

# Pastures of Plenty

*The Future of Food, Agriculture and  
Environmental Conservation  
in New England*

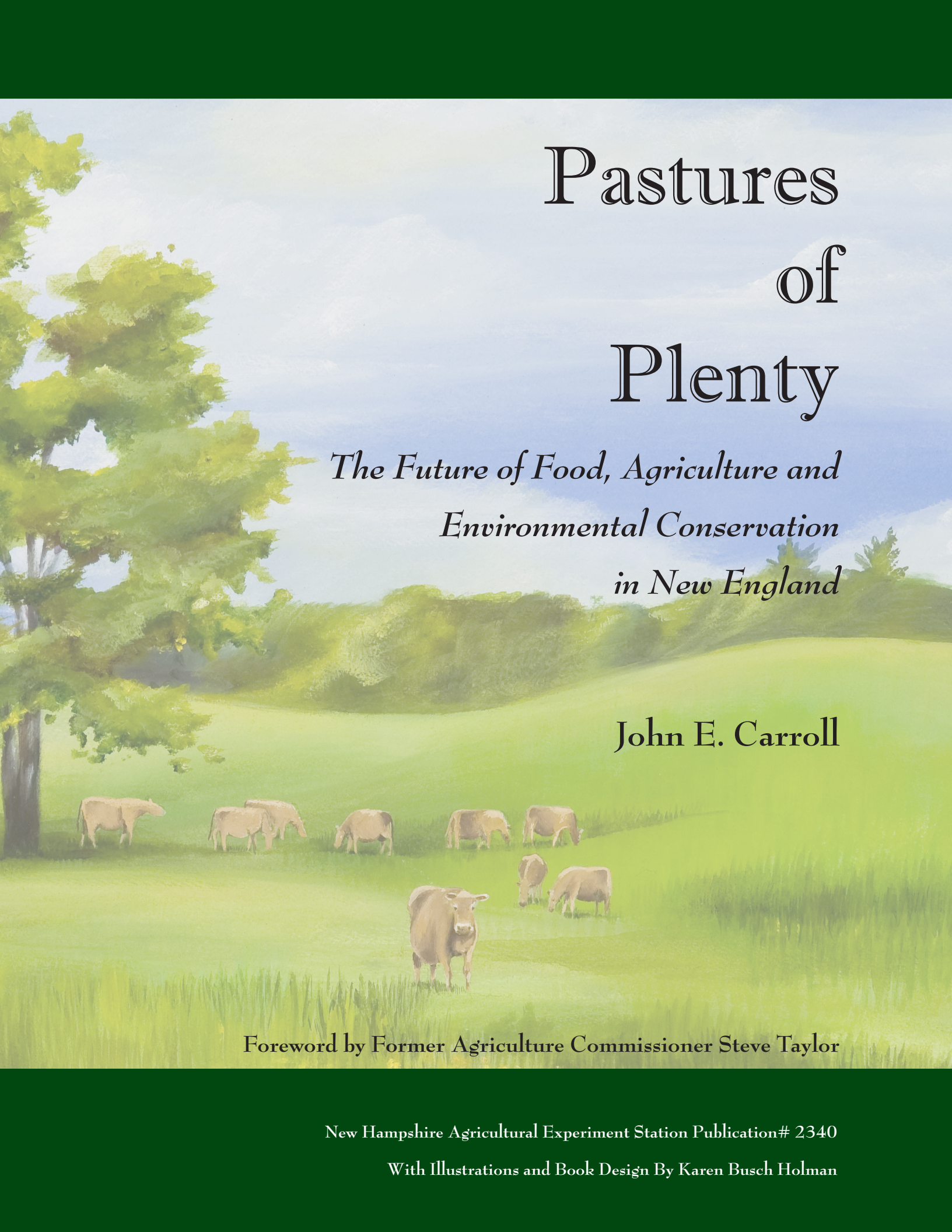
John E. Carroll

Foreword by Former Agriculture Commissioner Steve Taylor

New Hampshire Agricultural Experiment Station Publication# 2340

With Illustrations and Book Design By Karen Busch Holman





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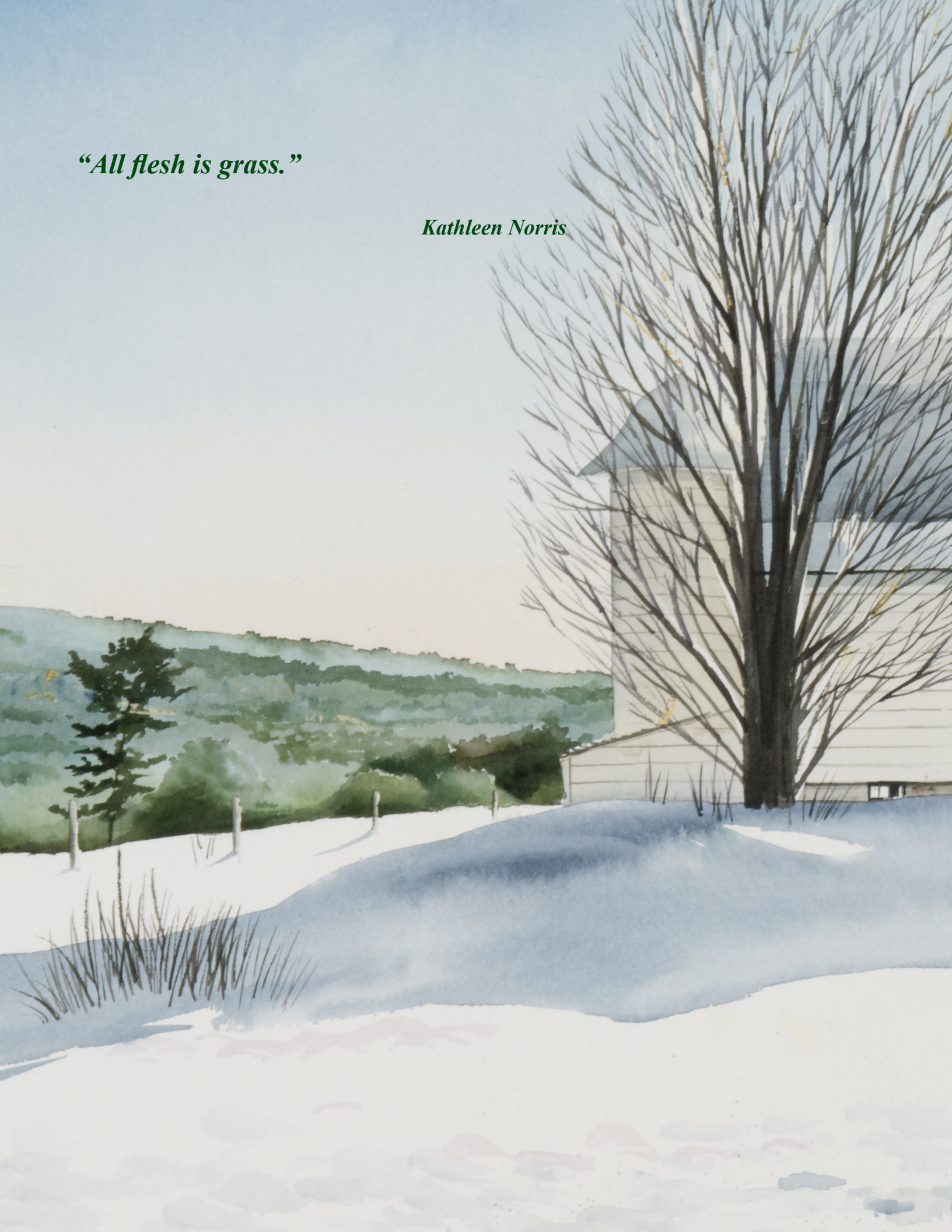


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*“All flesh is grass.”*

*Kathleen Norris*



## Foreword

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By Steve Taylor

*Former New Hampshire Commissioner of Agriculture, Food and Markets*

New England agriculture is evolving along two distinctly different paths, each of which presents its own set of opportunities and challenges for practitioners, policymakers and the entities which serve and benefit from the business of producing food and fiber.

Traditional bulk commodity agriculture – dairying, apples, potatoes, cranberries, and poultry most notably – continues a pattern of consolidation and concentration that has played out since WWII. It is characterized by heavy reliance on leveraged financing and increasingly expensive land. It is vulnerable to the forces of market concentration and globalization with little power to assure itself sustained adequate returns through product pricing.

Most ominous for commodity agriculture in New England is the aging of its ownership and its difficulty in attracting a new generation of people to carry the industry forward. Extreme high costs of entry and the severe risks facing enterprises with inputs priced at retail and output at wholesale values are scaring away the talented and energetic individuals needed to assure a secure future for traditional farming activity in the region.

The other track in New England agriculture lacks a distinct descriptive term – some call it “niche” agriculture, others call it “new” – but it is best characterized as agriculture in which there is a close connection between the producer and the consumer. Often it is a direct commercial linkage of seller to buyer, but it can also be a linkage formed by emotion, philosophy or social values.

This category of New England agriculture is ascendant, as documented by U.S. Department of Agriculture data showing New Hampshire and Massachusetts actually increasing farm numbers in the first years of the 21<sup>st</sup> century, and the other states holding their own, thanks to “niche” or “new” farms offsetting declines in numbers of traditional bulk commodity operations.

It is attracting practitioners who are realistic about the challenges facing farm enterprises and who recognize that good marketing strategy is as important to success as is ability to grow a good crop. Many of these people bring experience and capital generated in other pursuits to these enterprises.

Against this backdrop, Prof. John E. Carroll presents “*Pastures of Plenty: The Future of Food, Agriculture and Environmental Conservation in New England*”. It is an exhaustive examination of how agriculture in the region has evolved down through the centuries and how the influences of landforms, climate, science, technology, economics, politics and human behavior have brought us to where we are today.

Can New England enhance its environment with agricultural activity? What of strengthening food security for the region’s people? What are the public policy issues involved in expanding production agriculture’s impact? Where will the financial and intellectual capital come from to carry agriculture into the future?

There are many questions such as these to be answered, and this work affords us a vast store of ideas and information to help us with the task. It is sure to be a valuable tool for all who have a role or an interest in New England’s agricultural future.

Steve Taylor was the longest-serving state Commissioner of Agriculture in the United States. He served New Hampshire in this capacity for twenty-seven years, retiring in 2007.

## Executive Summary:

Based on the foundation of *The Wisdom of Small Farms and Local Food*, this volume focuses on sustainable agriculture and food security in four New England states: New Hampshire, Maine, Vermont and Massachusetts. The central theme of *Pastures of Plenty* is the future of New England's food security, established on a foundation of grass farming, of animal agriculture, of pastures and grazing. This work describes the grazing soils and other natural resource assets which insure a wide range of meat and dairy production in the region, fully integrated with diverse crop, fruit and even grain production in a biodiverse and ecological manner. All is predicated on direct marketing, farmer to consumer, at a scale appropriate to New England ecological, economic and cultural realities. It provides a path to New England's future food security.

This is NHAES Publication #2340 from the New Hampshire Agricultural Experiment Station. It is a product of Hatch Project 472.

## Acknowledgements

I am indebted to Prof. Sid Pilgrim of the UNH Department of Natural Resources for his very valuable grazing soils maps and map interpretation which appear in this volume, as well as for his review of the manuscript.

As in the preceding volume, I am indebted to the artistic and graphic design skills and illustrations of New Hampshire water color painter Karen Holman.

I am indebted to the University of New Hampshire College of Life Sciences and Agriculture, to Interim Dean Bill Trumbull and Dean Thomas Brady, and to the New Hampshire Agricultural Experiment Station, for funding assistance and for providing me the climate and moral support to carry out this work.

I am grateful to New Hampshire Commissioner of Agriculture Steve Taylor for his manuscript review and for his authorship of the Foreword. I wish him all good luck as he enters a well deserved retirement after long tenure at the helm in New Hampshire.

I'm grateful to the University of New Hampshire Master of Liberal Studies (MALS) Program, and its Director, Professor David Andrew, for funding assistance.

And I'm indebted to my colleagues in the UNH Department of Natural Resources, and its Chair, Dr. Mimi Becker, for providing a wonderful climate of support in which to conduct this work.

Finally, I'm grateful to my wife, Diana, for her ever present support and for her careful reading of the manuscript.



## Prologue

This book is an excursion into and through the ideas and practical application of food security and agricultural sustainability in four states in northern New England: New Hampshire, Vermont, Maine and Massachusetts. It starts where New Hampshire's prescient 1979 study of food security, "*Who Will Feed New Hampshire's Residents Five, Ten, Fifteen Years From Now?*", left off. That 1979 study, like similar studies in many other states, never went anywhere and gathered dust on the shelf for nearly thirty years. Its intent was to lead to a food policy that never saw reality, and for one very good reason: with the onset of a quarter century of cheap food fueled by cheap energy, people turned away and ceased to care. Full supermarket shelves at the lowest food prices in the world did the trick: who cared about lost nutrition, lost soils, lost farms and farmers, lost rural communities, lost food and farming culture, lost ability to feed ourselves on our own land? Wendell Berry's wise words with respect to starvation, "It can happen here", fell on deaf ears. Today, with farm land and agricultural soils lost, with health and nutrition gone, with a kind of hunger called obesity and other health problems facing us, and with more expensive energy and a rising feeling of food insecurity, with a missing and lost connection to nature, to our land, to our sources of food, we face new challenges. Given our basic need for security, for reconnection, for re-localization in our own communities, this book is designed to help answer the need of northern and central New Englanders to overcome the food and related challenges on our horizon, to give us direction, to show us a way. And it will serve as a model for other regions. Based ultimately on land ethics, including the work of the greatest of all land ethicists, Aldo Leopold, and coupled with its predecessor, *The Wisdom of Small Farms and Local Food*, this book is a source of ideas and practices that we can and must try as we re-learn and re-connect to the natural systems around us, agro-ecological systems of which we are a part and upon which we are fully dependent.

Local agriculture and the local foods movement is a tool for land conservation, and it is a power, a force, a force against sprawl, a force for open space protection and preservation throughout New England. It is, indeed, the most powerful force there is, and environmentalists, conservationists, need to learn how to use this most powerful tool. It is my hope that this book helps answer that need.

**"The salient fact about life in the decades ahead is that it will become increasingly and intensely local and smaller in scale ... Complex systems based on far-flung resource supply chains and long-range transport will be especially vulnerable. Producing food will become a problem of supreme urgency."**

**James Howard Kunstler**



*“There’s something about productive open land. It reaches people. It strikes a chord, and they get more vision.”*

*Joan Appleton*



*“The greatest fine art of the future will be the making of a comfortable living from a small parcel of land.”*

*Abraham Lincoln*

## Chapter One

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### ***Food and Agriculture: A Central Organizing Principle for Our Land and People***

For most of human history, the production of food and its marketing and distribution have been the central organizing principle of community life. Such has ceased over much of the 20<sup>th</sup> century. Might agriculture, and the food system which it supports, once again, in the 21<sup>st</sup> century, become that central organizing principle? Widespread failure of the present large-scale industrial model farm and food system would surely force that return to the local. So also at the moment, though less dramatically, will consumer preferences.

A central organizing principle is a principle around which the life of the community, or individuals, is organized. The necessities of life (food, clothing, shelter) have been central organizing principles precisely because they are necessities. Food production, processing and marketing would naturally have been such a central organizing principle for humans, and all human communities, over most of history.

An example of a central organizing principle of human community in modern times is the car. So much of our design, planning, architecture, and the organization of our lives, is dictated by the motor vehicle and its vast infrastructural support system (roads, parking, fueling, numerous services) and, as well, the disappearance of competitor systems such as trains, trams, buses. And so much of our way of life is influenced by, even governed by, the availability of the car and its use, including where we live, where we work, where we shop, how we move about, and, importantly, how much we move about and for what reasons. This includes moving about as an end in itself rather than as a means. The car is so fundamental that it also underlies, very significantly, how we use land, including agricultural land, how we value land, including farmland (whose value is greatly reduced as farmland due to competition from the higher valued uses), and the pattern of sprawl which we all witness and live with. Underlying the role of the car as such a central organizing principle is the long-term availability of cheap fuel for much of the past century. This cheap fuel/cheap energy availability, especially in the form of oil and natural gas, not only provides the foundation for the central role of the car, but provides as well the foundation for cheap food prices. It also enables the long-distance transport of food which has demolished the role of locally available food and smaller-scale farmers and food production. It has also resulted in the lower nutritional value of food due to the direct linkage between the length of time between harvest and consumption and the reduction in nutritional value that accompanies that time delay.

