1951, preserved some seven and a half million acres of land in its effort to protect biodiversity. As I said, it has been extremely successful in raising money and buying land. As a matter of fact, the slogan internally was, "the Nature Conservancy was about bucks and acres." You see some acres that you need to protect, you raise the money and you buy it.

Recently, the Nature Conservancy said, "we're still doing well in raising bucks and purchasing acres," but the question has become, "how are we doing at protecting biodiversity?" And there the answer is not so promising, it's not so optimistic. There are articles in the recent New York Times that show that ecosystems throughout the country are in serious decline. Virtually every major ecosystem in this country is in decline. They are in some state of decline and species--some have been able to be restored but there are still many of those species on the endangered species list. And the question is, "Why is that so? What's going on?" The Conservancy realized recently, and they base most of their work on science, as they talked to the conservation biologists, that the strategy of protecting individual habitat probably is not working. But what that has done is force the Conservancy to another level of biodiversity protection. And that is to look at protecting entire ecosystems--water systems, large landscapes. As we begin to realize it is probably the only way that the Conservancy is going to be able to meet its goal of protecting biodiversity, we realize that we can't buy it all. You can't buy every stitch of land in the ecosystem. And what that suggests and what that means now is we have got to work with private land owners. Again, the Conservancy, present in all fifty states, is highly

reputable. As they looked across all of their projects, everywhere they looked, they saw the dominant activity on every stitch of land in every state that they worked on, was farms. And, in most cases, it's the initial reaction, the initial evaluation that they've looked at the project and they've looked at the impact the farms were having on their efforts to protect biodiversity, is that farms constituted a threat. And perhaps in many cases, a major threat to them meeting their goals of protecting biodiversity.

The first reaction was, "this is terrible," but as the dirt settled and people began to sit down and figure out, "how are we going to address this situation, how are going to address what could be a very serious situation?" Well, then the answer became fairly clear. The Conservancy recognizes that this is really important and they cannot hope to achieve its goal of protecting biodiversity throughout this country unless it can become successful in encouraging farmers to adopt sustainable agricultural strategies. You can't ignore the fact that farm activities that are happening upstream have as much of an impact and are as critical to the goals of protecting biodiversity as that plot of land that we own that we could manage ourselves. And along with this is a recognition that even this notion that the land is something that, in order to protect it, in order to preserve nature or species, or even ecosystems, the idea is "hands off." That you've got to be passive. As a matter of fact, what the Nature Conservancy has discovered is just the opposite. "Disturbances"--the things that we sort of think are bad--are critical to the management strategies of protecting biodiversity.

We are going out now and setting fires--it's called "prescribed burning"--because we have recognized that fires, forest fires, are natural phenomenon. And without forest fires, you cannot hope to restore or maintain the ecological integrity of land. We've also discovered as one of our recent Board members of the Conservancy, Norman Swartzkopf, oversaw the release of the great bison back in the plains of Oklahoma not too long ago. And people said, "why are we doing that?" The reason was clearly that from an ecological point of view, hooved animals played a very critical role in maintaining ecological integrity. And the response of a couple of cattle rangers who came to the Conservancy at that time was, "Does that mean then that you may be able to work with us and help us understand how we can use our cattle to perform a similar function of the bison in terms of restoring and playing an important role in protecting biodiversity? And if so, can you help us come up with a strategy whereby we can manage our cattle in ways that are compatible with what you're trying to do to protect biodiversity?" And the answer is, "Probably, yes."

The answer to some of those strategies are the same kind of strategies that are being discussed right here with regard to rotational grazing, holistic resource management that probably is going to be the key to coming up with ways of finding that the environmental conservation movement and the sustainable agriculture movement (by that I mean agriculture in general including the sustainable movement) are on a collision course. A happy collision course, and it has got to happen. And so I'm hoping the purpose of this little plea to you today is to say that there is an inevitability of this conversion, and there is all the more reason why as we pursue our goal and our strategy for sustainable agriculture, to remain open to the environmental community. And again, I know that I say that on one hand, and on the other hand I know that you're going to go tomorrow and read another report of Dennis Avery, who says that sustainable agriculture or organic agriculture is the greatest threat to biodiversity in this country, which was a report that was issued by the Hudson Institute. There were other reports that came out in the environmental organizations that for the most part were fairly critical of agriculture. But they've got to be brought on board and they've got to be educated to look at what the sustainable agriculture movement is all about. And part of that process is beginning to happen with the Conservancy with a major survey that is going out to assess the impact of agriculture on their land. So that's why I come to you and am a bit optimistic about the future, particularly optimistic about this ability and I think the inevitability of the merging of the environmental community and the farming community. Optimism doesn't mean that you know something is going to happen. Optimism to me means that you know that the option exists for us to make them possible. And the fact that you've got this change in the mentality, this change in attitude and philosophy from one of your major conservation organizations. By the way, that the Sierra Club was one of the environmental organizations that embraced the notion of holistic resource management and rotational grazing as a tool that could probably help understand how livestock could be compatibly introduced into the Great Plains, to me gives room for hope and optimism.

I wanted to at least convey that and I wanted to say that I will certainly continue to be an active part of this consortium and would like to do whatever I can to facilitate (that's a word we use often today) that process of bringing together these two and the third leg, the consumer leg (but that's going to be discussed here in great length over the next day or so). So I say to you that I'm optimistic. I'm cautious. I hope that as we pursue our sustainable ag. strategies, we continue to work on the tools. You will be hearing more about this whole process of policy and the notion of trying to begin to change the context for how we perform agriculture--how we farm this country via this vehicle of the Farm Bill. And while, again, it may seem now like an unbelievably difficult and insurmountable task to begin to grapple with that, I'm saying that if we really want to bring about change, then that's one of the things we're going to have to tackle. We are going to have to mount the political courage and the intellectual capacity and courage to say, "This is something that has got to be addressed."

My guru was Buckminster Fuller. He was a person that influenced me. I don't know how many people know him at all. He is known as the inventor of the geodesic dome. He did a lot more. He probably was more responsible for introducing the concept of whole systems thinking into popular culture as anyone. For those of you who are old enough to remember "The Whole Earth Catalog," if you get the one called, "The Last Whole Earth Catalog" and look at the first page, there'll be a little snapshot of Buckminster Fuller and the caption that says that it was the insights of Fuller that inspired the creation of "The Whole Earth Catalog". Well, Fuller, at about age 85 or 86, died in 1983 and is buried in Mount Auburn Cemetery, in Cambridge, Massachusetts. If you go to Mount Auburn and look at his tombstone, engraved on it is, "Call Me Trimtab." Buckie was an engineer by trade and he sort of understood that one of the most important principles, one of the most crucial principles, and one of the least known concepts of engineering was this whole notion of the trimtab. In explaining it, he often used the analogy of a large ocean liner that's traveling through the ocean at a fairly good clip, and he said that in order to change the direction of that ship, it requires a tremendous amount of energy. Because you've got to overcome the momentum of the ship and you've got the friction of the water and you know water is very dense, to turn that ship, normally to turn the rudder, requires a great deal of energy. But he said, "You know what, there's a little engineering trick called a trimtab." And at the trailing end of the rudder, right above the surface of the water, you could put a small rudder, called a trimtab. It only takes a small amount of energy to turn the trimtab. But when the trimtab turns, it creates a partial vacuum. That turns the rudder and that turns the ship. And he said, "Every system, whether it's a mechanical system or social system, no matter how large, no matter how seemingly insurmountable or how difficult to change, has some place where you can put the trimtab."

Now what we have to do, as people who are interested in social change, whether it be sustainable agriculture or whatever, we have to determine how and where we can place the trimtab. In that respect, I really believe that all of us can say, "Call me Trimtab." I hope that when you leave here you really understand that we can do it, whether it is the agriculture system or whatever, we can change it. I can look across this room, again, I look at the folks here and I see 250 potential trimtabs and you know what? You only need one.

Summary of Workshop Presentations with Study Circle Recommendations

During the conference, the following ten workshops were offered twice--once in the more traditional presentation style with a question and answer format, and once with an in-depth study circle discussion following the technical presentations. Each workshop was facilitated by a university or agency presenter and a farmer.