Local agriculture constituted a central organizing principle for New England communities and New England food systems in an earlier time, both in upland regions and in coastal lowland regions. What can we learn from such New England and regional systems, including those in the Maritime Provinces of Canada, that can aid and help facilitate movement toward renewal of such locally secure food systems in the future?

In a film that I have shown to my students a hundred or more times over many years, there is a scene which is deeply and indelibly imprinted in my mind. Narrated in the voice of American environmental philosopher and philosopher of the land Wendell Berry, the scene is that of a large American supermarket, shelves completely empty, totally devoid of any food, an eerie and disturbing sight to be sure. And Wendell is describing food shortages and disruption, hunger and starvation. He remarks, “Don’t ever think it can’t happen here. It can and it will”. That is, if we are not smart enough to pay attention and act wisely. We all know the public reaction to word that a storm, perhaps a hurricane or a snowstorm, is on the way: people crowding into local supermarkets quickly depleting the stock. We seek a security blanket and want to be assured that, if travel gets a little difficult, if the electricity goes out, we’ll be supplied. We overreact in these circumstances, often our own detriment. (Spoiled food and local temporary food shortage is the result. An inconvenience to be sure, but it could be much worse. Our behavior can do us in.)



When people in my town, Durham, New Hampshire, ask me why my concern over the protection of the remaining good agricultural soils in our area, I speak not only to future local needs for locally grown and locally accessible food, but also to the irreversibility of the decision, intended or otherwise, to destroy those soils for short-term “economic development”. We have in our town an official map of important agricultural soils, soils of both state and local agricultural significance. The map indicates that much of our southeastern New Hampshire town is covered with such soils, many of which have already been destroyed by development, residential and commercial. An effort is being made to save some of the rest, mainly through expensive “conservation easements”. When people in town ask me why my concern over the protection of these significant agricultural soils, undoubtedly they are thinking of full supermarket shelves and continuing cheap food prices. I then ask them a basic question: do you believe that our present agriculture and our food system is sustainable? Most people have never even thought about this, and certainly can’t conceive of empty supermarket shelves or of any form of food insecurity. But how many know the reality? How many of them know

- That their food travels at least 1500 miles (some say 1700 miles or even more), now referred to as “food-miles”, from its source to their dinner table?
- That energy inputs relative to outputs (that is, energy units invested to energy units returned) are three to one in the field and ten or even thirteen to one at the dinner table? How much more inefficient could we get?
- That the energy content in food is 98% oil and natural gas, and only 2% all other forms of energy combined?
- That we must have oil before we can eat?
- That as we approach a condition of peak oil (that is, the global peak in oil production), we face both steadily rising prices and supply disruption, creating serious vulnerability in our food security as well as our energy security?
- That our roads and bridges are deteriorating and our ability to maintain them declining (partly due to the rapidly rising price of asphalt, concrete and steel, oil-based and energy-intensive), precluding future dependence on long-distance transport of food (and everything else) by truck? (Increasing broken axles on rigs hitting potholes is one measure of this deterioration.)

This is food for thought which engenders, at the least, respect for Wendell Berry’s admonition. It can happen here.

The New Hampshire Agricultural Experiment Station (NHAES) published, in the Spring of 2005, Publication # 2260, *The Wisdom of Small Farms and Local Food: Aldo Leopold’s Land Ethic and Sustainable Agriculture*. This research illustrates the application of the American environmental conservationist and ecological ethicist Aldo Leopold’s land ethic to the practice of sustainable agriculture. The publication further details how four land grant universities, two in the Midwest and two in the Northeast, have put into practice this philosophy and values system of sustainable agriculture in the context of their three-fold land grant university mission of teaching, research and extension.

This sequel, New Hampshire Agricultural Experiment Station Publication #2340, *Pastures of Plenty: The Future of Food, Agriculture and Environmental Conservation in New England*, brings the research home to New Hampshire and to its three immediately neighboring states, Maine, Vermont and Massachusetts. It responds to the need for both food security and open space protection with the environmental conservation aspirations of this four state region in northern New England.

This study is predicated upon five assumptions:

1. That a food system based upon food produced thousands of miles from its market is not a sustainable food system, either from an energy or an environmental perspective;
2. That New England, as any locality in the United States, is capable of feeding itself from internal and nearby sources to a much greater extent than it now does, and that it should, therefore, do so;

3. That New England has the soils, climate and geographical circumstances, as well as the cultural heritage, to support a strong grass-based agriculture, an agriculture producing significant amounts (in fact, copious amounts) of meat and dairy product as well as a wide range of mixed vegetables, some grains, and many specialty food products, and should, therefore, reinstitute a supporting infrastructure to do so;
4. That, given energy and environmental realities, particularly the circumstances of imported fossil fuels and the ecological need to significantly reduce carbon and other greenhouse gas emissions, New England must engage in relocalization in all areas of life, in food, in energy, in transportation, and in its basic economic reorganization;
5. That the land grant universities of these four states, including their Cooperative Extension systems, can play a vital and, in some areas, a leadership role in assisting the reconstruction, revitalization and, specifically, the relocalization of the region and people which they are called upon to serve. By this I mean the ecologically necessary re-ordering of our society toward a higher level of local independence, local self-sufficiency and local sustainability.

Why these four states? Because they constitute our locality. What does “local” mean? The word “local” is obviously relative. California might be thought of as “local” compared to China, Pennsylvania as “local” when compared to California. Likely the best way to approach this subject is to employ the idea of subsidiarity. This entails fulfilling our most basic needs from the nearest sources possible, keeping decisions and actions affecting ourselves and the well-being of future generations, the sustainability of the planet as a habitable place for human beings, as close to the people affected as possible. Such enables them to accept moral accountability for their actions and behavior, to, in other words, be ecologically ethical, both in terms of Leopold’s land ethic and in other terms of ethical principles.

That being said, the area of responsibility of the New Hampshire Agricultural Experiment Station, the state of New Hampshire, and its three neighboring states, Vermont, Massachusetts and Maine, all with very similar physical, ecological and cultural-historical circumstances, have been arbitrarily chosen as the geographical base for this book. A desire for geographical emphasis precludes equally intense treatment for Rhode Island, Connecticut, New York, Quebec, New Brunswick or Nova Scotia, but much of what is included in this study will be equally applicable to these places.

The four state study region and its surroundings has the proper circumstances for a much higher intensity of food sustainability, a higher level of food self-sufficiency, predicated on geography, soils, climate, exceptional nearness to large market demand, transportation infrastructure, and a heritage of significantly higher level of food self-sufficiency in the recent past. The region also has four very similar land grant universities in terms of their infrastructure, their missions and their heritage, institutions which have worked together in the past and which could do so much more in the future.

Because so much of the food production reality and the food security of these four New England states lies in the potential of grazing, of a grass-based agriculture, special focus will be placed in this study on the role of grazing, of pastures, and of the newer developments in intensive rotational grazing (also known as management intensive grazing) which can be used to support a meaningful and substantial food-based economy in New England. As Vermont farmer Abe Collins tells us, the planned grazing of livestock on perennial grasslands is the single most powerful tool we have to restore ecosystem health and functioning to our agricultural lands. We should not ignore such an important tool.

Attention must also be given to the integration of crop and livestock agriculture, including fruit and specialty crops, to achieve an economically healthier outcome. And attention must be devoted to direct marketing techniques to insure sufficient revenue flow and thus economic incentive to the producers, leading to keeping more people on the land and attracting more people to small-scale farming, outcomes which can only lead to the fulfillment of two principle goals of this book:

- a higher level of regional food self-sufficiency and food security; and

- protection of open space and agricultural potential for future generations.

Any book about practice, including this volume, must be based, and is inevitably based, on some kind of value system, a philosophy, a set of assumptions about how the world works. This volume, conceptualized as a sequel to the earlier work, *The Wisdom of Small Farms and Local Food: Aldo Leopold's Land Ethic and Sustainable Agriculture*, is, like its predecessor, based on the philosophy and values of that Leopoldian land ethic. Leopold, whom many consider America's greatest and most revered environmental philosopher, lived through the first half of the 20<sup>th</sup> century. The reader is referred to that earlier volume for a full description and analysis of Leopold and his land ethic. That land ethic of Aldo Leopold, Robert Thorson suggests, helped stimulate late 20<sup>th</sup> century reoccupation of rural New England.

## A Question of Perception

In environmental studies, it is often said that resolution of environmental challenges cannot come about without a change in peoples' basic values, a conversion of sorts. The Leopoldian land ethic, in all of its wisdom, is not the dominant ethic or value system in America today – not by a long shot. So if that ethic is to guide us, a change, a conversion, is needed. It is difficult to bring about a change in values without a change in perception. Portland, Maine and its Museum of Art recently became the only arts institution in the United States to exhibit the work of masters of perceptual change, the contemporary American installation artists, Christo and Jean Claude. Known for their controversial “wrapping” of buildings, bridges, coastal headlands, rivers and trees, the point these artists are making is that the way people perceive, and thus the way they think, can be changed. In wrapping everyday objects, the artists obscure the original form and function of the object, and introduce a modern sense of ambiguity and curiosity, the exhibition tells us. These artists directly challenged the function of art since the Renaissance when, we are told, the visual arts were seen as a window on the world and a means of revealing religious, political or social truth. If objects and perceived reality can be neutralized of their usual associations and set in new relations, then people will be at least enabled to perceive and to think differently. True change can be the result.

It is a purpose of this book, therefore, to bring about basic change in the perception of New Englanders toward their food sources, toward agrarian and ecological values, toward an ethic of sustainability, and toward their land and environment and the resource production capability which it contains. Perhaps the extraordinary grazing soils maps of Sid Pilgrim and the new discourse on grass farming, on intensive rotational grazing, can be the “wrapping” that can help people perceive differently, to develop a new and ecological vision.

In terms of that vision, according to the philosopher Mircea Eliade, people were less aware in the past than we are today of belonging to the human species. Rather they belonged to a kind of cosmic biologic participation in the life of their landscape – the land. They had, therefore, a feeling of connectedness to the land which we can

### LEOPOLD'S LAND ETHIC

**Leopoldian philosophy has been largely driven out of Leopold's own country, the Farm Belt of the Midwest. In his famous essay, “The Farmer as Conservationist”, Leopold argued as if the farmer were in control of land use and therefore the possibility of land stewardship. In Leopold's time the Midwestern farmer was in the driver's seat. This is no longer true in the Midwest, as the forces of control over land use today come from above, in the ruling industrial model of agriculture. But Leopold's model is workable and realistic in New England where, generally over the past and increasingly today, the farmer/landowner is in the driver's seat. Thus, the Leopoldian land ethic and model is far more realistic in New England today than it is today in Leopold's own homeland.**

**If the appearance of the farm landscape is a reflection of the farmer's land ethic, then it is obvious that the uniform monocultural farm landscape of much of the Midwest – endless corn, soybeans and hogs – has rejected Leopold. The New England farm landscape - to the extent it remains, and that is the problem here – is far more reflective of Leopoldian land ethics, is far more biodiversified and ecological, and far more hopeful for the future. Leopold's is an applicable model here: the farmer is a conservationist, a student if not always an icon of conservation biology.**

barely imagine. Most maintained a subsistence form of living, which means they lived and existed in reality, not removed from reality. Thus, they routinely and automatically followed the maxim “Let nature never be forgot. Consult the genius of the place in all”, as Wes Jackson is fond of telling us. A first precept of this book about New England is advice to the reader: Learn from nature. Consult the genius of this place, for proper sustainable agriculture, ecological agriculture, could be said to be about elegant solutions predicated on the uniqueness of place.

The American environmental philosopher and poet Gary Snyder, a favorite in my own environmental philosophy classes at the University of New Hampshire, tells the story of an American Buddhist monk and Director of the San Francisco Zen Center who journeys to Yosemite National Park and observes the Great Falls of the Yosemite. He sees the oneness of the river above the Falls and the oneness of the river below the Falls. But he observes the great fragmentation of the river in between, as countless individual droplets of water fall over the precipice. He sees this as a metaphor for our lives. We come from oneness. We live lives of great fragmentation and reduction. We return to oneness at our death. We see this vividly in our agriculture, in our treatment of the land, in the production of our food.

We come from dust, from the soil, from oneness; and to the dust, the soil, the oneness do we return. But what about in between, what we call our lives? Fragmentation, duality, separation abounds. But ecology, and ecological agriculture, agriculture which is truly sustainable, teaches us otherwise. It shows as an alternative to that separation, that fragmentation, a better way. Such agriculture is a practice arising from an ecological value system. It is an agriculture which we must devote our lives to if we are to achieve or even approach sustainability. It is an agriculture of biodiversity, an agriculture of rotation, an agriculture which puts the soil first, an agriculture of grass farming and grazing, of animals on pasture, an agriculture of serious organic methodology, an agriculture requiring connectivity (i.e., direct relationship) between farmer and consumer. It is the agriculture, the food production system, upon which this book is focused.

## **Sustainable Agriculture and Environmental Conservation in Communion**

What we eat, our choice of food, significantly determines our land use, even the landscape in which we live, as well as our energy use and our environmental quality. Our land use, our use of energy and our environmental quality significantly determine the environmental questions, the natural resource questions, we face. If we don't get our approach to what we put in our mouth right, we cannot resolve natural resource and environmental challenges. Eating is, indeed, our most direct impact on our environment, on our natural resources.

Sustainable agriculture is ecological agriculture. Ecological agriculture is the underpinning of a sustainable society, of the Conserver Society. As a Professor of Environmental Conservation, I am naturally interested in, and involved at, the intersection of sustainable agriculture and all forms of natural resource conservation.

Aldo Leopold, whose philosophy and values constitute the philosophical foundation of this work, was one of our nation's first professional foresters. He was a wildlife biologist extraordinaire, author of the basic text in the field. He was a champion of land conservation and restoration, a conserver of soils and water, a proponent of small-scale farming, and among the earliest icons of agricultural sustainability. He gave us the “Bible”, as it were, his Leopoldian land ethic. Agriculture, ecological agriculture, sustainable agriculture, is one of the most basic of natural resources, and the one with which we intersect more than any other, in fact multiple times per day. It is the one natural resource upon which we, as individuals, can have the most direct effect. And it is the one in which we are all most directly involved. If you eat, you are involved with, you have an interest in, a stake in, agriculture. All other aspects of natural resources evolve from that center.

We New Englanders are descended from forebears of only three or four generations who were heavily dependent, in this pasture and grass-rich region, on animal grazing and the product of such grazing for their sustenance and sustainability. If those forebears of ours could not have been sustained by the protein of grazing, then we couldn't exist today. And if our forebears came from elsewhere in North America, or more recently from overseas, the likelihood remains that they too were significantly sustained by grazing as well. Hence we,

who hardly know grazing and nowadays rarely experience the sight of grazing animals, owe our very existence to this form of agriculture. We New Englanders can and may very well return to that state of affairs, that basic source of our food, in the future. Our geography, our ecology, our economy all allow for it.

## **An Opportunity to Choose “Conservation Food”**

Few Americans are aware of the power they hold, as individuals, to bring about change. Few are aware of the power of the fork, the power of the personal choice we make as to what we put into our mouth. After all, this is something we do very frequently every day of our lives. Agricultural writer Michael Pollan tells us that our eating decisions are biological votes for the world we want to have. Over fifty years ago, the great American environmental philosopher Aldo Leopold taught us the difference between exploitation food and conservation food. Exploitation food is any food whose production causes exploitation, of people, of soil, of nature, of future generations, all of which is harmful to life, to our sustainability on this planet. Conservation food is that food whose production conserves, conserves soil, conserves biota, conserves ecological diversity, and ultimately conserves people and society. Conservation food is thus that food which insures sustainability. In modern terms, exploitation food comes particularly from large-scale agriculture conducted within the industrial model. Conservation food comes particularly from smaller-scale and mid-scale agriculture, especially local agriculture for local markets, and produced under an ecological paradigm. Being inherently sustainable, conservation food is obviously the kind to be desired, as it alone insures food security and a steady supply of food indefinitely into the future.