- Improved Decision-Making through Whole Farm Analysis
John Ikerd
Richard Wiswall
- What Leads to Change on the Farm?
Helene Murray
John Roberts
- Techniques for Evaluating Alternative Products and Enterprises
Paul Pieri
Michael Sciabarrasi
- Quality of Life: How Can Farmers Get More of It?
Jean Paul Cortens
Willie Gibson
- Building Consumer Enthusiasm for Agriculture
Linda Simpkin
Greg Watson
- Environmental Issues and Regulations: A Pro-Active Approach
Steve Wood
Tara Zadeh
- Crop Rotations to Manage Nutrients, Pests and Markets
Dave Coulson
Ruth Hazzard
Rhonda Janke
- Participatory Research: Linking Producers, Extension and Scientists
John Gerber
Tony Lincoln
- Diversifying Markets for Economic Survival
Lynda Brushett
Theresa Freund
- Managing Animals for Health
David Hoke
Rich Houston

The following are the available summaries submitted by these speakers, accompanied by recommendations for possible actions steps on that issue, formulated by the study circle discussion groups.

Improved Decision-Making through Whole Farm Analysis

Sustainable agriculture emphasizes a systems-oriented approach to problem solving. The motivation for this approach is the fact that limited approaches to problems often lead to short-lived solutions and unanticipated side-effects. How can whole-farm analysis help producers account for the complex consequences of management decisions without being overwhelmed with information? Has this method worked out in the real world?

Improved Farm Decision-Making through a New Management Paradigm John Ikerd, University of Missouri

A new paradigm of farm management, arising under the conceptual umbrella of sustainable agriculture, may be more significant than the central issue of agricultural sustainability. Nearly everyone agrees that agricultural sustainability will be necessary to sustain human life. Most disagreements concern alternative means of pursuing sustainability. These differences will not likely be resolved, at least not in the foreseeable future. However, the sustainability issue is causing many people to question the process of industrialization, the prevailing paradigm for economic development and human progress. Some of the most challenging questions of sustainability are linked directly to either the consequences or failure of the industrial model--environmental degradation, reliance on non-renewable resources, 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 a fundamentally different developmental model for the future.

Joel Barker, in his book Paradigms, defines a paradigm as a set of rules that do two things: (1) establishes or defines boundaries and (2) sets standards of success and 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 racquet, not a baseball bat 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 and natural resource base are 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 long run growth. Almost anything that is possible and legal is encouraged if it leads to profits and growth. The dominant paradigm for the U.S. economy, including U.S. agriculture, 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 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, routinized. The agricultural sector has been among the last to become fully industrialized. But, the driving force of modernization has 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 and freed farmers and others from the subsistence living that characterized earlier times. However, fossil energy supplies are being quickly depleted. In addition, industrialization has generated a whole new set of environmental and social costs that may soon 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, 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.

The new emerging paradigm may not be widely understood or even have an accepted name 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 for farming clearly considers ecologic and social impacts to be “within” rather than “outside” of its boundaries. The new constraints or boundaries have become the laws of nature, including human nature.

The new paradigm considers economic, ecologic, and social dimensions of sustainability to be inseparable. Fields, farms and communities are considered to be wholes that are made up of smaller wholes and make up still larger wholes. Thus, the approach to farm decision-making and management must be “holistic.” The challenge is to comprehend the complexities of wholes rather than attempt to reduce whole to more simple and easily understood elements. Success in the new paradigm is measured against the goal of sustainable economic, ecologic, and social progress, rather than profits and growth.

Each complex whole is unique and requires a unique management strategy. The human mind may be the only mechanism capable of coping with the multitude of complexities implied by this new paradigm of farming. Thus, 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.

Action Steps--Improved Decision-Making through Whole Farm Analysis

- Educate consumers that New England farms are small farms; family farms that work with values and systems. Promote farmers as stewards. Use sustainable agriculture as a marketing tool.
 - Interact/promote farms within own community.
 - Form coalitions among farmers.
 - Form more small groups of diverse farmers working together on whole farm analysis. Support network.
 - Encourage farmers to have courage to plan.
-

What Leads to Change on the Farm?

New information isn't always accepted, even when it's useful. Farmers integrate input from researchers, peers, family and personal experience when making decisions that lead to changes in how they farm. How can we better understand this process, and more effectively help farmers adopt progressive practices?

Whole Farm Case Studies

Helene Murray, University of Minnesota

Research and extension personnel are beginning to look for new strategies to involve more farmers in their programs. One approach to increase farmer involvement in programs is through the use of Whole Farm Case Studies (WFCS). A WFCS is a systematic examination over time of the biological, social and economic factors of an entire farming system. Factors such as production practices, economic status, business management, and inter-relations between farmers and farm employees are examined.

The process of conducting WFCS proved extremely useful for building problem-solving partnerships between the land grant universities and agricultural constituents. Noteworthy outcomes of the Oregon and Washington WFCS include: applied on-farm and complementary on-station research; farming system analysis; public education; new linkages with environmental and agricultural interest groups; additional grant funds, and interdisciplinary teams that cut across the biological and social sciences and include diverse citizen representation.

What Leads to Change On the Farm?

John Roberts, Vermont Dairy Farmer

My presentation covers four main areas, illustrated from personal experience on my farm. I used my experience with introducing round bale silage to this country, and switching from a total confinement system to intensive rotational grazing.

The four main areas of discussion included the following.

- Realization that there is a problem, or a better way of managing one's operation.
- Analysis of possible solutions, including education about these solutions.
- Implementation of the solution.
- Analysis of the implementation.

Action Steps--What Leads to Change on the Farm?

- Extension should consider risk assessment when making recommendations for change.
- Build trust and better two-way communication between farmers and researchers. Improve communications at all levels so information can flow not just horizontally or vertically but spirally, i.e., use of answering machines.
- Early communications between agencies, etc.
- New ideas should be tested on-farm.
- Change could be tested/explored by a group of farmers who meet together regularly, i.e., Vermont pasture management group.
- Use/create E-mail bulletin board/forum for New England farmers.

- Create and implement a project to explore the dynamics of farmer information exchange groups and discover what makes them successful.
 - Develop a process to articulate vision and values of farmers.
 - Include social scientists in research teams.
 - Need information to reach farmers.
 - Cropping systems designed to be unique to each farm--no "recipe" but need for information on components.
 - Consortium role could include information "clearinghouse" role for all of New England and also outside sources.
 - Change must occur in all parties: farmers and researchers.
 - Someone who has practical experience with a change should present/sell it.
 - Need a process to generate/articulate a vision that would help make people more ready to decide where to put their energy.
 - Change philosophy of how information is supplied to producers (Extension people talk about "my producers.") Use an integrated communications approach (Extension, agribusiness, etc.), an interdisciplinary, team approach that involves spouses, family members, etc. Use a framework of tools that are presently available.
 - Experiential learning--peer information exchange involving all family members--support groups, twilight meetings, farmer to farmer.
 - Follow up. If someone has expressed interest in change, support long-term sustainability. Re-evaluate changes.
-

Techniques for Evaluating Alternative Products and Enterprises

Many traditional farm enterprises have faced or will face severe economic and/or environmental obstacles to their viability. Rather than fine-tuning, some producers choose to make drastic changes in their operations to allow them to stay in business. Other than trial-and-error, how can producers obtain information on alternatives, compare the costs and potential profits of various endeavors, and determine the extent of markets and financing?

Alternative Products and Enterprises **Paul Pieri, Rhode Island Diversified Farmer**

By their very nature, alternative agricultural products are difficult to research for both production and marketing information.

I. Production - consider the source:

Farmer: When available, is the best source to obtain information because he/she has similar needs and concerns. View anecdotes with caution.

Researcher: Accurate information but usually limited to answering one particular question at a time, i.e., does variety A out yield variety B? does variety C have more resistance to powdery mildew than variety Y?, etc.

Sales person: Highly variable, quality of information directly related to integrity and knowledge of the salesperson/company.

Publications: Who is the author? Farmer, researcher, or (watch out) someone who makes their living writing about agriculture.

On Farm Experimentation: An absolute necessity.

- Usually takes up more time than expected.
- Must be simple to evaluate.
- Modify only one variable at a time.
- Do not rely on a single year's data.

II. Marketing

- Must have reasonable production data before making marketing commitments.
- Many times you must have product in hand when making exploratory sales calls.
- Often a wholesaler or retailer cannot accurately predict demand for new/unusual products.

III. Bottom Line

- Does this enterprise fit into your farm's existing work schedule and product line?
- Does this enterprise make a profit on paper? (Things will never get better in the field!).
- If you make a profit on each unit, can you sell enough units to justify the enterprise?
- 80% of new product ventures fail.

~~Business requires a 100% commitment to quality.~~

Techniques for Evaluating Alternative Products and Enterprises Michael Sciabarrasi, University of New Hampshire

Economic budgeting tools are a principal means of organizing relevant information for use in making business decisions. All budgets are essentially written plans for future action. The anticipated results of these plans are quantified, i.e., budgets show the expected dollar outcome. Budgets enable a manager to plan on paper before committing resources, helping to avoid costly mistakes.

The four major types of budgets used to help managers make business decisions are the partial budget, enterprise budget, whole firm budget, and cash flow budget. Each of these budgets are useful in answering specific questions about the anticipated economic impact of alternative production practices or business operations.

Partial Budget

The partial budget measures the **change in business profit as a result of a minor change** in production or marketing practices. Using a partial budget, the manager commonly compares the annual receipts and expenses of an alternative practice to the present method of operation to determine the impact on profit if the alternative is adopted.

With minor modifications in operations, many aspects of the business will remain the same. A partial budget lists only those receipts and expenses which will change under the alternative practice. It is imperative that the manager correctly identify the anticipated dollar changes. The general components of a partial budget are added receipts, reduced costs, reduced receipts and added costs. If the estimated added receipts plus reduced costs exceed the reduced receipts plus added costs of an alternative practice, then business profit will increase, and the manager should adopt the alternative. In the case where the sum of added receipts and reduced costs are less than added costs and reduced receipts, changing business practices will decrease profits.

There are three general types of questions suited for partial budget analysis: First, what is the impact on profit if one production/marketing method is substituted for another? Second, how will business profit

change if a new commodity is produced and marketed versus continuing with an existing product? Third, will profit increase if production levels increase?

Enterprise Budget

Enterprise budgets show annual receipts, expenses and resource requirements of producing a single product or providing a specific service. As such, enterprise budgets provide managers with an analysis of the **economic potential of a particular product**. Also, they are used to determine break-even output level and price. Receipts, expenses and resources listed in an enterprise budget are commonly expressed on the basis of output or with respect to a key input. Crop budgets are often prepared on an acre basis; whereas, many livestock budgets show dollar amounts and inputs required on an animal unit basis.

When preparing an enterprise budget, the first step involves estimating production levels, expected output price and total receipts. It is important to relate the level of receipts to production methods, management expertise and local market conditions. The second step is estimating the level of variable inputs required, their expected prices and total variable costs. Variable inputs change with the level of production in the short run (one year), hence these costs are “under the managers control” in a given business cycle. The third step is identifying fixed input and related fixed costs. Fixed costs are also referred to as ownership costs and include costs such as depreciation, interest on investment, insurance and taxes. The ~~final step to the~~ estimate net returns: Gross margin equals total receipts minus variable and fixed costs.

Whole Firm Budget

A whole firm budget is an estimate of receipts and expenses for the entire business; returns and costs of all enterprises are combined on a whole firm budget. Even though there are different whole firm planning procedures, the general steps commonly include formulating goals and objectives, taking inventory of available resources, identifying feasible enterprises and the resources required by each, developing the whole firm plan, and organizing total receipts and costs into a whole firm budget.

Whole firm budgets should be prepared when starting a new business, considering major changes to the existing business, and evaluating a business plan as a result of significant changes in technology, available resources or market conditions. The bottom line of a whole firm budget is the estimated annual **economic profit of a business plan**.

Cash Flow Budget

A cash flow budget projects all business cash inflows and cash outflows for a given period of time, usually a year. Cash flow budgets show not only the amounts of cash inflows and outflows, but also when the flows occur during the year (such as monthly or quarterly). A cash flow budget does not project business profit, instead it **evaluates the cash available** and need for funds as a result of changes in production or marketing methods, prices received or paid, loan repayment plans, capital investment, etc. Cash flow budgets of family farms will often include non-farm cash inflows (off-farm wages) and outflows (family living draws).

Action Steps--Techniques for Evaluating Alternative Products and Enterprises

- List/inventory farmers and what they grow--what alternatives tried, farmer contacts for farmer-to-farmer information sharing.
- Identify other resources/agencies doing similar activities that can complement Extension.
- Compile case studies of successful efforts (with contacts) regarding alternatives, new enterprises, etc.
- Technology information listing “what’s what” equipment, seeds, catalogs.

- On-farm demonstrations--partners with Extension or other agencies to share risk and help manage new techniques--site and climate specific.
- Develop tools to help people assess their direct marketing potential (location, personality, etc.). Direct marketing helps minimize risk of trying alternatives.

Quality of Life: How Can Farmers Get More of It?

You can't put it in the bank, but it's necessary to keep people in farming. Things like job satisfaction, family time, and stress management are critical to the quality of life for farmers and others. However, farming poses a special challenge in this area given the quantity of work, economic hardship, and increasing isolation that many farmers face. What are some specific steps for agricultural organizations and individuals that will help us address this issue?

Quality of Life

Jean Paul Cortens, New York CSA Farmer

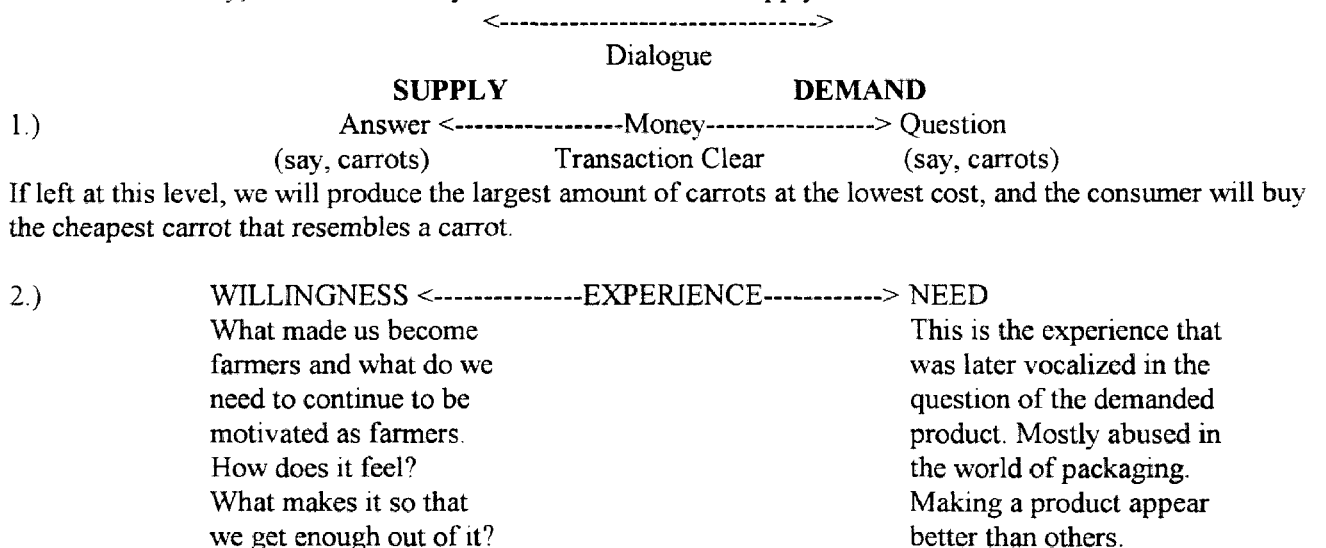
Quality of life is an individual process, not a quantity of conditions; but under what conditions will we get more of it?

- Anecdote: A dairy farmer discovers a new approach to his cows and enhances the quality of the barn environment. Result: More milk. Why did it take him so long? Our thinking is stuck in traditional conditions.

Let's talk about the economy.

- Anecdote: A teacher kept nagging us that we should never work for money. But if we become good at what we like most, the money will always follow. Why is this? How does this work?

In the economy, there is a basic dynamic motion between supply and demand:



3.)	<p>SURPLUS <-----DISCOVERY & COMMITMENT----->DEFICIT</p> <p>A combination of the knowledge of the farmer and the true potential of the land. In other words, a better product through better farming, with better soil.</p>	<p>What is it that truly nurtures the consumer after they eat through the glossy outside. Only true products get true rewards, in money as well as support.</p>
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Is this an idealistic model? The bottom line is that if we don't come to these deeper levels, we are not going to find support to truly nurture the land, animals or the well being of the farmer. It is partly an economic liberation so we can have more time, because we can move away from quantity alone to quality products. My own farm can be used as a test model. My farm works according to these principles and I can illustrate that if there are any questions.

Quality is not a thing in itself, but we have to learn about the conditions under which it can come into our lives.