## **New England: An Agricultural Region?**

New England, which is America’s oldest farming region and the place where Americans largely learned how to farm on this continent, is not normally thought of today as an agricultural region of any importance. The reason is obvious: most people’s image of farming is tillable lands and crop-producing soils, neither of which defines New England very well in comparison with much of the rest of the nation. Add a short growing season and the region appears to hold very low potential for its own food production. But such is not the case. New England is, conceivably, an ideal environment for pasturing, for the grazing of ruminants, for cattle, sheep, even goats and hogs and poultry. This spells a wide range of both meat and dairy products, a protein factory of high potential. New England has plenty of water and, in many areas, the right soils to produce the lush grasses and other forages upon which such food production is based. New England fields have many rocks and stones, a liability to crop farmers but of little consequence to graziers. New England has slopes and hillsides much more than it has level land, a big problem for those who would till the soil, but again of little consequence to diversified intensive rotational grazing. Rocks and stones can actually enhance the productivity of the soil, given their ability to store and slowly release heat and to shelter moisture. And rolling land of peaks and valleys, when not too steep, should not cause erosion if the grazing is done right (i.e., intensive rotational grazing, and ideally with diversified livestock). (Ironically, the single steepest state in the region is Vermont, the state with the most pasture grazing in all of New England.) New England, therefore, with its considerable pasture potential, may be able to produce more of its own food, and higher protein food, than most people might think at first glance.

The key is in the method, and in the philosophy behind that method. A large, diversified and very nearby market with both the means to pay and a value system supportive of local food, coupled with a long regional heritage in small-scale agriculture and a strong desire to save open space, combine to suggest an equally strong potential for this form of economic development in the region.

**Exploitation food is any food whose production causes exploitation, of people, of soil, of nature, of future generations, all of which is harmful to life, to our sustainability on this planet. Conservation food is that food whose production conserves, conserves soil, conserves biota, conserves ecological diversity, and ultimately conserves people and society. Conservation food is thus that food which insures sustainability.**



## SEEING NEW ENGLAND STONES AS A VALUABLE RESOURCE

For a long time in America we have applied the word “waste” to the very valuable resource of cow and other livestock manure. How foolish we’ve been to discount such a valuable resource by assigning it a negative connotation. (Of course, manure can be “waste” and a liability rather than an asset if it’s overly concentrated or overly contaminated with antibiotics and chemicals. But it need not be. We make it so.)

In a similar vein, we hold a negative view toward the numerous rocks and stones in New England fields and woodlands. If tillage or use of tractors or other mechanical equipment is the intent, then rocks and stones are an obvious liability. The presence of quantities of rocks and stones at the surface has contributed to New England’s reputation as a region poor for agriculture (read: tillage). But need such stones be a liability? Or could they be an asset?

Stones absorb the heat of the sun, store it, and slowly release it in an otherwise cold climate situation. And stones provide considerable micro-shade and moisture in a time of drought. A stony, hilly field, therefore, may have more productive potential than might otherwise be the case. Productive for what? Productive for the pasture grasses that make for excellent grazing potential. New Englanders have been aware of their region’s strong potential to support grazing animals for the past nearly four hundred years. And they have been doing grazing in the presence of New England’s stony, rocky geological heritage. Just as we need to reevaluate our thinking toward manure, we need to reevaluate our current negative attitudes toward our stony soils and their food production capabilities.

Robert Thorson writes, “(C)onventional wisdom held that small stones helped make soil more fertile. Some farmers actually worried that they would deplete the soil by taking too many of its stones away.”(1)

Thorson also reports that “...the stoniness of New England has been exaggerated. Agricultural reports make it clear that New England soils in every state were, during the seventeenth and eighteenth centuries, and remain today, highly fertile when managed wisely.”(2)



The agricultural limitations of New England are thought to be well-known:

- a long winter and short growing season (albeit an increasing length of growing season with climate change);
- a land of thin, stony, rocky soils not particularly fertile for crops;
- a general lack of flat tillable land with many slopes.

#### WHAT CAN YOU GET FROM GRASS?

**Dairy Products: cow and goat milk, cow cheese, goat cheese, sheep cheese, butter, cream, ice cream, yogurt, eggs**

**Meat Products: beef, lamb, pork, chicken, goat, bison, elk, duck, geese, turkeys**

These are, however, crop limitations and not grazing limitations. Three hundred years of European settlement in New England has taught the value of New England for livestock grazing and for the good food product of that grazing, whether meat or dairy. In the past fifty years, however, we have forgotten about grazing, about pastures, and about the many food products available to us in New England from that valuable local source. We need to re-learn that lesson, for New England soils, New England water, and New England growing season are all supportive of grass farming or grazing, as an important local source of food and, as well, an important part of New England land use and local economy. New England can, therefore, sustain more agriculture than we commonly perceive.

This volume is optimistic in its tone, and there is, indeed, plenty of reason for optimism when considering what New England's food future could look like. But, in assessing the local food and farming climate in the Northeast, hard-headed skeptics might well posit barriers to a local food and farming revolution in the region. Points they might raise include:

1. **Cost of Food.** Continuing uncertainty as to whether and at what point people might be willing to spend a greater percentage of their income on food as long as cheaper alternatives, the product of industrial agriculture, are still available from outside the region;
2. **Cost of Land.** Continuing high land purchase costs in the region (although leasing from landowners wanting to keep the land open and productive is an antidote if long-term leases can be secured);
3. **Lack of Farmers.** Insufficient numbers of people in the region capable of farming or willing to farm (although steady demand for locally grown food might eventually overcome that weakness and encourage more entrepreneurialism in agriculture).

Compensating for these challenges is the increasing regional interest in preserving remaining open space, in protecting remaining open land and farm land, and in stopping sprawl. The growing number of land trusts and of state and local bond issues across New England and the Northeast designed to secure such land and keep it open, motivated not by food but by protecting open space, is an outcome of such interest. The practice of agriculture, particularly small-scale and organic agriculture, is increasingly seen as a way of keeping land open. Farming thus becomes a tool, and a critical tool, in the work of open space protection.

Further compensation for these challenges is found in the greater national interest in and concern over security and the perilous vulnerability of our long distance, strung out, fossil fuel-dependent, highly centralized and exposed national food system. Such a system cannot



compete with a highly decentralized, and therefore very secure, local food system, a food system not dependent on long supply lines, nor on availability, nor on the cost of fossil fuel. This motivation, again, is not for local food but rather grows from mistrust and lack of confidence in the present food system.

## Food Security

Security is much on peoples' minds these days. National security, global security, personal security. Security from terrorism. Security from the threat of global climatic change. Security from loss of health. Security from bankruptcy. Job security. But we don't give much attention to one of the most basic forms of security, that of our food supply. Food which lies 1500 miles, or sometimes many thousands of miles, from our stomachs cannot be, by definition, very secure. Oil, its price, its volatility, its costs, or its threatened scarcity, cannot, in reality, be a comfort to us, given our great (and grave) dependence on it. With each molecule of the food we eat every day coming from an average distance of over 1500 miles; with each food molecule depending 98% for its energy source on just two fossil fuels, oil and natural gas, both largely imported from overseas; with terrorism an active threat; with competition between corn-based ethanol energy and food; with food contamination a threat from the industrial system, both domestic and foreign, which produces it, how can we possibly feel secure about our food supply?

The word "sustainability" is much on the lips of all Americans today. Any basic understanding of ecology reveals how ecologically unsustainable our food system is, how unsustainable for the soil, the land, the ecosystem, how unsustainable for the economic and social, including geopolitical, system which is its means of production and delivery. Full supermarket shelves with, seemingly, the greatest diversity on earth, and at the cheapest prices, are, indeed, cause for deception. Ultimate dependence on only twenty or so different types of plants, and very heavy dependence on only corn, rice, wheat and soy, suggests disaster and the very opposite of sustainability.

Much less talked about or thought of is food as story. To sustain our food, and therefore our lives, our being, we must know the story of our food. Very few do. We do not know where our food comes from. We do not know of what or how it is made. We have no relationship with its source, with the people who produced it, with the soil, with the farms. We have no sense of the food history of our own region, New England, with what it once produced, of what it can produce. We certainly have no idea of the adequacy, nay, the potential of our region for grass farming, for pasturing, for grazing. Of perhaps less consequence but nevertheless of importance in our growth-stressed region, even many of our environmentalists and land conservationists fail to see the connection between food production and open space preservation in these urbanized and urbanizing New England states. Our failure to know or understand our story has and will continue to be costly, perhaps most directly in something it deprives us of - our vision. Failure to change will cost us sustainability.

It is said that, without vision, the people perish. We will need that story and a good understanding of who we are and where we fit in if we are to have the vision we will need, if we are to change what we must change. All of the foregoing calls for a new era of agriculture in New England.

## The New Agriculture – Rising from the Ashes

The conventional agriculture of New England, that form dominant in the post-WWII decades, has significantly declined, in fact, largely disappeared from the New England landscape. Remnants, particularly of dairy, remain, but are much diminished in size. Commercial poultry production is long gone, and sheep, hogs and other farm livestock are ever harder to find. Commercial crop acreage and production

**Failure to change will cost us sustainability.**

**A refusal to believe in a different future is hobbling us.**

supporting conventional commodity agriculture is also down throughout the region. All of these very visible circumstances convince many people that farming is a thing of the past for New England. And many can't yet see what lies just below the surface: a renaissance in New England agriculture, but at the small farm level. And so diverse is the nature of that agriculture that no one product or commodity stands out. But the most visible sign of this renaissance, this agricultural renewal, is the great growth in farmers markets, followed perhaps by a proliferation of CSAs and ever more restaurants serving local food and printing farm names on their menus. And, indeed, the new farming is taking hold. The number of farms and farm acreage bottomed out in the mid-1990s and has been growing since. Both Massachusetts and New Hampshire farm numbers are increasing, while farm size is holding steady. This is attributable to strong local markets as well as a growing desire to farm.

The post-settlement history of New England agriculture has been one of relatively brief periods of farm prosperity within a framework of much more common eras of farm (and farmer) trial and tribulation. Recent challenges and setbacks to New England farms have all but resulted in the demolition of the art of farming in the region. Most are familiar with the collapse of dairy, of poultry, even of mixed vegetable production over so much of the region, spurred on by both price declines and intense competition from other regions and the expense of land and the movement toward more valuable non-farm land use. And yet a case could be made that we are now at the cusp, at the very beginning, of a new era of farm prosperity in New England, the first in a very, very long period of time. In spite of high land values, all the factors suggesting farm prosperity are in place. But first we must look more closely at what has been.

## Revolution on the New England Landscape

In 1968 I wrote a Geography Master's thesis on land use change on eastern Long Island, New York. That thesis documented the dramatic change in land use from agricultural to residential and commercial use over a twenty year period, 1945 – 1965. In keeping with similar developments in other places in the northeastern United States, the direction of land use change in this area has been unidirectional, from farm to residential and commercial development. In fact, it was so consistently unidirectional that it is easy to understand why not only people in this region but all Americans would think of land use change as heading only in one direction: away from agriculture, both crop and animal, away from woodland and natural vegetative cover, and toward houses, businesses, and the multitude of highways and highway interchanges which serve them. One might ask what was promoting such intense, rapid and unidirectional change in land use patterns. The answer is not difficult to find: cheap oil, public subsidy to all aspects of the automotive and related fuel industry, the power of construction companies and their suppliers, and a panoply of public policies at all levels of governance insuring the forward march and fast pace of such unidirectional "development". (The very fact that we use the word "development" to describe a change of land status from farm and forest to pavement and buildings, and never the reverse direction, is symptomatic of the fact that this usage of the word is implicitly and universally accepted without question. Americans have lost any concept of any kind of change in a reverse direction.)

We perhaps forget that New England, indeed, has a long agricultural history, and has long been prominent for grazing in particular. Said King George III of England: "To what produce is your climate best adapted?" Replied Thomas Hutchinson, Governor of Massachusetts: "To grazing, sir. Your Majesty has not a finer Colony for grass in all your dominions; and nothing is more profitable in America than pasture, for labour is very dear."<sup>(3)</sup> True then, true today. New England remains prime grazing territory.

In the early 19<sup>th</sup> century, the world demand for Merino wool and the high price paid for that wool resulted in massive conversion of the New England landscape

**Aldo Leopold told us that economic and aesthetic land uses can and must be integrated on the same acre. To segregate them is to waste land and is unsound social philosophy. Every decision that farmers make about land use has repercussions for conservation: crop choice, rotation schedule, tillage crops, pasture management, what land to fallow. All affect the capacity of the land to provide ecological services (natural capital) and to maintain biodiversity. Leopold wrote "Conservation implies self-expression in the agricultural landscape rather than blind compliance with economic dogma."**

from forest to sheep pasture. New England soon had more sheep than people, and, in a relatively short time, most of this four state region was open pasture and tilled land, not at all like the forested aspect of today. At that time a mere 25% was forested.

In the late 19<sup>th</sup> century, the established New England urban foundation in textile mills ballooned, as a result of world demand, into many of the largest textile mills in the world, Manchester, New Hampshire challenging Manchester, England for some of the very largest.

Such mills, somewhat reduced in size, still physically dominate the landscape of many New England cities and towns today, although long past their original use.

The late 20<sup>th</sup> century brought with it the suburban sprawl experienced by virtually all American cities, towns and countryside, once again truly revolutionary in its impact on the New England landscape.

Each of these New England landscape revolutions was caused by national and international economic and political forces far removed from New England. National and overseas markets for Merino wool, similarly national and international markets for woolen and cotton textiles, the international pricing of oil in conjunction with the national automotive, steel and construction industries have all come together to power these dramatic and relatively large changes on the landscape of New England.

I cannot help but wonder if the current food and agriculture circumstance in the United States and in New England might lead to a new revolution on the New England landscape, a return to significant pasture, this time not for sheep, but for a much greater biodiversity of cattle, sheep, pigs and poultry, in some places goats and other food-producing grazing animals.

Arguments favoring such a revolution in the New England landscape include:

1. The expected high future cost of fuel, a circumstance which will attack sprawl head-on, and which will also have a significant impact on large-scale energy-consumptive commodity food production, on the industrial production model in which it is embedded, and the until now very low food prices;
2. The concerns over food insecurity involving long and vulnerable supply lines;
3. The routine use of antibiotics in food, associated as it is with large-scale animal confinement;
4. The animal rights and welfare questions now commonly raised;
5. The lack of nutrition in our food, connections to obesity and other health problems, and to increasingly frequent contamination of industrial food sources;
6. The increasing desire for fresh more highly nutritious food as food tastes change;
7. The interest in and desire for a connection, or at least a sense of connection, to one's own food source, perhaps better known as "relationship agriculture";
8. The ability of New England to produce far more of its own food supply, particularly through grass farming and pasture grazing;
9. The relatively low cost of capital and energy necessary to maintain such low-input sustainable and ecological agriculture;
10. The high efficiency level of ecological agriculture and the amount of production possible under newly developing intensive methods and practices, combined with the addition of some new technology such as light-weight movable electric fencing.
11. The enhancement of the culture and lifestyle of farming, signaling to young people that this is a worthy profession.

**"Modern industrial agriculture has been described as a method of using soil to turn petroleum and gas into food."**

**Richard Heinberg**

**"Agriculture is the first victim of peak oil."**

**Kenneth Deffeyes**

12. The pure simple pleasure of taste – when a strawberry tastes like a strawberry, a peach like a peach, a stalk of asparagus like asparagus.

Might the New England landscape appear very different from the one we know in just a few decades hence? Might there be many more small farms, pasture paddocks, grassy slopes and animals on the land than we could possibly imagine today? Might New England's true agricultural potential be realized once again? Might Governor Hutchinson of Massachusetts have been into something in his message to King George?