Quality of Life: How Do Farmers Get More of It? **Willie Gibson, University of Vermont**

The "ways of the world" have been adversely affecting the quality of life for people since Adam and Eve gave up paradise. Today's "ways" are with the same lure: consume this, buy this, wear this, look like this, and you will become a god. Even though most of us do not have a conscious intent to fall prey to such deception (most of us may firmly believe contrary, and say so several times a week), conforming to the "world" seems to be our only choice much of the time. We do not have our own set of VALUES and IDEALS set out as gauges for making decisions, so we are subject to the ones presented to us in advertisements, television and government. I believe this to be the same for all of us, although I see farmers in the front lines of the war being waged for AUTHENTIC VALUES AND IDEALS, along with the other "lower classes" we have created in America. This is my sense of where farmers and farm families are in regards to having a genuine quality of life, as much the same as it is for any of us.

As out of control as farmers in particular feel about any aspect of their lives these days, it is critical to adopt some perspective that turns this table around. As it is from the VALUES that QUALITY OF LIFE truly comes, it is from the VALUES that we must center our perspective. I have been working with a systems management model--a "thought model," really--in the past 1.5 years that has as its center-piece a single, three part GOAL. The three components of the GOAL are:

- 1.) Quality of Life/Values
- 2.) Forms of Production
- 3.) Future Resource Base Description

The concept is that we really need to have ONE GOAL for everything - and that is to make all things PRODUCE our VALUES now and far into the FUTURE. ALL activities, decisions, plans, and monitoring are funneled through this comprehensive, single GOAL. The management model--called Holistic Resource Management (HRM)--entails a process for testing decisions, assessing management needs, developing financial and biological plans, and implementing all decisions with close to the ground monitoring. All of this revolves around the three part GOAL, with constant reflection upon balancing ecological, economic, and social sustainability.

The clarification of VALUES for each individual (and then pulling them together into a collection for the WHOLE family) and/or management team is the most critical feature for developing this new perspective. There are some good exercises available to help facilitate this. What I have found is that an open discussion with someone well versed in VALUES clarification (either from the outside or from within, if there is already

a healthy, whole relationship scene), can bring a good deal of core VALUES to the forefront. Communication skills and many of the higher virtues necessary for people to express caring can be put to the test in this process--and they probably need to be for the true VALUES to come out. Without having gone to all the ends of HRM, the gains realized in strengthening relationships, labor management, teamwork, and developing a greater sense of community have made this 3-part GOAL process invaluable. It gives individuals, families, and communities their VALUES (back), and it facilitates a sense of closeness and common concern in relationships (such as "management" vs. "labor") where parties are typically at odds with each other.

To really make the QUALITY OF LIFE(QoL)/VALUES become within the grasp of the people involved, the other two parts of the GOAL need to be developed as well. The FORMS OF PRODUCTION part speaks to the activities the people will do to attain the QoL/VALUES. The QoL/VALUES must be detailed enough so that all people have a common understanding and that there is no compromise. It is in the Forms of Production that flexibility and differences are built in. These are general enough so that they are not decisions that require "testing" against the achievement of the GOAL. Such terms as "profit from livestock," "enjoyment from recreation," and "beauty from art" fit into this part of the GOAL. The specifics are determined through the constant decision-making process.

So, as we have determined the QUALITY OF LIFE/VALUES, and the FORMS OF PRODUCTION to attain them, the GOAL needs to be finished off with the long view--the FUTURE RESOURCE BASE DESCRIPTION. This is essentially taking on the mind set--such as indigenous peoples throughout the world--to have a vision of the necessary characteristics the physical, ecological world must have in order to sustain future generations. Native Americans typically looked ahead 7 generations. Japanese companies are planning ahead 200 years. We can understand the functions of the ecosystem well enough to know how it needs to be, and we can readily predict the effects of the tools and practices we employ upon the natural world. What we really need is to re-gain the sense that we are not outside the natural world, but that we are interdependent with it, and everything that we do effects the health of the environment.

Not unlike the idea that there will be a quality of life whether we strive for it or not, so will there be a certain health and well-being of the world for which we are responsible. We can decide to establish ourselves as stewards of our VALUES and our World, or we can allow the ways of the world to be in control.

Farmers in particular are in a unique position to take on this perspective as they tend to be closer to both their VALUES and the Natural World than most people. In the financial- and time-burdened positions they are often in, they are also prone to being under heavy influence of the world. When farm credit continues to push for all farmers to be like their top 25%--who show great numbers from an industrialized farming system--then the pressure will continue to be that borrowing, spending and using more and more technology is the way to success. Do we really want to have only 25% of our farms left? Will this result in the Quality of Life that we really want? Will it really be sustainable? It is up to us.

Action Steps--Quality of Life: How Can Farmers Get More of It?

- More regional awareness from CES when planning programs.
- Regional inventory of skills of local citizens coordinated by CES.
- More selling of "values" (aesthetics, landscape) of farming.
- More bus tours.
- More discussion among farmers on quality of life issues and brought up in CES programs.
- Personal will to take charge of politics about land use and food policy.
- More education of children and adults of whole food system.
- CES improve public education of tax value about agriculture. Expand audience to tax planners.

Building Consumer Enthusiasm for Agriculture

Farmers make up only a small percent of the population, so coalitions with consumers are needed to support public policy and marketing decisions that can make or break agriculture in New England. It's not enough to aim for neutral acceptance of farming--there must be a societal desire to retain the benefits that local agriculture provides, in addition to "just" supplying fresh food. The values of open land to tourism, the savings to towns on costs of services, the connections to recreation, wildlife, and natural resource management must be advertised and strengthened. How can this effort be successful? What are some examples?

Building Consumer Enthusiasm for Agriculture **Linda Simpkin, Massachusetts Diversified Farmer**

~~1. Labeling:~~

- New England, state, organic, products, bags, signage.

2. Media:

- Television promotion of local products.
- Newspapers--every week.
- Farmer profiles.

3. Tourist Promotions:

- Maps highlighting farms.
- Roadside signs.

4. Public Farms:

- Open farm gates.
- Productive open space.
- Use of public land for food production.

5. Therapeutic use:

- Recovery.
- Work ethics.
- Hands on work experience for prisons, recovery programs, disabled persons, and court systems.

6. Local and State Laws:

- Zoning for agricultural preservation.
- Public support of land.

7. State and Federal Agricultural Department:

- Policies on **food** production only.
- Accurate statistics of food production (remove non-food producers).
- Develop policies to promote small to mid-size farms.
- Banking policies for family farms and rural communities.
- Halt the sale of **all** food producing land.

8. Education:

- Require high school study of food farm policies.
- Children's books on farming.

9. Public/Institutional:

- Prioritize purchase of regional foods.
- Restaurant promotion on menus and advertizing.
- Hotel chain purchase of regional foods.
- Schools must purchase within state, then region.

10. Direct Market:

- Promotion for farmers markets.
- Increase in numbers of farmers markets.
- Increase in monies available for WIC coupons.

11. More public awareness through public speaking.

Action Steps--Building Consumer Enthusiasm for Agriculture

- Agricultural agencies should develop educational materials and successful/convenient locations for farmers' markets.
 - Form state federation of farmers' markets.
 - More practical "Ag. in the Classroom" materials with lots of diversity, including career days as well as teacher training.
 - Create farm tour programs and farm events with educational materials and focus.
 - Support community-based agricultural initiatives that focus on personal choices and actions.
 - Create food systems alliances.
 - Develop New England label.
-

Environmental Issues and Regulations: A Pro-Active Approach

Although well-intentioned, environmental regulations often place an economic and emotional burden on farmers. Even more regulations are on the horizon. How can farmers become more involved in the process and work with policy-makers to make regulations more user-friendly?

Action Steps--Environmental Issues and Regulations: A Pro-Active Approach

- Send newsletters to environmentalists, governmental and consumer groups and invite them to meetings.
- Identify environmental groups in state and region.
- Keep track of "players" in agencies--pro and con in position on issue.
- Create "pro-active" group to meet and dialogue to prevent issues exploding into media frenzy.
- Land use record keeping/planning tool to evaluate economics/effectiveness of practices.
- Take regulators/other groups to visit farms.
- Farmers apply peer pressure to self-regulate "bad apples."

- Farmers get involved with boards, commissions, consumer and environmental groups. Join in change attitudes/perceptions from within.
 - Need central clearinghouse number that you can get legislative key figures and issues.
 - Education programs for homeowners regarding agriculture. Educational programs from farmers to consumers.
 - Do education programs for kids on agriculture. Do more "Ag. in the Classroom."
 - Get more people on farms. Clean up farms--better environmental benefits.
 - Reallocation of money to education.
 - Commodity groups need to be proactive.
-

Crop Rotations to Manage Nutrients, Pests and Markets

Crop rotations are integral practices to sustainable agriculture in that they make use of time and space to cycle nutrients, avoid pests, and still meet market demands. What are the ecological principles that underlie this approach, and how can they be used to make successful management decisions? What are some examples of innovative rotation systems that are in use? What's working well and what isn't?

Crop Rotation for Insect Control Ruth Hazzard, University of Massachusetts

Crop rotations have many positive effects in a farm system, such as building soils, reducing weeds, and fostering beneficial organisms. One of the key benefits of crop rotations is breaking the connections between host crops and the insects and pathogens that damage them. For a plant disease to occur, the pathogen must meet its host under the necessary environmental conditions. An herbivorous insect is a pest only if it finds its host in time and space, when the insect is in a damaging life stage and the crop is susceptible. The goal of crop rotation is to prevent these potential relationships from occurring on your farm at levels that cause economic damage to your crop.

Other cultural practices can be integrated with crop rotation to further reduce the success of pathogens and herbivores in colonizing the crop. These include early or late planting to avoid periods of pest activities, plowing of crop residues to foster decomposition, eliminating weeds that are alternate hosts, using row covers or trenches as barriers, using clean seed and transplants, and planting resistant cultivars.

Key aspects of the biology of each insect or pathogen influence how helpful crop rotation will be in reducing the pest below damaging levels. To know if rotation or other cultural practices will work, we need to be able to answer the following questions about the biology of each pathogen or insect:

1. What is the **host range**? What plants or plant families are attacked? What crop families, specific crops or cultivars does it feed on? What non-crop plants such as weeds or trees are also hosts?
2. Where does it **overwinter**, and in what life stage (for insects)? How well does it survive outside the host, and where (for pathogens)? Common overwintering sites and off-crop habitats:
 - Soil, stubble, crop residue, or weeds **in the field**.
 - Litter, soil, weeds, or woods **outside the field**.
 - Other regions **outside New England**.

Common life stages for overwintering/resting:

Insects: Late stage of larval growth, pupa, adult or egg.

Pathogens: as toughened chlamydo spores or sclerotia; as fungal or bacterial growth inside crop tissue; in seeds; in insect vectors.

3. When and how does it **colonize** the crop? What is its **dispersal range**--how far will it move or be moved to reach the crop? What **environmental conditions** favor successful dispersal? Does it actively **orient** to the crop? (If so what cues are used, such as odor, visual cues.) **When** does movement in the crop occur? **How rapidly** and successfully will it reproduce and spread through the crop?

Biological control and crop rotations

Crop rotations may also help to support populations of natural enemies that suppress pests. This may occur within the soil or in plant canopies. Cover crop rotations can add microbial diversity to the soil simply by increasing its organic matter content. This may promote antagonistic soil micro-organisms and suppress disease potential.

Beneficial insects and mites usually require resources outside the crop in order to survive and reproduce. This includes food resources such as pollen or aphids that can be found in cover crops like vetch, clover, sweet corn and grains, and overwintering habitat such as leaf litter, woods, and crop residue.

Pest traits that influence the usefulness of crop rotations:

Rotation very effective

- Narrow host range
- Overwinter/survive in or near crop
- Short dispersal range
- Resident pest
- Soil-borne pathogen

Rotations less effective

- Wide host range
- Overwinter away from host
- Long dispersal range
- Migratory pest
- Non-soil borne pathogen

Action Steps--Crop Rotations to Manage Nutrients, Pests and Markets

- Encourage collaborations between farmers of dairy/animals and crop production to get greater variety of crops for rotations.
- Nutrient cooperatives, nutrient sheds--database to inform availability and use.
- Long-term rotation studies for consequences.
- Communication networking among farm community, i.e. problem of nutrient overlapping, potassium in forages for dry cows. Connecting people together, i.e., specialists, local practitioners, etc.
- Keep trying: compatibility variables, wild and crazy crop alternatives, and economic options--multiple use systems.
- Equipment access and information (remember Canada as source too).
- Internet/dealers/newsletters in northeast region for better access to current information.
- Compile research on green manure crops.
- Organize agronomic information (clearinghouse).
- Growers dialogue with "higher levels" in Extension.
- Focus on understanding of biology of crops, interaction with pest numbers and cycles.
- Determine what happens in rye/vetch green manure--effects on following crop (especially potatoes).
- Document and/or research effects of green manures on soil life.
- Look at transition phase and trends from conventional to biological system--yields, pest populations.
- Extension consortium--information sorted across commodities.

Participatory Research: Linking Producers, Extension and Scientists

All knowledge does not arise from replicated research, yet experiential learning is not the most efficient way to get the information necessary to understand the mechanisms behind why things work the way they do. Together, farmers and researchers can make a powerful team that asks the right questions, makes observations in “real-life” situations, and draws conclusions that consider practical as well as scientific processes. What are methods for building such teams and recruiting and motivating the necessary participants? What is Extension's role in making this happen? Working models of participatory agricultural research will be shared.

Participatory research: Linking Producers, Extension and Scientists **John Gerber, University of Massachusetts**

Scientists generally lay claim to the process of discovering “truth.” Farmers who may see little immediate value in scientific research often protest the researcher’s monopoly over truth. This results in reduced communication, lack of respect, and limited trust between these two groups who should be working together. Why is there such a difference of opinion?

Agricultural scientists value truth. They are trained to discover truth through a process which identifies measurable objectives (such as yield), creates an artificial environment in which most variables are uniform across an experiment except for those under investigation (such as fertilizer), and then observes the effect of a change in this variable on a chosen objective. The result is believed to be universal truth.

Farmers also value truth. They have learned to discover truth through a process which considers multiple, competing objectives within a complex and ever-changing agroecosystem. Knowledge in this system is not desired so much for universal understanding as for solving local problems. Truth is discovered through intuitive understanding, confidence in their observations, verification with their neighbor’s experience, and the utility of practical solutions. The result is believed to be local truth.

Thus, we find farmers and researchers are likely to hold different views on what is true or valid knowledge. Extension workers are often caught in between. The sustainable agriculture movement has challenged the research monopoly on truth and research scientists who have risen to this challenge are beginning to discover a new way of inquiry called “participatory research.” Many believe that participatory research offers an alternative for agricultural researchers to utilize the scientific methodologies to better understand the complex, real-world interrelationships important to farmers.

Participatory research includes knowledge users or practitioners in the inquiry process. The outcome of this inquiry is not only new knowledge, but empowered participants more likely to take action on the new knowledge. Since this is an explicit goal of extension workers, this serves their needs as well. In participatory research, the knowledge users are expected to help identify real problems, suggest alternative solutions, test those solutions, and attribute meaning to their experiences, thus helping to interpret the research results. This is true, mutual ownership of the inquiry process and will more likely result in practical solutions to real problems than a “scientifically” sound practice, developed through research and delivered from the scientist to the farmer. Participatory research allows producers, extension, and research scientists to discover a common language and respectful means for solving problems.

Participatory Research: Linking Producers, Extension and Scientists

Tony Lincoln, Massachusetts Apple Grower

Most producers have environmental conditions which are unique to their farm requiring modifications to “normal” industry-wide farming practices. Soil type, topography, access to water, and pest pressures are just a few of the conditions which may vary from farm to farm.

The University Research Facility is quite often the birthplace of new concepts in agricultural practices. Scientists and extension personnel doing the research fully realize the success of these concepts is directly related to their own station’s micro-environment. In order to recommend these concepts on an industry-wide basis, they need to move their experiments to other micro-environments.

All producers have a stake in the research being done by scientists and extension. They also have an obligation to assist in this research by providing sites with different environmental conditions. By working closely with research personnel, a producer can provide information necessary to fine tune concepts for industry application.

Action Steps--Participatory Research: Linking Producers, Extension and Scientists

- Share results of on-farm research.
 - On-farm research has to be farmer driven/initiated.
 - Solve problems with farm management skills rather than bringing in new products.
 - In-state groups should support their own research at some level.
 - Form farmer groups to initiate research. Establish farmer clubs, like AERO in Montana.
 - Identify or develop tools for on-farm research like weighing systems. Share innovations from farmers.
 - Research reporting translated into understandable English.
 - Advisory boards for research faculty.
 - University “teams” travel to farms to look at problem situation.
 - Financial support (from SARE, etc.) for farmer groups that form.
-

Diversifying Markets for Economic Survival

Farmers who produce without knowing where they will market have pretty much disappeared. Now, farmers who produce for conventional wholesale markets are disappearing as factors beyond their control dictate prices and profits. Achieving the economy of scale that facilitates profits on conventional wholesale markets is difficult in New England, so options like direct marketing, value-added processing, or selling to premium specialty markets are gaining in importance. How can producers determine their choices in the marketplace and make appropriate decisions for their operation?