## Land Reform in New England

The phrase "land reform" is often used to denote the controversial practice of breaking up large tracts of privately held land, owned by individuals or corporate entities, and providing the land at little cost to landless people of little income. It is a common idea in Latin America where it is particularly controversial. But there can be a very different kind of land reform from which future New Englanders could gain great value. I posit at least three very specific kinds which might be witnessed on the New England scene in future years:

1. **Grazing Systems.** Conversion of scrubland and some woodland (not mature forest but younger woodland which has been high-graded of its more valuable wood) to pasture, and less frequently to cropland. As the new soils maps in this volume indicate, there is much territory in the New England states which have the soil, and the water as well, to yield productive pasture. The bulk of this land today is in unproductive or low production "pole stage" timber. Of course, eventually, if left alone or managed for longer-term rotations, a good proportion of this land would yield old growth forest. But that will take quite a long time – a half century or more. In addition to pasture and some cropland, this land, after conversion, can also provide a base for agroforestry and permaculture, that is, productive woodland strongly integrated into a farm (crop and animal) unit. This kind of land use conversion can be accomplished through the use of animals, taking full advantage of "natural capital", of the services on offer to us from nature itself. Joel Salatin of Virginia and a number of New Englanders have developed grazing and browsing systems generally starting with pigs and/or goats, graduating to sheep, thence cattle and chickens. Much research opportunity arises from these multispecies progressions, and the conversion itself, and this region's land grant universities are well equipped to conduct such research.
2. **Food and Grazing.** Conversion of extensive parking lots into (often back into) crop land, and some pasture. Parking lots, large and small, cover a substantial acreage in New England, as elsewhere. As transportation needs change, our need for them should be substantially less in the future than at present. Techniques are available for removing asphalt and recycling it into needed road maintenance, altering and decontaminating the soil of pollutants, and recovering the fertility of the land surface through composting, manuring, and practicing other soil-building techniques. These areas, after sufficient treatment, should come to favor those crops and grasses which favor well-drained soils. The land is flat and erosion should be minimal. Again, our land grant universities, the colleges of engineering as well as the colleges of agriculture, have the means and the qualification to conduct needed research in this area of land use conversion.
3. **Food Production.** There are many residential large-lot subdivisions across New England, at one residence per acre or larger tract. Many of these were built on farmland. Many are close to larger cities and towns. All of them today support lawns, other landscaped areas, and sometimes small gardens. Many of them lend themselves to permaculture and to small-scale crop production using the latest of bio-intensive methods for strong yield (including double and triple-digging, raised beds and season extension, among other techniques). They could become ideal for small-scale highly

**"The question of the survival of the family farm is really the question of who will own the people."**

**Wendell Berry**

efficient organic and ecological agriculture. I do not refer here to the well known WWII “Victory Gardens” but rather to an entirely new concept: a change in zoning laws so as to enable small management firms of professional gardeners to lease these small tracts from the landowners, invite the involvement and participation of the land owners if they so desire, and return the land to food production capacity. This land would be primarily dedicated to mixed vegetables but could occasionally support small-animal agriculture as well. Such small-scale agriculture, though labor-intensive, depends on very low capital and energy input and is highly efficient. With high food price return for locally grown, fresh, highly nutritious organic food, and with the possibility of long-term low cost leases, such a system is likely workable as a part of future New England food systems. (In today’s circumstances, this might be viewed as an odd idea. In tomorrow’s energy and food picture, it could be quite workable wherever there is a will, in local government, in the landowner, and in the lessee choosing to make a living in this manner. The system would only likely work where there are numerous small opportunities geographically close to one another so that the new farmer leasing these lands could produce a good quantity of product in a small area. The land grant colleges of agriculture could provide assistance in small-scale agricultural engineering and agricultural economics at the micro-enterprise level to further insure success in these endeavors. The resource economics and community development faculties and other faculties of our region’s land grant universities are equipped to conduct the systems research needed to sustain the organization and management of such multi-unit small-scale endeavors in residential food production.

**“(We exist) in a community that believes itself well and does not want to be told otherwise.”**

**Aldo Leopold, A Sand County Almanac**

## **Environmental Conservation and Local Agriculture: A Necessary Partnership**

Environmentalists are faced with a good opportunity, not only a potential partnership but a necessary one: local foods movement, organic movement, direct marketing movement, intensive rotational grazing movement, sustainable agriculture all add up to open space, anti-sprawl, wildlife habitat, cleaner air and water, and other goals that conservationists seek.

Natural resource and environmental conservationists, in New England as elsewhere, spend most of their time and energy on small stakes poker. And they are losing. Ecological ethicists and environmental philosophers, from Wendell Berry and Wes Jackson to David Orr and E. F. Schumacher, tell us that nothing less than a change in values, what I have described in *Sustainability and Spirituality* as a “conversion experience”, is what is required if we are to respond sufficiently, adequately, to our environmental and resource challenges, to change our path. I suggest that an attitude about food which favors the local, which leads New England toward significantly enhanced ability to feed itself, would achieve far more environmental conservation than would any endeavor thusfar undertaken by New England conservationists. The University of Massachusetts in the late 1990s told us that Massachusetts could fulfill one-third of all its food needs for its people if it chose to do so. This is certainly more than a five-fold increase in present food provisioning in that state, and in the other New England states as well. Such local food production would not only have vast repercussions on New England, and the



## NEW ENGLAND'S GREATEST NATURAL RESOURCE

It is natural that one might posit the following question to a Natural Resources faculty at a New England land grant university: What is the greatest natural resource in New England?

Many at present would likely answer “trees and forests”. This region is the most heavily forested in the United States, with two of its states, Maine and New Hampshire, being the two most heavily forested states in the nation. And the long history of forest exploitation, utilization and practice is obvious in this, among the oldest of regions in terms of European settlement. And all the New England land grant universities, except perhaps Rhode Island, have offered forestry programs for many years.

Historically, some might argue marine fisheries as it was, at one time, the greatest of New England natural resources. It is certainly the oldest of what we call natural resources, dating to Portuguese and English fishing colonies on off-shore islands as far back as the 16<sup>th</sup> century, well before permanent European settlement. And the rise and development of New England's coastal and off-shore fishery history set the pace for the practice and the culture of all the nation's marine fishery resources. This is certainly a natural resource which is now history, since the late 20<sup>th</sup> century collapse of the resource.

Given the prodigious rivers and the numerous large lakes of the region, along with the nation's earliest and perhaps most significant use of water power for industrial development, some might argue that water is the region's greatest resource. Water certainly holds an historical claim similar to that of fisheries. And, like the fishery, the hydro-power portion of the water resource has declined sharply in importance. The overall value of a sizable clean water supply perdures, however, and supports the high population now resident in the region, and, as well, a portion of the region's tourist economy to boot.

Mineral resources have never been a very significant natural resource in the region, in spite of the common occurrence of granite, and a state called the Granite State.

Few would regard agriculture as a major natural resource in the region, in light of so much greater agricultural productivity in New York, Pennsylvania, and even in New Jersey, the Garden State. Not to mention the Midwest and the rest of the nation. All other U.S. regions have much more tillable cropland than does New England. However, we must not be too quick in our dismissal of food production capacity in New England.

health of New Englanders, but also have truly profound repercussions on land use – saving significant quantities of open space, changing the aesthetic of the landscape, stopping sprawl, and even enhancing the region's water quality.

## Food: A Natural Resource

Food is a natural resource. With air and water, it is the most basic of all natural resources. And agriculture is a form of natural resource management.

Unfortunately, agricultural education/ agricultural science comes out of a culture separate from that of natural resources and environmental conservation. The dominant culture of agriculture, with few exceptions, proceeded down a 20<sup>th</sup> century industrial path (the exceptions being the soil conservation and “permanent agriculture” movements of the 1930s and 1940s, and the more recent sustainable agriculture movement, including the local organic movement).

The culture of natural resources and its companion, environmental conservation, including forestry, wildlife ecology and management, water resources, and some aspects of soil science, as well as environmental science and environmental management, has been more exposed to ecological thought and ecological values systems than has conventional agriculture. In agriculture this has meant a largely unfettered belief in economic growth, in commodity production per unit, in the dominance of the idea of “bigger is better”. In natural resource conservation and management it has meant some degree of acceptance of limits, long-term stewardship of soil and other resources, in small (or at least “smaller”) is beautiful, and even, at its extreme, in the more radical notions of endangered species and wilderness protection and preservation.

Agriculture and natural resource conservation, as academic disciplines, thus have been somewhat at odds with



one another. As recently as the 1970s the two were still at odds here in New England. But, with the lack of opportunity for truly large-scale industrial agriculture in this region, and with the demise of much of mid-scale agriculture, the professional field of agriculture here, including its base in the land grant universities, has largely disappeared. Natural resource disciplines, on the other hand, remain stronger. Small-scale agriculture, usually not taken too seriously in the land grants, is flourishing, today more than ever. It is just now beginning to be discovered and acknowledged by the land grants, institutions which, unfortunately, no longer contain the faculty and staff for very significant involvement in this movement, at least not here in New England. With merger and consolidation in the air on land grant campuses, this is likely the time to do what has always been the logical thing to do: unify agriculture and natural resources as one entity. And the more that small-scale farm systems and ecological approaches to agriculture rise in stature here, the more likely such mergers can succeed.

New Englanders increasingly agree that we must bring to this region greater food self-sufficiency.

## The Plan

This book is organized as follows:

Chapter Two focuses on grazing, and particularly the practice known as intensive rotational grazing, and pasture-based agriculture. Grazing is placed in a position of prominence, as befits the author's belief that grazing represents, more than any other form of agriculture, the best insurance that New England has against future food insecurity. New England's soils, water, climate, historical culture, and market demand indicate that grazing will play a central role in New England's future. This chapter provides substantial historical and philosophical information on the nature and power of grass-based agriculture, the current rejuvenation of this agricultural form in New England, the relationship between grazing and organic agriculture, and the evidence to support why it will be so prominent a food source on the future New England scene.

Chapter Three focuses on agriculture and integrity, an integral and highly biodiverse agriculture (which is what ecological or sustainable agriculture is all about), and ideas as to how such an agriculture might emerge in New England. It introduces the levels of integration, the service provided by natural capital, by the support of each unit in the farm and the farm system to every other unit of the farm and the farm system. It discusses permaculture, organic norms, the idea of "local" vs. organic, and related subjects.

## THE MOST IMPORTANT NEW ENGLAND NATURAL RESOURCE

**I posit that a sound candidate for the title "Most Important New England Natural Resource" might well be GRASS! Yes, grass. New England is not prairie grassland. And it is certainly not tropical savanna, two geographical zones that come to mind when one mentions grass. But grass it could well be. New England is well watered over all four of its distinct seasons, relative to all other areas of the country. And New England has excellent soils to support pasture, perhaps ten or a dozen such soil types well spread over the whole region. New England soils do have rocks. (A local farm manager told me his farm soils were varied, ranging from rocky to very rocky!) But of what consequence is that to pasture? Discouraging for tillage, yes, but not necessarily for pasture. And if European organic and biodynamic farmers are correct, those rocks might even harbor positive value, as a micro-heat source in cold weather, as a micro-moisture source in dry weather, and as a source of minerals through their weathering. We have seen the early recognition of New England grazing values in Governor Hutchinson's words to the King of England.**

**New England and its pasture soils have offered rich grazing over the centuries, and, as protein food sources for humans (meat and dairy) produced a great distance away become more problematic for reasons of energy costs and other reasons, New England production of such protein may again come into its own. New England pasture, and the soil and climate which supports it, may once again become New England's most vital and most significant natural resource. Agriculture, food production capacity, must never again be discounted, as an important, even critical, natural resource. Nor should agriculture's future role in New England be discounted or dismissed.**

### **THE FOSSIL FUEL CREDIT CARD:**

**As a people, as a culture, we have a great fear of going backward. We fear getting caught in a trap of nostalgia. This fear is so strong that we too often reject that from the past which can be useful to us today, an answer to some of today's problems. In his book, *Living Within Our Means: Beyond the Fossil Fuel Credit Card*, Kamyar Enshayan considers fossil fuel a form of credit card, and criticizes our dependency on the "fossil fuel credit card", a temporary dependency (a century and a half) and fast running out. Enshayan writes, "Am I suggesting that we commit the cultural sin of "going back"? I am saying that we should go ahead with the aspects of "back then" that were already advanced (in the past). I am saying that it is possible to regress while maintaining the illusion of progress. Any fool can create the illusion of wealth... But in the physical world of actuality where energy is King, true technological progress is one that allows us to do something better within our means energy-wise. That is, without using the fossil fuel credit card."**

**We must not fear wisdom from the past but rather learn how to put it to work.**

Chapter Four focuses on soils as a central consideration. The core of this chapter is the remarkable grazing soils maps of four New England states developed for this volume by soil scientist Sidney Pilgrim and colleagues. Why soils are so central to our consideration of a sustainable grass-based agriculture in this region is described in the text of this chapter.

Chapter Five focuses on animals, providing a case study focus on dairy, an animal-based form of agriculture so critical to the historical development of New England. Dairy affects much of the rest of agriculture and the use of farmland in this region.

Chapter Six focuses on various breeds of farm animals in particular, with an eye to determining which breeds are best adapted to the needs and demands of grass farming/grazing, and therefore most appropriate and realistic for the region. Much more work is needed in this important area.

Chapter Seven focuses on markets, explaining the critical value of reestablishing an agriculture with direct rather than indirect relationship with the people. And this chapter

describes the absolute dependency that our farmers in New England have on direct marketing to the end-user, whether through farmers markets, CSAs, restaurant, school and food service contract, or on-farm sales. Without these outlets, our local and regional farming system cannot survive and we will lose both our farmers and our farm land.

Chapter Eight focuses on our land grant universities as servants of the people and as institutions with a mission and an obligation to serve particularly the food, agricultural, natural resource needs and environmental needs of the people. Although their budgets are not what they once were, these universities remain the only institutions in the four state region with the physical infrastructure, the capital and the personnel to significantly carry out this task and provide this service. It is the people of these states who own these land grant universities – it's up to them to nurture and protect them and to expect of them the education, research and service which is their mission, their reason for being.

Chapter Nine concludes the volume with a focus on the importance of food independence, sovereignty, security; views local agriculture and local food security as a central organizing principle for our New England society to come; and highlights activities in the four states studied in this volume.

The first order of business will be to focus on a central organizing principle of this book, the role of grazing, of grass farming, for a food-secure New England future.

## ENDNOTES:

1. Stone by Stone by Robert Thorson (New York: Walker and Company, 2002), p. 124.
2. *ibid.*, p. 224.
3. Peter Orlando Hutchinson, comp., *The Diary and Letters of His Excellency Thomas Hutchinson, Esq.*, 2 vols., Boston, 1884-1886, I, 171.

## BOXNOTES:

1. (Kamyar Enshayan, *Living Within Our Means: Beyond the Fossil Fuel Credit Card*, Cedar Falls, Iowa: University of Northern Iowa, Local Food Project, 2005, p. 18)

### *Green-Up Time*

*Yesterday morning I did see*

*Blossoms on the apple tree,*

*I took a breath and thought,*

*Could it be, it's green-up time?*

*Then I began to look around*

*And in every field I found*

*Greens were pushing up through the ground*

*For green-up time!*



*From a song by Kurt Weill, Lyrics by Alan Jay Lerner.*

*Young Farmer,*

*by Liberty Hyde Bailey*

*He shall go out to the far green hills  
And he shall go out on the mains  
He shall go north 'long the rock-bound kills  
And he shall go south on the plains.*

*He shall go out to the desert reach  
Where the dead winds gather the sands,  
He shall go on where the waters breach  
Far down in their weltering lands.*

*He shall go forth in the winter's rage  
And away in the tropic fire  
And there he shall stand; nor fame nor wage  
Shall defeat him of his desire.*

*For he shall build on the good stout earth  
That he takes from the hand of God,  
And grip his place with a free man's girth  
And shall strike his fires from the clod.*

*No nature-doubts shall haunt him to fear,  
Storm and calm shall he walk with her---  
Together joined in the rolling year  
Where elemental pulses stir.*

*Temples shall rise on the land he smites  
Visions turn with his good plow-beam,  
For steadfastly on through days and nights  
There shall rest on his face the Dream.*

*From "My Great Oak Tree and Other Poems" by Liberty Hyde Bailey*



## Chapter Two

### *“A Perfect Place for Grazing”*

According to agricultural economist John Ikerd, “The three cornerstones of sustainability are ecological soundness, economic viability and social justice”.<sup>(1)</sup> Animal factories, that is, animals raised in confinement, represent the very opposite of intensive rotational grazing, both as a philosophy and as a practice. Such animal factories are deficient in all three of Ikerd’s “cornerstones of sustainability”. In the same vein, intensive rotational grazing meets all three criteria.