Niche Marketing: Fitting A Square Peg Into A Square Hole **Lynda Brushett, Niche Marketing, Barrington, New Hampshire**

Since colonial times, proximity to mass markets has been the New England farmer's ~~principal~~ asset. Over the years, however, improved transportation networks and changes in the scale of agriculture have seriously eroded the region's traditional location advantage. Nowadays, it is the entrepreneurial ability to identify, differentiate and serve niche markets which gives New England's agricultural businesses a competitive edge in the regional marketplace and elsewhere.

Every entrepreneur starts with a gut feeling--a strong intuitive sense of having come upon a truly great business idea. Making the transition from concept to a profitable venture requires vision enhanced by information and planning. In New England we call it "Yankee ingenuity," and marketing savvy is a key element of success.

Marketing encompasses everything a business does to promote its products and services. Marketing is a purposeful process of identifying and satisfying customer needs.

Marketing products or services to an undifferentiated mass market is rapidly becoming a thing of the past. Demographic changes, intense competition and information technology are dividing the mass market into more and more separately definable segments. Just the sheer volume and variety of available products alone means that no one has to make do with a product that does not quite fit a specialized need.

Surveys, scanning, computerized data bases, cable television are just a few of the methods making it possible to identify, understand and communicate with well-defined customer groups or niche markets. There is no longer a market for products or services with broad appeal. Trying to be all things to all people does not work any more.

Niche marketing defines our times: customers expect and demand products and services that fit them perfectly. Niche marketers target specific customers and give them what they want.

Niche marketing is an attitude: a customer focused way of thinking and acting. And it is a practical methodology for adding value to a product, whether it be an apple, a farm stand or a pick-your-own strawberry farm. The process begins with a commodity, a generic product or service. Through research, the niche marketer identifies and targets a particular customer group with an affinity or need for the item.

The customer's needs and desires determine the marketing strategy product positioning, packaging, promotion, presentation and pricing.

In a sense, the customer's interests are wrapped around the product. This adds increased value to a previously generic offering since the customer can easily recognize that the product fits their need. Rather than trying to make a square peg fit into any hole, niche marketers prepare the square peg to fit the square hole.

Niche Marketing: Fitting Your Product to its Market

Niche marketing requires market focus and product differentiation. Success depends on research and careful attention to detail. Putting together a marketing plan helps assure a product is fitted to its market:

1. What is my market niche?
2. What am I going to market?
3. How does my product match the needs of my market?
4. How will the market know I have what they need?

Market planning is a circular rather than linear process. Answers found for one question help inform and clarify answers to the others.

1. Market Analysis: What is my market niche?

Eight years ago, Vermont Butter & Cheese looked over the marketplace and singled out professional chefs in the Northeast as their market niche. Today the company successfully fills a growing need in the white tablecloth food service industry for high quality domestically produced European style fresh cheeses.

A market niche is a well-defined group of customers. Market niches can be found within any broad market category: consumers, businesses, industries, institutions etc. Consumer groups, for instance, can be characterized by demographics, geography, lifestyle, values, leisure, occupation, etc. Business customers can be defined in terms of markets, products, management styles, distribution channels, size, etc. Finding a market niche is a bit like finding truffles. It takes a determined well-informed nose to sniff out the real thing from all the possibilities.

Conjure up a mental image of the kind of customer who would want your product. What important characteristics categorize the buyer? If you are marketing to consumers, is it age, sex, family status, household size, the kind of car they drive, where they live, how they entertain, what they read, education, or lifestyle that defines your market? What are the reasons someone would buy your product? Is it, for example, status, taste or health? Where are you going to find more of these buyers?

2. Product development: What am I going to market?

When Porter's Greenhouse decided to expand their greenhouse and bedding plant business into dried flowers, it required more than simply the cultivation of new plant varieties: they needed a reliable, cost-effective method of removing moisture from freshly harvested crops. The solution was found in retrofitting the attic of the sales house in one of their greenhouses. Solar heat, dehumidifiers and extensive layers of racks were utilized to provide a perfect drying environment. Once dried, plant material is crafted into arrangements and marketed locally through the farmer's market, private home parties and craft shows.

Product development is an on-going task. Products are continually fine tuned as you better understand the needs of your customers and the mechanics of your business. Some important questions include: What is needed to produce your product—technology, equipment, packaging, labor, utilities, physical facilities? What health, sanitation, zoning, labeling and other legal and governmental regulations affect your business? Are patents, licenses, trademarks or copyrights necessary?

3. Market Positioning: How does my product satisfy the needs of my market better than my competition?

Stonyfield Farm has evolved from an eight cow, farmstead yogurt operation into a multi-million dollar business by satisfying the needs of health conscious, environmentally concerned, socially active consumers. The company's use of recyclable containers, support of hunger programs and commitment to sustainable agriculture appeal honestly and directly to its target customers—and distinguish Stonyfield Farm Yogurt from competing brands.

Market positioning is the way you communicate precisely what niche your product is filling. How you position or place your product in the mind of your customer determines how the product is perceived. Positioning is the strategic component of niche marketing. It ties together information about your product, your market, your competition and your industry. It is the answer to a very basic question: What business am I in? For example, am I in “the what’s for dinner business?”, “the family vacation business?”, etc.

Developing a position for your product or service involves thinking about: what benefits does my product offer? what needs does it fill? why will the market want my product rather than that of my competition? how is my product different?

4. Market Connection: How will the market know I have what they need?

New Hampshire Country Specialties is a distributor of New Hampshire-made gifts— specialty foods, personal care products, New Hampshire videos, wood crafts—to gift shops, farm stands and country stores which feature a New Hampshire theme. The company keeps in touch with its customers through newsletters, telephone calls and a store-door delivery program. Participation in trade shows geared to the gift and tourist industries helps boost the company's image and develop new customers.

Making connections with your market lets the customer know you have the product or service they need. Given the characteristics of your niche, how will you enter the marketplace? What mix of personal selling, merchandising, advertising and promotional activities is needed? What distribution channels are best suited to your product, your customer and your business? How does your packaging, advertising and promotions link your product to its market? Does the appearance and style of your business reinforce your market message?

Yankee Ingenuity. Niche Marketing. Together a powerful combination for diversifying agricultural market opportunity in New England.

This paper was originally prepared for the Connecticut River Valley Conference: Opening New Markets for Agriculture.

Diversifying Markets for Economic Survival **Theresa Freund, Connecticut Vegetable Farmer**

The farmer's (producer's) ultimate challenge is knowing what choices are available. Making decisions based on these choices will ultimately determine the profitability and survival of your operation.

Goals: Marketing the Best!

We started out as a very diverse operation by selling only what we grew. Our customers demanded more, as they wanted top quality and one stop shopping. To satisfy our customers, we specialized in the

crops we did best and purchased produce from growers who did the same. Our goal was to have the best produce money can buy. We achieved this goal by realizing that the ability to grow every vegetable and produce a timely crop for customers is not feasible in our situation.

Labor: How Do You Divide Your Time?

The biggest challenge has been in trying to expand a labor-intensive vegetable growing enterprise alongside an already labor-intensive dairy farm enterprise. The diversification is more like a separation. The need for a separate labor force becomes most apparent when trying to accomplish spring planting. Each business has daily tasks or chores to accomplish and having the extra labor during peak season is difficult. It's frustrating to have jobs left undone.

Profit: Can You Survive without the Other?

The second biggest challenge has been tracking the market expenses and income. To determine that the income to the market is not an expense to the dairy. The profitability of each business needs to be judged by its own merits. The following is an example of this. The dairy farm made the investment in a six-row, computer-controlled corn planter used by the dairy farm to plant over 200 acres of field corn. The vegetable enterprise uses this corn planter for planting just 20 acres of sweet corn (1.5 to 2 acres per week for 10 weeks). This is a typical expense to the dairy that you should also expense partially to the vegetable enterprise. The profitability of each enterprise, when sharing equipment, tools or land, needs to have these costs expended equitably so that each business can show its ability to survive on its own.

Time: Balance Business and Family

The third biggest challenge is trying to keep our sanity with a balance of business and family. We cannot allow the business (as a grower, farmer, buyer, retailer) to control our lives. This particular challenge is the hardest to manage as setting up family goals as well as the goals for our business sometimes do not balance. The difficulty comes not only with oneself but also to compliment the other people involved, whether it's a spouse or the in-laws.

Management: Who, What, How, When, Where, Why?

The last of our big challenges is the actual management or running of the market. Who is in charge of decisions? What are we selling? How do you see your business and how do your customers see you? When do we invest in our business thus increasing our overhead? Are we being forced to grow faster than what we are ready to handle? When do we go from the baby-wipe cash box on the honor system to a computer programmed cash register with 256 PLU's and 32 departments in a 2-story custom built farm market? When do we go from selling only what we grow to only growing what we do best? Where do we want to be in the future? These are some of the every day (every year) questions that are challenging to answer.

With each operation the answers will be different. There are many other questions we ask ourselves and many of the **answers come as demands from our customers.**

Action Steps--Diversifying Markets for Economic Survival

- Develop database of broker profiles, wholesalers, country stores, etc.
- Utilize existing information to expand on sources for you. Computer generated and updated.
- Extension focus on marketing as equally as they do for production.
- Look for grants that are for new market opportunities, i.e., FSMIP.

- Utilize technology to advertise farm to your customers (through Worldwide Web).
 - Emphasize quality products. Workshops for producers to provide optimum product.
 - Extension and farmers respect each others' position/roles.
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Managing Animals For Health

Livestock plays a vital role in New England sustainable agricultural systems. The goal of livestock farmers should be to manage animal health, not animal sickness. What are the important on-farm factors and production methods affecting animal health? How can farmers minimize the need for antibiotics and other drugs through alternative management practices?

Managing Animals For Health

David Hoke, Vermont Veterinarian and Pasture Management Consultant

Domestic and global economics of livestock agriculture, public concerns for clean food and animal welfare, and persistent shortcomings of standard management models have produced an interesting opportunity for different perspectives. Over the past few years, crazy notions have moved into credible positions.

Standard management models make a goal out of animal health concerns, for example: reduce mastitis, eliminate foot rot, control coccidiosis. Following consideration of the resources available and the technology that applies, decision making includes peer pressure, regulations, research findings, cash flow, expert opinion and expected rate of return. Short term results are often encouraging but long term results are often unforeseen. Management goes from one goal to the next, limited in scope and vision, distracted by the present, addicted to repetitive applications of technology, and blind to the traps of any method over the long run.

Standard management models perpetuate the idea that economic success will result from controlling individual disease processes. Given the proper preventive medicine strategies, the right antibiotic regimen, the timely use of improved vaccines and so forth, we might continue using the same basic approach to livestock agriculture for generations to come. This is a form of denial that we all practice because of our upbringing, our education, our life experience, and our desire to succeed in our endeavors. Convinced that we are not the problem, that we are not the stressors, that our system is sound and we are good managers, we look for a cure for pasteurilla pneumonia, B.V.D., hairy heel warts, or O.P.P. The cost of disease is significant in labor and expense for prevention, treatment, control, and most of all, salvage and replacement.

All the existing farm features and production methods affect animal health, because they are all interrelated. Modern systems and methods have developed with a focus on per unit production, followed by concern for either cost or human efficiency. Individual and herd behavior requirements, habitat requirements, selection criteria for suitability to the farm's ecosystem, and nutrition as a part of the quality of life of the animals have seldom been considerations. As the profit margin of commodity production shrinks, increasing production is the favored route. The concurrent hope is that size and scale will effectively distribute input costs over more production units. This call and response trend is not sustainable by any definition, and puts quality of life for animals dead last.

The prevalence and expense of disease and disorders in various livestock systems are both indicators of the health of the system, and indicators of opportunity for change. Current economic success is a big

barrier to change in livestock agriculture. Economic failure in the present is the most common reason for change. Voluntary intentional change often occurs to capitalize on opportunity. There is a wealth of opportunity for livestock agriculture.

Managing animal health is not a goal. Animal health, or more generally, the quality of life for animals is important enough to be part of a larger goal of quality of life on the farm. The interrelated building blocks of animal health are habitat, behavior, selection, and nutrition. Respect and regard for the building blocks and their interrelationship directly improves the quality of life for animals. The building blocks of animal health need to be an integral part of the proposed role for livestock on the farm.

Contemporary agriculture enrolls animals in a manufacturing process and operators define themselves as producers. “I’m a wool grower, I’m a beef producer, I’m a lamb producer.” Dairy farmers typically use cows to manufacture milk from the ingredients set before the cow. An offshoot of modern livestock farming is a subconscious equation that relates effort per animal unit. Part of the effort is related to the constant requirement for control of artificial constraints on the building blocks of animal health. The constraints are the product of human-designed facilities and production models. They require constant monitoring and control to maintain acceptable levels of animal health and performance.

Ruminant livestock still have a place beyond manufacturing that allows a farm to be ~~productive, but~~ with a different description. “I’m a grass farmer, I’m a ski-slope grazier, I’m a river-bottom manager.” The farmer is a resource manager, and livestock are powerful management tools. Improving our powers of observation, our management skills, and our knowledge of technology allow us to use the livestock tools more effectively. The building blocks of animal health become important factors in design considerations for the farm, and less of a focus of the control functions of a factory.

A perceptual change reveals the opportunities for livestock agriculture. If we are willing to think outside the established patterns for a food manufacturing model, there is more opportunity to use livestock as tools for resource management. A successful management plan can generate livestock agricultural commodities as net product from a system responding to improvements in the nutrient cycles, energy flow, and community dynamics. Animals are selected for specific roles in resource management directed by their needs for habitat, behavior, and nutrition. Selection can be used to recombine desirable traits that make livestock more suitable to the farm ecosystem. We can expand the resources we manage and we can expand the number of animals we involve in resource management while providing for the quality of life for the animals on the farm.

Mastitis Prevention and Control

Rich Houston, New Hampshire Dairy Farmer

My presentation focused on mastitis prevention and control with an emphasis on minimizing the use of antibiotics. The milking steps that we use in our “double 8” parallel milking parlor, include pre-dip, wiping with disposable towels, unit attachment, and post-dipping. The slides included photos of the holding area, main barn, freestalls being filled, curtain sidewalls, roof ridge vents; action shots of cleaning the barn, the dry cow barn, the heifer barn, the silo face; and slides of the non-antibiotic drugs that we use.

There was a handout review outlining which treatments are used under which conditions, and when to resort to antibiotics as a fall back alternative.

I brought to the presentation an assortment of treatments such as oxytocin, hypertonic, sugar, probiotic, drenching fat, Epsom salts, etc., that are used instead of or in conjunction with the treatment of cows with clinical mastitis. I also described when to draw the line between “letting her go” and “treating her” with antibiotics. I stressed, however, that I was not a veterinarian and was only describing the

procedures used at Pine Lane Farm. Our veterinarian, Dr. Ed Meehan, has sanctioned these methods and I encouraged each of the attending farmers to seek advice from their own veterinarian.

Action Steps--Managing Animals For Health

- Research non-antibiotic treatments for livestock health problems.
 - Provide an information directory for people interested in reducing antibiotics on the farm and other animal health issues. Include a list of people who can advise farmers on livestock health, especially in regions with fewer farms (Rhode Island).
 - Research the environmental effects of winter pasturing.
 - Research the financial impacts of intensive off-season production. What is the balance of high costs and high selling price versus seasonal production with lower costs and lower returns?
 - Hold farm meetings on various topics (similar to "pasture walks" or "twilight meetings"). Organized regionally in areas with fewer farms and resources.
 - Encourage Extension to work across state lines, mail materials to agents in neighboring states.
 - Promote healthy animal products as an integral part of ecological agriculture to encourage consumers to buy these products.
 - Research/networking on practices related to animal health. share information.
 - Involve producers in setting research agenda.
 - Seek out and disseminate good animal health models in industrial as well as ecological systems.
 - Help with information for transitioning farms.
 - Lobby legislators for sustainable agriculture programs, support for health of agriculture in general.
 - Better connection/usefulness of research. Partnerships with farmers and research.
 - More concrete give/take sessions like today.
 - Concentrate funds that are left on education/research.
 - Consumers get involved in alternative relationships with farms, i.e., CSAs.
 - Incentives for alternative row crops.
 - Educate/advocate about policies, market realities that limit farmer's choices and reduce animal health.
 - Reduce stress on animals.
 - Learn to manage health more holistically.
 - Use a variety of information on animal health, peers, university, etc.
 - Take stress off farmers so they notice and manage better.
 - More local "kitchen" roundtable meetings versus "big" meetings.
 - Producers have to reach out too--get more involved in collaboration, appropriate industry, farmer associations, too.
-

State Caucus Reports

There were two opportunities during the conference for the participants to meet by state to summarize and identify possible actions that might be taken by farmers, Extension staff, other agency representatives, consumers, marketers, etc.