If this book has a centerpiece, a central axis, it is not sustainable agriculture or small-scale agriculture per se; it is not ecological agriculture nor agricultural integration per se; it is not local foods and direct marketing. Indeed, it is a practice. It is the practice of INTENSIVE ROTATIONAL GRAZING. All else follows. For New England, all else is enabled through grass, through grazing.

Thus, this book is largely the story and the vision of intensive rotational grazing, also called grass farming, in a certain place, New England. Hence, the geography, the philosophy, the economics, the science of intensive rotational grazing in New England form this book’s axis.

### **New England: A Land of Grass?**

Everyone knows New England as a land of forests, the Great North Woods. No one thinks of New England as a land of grass. That’s Kansas. That’s the prairie. That’s the Great Plains. But history indicates otherwise. The great Merino sheep industry of the early 19<sup>th</sup> century indicates otherwise. The great history of New England dairy industry indicates otherwise. Geography, ecology, the New England climate indicate otherwise. New Englanders know that, if they leave their backyard unmown, the soil wants to grow trees. And yet New Englanders of the past, including the native peoples, knew that that land would open, largely through fire, and would yield grazing benefit. And, in fact, when compared with the prairie grasslands of the Midwest, comparatively well-watered New England would yield generous high quality grass to support dairy and meat industry, rocks and stones notwithstanding. Water, weather, and especially fine grazing soils all add up to grazing potential for serious food production.

Larry Shearer, Massachusetts grazier, tells us that New England is a better pasture and grazing area than any place in the Northeast, West Virginia to Maine. His reasons include denser populations near urban markets, and this population’s greater environmental concerns. Circumstances for grazing in New England are better than anywhere in the world – as good as Ireland, he says. Organic production and consumption are increasing faster in the Northeast than anywhere else. Grazing is the way into that production, as well as a way of reducing our

**Maine Pastures: “We’ve got a perfect climate for growing grass ... Maine is a great place to farm if you want to grow grass crops for cows. We are probably some of the premier pasture lands in the country.”**

**Spencer Aitel, dairy farmer, interview on “Made in Maine”, Maine Public Broadcasting Network, October 27, 2005.**

**The best grasses are these that are native, those that grow in the ditch. We need to have more nutritional analysis of these native grasses which are really going to be the best option.**

**Julie Brussell, NH Cooperative Extension**

**“The French officer Marquis de Chastellux had been struck with admiration at the fine cattle he saw on the meadows at Greenland, New Hampshire; and the Connecticut Valley became noted for fat stock which another French observer, Brissot de Warville, called enormous. When slaughtered, such beeves helped the Boston market acquire a reputation for the high quality of beef offered there.”<sup>1</sup>**

**Howard S. Russell, A Long Deep Furrow: Three Centuries of Farming in New England**

energy imports. But, he notes, the thing that's missing is the research, for it just isn't there. (For specifics on that needed research, see Chapter 5 of this volume.)

## The Brief Rejuvenation of Grass and “Permanent Agriculture”

In the years immediately following WWII, there was a brief resurgence of public interest in the United States in grass farming and grazing. The USDA devoted its entire 1948 Yearbook of Agriculture, which bore the simple title *Grass*, to this subject. And a surprising amount of this national book on grazing was devoted to the Northeast, further validating the important historical actuality and future potential of grazing in the Northeast. There was also *Grassland Farming in the Humid Northeast* by UNH's Ford Prince, with important contributions by UNH's George Frick. And there were a number of other books published in the decade following the war, 1945 to 1955, books from the South and the Midwest, celebrating the wonders of grass and grazing as an important and inexpensive source of food. This movement did not last long, however, as two factors were entering the picture: industrial agriculture and the high profits it promised was stirring and soon came on rapidly, promoting confinement animal agriculture and the industrial production of crops to feed the now-confined livestock. And recognition grew in the conservation and environmental movements of how destructive bad grazing practice and overgrazing could be. Soon the mantra “zero grazing” came into vogue, grazing gained a bad image in the public eye (an image deserved, given the overgrazing which had occurred), and animal confinement took firm hold. Pasture grazing, grass farming, largely disappeared from the scene in the decades following. It was not until the 1990s, with the help of Allan Nation (writer and editor of *Stockman Grass Farmer Magazine*), farmers and writers Joel Salatin, Gene Logsdon, and others, along with the agrarian philosophy of Wendell Berry, that the current interest in this form of agriculture was able to gain a foothold and thrive.

“Permanent agriculture” is the 1940s expression for what we today would call “sustainable agriculture”. How interesting that the opening lines of the USDA's *Grass: The Yearbook of Agriculture, 1948* should begin in this way: “Our goal is permanency in agriculture – an agriculture that is stable and secure for farm and farmer, consistent in prices and earnings, an agriculture that can satisfy indefinitely all our needs of food, fiber and shelter in keeping with the living standards we set.” And the statement concludes “(A)round grass, farmers can organize general crop production so as to promote efficient practices that lead to permanency (read sustainability) in agriculture”.<sup>(2)</sup>

We got it right in 1948. We can hope to get it right once again in the first decade of the millennium. And grass may well be the key, particularly here in New England, in combination with an authentic, that is to say an ecological, land ethic.

We were perhaps wiser then, with the War and the Great Depression so fresh in our memories. A lesson taught. But it didn't take long before we embraced a new and much less ecological ethic, an ethic of consumption regardless of cost, an ethic that was to remain with us for at least half a century. Maybe we felt cheated from all the loss and sacrifice of those Depression and War years, and became angry. The most consumptive society on earth was perhaps the result.

**“When Cato the Roman philosopher was asked over 2000 years ago what was the most profitable thing a farmer could have, he replied, ‘A first class pasture’. Somewhat startled, his questioners then asked what the second most prized possession would be. ‘A second class pasture’ was his ready reply.”<sup>(2)</sup>**

But now it is time to return to permanence, to sustainability, to a land ethic, Aldo Leopold's land ethic of 1948 being as good a guide as any.<sup>(3)</sup> And it is time, therefore, to return to grass.

Since serious attitudes toward grazing and the very practice itself declined significantly in the decades after 1960, agricultural research and technological development, whether in the land grant universities, the agricultural experiment stations, the U.S. Department of Agriculture, or elsewhere, shifted to animal confinement questions. One would normally not, therefore, turn to these large traditional centers of agricultural research for answers to questions of grazing, pastures or grass farming. This is why it has become obvious that grass farmers must turn more to one another for assistance and support. It is also why land grant university

and USDA agricultural scientists can provide little assistance to graziers and other practitioners of ecological agriculture. Indeed, highly credentialed agricultural scientists (and, as well, agricultural economists when it comes to direct marketing) will have to learn from less credentialed but more experienced farmers on the land, many of them small-scale. My recent experience on Wisconsin pastures comes to mind: University of Wisconsin agricultural scientists and Extension agents conducting farm demonstration tours could not answer the most basic questions asked by farmer graziers attending such demonstrations. And, increasingly, the farmers showed that they knew more from their own experience, and had more to teach the university agricultural scientists, than the reverse. Additionally, since the land grant university was exclusively engaged in animal confinement as the means of production and was doing no serious grazing, and had not been doing any for a long time, the university had very little credibility with the people it was meant to serve. Thus, the knowledge necessary will have to come from the grass roots, and largely from smaller scale producers and growers.

**“Societies should be in charge of their own food security.... In the last decade, governments have not supported the concept of local self-reliance. Rather, they have encouraged corporate involvement in the agri-food industry with the movement of capital from region to region for mega-projects that use the lure of creating employment and export markets to hook society, but in the end profit few and eventually leave the rural communities empty shells.” (3)**

**Alan H. Fredeen**

## **What’s New About Grazing?**

So, what’s new about grazing? There’s nothing new about grazing, per se. Ruminants large and small, cattle, sheep, goats, have been doing it for eons. And non-ruminants, such as pigs and poultry, have been doing it in their own way for just as long. And yet, there’s everything new about grazing: paddocks, rotations, time, movable electric fences, soil and forage management, modern technologies, various newer techniques and practices, integration and rotation of different farm animals and different breeds, all developed in the last four or five decades, in France, in New Zealand, in other countries, and, as well, here in the United States. And yet, just as modern grazing practice and technique, properly known as grass farming due to its emphasis on grass and soil, was starting to develop, particularly in France and New Zealand, the United States was shifting philosophically away from the very idea of grazing, to an idea called “zero grazing”, evolving quickly into animal confinement systems. Such confinement systems soon emerged as highly profitable techniques for large-scale corporate enterprises and thus grabbed hold. All such confinement feeding fit in very well with new ideas of control and management, and led to false hopes which developed with such ideas.

Confinement feeding, grain feeding and the industrial agricultural model in which those ideas are housed has now run its course. High expense, debt load and other economic issues, loss of nutritional values (in both the animals and in the humans who consume the product), extremes of water and air pollution, loss of soils through the intense grain production needed to support the industrial agricultural system,



food contamination, dependency on antibiotics, and the inherent inefficiency and insecurity of a highly centralized system (and increasing inability to compete economically with overseas production and rising food imports) are all contributing to bringing to an end the era of the industrial model, the dominant and virtually the only model of agriculture and food production and distribution in the United States in the latter half of the 20<sup>th</sup> century.

**To land-poor New Englanders, USDA had this to say in 1948: “Grassland agriculture does not mean necessarily extensive agriculture. In some areas, it is very intensive – as much so as vegetable farming.”<sup>(4)</sup>Limited land availability thus need not be a hindrance to grazing.**

Grass farming, the new way for raising farm animals for meat and dairy production, appears to be arriving on the scene just in time. And New England, a most natural grass farming/grazing region with excellent marketing advantage, is set to take advantage.

## **A Journey into Agroecology: Chaboussou, Voisin, Murphy, and Rotational Grazing**

### **deFrancis Chaboussou and Ecological Health:**

In my own journey into agro-ecologic thought (i.e., that agronomic thought which is informed by ecological principle), I have been most impressed by the work of French agronomist deFrancis Chaboussou. Chaboussou worked in the mid-20<sup>th</sup> century in the southwest of France, based at the University of Bordeaux, where he served as Director of Research at the National Institute for Agronomic Research. His discoveries have not generally been available among English-speaking peoples.<sup>(4)</sup>

It was this brilliant French agronomist who first introduced me to the important ecological agriculture concept that unstressed and well cared for creatures, plant and animal, have far greater resistance to disease and pests than do their highly stressed and poorly cared for counterparts. A contemporary of Andre Voisin (see below) but working at the other end of the country, Chaboussou engaged with plants rather than animals. He made numerous discoveries, not only about natural resistance and the general health of biotic organisms, but also about the role of stress and of bad nutrition in destroying natural immunity. More specifically, Chaboussou found that chemical industrial agriculture caused maladies and increased the vulnerabilities of crops to disease through destruction of their natural resistance. It did so by attempting to remedy sickness through the application of further protection through chemicals, both pesticides and fertilizer. The corollary in livestock is removal of the health-giving and health-protecting role of the pasture and access to natural habitat, and replacement of this access with confinement, antibiotics and veterinary services. According to Vermont agronomist Bill Murphy, America shifted, about 1960, away from pasture and animals out-of-doors to “zero grazing”, as it was first called (and what we refer to today as animal confinement). What happened to farm animals as a result correlates to what has happened to plants and their ever greater needs for more fertilizer, more pesticides, and what has happened to soil with its concurrent destruction by fertilizer application and over-use.

#### **ON FARM ANIMALS:**

**The word “livestock” is the commonly used term for farm animals of all types which produce animal-based food products from the farm. Cows, horses, sheep, pigs, goats, poultry of all types, even rabbits, honey bees, etc. can be included in this common term. The term is clear in meaning and comfortable to many. However, the term suggests an object, a commodity, more than it does a living biological being. Agrarian or ecologically-based value systems more accurately suggest a different term, “farm animals”, rather than “livestock”. In keeping with the theme of this book, therefore, “farm animals” will be used wherever possible in favor of “livestock”.**



Chaboussou's pioneering work at Bordeaux on orchard, crop and livestock interrelationships, while not grass farming per se, catalyzed the kind of approach necessary to understand and succeed in ecological agriculture, as did Voisin's simultaneous efforts farther north in Brittany on grazing and pastures. (So impressed was I with Chaboussou's findings, which I initially learned of through a mutual friend, British ecologist Edward Goldsmith, that I commissioned a French-speaking student at the University of New Hampshire some years ago to become the first to translate Chaboussou into English.) The still largely unknown and unappreciated Chaboussou will eventually come into his own as a key player in sustainable and ecological agriculture. We New Englanders can learn much from deFrancis Chaboussou.

**"Grazing-based systems create self-reliance."**

**Alan H. Fredeen**

### **Andre Voisin's Grass Productivity:**

The essential scientific and philosophical voice behind modern day grass farming is that of Andre Voisin. Writing in the mid-twentieth century at the end of his now classic work, *Grass Productivity*, this French agronomist and scientist of pasture management, waxes lyrical, entitling his conclusion to his otherwise very scientific treatise "Grass Lyrics". In this section he asks, "Why have the poets who so ably sing the praises of trees forgotten the beauty of grass?"<sup>(5)</sup> He posits that the poetry of the pasture, as he calls it, is no less than that of the forest. Voisin is not writing of any old pasture here, as beautiful as that might be, but specifically of intensively rotated paddocks, or sections of pasture, and their relationship to one another. He writes, "...the different paddocks, at different stages of re-growth, are not all of the same hue. Moreover, in a well managed system the paddocks are not grazed in the same order as they stand, and so the color tones, like reflections on the sea, do not gradually and uniformly diminish in intensity. Between two dark greens one glimpses a paddock lighter in color, like the depth of a wave. A part where the grass has already begun to flower takes on an undulating wavy aspect. What enchantment a pasture, grazed in this way, offers to the eye."<sup>(6)</sup>

In my book, *Sustainability and Spirituality*, I wrote that we will not save what we do not love. Voisin writes that grass must be loved, profoundly, and he finds that the loveliest hour of the day is in the morning as dew drops sparkle on the blades of grass. The Bible tells us "The King's wrath is as the roaring of a lion, but his favor is as dew upon the grass". (Prov. 19,12).

Voisin tells of the poetic, aesthetic, artistic and musical inspiration we receive from grass pastures, that they have become the symbol of serenity, of stability, of peace, and of plenty. He remarks that they are associated with eternal rest, and ends his foundational book, *Grass Productivity*, with the question, "Is it not a pleasant thought that rational grazing helps to realize this dream on earth?"<sup>(7)</sup> ("Rational grazing" was Voisin's term for intensive rotational grazing.)

Andre Voisin opens his treatise with the simple question, "What is grazing?" He identifies the conventional answer as "causing grass to be eaten by an animal".<sup>(8)</sup> But then he provides what he calls a more realistic answer: "Causing the grass and the animal to meet".<sup>(9)</sup> This reveals his own deeper ecologically driven value system, for when the grazing animal and the grass meet, eating will occur. Man plays no part in that – indeed, the behavior long precedes man. Voisin is sufficiently humble, sufficiently eco-centric to understand that – this is an important realization for the reader of his book, and of this book as well.

Voisin recognizes the long history of agronomic study of grasses and pasture plants, both in the pasture and as forage. And yet he finds our knowledge to be only approximate to the actual value of a plant or an animal. Biochemical analysis is not sufficient for "We must never forget the animal when we are studying the grass".<sup>(10)</sup> (p. 2) We must also never forget the cow's influence on the pasture. Voisin tells a story from the United States:

"At an American experimental station they were studying different types of white clover from the botanical point of view on small plots. The young professor accompanying us said: "Strain A gives higher yields than strain B, but it is of no interest because, at the beginning of summer it is attacked and

destroyed by the Potato Leafhopper (*Empoasca Fabae*). Variety B, on the other hand, is not attacked.”