The goal was to formulate concrete strategies that participants could implement in their states. The following are what came out of the caucuses.

Connecticut State Caucus Report Submitted by Roy Jeffrey and Paul Stake

The two state caucuses resulted in the collection of many and diverse suggestions for sustainable agriculture education to be coordinated by University of Connecticut CES. Post-conference fractional distillation resulted in the following three major action step categories:

1. Improve communications involving all parties interested in successful and sustainable agriculture within the state. This group is envisioned to include federal agencies (e.g. CFSA, NRCS), representatives from organized commodity/producer groups, the CT Department of Agriculture, CT Farm Bureau, CT NOFA, statewide Conservation District personnel, faculty of the CT Agriculture Experiment Station as well as resident faculty of the College of Agriculture and Natural Resources and the Storrs Agriculture Experiment Station. Statewide meetings and jointly sponsored forums/educational projects are envisioned, in addition to sub-group activities and individual networking.
 2. Begin development and implementation of a multi-faceted, proactive external public relations and education effort aimed at the non-farm public within the state and region. Topics would include agriculture as an integral part of a sustainable environment, as well as the positive aspects of agriculture on both urban and rural economies. Target audiences would include land trusts, environmental groups, legislators, municipal officials, youth groups, etc.
 3. Provide a forum to explore and educate producers on the various aspects of whole-farm analysis, enhance marketing opportunities, and maximize linkages with statewide economic development initiatives (i.e., agri-tourism, local markets, CSA's). University faculty and personnel from the CT Department of Agriculture will be expected to provide major leadership in these efforts.
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Maine State Caucus Report Submitted by Tim Griffin

Workshops Relevance to Maine Actions at Home

1. Case studies of success or what's been tried.
2. Products and services for farmers.
3. "Standing" groups:
 - DEP - BPC
 - farmers - industry
 - NRCS - NRC/Audubon
4. Farm visits (by farmers).
5. Include quality of life issues in other programs.
6. Conf 75% farmers sponsored by farm groups.

Do What? Maine Caucus

1. Nap (Don).
2. Whole-farm plans - collaboration of common goal.
3. Collaboration among farmers.
4. New England label.
5. Farm tours (Barb).
6. Language issues.
7. Stop scaring the public.

8. Unite agriculture.
9. Farmer's voice "dealing with media".
10. Helping with demonstration and research.
11. Mixed groups - define issues/alternatives.
12. Radio shows.
13. Political leadership among farmers.
14. Regular article.
 - Improved decision making.
 - Whole farm analysis.
 - Farm planning: economic/social/environmental.
 - Sensitive to individual and family values/goals.
 - Environmental: stewardship and regulation.
 - Sustainable agriculture projecting values, too?
 - Sustainable agriculture is question not answer.
 - Sees great payback to planning, not what can grow here? But what can you see from here?
 - Values/profit.
 - Change may require capitol.
 - Cooperation/sharing.
 - Change mind set.
 - Nutrition, MGT., IPM, etc.
 - Avoid off-putting, judgmental language.
 - Help people pursue what makes sense to them.
 - Education needs: Respond to changed needs, demands on young people, negative images need to be integrated.

Action Steps

1. Consumer education - farm systems, values, family farms, stewardship.
2. Promote your own farm within the community.
3. Coalition unity of farmers.
4. Advocate development of small diverse groups of farmers to help each other with whole farm analysis.
5. Encourage farmers to have the courage to plan.

Massachusetts State Caucus Report **Submitted by Stephen Herbert and Cathy Roth**

The state caucuses began by reviewing the workshops that were attended by each of the Massachusetts participants. From this review, a list of key ideas was drafted and discussed. Of particular interest and focus was application of these ideas to on-going sustainable agriculture initiatives. Eight priority actions were identified as follows:

1. Increase cooperation with key groups.
2. Include consumers in collaboration/dialogue.
3. Increase opportunities for improved communication among farmers.
4. Develop one voice for New England agriculture. This region has 12 senators who represent the 8th largest area in the U.S. in agricultural production.
5. Include values in dialogue.

6. Increase public awareness of agriculture.
 7. CES help facilitate grass roots movement in behalf of agriculture.
 8. Incorporate systems approach to agricultural research production and education.
-

New Hampshire State Caucus Report Submitted by Bill Zweigbaum

Priorities

1. Information sources.
2. Brokering/marketing.
3. "This view is brought to you..." signs to promote tourism/farm connection.
4. Farmers coalition.
5. Communication--everyone working together.
6. Commodity groups become involved in regulations (drafting, etc.).

Other Ideas

- ▶ Research sustainable and/or non-traditional practices.
- ▶ Extension to develop protocol for setting up and evaluating farm research.
- ▶ Re-evaluate all government incentive plans.
- ▶ More local "kitchen" type meetings.
- ▶ Formation of farming groups made up of all farmers who invite speakers in.
- ▶ Redirect university researchers away from publishing for tenure.
- ▶ Improve communication at all levels. Change in philosophy from giving information to producers to an integrated team approach. Farmer to farmer and family communications.
- ▶ Follow up people's interests in making changes.
- ▶ New ideas should be tested on farm before Extension gives the information out.
- ▶ Use of email for fast communication.
- ▶ Developing trust is essential between growers and Extension (both sides need counseling).
- ▶ Outreach people work across state lines.
- ▶ Farmers actively invite legislators to come to farms.
- ▶ Getting farmer involved in regulations.
- ▶ Educational efforts to displace regulatory actions.
- ▶ Agricultural agencies need to be more accessible.
- ▶ Network directory of services available to public.
- ▶ Extension to conduct more farm tours (include quality of life).
- ▶ More general education, especially towards children--model agriculture in the classroom.
- ▶ Community groups need to be proactive in drafting regulations.
- ▶ More on-farm research that considers profitability among other factors.
- ▶ More funding into education. Do not cut it back.
- ▶ Producer generated/directed research.
- ▶ Extension education should be "culture-based," not science based (land use, food policies, zoning laws)
- ▶ Read *Seven Habits of Highly Effective People* by Stephen Covey.
- ▶ Directory (print and computer) of farmers active in successful crop rotation, marketing, networking, etc. (New England Consortium).
- ▶ State agencies keep computer data bases that others could call in to get or set up a computer system that clients could use with training for use.
- ▶ Extension focus equally on production, production quality and marketing.
- ▶ FSMIP funding.
- ▶ Collaborate to figure out how to get information out.

- ▶ Recognize diversity of New Hampshire agriculture.
 - ▶ Icon to identify things grown in New England.
 - ▶ Agencies give information on how to organize farmers markets.
 - ▶ Create on-going coalition from this conference with representation from all groups.
 - ▶ Help farmers realize the expertise they already have empowerment, what they can do for themselves.
 - ▶ Educate lending agencies about needs of farmers.
-

Rhode Island Recommendations for Action Steps

Submitted by Will Reynolds

1. *Twilight Meetings* hosted regionally and open statewide.
 2. Followed by *tours* organized around a topic. Invite regulators and buyers.
 3. *Case studies and discussion* may lead to participatory research arrived at by consensus.
 4. *National Ag. Day* in Rhode Island.
 5. *Farm open houses*.
-

Vermont State Caucus Action Plan

Submitted by Vern Grubinger

1. Get list of action steps out to Vermont folks.
2. Use the ideas in on-going programs.
3. Respond to Center for Sustainable Agriculture about how/what you want to be involved.
4. Steering committee organizes study circles.
5. Get whole group back together.

Action Steps

- ▶ Educate non-farm folks (including youth) about food/farming system..
 - ▶ Get farmers together in small groups--use a variety of approaches.
 - ▶ Provide more holistic resource management (HRM) exposure/workshops to Extension, public, farmers, other agencies.
 - ▶ Involve high school/college/K-12 students in on-farm projects, e.g. inventory food shed needs management role.
 - ▶ Involve farmers in generating research agenda, policy regulation-making, etc.--let farmers define the "problem."
 - ▶ Whole farm planning--multi-agency, farmers, get people into the process.
 - ▶ Ag. community more participatory in policy, rules and regulations. process at local, state, and federal levels.
 - ▶ Marketing and advertising how and why workshops..
 - ▶ Research on social, ecological and economic benefits of agriculture.
 - ▶ Cost/benefit of agriculture included in town plans (use existing data and new research effort). .
 - ▶ Networking using electronic technology.
-

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