We went on to another American station which was likewise experimenting with the two strains A and B of white clover. This time, however, it was not a case of botanical experiments on small plots, but an actual grazing trial with cows. The professor explained to us that strain B was non-existent by comparison with strain A, which gave vastly superior milk yields. “But”, we said, “have you no potato leafhopper in this region?”

“We are infested with it”, was the reply. And the professor, guessing our thoughts, added with a smile: “Potato leafhopper attacks Variety A when it is not grazed. But reproduction of the leafhopper in a grazed sward is hindered by the hoof and tooth of the grazing animal.”

One can therefore understand the errors which might arise from a botanical study in itself, forgetting the relations between plant and animal.”<sup>(11)</sup>

Voisin continues likewise to report on what he refers to as excessive work done on feeding animals in confinement and the lack of much more valuable studies on the behavior of the animal as it grazes, and, as well, the lack of attention to animal aspects of grass. We witness botanists studying the plants and animal scientists studying animals in confinement. We see the grass itself and the animal itself, “. . . but above all, there is the cow that grazes the grass, and for eight months in the year that is just what it does do”.<sup>(12)</sup> The two sciences, plant and animal, therefore, must get together if truth is to be found. Voisin’s approach is “When we think of the cow, we will not forget the demands of the grass. When we examine the grass, we will always bear in mind the demands of the cow . . . It is by satisfying as far as possible the demands of both parties that we will arrive at a rational grazing . . .”<sup>(13)</sup> Such an approach will yield maximum grass productivity and optimum animal performance.

With the underlying philosophical foundation and goal thus established, it is now appropriate to describe in synopsis form what Voisin advocates.

Voisin defines rational grazing (read intensive rotational grazing or management intensive grazing, all of which are interchangeable terms) as that grazing which “. . . affords maximum satisfaction to the requirements of both grass and animal” since “. . . grazing is the meeting of animal and grass”<sup>(14)</sup> Rational grazing does not result simply from division of a pasture, and division is not an end in itself: it’s there to help satisfy the requirements over time of both animal and pasture. The rest period is fundamental and varies with season, with place, with precipitation. Voisin recommends a healthy grass height of 6” or a bit more for grazing. (This, too, varies with type of animal and with breed.) The length of rest period at his location in northwest France ranges from sixteen days in May-June to 100-150 days in winter, with 36-40 days typical in the rest of summer, all reflecting growth rates of the plants. These rest periods allow the grass to reconstitute reserves, to re-grow vigorously, and to produce a high rate of daily growth (which Voisin calls a “blaze of growth”). Interestingly, Voisin finds that, in continuous (i.e., non-rotational) grazing, some grasses are sheared twenty times per year by an animal’s teeth, while six times per year is average in rotational grazing. (If a forage crop were cut ten instead of three times in the course of a year, the yield would be miserable, Voisin says, and the same is true of a pasture sheared twenty instead of six times.) He makes the point that if the period of occupation in any one paddock is too long, a grass plant will be sheared twice in the same rotation, thus destroying its “blaze of growth” and setting it back significantly. This is why a rotational grazer must accept and be comfortable with very frequent rotation to new paddocks, ideally every twelve to twenty-four hours, and never more than three days. (A random visit to eleven organic dairies in Vermont and Maine revealed that all eleven rotate every twelve hours, and do so routinely without any hardship. Non-graziers often find this hard to fathom.)

Voisin also urges close attention to the pasture’s need for mid-summer (i.e., July-August) rest. This is best accomplished through a larger number of smaller paddocks, easily achievable today through available new technologies in very light and easy-to-handle movable fencing. Voisin also insisted on the need for uniformity in production of one paddock to another, and to arrangements for water access (which is more important for dairy animals than for others). He also finds that “rational grazing” with a one day period of stay allows more animal carrying capacity than does, say, a three day period. And, while higher stocking rates mean more need for winter feeding, bedding or housing, there is also an increased return: higher production of excrement and farmyard manure, the important foundations of soil fertility. Voisin also recommended “suitable and well-proportioned dressings of nitrogenous fertilizers to stimulate (grass) re-growth when it begins to flag.”<sup>(15)</sup> He also speaks to

the temporary grazing of arable crop land (leys) as a supplementary food source, a measure external to the pasture, but only if such measures continue to observe the necessary pasture rest periods. And rotation of the timing of paddock use is essential: for example, "... the commencement of grazing each year on the same paddocks and in the same order is to be avoided."<sup>(16)</sup> Flexibility with paddock use is key. As Voisin concludes, "If rational grazing is well managed (i.e., large number of paddocks, fairly short periods of stay, judicious use of nitrogen, and flexibility in handling), the grazer will quickly obtain very obvious improvement of the flora and "doubled (or even greater) yields per acre."<sup>(17)</sup>

### IS THIS PRODUCTIVITY?:

**"The total income generated by the pasture can be broken down like this: cattle - \$300/acre, egg-mobiles - \$500/acre, broilers - \$2500/acre, and turkeys - \$1500 per acre. So the total gross income is \$4800/acre with almost no infrastructure...Our 100 acres supports four full time salaries."**

**Joel Salatin**

One of Voisin's great contributions to the contemporary period is his recognition that the principles of rotational grazing (minus, of course, knowledge of certain modern technology) have long been known to and thus available to humanity. Thus, we have chosen to forget. Voisin contends that rational grazing has always been known, and that the earliest of shepherds had the technological equivalent of electric fencing, namely dogs. Dogs do more than protect grazing animals from predators: they restrict the area of grazing to strips that are essentially paddocks. Voisin calls the dog a living electric fence.

Following countless generations of the transfer of oral knowledge about grazing, there began to be written descriptions of these techniques, starting as far back as the mid-18<sup>th</sup> century. From *The Agronomist: Pocket Dictionary of the Farmer* (France, 1760), Voisin quotes these words from 1760:

"Grass that is too mature becomes hard and loses much of feeding substances. Grass that is not mature does not possess enough of these substances. As beasts always go to the most tender herbage, it is essential when managing grassland, so that all the grass will be grazed at maturity and re-grow, that the pastures be divided up into sections, the size of which is in proportion to the number of beasts they are to carry; the aim being that each section contains sufficient keep for three or four days, after which the stock are put on to another section so that the first can bear fruit. Division is achieved by banking up the soil and planting trees on top, or by hedges and willow trees."<sup>(18)</sup>

And, in 1768, in *Maison Rustique*,

"All the grass is eaten at once: there is no trampling, no waste; the cattle have more grass and better grass, because they move round. The grass grows again more rapidly and more vigorously and one can let it mature as much, or as little, as one wishes ..."<sup>(19)</sup>

Voisin goes on to say, "There is no better explanation of the Norman proverb, the cow eats with five jaws: its own and its four hooves."<sup>(20)</sup>

In his text, Voisin presents, as further evidence, the 1785 published work of Abbot Jean-Francois Rozier, *Complete Course in Agriculture*:

"The intelligent landowner divides up his acreage into several parts, enclosed by hedges, living or dead, over which the animals pass in succession. The result of these divisions is that while the grass of one section is being grazed, that of the other sections is re-growing, so that the animal is always sure of fresh food and plentiful grass.

**"We need to create an agricultural paradigm that romances the next generation into it if we are to answer the fundamental question of who will love the land, who will live on the land, and who of integrity will produce the food for our grandchildren."**

**Joel Salatin**

**This is very much a Wendell Berry type of question, and Joel Salatin can be seen putting Wendell Berry's philosophy and theory directly into practice. Berry of Kentucky and Salatin of Virginia will become great contributors to New England's farm and food future.**

If the area is not divided, the animal eats in one day and destroys with its trampling more grass than it would have consumed in a week. If it is found that it takes too long to produce hedges, they can be replaced by ditches, the soil from which is thrown up on either side and sown with selected seed suitable for meadows.

Division of pastures is the greatest essential of all when foals and horses are being reared. Without this precaution they attach themselves to the most tender grass, and the more there is of this, the more they scorn the remainder which in the end becomes too tough.

As soon as the animals have consumed all the grass in one section they are transferred to another. If there are facilities for irrigation this should be done immediately after the stock have left and as often as is necessary. By following this method one is assured of always having excellent grazing available.”<sup>(21)</sup>

Voisin then poses the question, If we knew, why did we forget? Why did this system not develop? He finds that the rational grazing so described and celebrated in 18<sup>th</sup> century literature had all but disappeared in 19<sup>th</sup> century literature, and has remained ignored to the present time. In considerable detail, Voisin provides reasons in the ensuing pages of his mid-20<sup>th</sup> century book, reasons that have largely to do with ignoring the time factor according to the season, and the need for flexibility in rest periods depending on local circumstances. This ignorance led to overgrazing and failure, and, according to Voisin, to great distortion in the 19<sup>th</sup> and 20<sup>th</sup> century grazing literature of Europe and North America. The time factor has not only been neglected but forgotten.<sup>(22)</sup>

## The Greener Pastures of Vermont’s Bill Murphy:

Andre Voisin in his 1959 book, *Grass Productivity*, makes the case that the wise pasture management of antiquity, as handed down orally through countless generations, and the more modern and scientific pasture management of the 18<sup>th</sup> century, as we know from published findings, represents essentially the last wise approaches to pasture management and animal grazing in our culture. He wrote of the distortion of knowledge that set in in the United Kingdom, North America and elsewhere in the 19<sup>th</sup> and early 20<sup>th</sup> centuries, distortion that ruined the land and helped open the door to conversion of animal husbandry to confinement feeding methods. Thus, the United States, whose agricultural development occurred in the 19<sup>th</sup> and early 20<sup>th</sup> century, developed too late to benefit from earlier knowledge and readily fell victim to the later distortions that led to pasture overgrazing and destruction. Bill Murphy, principle American interpreter of Voisin, whose classic 1987 book, *Greener Pastures on Your Side of the Fence*, carries the subtitle *Better Farming with Voisin Management Intensive Grazing*, writes in his Preface that an end result of the American shift to year-round confinement feeding is that “... pastures have been practically eliminated from American farming experience for a generation.”<sup>(23)</sup> He continues, “It’s just as well, though, because pastures never were properly managed in this country, and the old ways are better forgotten ...”<sup>(24)</sup>, an acknowledgement that U.S. agricultural development came along too late to benefit from the earlier wisdom about which Voisin writes. As I wrote in *The Wisdom of Small Farms and Local Food*, Murphy often speaks of the early origins of animal confinement as a replacement for grazing in the U.S. This occurred around 1960 and relates to the by then terribly devastated conditions of much of American grazing land which could hardly support anything anymore. That devastation pushed the idea of “zero grazing” before the term “confinement” was introduced. It took decades after that time for the realization to come of the true costs of confinement, namely serious animal health issues and pollution problems, great input costs and farmer exhaustion, both economically and physically. Bill Murphy also comes naturally to the importance of placing a much stronger emphasis on cost reduction for farmers rather than on increased income, or even, under some circumstances, of reducing income for a better quality of life. (There

**“The main tool we use is portable electric fencing. It is the steering wheel, brake and accelerator on the four-legged mowing machine. It allows us to maintain the grass in its adolescent growth stage...The rotational grazing system requires only \$20/acre in infrastructure costs. This includes fencing and water. We have been able to double production in two years on rented land, from what the previous renter was getting.”(6)**

**Joel Salatin**

is great American social resistance to this concept, a resistance which Murphy well understands.) Hence, we set ourselves up for the animal confinement problems which we now face, and lost what could have been forty years of pasture-building, improved profits, reduced debt, and a far more ecological and sustainable agriculture. As if that wasn't a high enough price to pay, the ability to graze has been bred out of our animals and they no longer know how to do it, necessitating re-training and the use of heritage breeds wherever possible. Such breeds preserve and continue the otherwise lost grazing skills.

Taking inspiration from Voisin and practical experience from the New Zealanders whose highly productive and profitable agriculture depends almost entirely on permanent pastures, Murphy says that if we take care of the pasture plants and soil life, they will take care of the grazing animals. Murphy predicts that "As more and more farmers return to proper five to seven year crop rotations (as they surely must do before monoculturing or two-crop sequences destroy the soil and ruin the environment), pastures will become essential parts of crop rotation again."<sup>(25)</sup> We will then see the return of "leys", a British term for pastures that are part of tilled crop rotations.

Hinting at John Ikerd's views on farmer joy, and even the response of generations to Beethoven's Sixth Symphony, *Pastorale*, and its pleasurable effects on humans (as addressed later in this chapter), Bill Murphy concludes "Probably the greatest benefit arising from using pastures as valuable parts of farms isn't in terms of dollar profits but the peace of mind and mellowness that naturally develop in farmers as they get back in touch with the land, and stop running to feed and clean up after confined livestock. It's a lot better to just let the livestock go to the feed and spread their manure themselves."<sup>(26)</sup>

## The Pastorale

In western civilization, in western culture, perhaps the most famous piece of music composed to celebrate the atmosphere of the pasture is Ludwig von Beethoven's Sixth Symphony, better known as the Pastoral Symphony. This popular piece of classical music, so well known around the world, perfectly illustrates the thought of John Ikerd pertaining to the spiritual and the mental health qualities of the pasture, of the pastoral scene, to the human psyche. Ikerd equates pastures with human happiness, human contentment. Musicians and music listeners perceive Beethoven's Sixth Symphony in the same way. Lewis Lockwood in his book, *Beethoven: The Music and the Life*, writes "(This) symphony evokes the quiet exaltation we feel amid the fields, streams, trees and birds; it is impregnated with a sense of communion with all that is natural and God-given in the outdoors ... (H)e seized on the great tradition of the musical "pastoral", with its complex connections to the pastoral tradition in literature ..."<sup>(27)</sup>

When I considered Beethoven's *Pastorale* as a celebration of the joy of pastures, of grazing animals and lands, of pastoral environments, I wondered if any attempt had been made to create lyrics for any part of the piece. To my knowledge, no such lyrics have been written for the symphony or any of its movements – the joy, the calm, the serenity, the aesthetic beauty of the pastoral environment are contained in the very music itself.

I also wondered if insight could be gained into Beethoven's own inspiration in composing this music. Did he know pastures and pasture animals? Was he inspired by them? What was he thinking? Charles Stanley writes, "To say that Beethoven was a nature lover would be putting it mildly. He was never happier than when out of doors, strolling in the forests or fields, taking gargantuan breaths of uncitified air. He was accustomed to compose during these outings..."<sup>(28)</sup> But we know, of course, that nature, at least today, is more associated with "wild" unmodified environments and not so much with agricultural modification, including grazing. In fact, our American image of grazing, as discussed by Bill Murphy, has been more one of overgrazing, of abuse of nature, thus contributing to the anti-nature image of American agriculture. The 19<sup>th</sup> century European view of pastoral habitat would undoubtedly be more in synch with "wild nature". Beethoven's music, composed in pasture at Heiligenstadt (Austria), likely in the presence of sheep and shepherds (one of the most beautiful and peaceful of symphonic finales is his "Shepherd's Song"), represents a holistic treatment of nature and pasture in unity. Ecological agriculture, sustainable agriculture, suggests the same unified image.

## Grazing and the Ecology of Joy: Four Vignettes

ONE . While on farm visits in southern Maine with the Maine Sustainable Agriculture Society (MESAS), I had occasion to visit one of the few grain farmers in the area. While on this farm I witnessed the kind of agricultural implements one would far more expect to see out on the Midwestern prairies than in New England. I learned from this successful grain farmer that, in the off season (and grain farmers have more freedom to get away than do most other kinds of farmers), this particular farmer scouted farm auctions across the Midwest and Great Plains and brought back to Maine at very low cost somewhat worn farm implements which he proceeded to recondition and use on his own farm and in sales to other area farmers. He was very good at this, and obviously enjoyed it immensely. For this farmer, such mechanical work on the farm was his “ecology of joy”, that which he truly loved to do and from which he achieved great satisfaction.

TWO. Years ago I visited early organic farmers in northeast Nebraska, farmers precluded from using chemicals to control insects. One in particular, an organic beef cattle producer, took great pride and pleasure in developing systems to control insects, mainly flies, on his cattle. He developed various very low cost and simple walk-through fly traps, using pheromones, which efficiently removed the flies from his cattle. The animals loved them, the energy and capital input was very low, and the job done was superb. The organic farmer who developed these systems was well rewarded and was obviously experiencing his ecology of joy.

THREE. Recently I visited an organic dairy farm in northern Vermont, a farm which had a supplemental maple syrup operation for extra income. The dairyman spent so much time showing me his maple grove, and particularly his sugar shack with much very creative infrastructure leading to a high level of efficiency in terms of both energy savings and syrup production, and this equipment gave so much pride to the farmer that I soon concluded that his heart was more in maple than in cows (even though dairy was his principle product in terms of income). This farmer’s “ecology of joy” was in maple syrup production and, like the grain grower cited above, he was enamored of his creativity in building efficient equipment.

FOUR. And then we have Joel Salatin. Probably anyone who knows Joel or knows much about him would probably say that his ecology of joy was in moving animals paddock to paddock. It’s almost as if Joel was born for that purpose. Joel is a master at developing paddock systems for intensive rotational grazing, and he devotes much time to personally moving the animals, whether cows, sheep, poultry or pigs, or various combinations thereof. Moving animals, leading them to new pasture like the Pied Piper of Hamlin, is Joel’s ecology of joy.

Each of us, I conclude, can construct for ourselves such an ecology of joy.

During years of research on models of sustainable agriculture across the United States, I have encountered a phenomenon in human behavior which I believe is critical to the sustainability of sustainable agriculture practice. Because such practice has been counter-cultural to the dominant culture in the United States for most of a century, the success of sustainability practice will rely on traits of human behavior which transcend economic or other common considerations. An answer to approaching an understanding of such behavioral traits may lie in something I call the ecology of happiness, or perhaps more accurately, the ecology of joy.

I owe to John Ikerd of Missouri, Professor Emeritus of Agricultural Economics, the inspiration for my thinking on the ecology of happiness, “happiness” being the word Ikerd would use. Prof. Ikerd identifies this sense of happiness specifically with grazing livestock and with pastures, with pastoral settings – hence, the place of this chapter in this book.

In answer to the question, “What can I do?”, the ecological philosopher and “geologist” Thomas Berry often instructs students to work to find out what they “like to do” in the deepest sense of that phrase, to identify both

### THE FAMILY COW: A NEW TREND?:

Workshops are now being offered for families that want to own only one cow, a family cow for their family’s needs: milk, cream, butter, soft cheese, ice cream. (E-Mail: [lifeskills@motherhouse.us](mailto:lifeskills@motherhouse.us) (Website: [www.rlocalfarm.com](http://www.rlocalfarm.com)) The workshops are based on the book, *Keeping a Family Cow* by Joann Grohman (Coburn Press, Dixfield, Maine).

what they're good at and what they take pleasure in. What would make them happiest? For some of my students in New Hampshire, the answer to that question is to farm. That would be their bliss, their ecology of joy.

## Signs of the Grazing Renaissance

In my book, *The Wisdom of Small Farms and Local Food*, I described the very spirited scene a few years ago at the annual winter meeting of the Vermont Grass Farmers Association (VGFA): the large gymnasium of the Vermont Technical College at Randolph Center, atop a high windy ridge, subzero temperatures outside, and the assemblage of 400 Vermont graziers and would-be graziers (or grass farmers as they are called here) arriving early in the morning, many just having completed milking, set for a day of learning, of exchange, of comraderie, women nearly as common as men, young as common as old. It was duly noted that the newly minted Vermont Commissioner of Agriculture made an unexpected visit that day and got a look at the beginnings of this new movement in his state. It was reported that these meetings, this high and spirited attendance, occur at this place every year, and that one could see the beginnings of a social movement on the land in Vermont, a movement that has since spread to Maine, New Hampshire and Massachusetts, as described elsewhere in this volume.

Fast forward to 2006: VGFA meetings continuing healthy at 350-400 registrants every January in this same place. And NOFA-Vermont is meeting at the same site three weeks later every year and now breaking all attendance records with over 800 registrants. The large banner over the stage at the NOFA event read "Welcome to the NOFA-Vermont Winter Conference and Celebration". And celebratory it was: 800 mainly Vermonters, many of them farmers, arriving early, staying to the very end at 6 P.M. Bringing with them what is possibly the biggest pot luck meal in the history of Vermont, they ended the day with what might have been the biggest organic ice cream social ever in the state (much to the pleasure of Vermont's organic Strafford Creamery). And Vermont's same Agriculture Commissioner was again present, this time more formally for a "Listening Session" with farmers, and he got to witness this land and agriculturally-based social movement which is now stronger than ever in Vermont. Heard on the floor, from both UVM and agriculture folks and from state agriculture officials: This conference, its ideas, its aliveness, is a lot more interesting than attending conventional poorly attended agriculture meetings with an aging farm population with problems, or reading the literature associated with that conventional agriculture. (Proportionally, of course, that still is the agriculture which is the most prominent supplier of our food, but its time is likely passing.)

**On Unlearning: No conventional farmer can convert to an organic or a grass-based (grazing) agricultural system without, in the process, learning a good deal. But what he learns is as nothing compared to what he unlearns.**

The 800 enthusiastic participants in NOFA-Vermont's 2006 Winter Conference, that year heavily focused on the peaking of oil supply and other farm and food energy questions, are a clear example of the health and rapid growth of both the organic and local foods movement. Vermont is providing a model of leadership rapidly extending across all the Northeast. (In 2006, James Howard Kunstler, author of *The Long Emergency* and a prominent writer in the peak oil debate, delivered the keynote addresses at both the NOFA-Vermont and NOFA-Connecticut Winter Conferences, indicative of the growing interest of organic and small-scale farmers in this subject of what will become of oil and our dependence on it.)

## SOME ISSUES IN GRAZING

### On Organic and Grazing

Aldo Leopold, America's greatest environmental philosopher, said over a half century ago that the discontent that labels itself organic farming, while bearing some of the earmarks of a cult, is nevertheless biotic in its

direction, particularly in its insistence on the importance of soil and soil flora and fauna. Leopold was perceptive in recognizing such farming as a sign of discontent, as a refusal to accept, of resistance to 20<sup>th</sup> century industrial agriculture and its ignorance of ecology.

The relationship between the organic movement and the rotational grazing movement is natural, indeed one can be an entre into the other, in spite of the fact that some number of organic growers and organic consumers are vegetarians and a smaller number are vegan (avoiding all animal products, including eggs and dairy). Nevertheless, intensive rotational grazing lends itself in support of organic production because:

- it enables significant on-farm biodiversity, a basic ecological principle;
- it enables the important service provided by farm animals (i.e., provision of significant soil amendment and other nutrient into the farm system);
- it strongly enhances all forms of on-farm rotation; and
- it strongly enhances farm income and financial security.

But, perhaps most importantly, intensive rotational grazing, while not of necessity organic, is one of the easiest ways for a farm to operate with organic certification. An important factor in this ease of organic operation is the replacement of expensive organic feed by naturally organic pastures for much of the year. The increased popularity of such grazing is also leading to research on forage plants that can be grown easily organically to replace corn which is more difficult to produce organically. Thus, the combination of rotational grazing and organic certification is driving a new area of New England agriculture, namely, forage crop production to support winter animal feeding in pasture grazing systems. The practice of intensive rotational grazing can thus be seen as an entre to certified organic agriculture in New England. Likewise, the drive to organic agricultural certification can be seen as an entre to intensive rotational grazing in the region. The two are complementary and in a most significant way.

## On Grazing and Erosion

Animal grazing, both cattle and sheep, are connected to erosion in the American mind. Overgrazing, as well as over-planting of crops fence row to fence row, soil erosion by wind and water, sedimentation in streams and rivers have been strongly associated with one another since the dramatic images of the Dust Bowl years of the 1930s. And the mixture of grazing and woodlands has been a no-no since the advent of modern forest management at mid-20<sup>th</sup> century. And yet both of these images are inaccurate, are misleading, when applied to intensive rotational grazing. This form of animal grazing cannot, by definition, lead to erosion and sedimentation, and, in fact, often represents less erosion and sedimentation than might be the case with managed woodland. And this practice can help fertilize and enrich woodland and forest, if the animal/acreage ratio is managed properly, given the work animals can do and the service animals can provide through both removal of plant competitor species and soil fertilization through widely distributed manure. Soil compaction is ameliorated through the distribution of animal pressure, as grazing becomes a key element of agroforestry.

### **SOME ENVIRONMENTAL CONSERVATION BENEFITS OF AGROECOLOGY:**

**Among the environmental conservation benefits of intensive rotational grazing and many other forms of agroecology are:**

- **open space and open land preservation**
- **water quality (including the potential for pasture restoration from paved over environments)**
- **wildlife habitat**
- **enhanced biodiversity**
- **improved soil health and fertility**



## On Birds Following Ruminants on Pasture

Images of grazing in the public mind are largely limited to cattle and sheep. And yet successful ecological grazing requires an integration of other animals, each of which has a role to play and a service to provide: pigs, goats, poultry of all kinds (chickens, turkeys, ducks, geese, of which turkey are particularly important grazers), horses and other animals. Pigs and goats are most useful in the early stages of pasture conversion from woodland and scrubland. Poultry are ideal on a more regular continuing rotation basis following ruminant grazing: the model nature gives us on the plains, grasslands, savannas of Africa, Asia and the Americas: birds follow grazing animals, fertilizing and returning the plant and soil mix in preparation for future rounds of ruminant grazing. Birds spread the animal waste, thereby enhancing soil fertility; break pathogen chains; and they aerate and further fertilize the soil through their own waste.

## On Katahdin Hair Sheep

Most New England interest in sheep has historically focused on wool rather than meat. Undoubtedly this results from the world-class and profitable Merino sheep and wool export industry so well established in New England in the early 19<sup>th</sup> century. Hence, non-fleece-producing sheep breeds have never been a big part of the New England landscape. A lamb meat industry largely limited to ethnic groups and seasonal sales has been a further factor in the regional focus on fleece over meat. The situation is changing, however, as more members of the public are coming to favor locally grown lamb, a meat source not so dependent on large-scale distant industrial agriculture, animal confinement, growth hormones and many antibiotics, as is the case with feed-lot beef and confinement hogs and poultry.

Hence, the prospect for a market, retail and restaurant, for lamb, and specifically for naturally and/or organically raised lamb in New England, is enhanced.

This market potential merges with the other advantages of pasture-raised Katahdins, a New England breed, as the name implies, to paint a positive picture of the role of grass-fed pastured sheep for meat in this region. Katahdins are perfectly adapted to New England conditions, require exceptionally few inputs, and can take care of themselves, even at birthing. They are survivors and they epitomize the low input ecological philosophy of this book.

**Perennial forage is often a better option for new hampshire over grazing because of the problem of too many non-contiguous fields.**

**Juli Brussell, NH Cooperative Extension**

## On Pasturing and Pollution

The U.S. Northeast suffers from nitrogen pollution from an excess of nitrogen (N) in its ecosystem. Might pasturing represent less nitrogen depletion in the soil, and hence less need for imported nitrogen as an input?

Since most food imported into the region has been produced with excess nitrogen fertilizer, these food imports could be the largest source of nitrogen coming into the Northeast.

This raises some interesting questions, and suggests research needs:

1. Is there a difference in nitrogen depletion in pasture vs. tillage? If so, how much? Is it significant? Might it vary much with different forms of pasturing?
2. How significant are food imports as a source of nitrogen coming into the Northeast? Can this be used as an argument to promote the Northeast's production of its own food (especially meat) for the region's own use?
3. Does pasturing alleviate greenhouse gases, acid rain damage, sedimentation and pollution problems, and, if so, by how much?

These are all important questions with pastoral agriculture at their center.

## On Animals on Snow

Any mention to a New Englander of livestock on snow, of grazing through snow cover, will generally bring a look of puzzlement if not outright skepticism. This is as true with those who work with animals as it is with others. The blind assumption is that New England has a short grazing season governed by snowfall and weather. This is only partially true. Rotational grazing experience in Wisconsin and Iowa clearly indicate that ruminants can graze well in conditions of snow cover up to one foot in depth. (This is less true if there is an ice cover beneath the snow. But such a cover does not last long, given the insulating effect of snow.) The experience of Joel Salatin in Virginia's Shenandoah Valley (at 2000 feet elevation) likewise indicates a high tolerance for snow among grazing animals, and Salatin sees no reason why New England should not be the same. This is conditioned, of course, by the breed of the animal and its general ability and tendency to graze. Confinement Holsteins, for example, are less likely to be successful. Salatin goes on to say in his talks around New England that livestock in the West (Montana, Alberta) can graze in up to five feet of snow, but that is based on the dry, light, crystalline snow of that region. And, he asks, what did the bison do in heavy snow and very cold conditions? He debunks theories that they migrated south and he touts grazing abilities that we don't often give them credit for. And while bison are not cattle and have different qualities, they are grazing ruminants.

What we have here, therefore, is the gift of season extension, without the need for technology investment associated with season extension of crops, except perhaps for proper breeding. And for organic producers of dairy or meat, with this longer than expected grazing season we have a reduced need for expensive organic feedstock. Depending on the local circumstance, many New England organic graziers should be able to make it through on their supplemental forage production. (This is especially true in New Hampshire where the lack of larger contiguous pasture will bring with it a greater dependence on smaller fields for local forage production.)

## On “Intensive” Grazing

The use of the word “intensive” in “intensive rotational grazing” and in “management intensive grazing” may suggest to conservationists, wildlife biologists, land managers and environmentalists that such grazing might be hard on the land. After all, the American experience of grazing certainly conjures up images of pressure on the land and on vegetation and habitat, destructive pressures, land abuse. And the word “intensive” makes it sound even worse. It is only when one realizes that “intensive” does not refer to animal pressure on the land, in other words, intensive tearing down, but that rather it refers to intensive rotations which build up soil nutrients and plant biodiversity, that the picture, the image, very much changes.

## When “Old” Becomes “New”

While attending an outdoor concert given by our local Middle School jazz band, an older man standing next to me asked me if I liked the music. I could tell he did not. He said to me that he was too old for that sort of music (jazz), and he evidently did not understand why anyone else would take pleasure in it. I reminded him that much of this music was from the 1930s, 40s, 50s, and would have been music familiar to his parents. In other words, it was not new at all. It was, in fact, quite old. But it was being revived by twelve year old middle schoolers and their music teacher/band leader. But to this older man, it was felt to be too new, too modern. “Old” had suddenly become “new”, and somewhat unwelcome.

There is a corollary here in grazing. Intensive rotational grazing is growing in popularity and becoming more discussed, more practiced. To some, it might appear new, and obviously a change from what many are more used to, confinement agriculture. But is it new? No, not really. It's based on ages-old principles of grazing animals on the land, not only ruminants like cattle

**On Lightweight Pasture Fencing Technology: “The easily rolled wire fences are a brilliant innovation, allowing pasture to rejuvenate constantly by making daily rotation simple work.”(7)**

**Bill McKibben, *Wandering Home***

and sheep which are biologically designed for grazing, but also pigs and poultry, which themselves can benefit enormously from the opportunity and, in turn, benefit the soil and pasture grasses. What is new is the refinement of schedules for intensive rotational grazing and, to support the rotation, the new light-weight fencing technologies, including solar-powered fencing, which replaces the role of shepherds and herders in the process. What may also be new is recent ecological knowledge about the land, the biota and animal/land relationships. However, even the latter may not be so new but merely replacement for earlier human knowledge which may well have been present in an earlier and different form.

Similarly, one might ask what is “conventional agriculture” and how might we know it? *Farmers of Forty Centuries*, a well known book about Chinese agriculture, makes it clear that what we today call organic agriculture was more or less the conventional form of agriculture since the advent of farming over 4000 years ago. Industrial agriculture, modeled after assembly line manufacturing models (also called “Taylorism” or “Fordism” after its inventors), chemical agriculture, animal confinement agriculture, is hardly conventional in human history. It is very, very new, very recent, most of it not more than five or six decades old. It is organic agriculture, an infinitely older form which itself should be referred to as the conventional or traditional agriculture. Thus, modern forms of sustainable agriculture, ecological agriculture, organic agriculture and rotational grazing, including interspecies grazing, crop-livestock integration and other such farming techniques are, for the most part, truly older and more traditional, more conventional than these much more recent newer forms of the industrial model. “Old” has somehow become “new”, and “new” has somehow become “old”, not unlike the image in the mind of our elderly jazz skeptic. All this proves that human beings have very short memories.

## **“Grazing-Mania” in New Hampshire and New England**

“Grazing-mania” spread to New Hampshire in early 2006. In February, the Northeast Pasture Consortium, which covers all the states from West Virginia to Maine, chose New Hampshire for its annual meeting. In the days immediately following, New Hampshire held its first state-wide two day New Hampshire Grazing Conference, as part of the very popular annual two-day New Hampshire Farm-Forest Exhibition. It’s understandable that New Hampshire comes in after Vermont and Maine in terms of state-wide grazing interest, for New Hampshire, albeit known for its great forests and high mountains, is, in fact, the least rural of the northern New England states. New Hampshire is not, however, without means to be a player – just study the grazing soils map in this volume. And historically New Hampshire has been a key grazier, as witness the enormous 19<sup>th</sup> century production of Merino sheep and the 20<sup>th</sup> century establishment of dairy and poultry industry (and the development of the New Hampshire Red, a pasture poultry breed). Vermont and Maine are both witnessing a renaissance in grazing, and today have established very active state-wide grass farmers associations. Massachusetts has become a player with important pasture animal breeds work and a planned pasture research center at U Mass. And New Hampshire, a centrally located state near to important markets, is now joining the crowd. The recent University of New Hampshire decision to establish an organic dairy, largely grass-based, further solidifies the state’s position among the grazing fraternity, as does New Hampshire-based Stonyfield Farm’s continuing search for more organic milk supply, milk which will have to become ever more pasture-dependent, given the very high cost of organic feed.

More broadly across New England, if numerous and well attended meetings, conferences, workshops, as well as farm tours and pasture walks, are any indication of the health of a social movement, grass farming or grazing in New England is very healthy indeed. Just within a two month period in early 2006 there occurred:

- the three day annual Maine Agricultural Trades Show in Augusta, with heavy emphasis on organic agriculture, sustainable agriculture, and grass farmers/grazier workshops and exhibits;
- the annual Vermont Grass Farmers Association Winter Meeting, a full day with 350-400 in attendance;
- the first ever New Hampshire meeting of the Northeast Pasture Consortium, held in Manchester, N.H. with 200 in attendance;

- the first ever New Hampshire Graziers Symposium, a two day event held in conjunction with the annual New Hampshire Farm/Forest Exhibition and attended by about 150 persons;
- the annual Winter Meeting of NOFA-Vermont held in Randolph two weeks after the state's graziers' conference and attracting nearly 800 registrants;
- the first ever Northeast Sustainable Livestock Conference, held over two days on the Vermont/New Hampshire border and attended by several hundred;
- the annual and fast-growing NOFA-New Hampshire Winter Meeting with an increasing array of diversified grazing-related workshop sessions.

This is quite a series of well attended grass farming events in a very short period, likely indicating the level of excitement and commitment concerning pasture and animal activity that one can now find in this region, both on its own merits and as an entre to organic farming. Grazing significantly reduces the number one hurdle to organic farming, the high cost of organic feed. And invariably the product of all of this grazing, and a prominent feature of all of these gatherings, is direct marketing of product to a grateful and willing-to-pay market.

## A Few Conclusions

### Some of the inevitable conclusions of this chapter include:

1. The idea of moving off grains entirely, for both dairy and beef cattle feedstock, is worthwhile and should be explored. There is now enough experience out there to indicate that this can be done successfully. While output of milk and rate of growth of beef will decline somewhat, the cost of inputs declines even more so, making this an attractive option. In any event, ruminants' digestive systems were not designed for grains. And vet bills tend to drop dramatically when grains are replaced with grass. There is prejudice against this move, which is viewed by some as extreme and radical, but it deserves to be much more seriously considered, in New England and elsewhere.
2. The New England grazing season is likely longer and more productive than we tend to think. Wisconsin and Iowa experience clearly teaches that cattle can graze through snow up to a twelve inch depth, as long as the ground underneath does not have an ice cover (which it generally doesn't at that snow depth). Additionally, the longer summer day length in the colder northern states yields additional grass productivity not found farther south. Hence, we should not discount what our northern pastures can do.
3. Our nation and its farmers have a very strong cultural bias in favor of corn. This needs to be acknowledged and to end, for it has caused us to overdo corn, much to our detriment. Soils are ruined,

### WORDS OF WISDOM FROM GENE LOGSDON, AUTHOR OF ALL FLESH IS GRASS: THE PLEASURES AND PROMISES OF PASTURE FARMING:

**Farmers today are nothing more than workers in a vertically integrated system.**

**Pasture farming/intensive rotational grazing/grass farming is the oldest form of agrarianism.**

**Since rotational grazing yields a short-term profit gain as well as a long-term gain, intensive rotational grazing offers a lot of hope.**

**More people attend a grass farmers meeting than a corn meeting or any other kind of agricultural meeting.**

**The government has never subsidized pasture farming because pasture farming doesn't make agribusiness money.**

**Bib overalls are the symbol of agrarianism. They, like agrarianism, have always been practical and usable.**

### A CHANGE IN THE WAY WE THINK:

**"...(W)hen farmers start grazing they have entered a world where animal behavior, perennial plant growth, and soil biological activity interact in sometimes wonderful, oftentimes baffling, ways. Decisions based on the interactions among tractors, herbicides and hybrid seed don't apply anymore."(8)**

**Brian A. DeVore**

chemical contaminants are over-used, and our American bodies are showing, according to Michael Pollan, a massive build-up in corn content (through corn syrup sweeteners and corn product in virtually everything). And corn is difficult to grow in organic and/or low input systems of any kind. Perennial grasses and, to some extent, annual forages alternative to corn, need to be strongly encouraged and corn needs to be abandoned, as difficult as it might be to confront the cultural bias which corn represents.

4. Corn silages' advantages in yields should not be emphasized over perennial grasses, and especially not over alternative pasture forages, especially since the input costs are so much higher with corn and so much lower with the alternatives. Focus on corn silage productivity is misleading, and likely inappropriate.

#### **A STORY OF GLASS FLOWERS:**

**In the world famous Botanical Museum of Harvard University in Cambridge, Massachusetts there are on display magnificent glass models of six kinds of New England pasture grasses collected from a pasture in Shelburne, New Hampshire in 1890. Thinking there might be a particular ecological or nutritional value to these pasture grasses for grazing animals, a value recognized in the 19<sup>th</sup> century if not today, I considered highlighting the grasses for illustration in this volume. First, I needed to determine their nature and value so I approached appropriate pasture agronomists, first in Vermont (where most of the region's pastures are found), then in Maine and New Hampshire. It is perhaps symptomatic of what we in New England have lost from our cultural knowledge of our land that highly experienced experts (and there aren't too many left) no longer recognize or know the value of five of the six species presented. Only *Phleum pratense*, timothy, was known among these New England pasture grasses.**

**Grazing was, of course, an important land use and source of food production throughout New England's post settlement history, until the 1950s. Starting, therefore, half a century ago, we began to lose our inherent knowledge of pastures, pasture grasses, pasture soils, and the characteristics and needs of grazing animals. We are just now, thanks to Vermont's Bill Murphy and Maine's Rick Kersbergen, among a few others, developing a renewed interest in such subjects. To assist our grazing renaissance, we will have to go back in time to uncover the insight of earlier agronomists, soil scientists and other specialists, not to mention graziers themselves, and recapture their knowledge and insight. In doing so, we will have to accept that their knowledge is based on the science of an earlier time, tempered by significant real-world farm experience. We will need to develop a respect for that insight and how it was gained, and, in doing so, reject the temptation to regard earlier knowledge, earlier observation, and earlier research as "primitive" or somehow inferior to that of more recent times. In this effort, we may well find earlier agricultural publications, up to and including the 1950s period, as invaluable.**

### **The Taste of Grass**

Sarah knows the taste of grass. Sarah Flack, that is, of Flack Family Farm in northern Vermont. And numbers of graziers across the region who have attended her numerous talks and workshops know that Sarah knows that taste, and the variations in that taste over time as well as by species. They perhaps have been moved to try this technique to achieve a better understanding of their pastures and their herds. This is precisely the kind of intimacy that exemplifies the wise rotational grazer, the wise ecological farmer. Intimacy is a necessity in the production of organic, of locally fresh and nutritious and taste-filled farm products, from pork and beef on the hoof to milk to broccoli and carrots. Intimacy with the soil, intimacy with the plants, intimacy with the animals. An intimacy only possible with the small and highly efficient scale of production featured in this book. This vignette speaks to the success of intensive rotational grazing and, ultimately, to the achievement of a truly

sustainable agriculture for New England. It speaks to our path of food security. It speaks to the potential of a bright pastoral future for our part of the world. Perhaps we all need to learn how to taste again.

This chapter has been much ado about grazing. But grazing cannot stand alone in New England – it must be integrated into a broader picture of sustainable agriculture if it is to be viable within the New England reality. Agricultural integrity, therefore, is the stuff of the next chapter.

## ENDNOTES:

1. From “Stupidity in Concentration” in *Citizenship Papers: Essays by Wendell Berry* (Washington, D.C.: Shoemaker and Hoard, 2003), p. 129.
2. *Grass: The Yearbook of Agriculture, 1948* (Washington, D.C.: US Department of Agriculture, 1948), p. 1.
3. See *The Wisdom of Small Farms and Local Food: Aldo Leopold’s Land Ethic and Sustainable Agriculture* for an analysis of that land ethic.
4. See *Sante des Cultures: Une Revolution Agronomique* by DeFrancis Chaboussou, published in Paris by Flammarion and available in the U.S. at the USDA National Agricultural Library, Beltsville, Maryland.
5. *Grass Productivity* by Andre Voisin (Philosophical Library, Inc., 1959; republished in 1988 by Island Press, Covelo, California), p. 33.
6. *ibid.*, p. 333.
7. *ibid.*, p. 335.
8. *ibid.*, p. 1.
9. *ibid.*
10. *ibid.*, p. 2.
11. *ibid.*
12. *ibid.*, p. 3.
13. *ibid.*
14. *ibid.*, p. 291.
15. *ibid.*, p. 293.
16. *ibid.*, p. 295.
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18. *ibid.*, p. 189.
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20. *ibid.*

### POULTRY – A FOREST PRODUCT

**In France, high quality free range chickens have become a forest product. The pine forests of southwest France now host a substantial production of quality poultry which yields a high price on the market, being identified as “Label Rouge” (red label), a mark known all over France. The taste quality more than justifies the high price to the consumer and the high return to the farmer.**

**One immediately thinks of predators. French forests do not appear to have predators other than the occasional fox which seems to be controllable. American forests sport more predators and such an environment may present a problem that is overwhelming.**

**One might ask: barring predators, could chickens be raised profitably in a New England pine forest? Would there be enough nutrient, and of the right kind? And how would a pine setting compare with a northern hardwood forest? If the technique does work from a nutrient perspective, as it seems it might, can predators be controlled? The French use portable chicken houses (i.e., a type of chicken tractor) on wheels which provide night-time shelter and which are moved three times per year to insure a good rotation. The wheeled buildings are of wood or metal, range in size from 270 sq. ft. to 645 sq. ft., and are floorless with a spread of litter. Brooding is done in the houses with portable gas brooders. The chickens graze outside of the shelter most of the day.**

**New England is well endowed with woodland. And New England woodland could benefit from cleared understory and the nutrient input and soil aeration resulting from poultry pasturing.**

21. *ibid.* (Rozier, 7<sup>th</sup> volume, 1786)
22. The reader is referred to Voisin's Grass Productivity for considerable further detail. Consider especially p. 321 – educational difficulties; p. 323 – difficulties of research; p. 325 – general economy of the farm; and p. 327 – productivity: state of mind.
23. Greener Pastures on Your Side of the Fence by Bill Murphy (Arriba Publishing, Colchester, Vermont, 1987), p. 14.
24. *ibid.*
25. *ibid.*, p. 17.
26. *ibid.*, p. 18.
27. Lewis Lockwood, *Beethoven: The Music and the Life* (New York: Norton, 2003), p. 225.
28. Charles Stanley, jacket notes to the Vienna Symphony Orchestra's recording, "Beethoven – Symphony No. 6 in F, Opus 68 – Pastorale".

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3. Nova Scotia Agricultural College
4. Grass, *ibid.*, p. 2
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7. New York: Crown Publishers, 2005, p. 62.
8. "Why Do They Do It?" in *The Farm as Natural Habitat: Reconnecting Food Systems With Ecosystems*, Ed. By Dana L. Jackson and Laura L. Jackson (Washington, D.C.: Island Press, 2002), p. 112.
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## GRASS, THE FORGIVENESS OF NATURE

**"Grass is the forgiveness of nature – her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality, and emerges upon the first solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibres hold the earth in its place, and prevent its soluble components from washing into the wasting sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates, and determines the history, character, and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare and the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates. It bears no blazonry or bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year, famine would depopulate the world..."**

**The primary form of food is grass. Grass feeds the ox: the ox nourishes man; man dies and goes to grass again; and so the tide of life, with everlasting repetition, in continuous circles, moves endlessly on and upward, and in more senses than one, all flesh is grass."**

**"In Praise of Blue Grass" by John James Ingalls (1833-1900) (9)**

A watercolor illustration of a rural landscape. In the foreground, two horses are grazing in a lush green field. The horse on the left is light brown with a white blaze and a long, flowing tail. The horse on the right is a darker brown. In the background, a large, leafy tree with a thick trunk stands on the right side. The sky is a soft, pale green, suggesting a bright, sunny day. The overall style is soft and painterly.

*“Splendor in the Grass” (Wordsworth)*

*“Man and nature will bring back the hour  
Of splendor from the grass and glory of the bower,  
That new our farms will cultivate;  
We will not grieve but rather find  
New Wealth, new health, new paradigms;  
The time is ripe and not too late  
For splendid hers and splendid yields  
And splendid children born of splendid fields.”*

*Wordsworth reflects optimism.*



## Chapter Three

### *Poetry in Motion: An Agriculture with Integrity*

An agriculture with integrity is a well integrated and highly biodiverse agriculture, with all parts supporting all other parts. Such is an ecological agriculture and, to use a phrase from the 1940s and 1950s, a permanent agriculture. Today we would call it a sustainable agriculture.

#### Keeping Up Appearances

A few years ago the Canadian Centre for Architecture in Montreal hosted a major design exhibition on the American addiction to the lawn. The exhibition, accompanied by the publication of a large coffee table book, was an indictment of Americans' love affair with lawns, naming it a disease, a pathology, a psychological illness. Such a conclusion was reached by taking into account the constancy and high energy investment of mowing and manicuring, the constant fertilizer and chemical application, the attitude against dandelions, crabgrass and other unwelcome species and, perhaps most importantly, the extreme reaction of so many Americans and American neighborhoods against any alternative toward the use of front lawn space (i.e., cultivation of wildflower gardens, planting of vegetable gardens, or any other unmown or unmowable alternative). Such extreme views as this reach into the arid regions of the country as well where enormous quantities of scarce water are used to maintain lawns at great expense (and where natural xeriscape or arid plant environments are still widely rejected). And this attitude toward lawns establishes itself in codification through zoning ordinances and homeowners' association rules. The Montreal exhibition couldn't have been more critical of the American psyche on this matter (inferring that the Canadian and European psyches were not so jaded). The American lawn is the ultimate symbol of monoculture, of uniformity, of high chemical and energy dependency, of what looks good but in reality is not good. In its own way, it is the ultimate symbol of the industrial agricultural model. It stands in every sense at the opposite extreme of what this book is all about. It is an environment which lacks integrity.

This pervasive pro-lawn thinking impacts ecological agriculture in many ways. It shows in the often unrelenting cultural pressures brought to bear on farmers to maintain so-called “clean” and “orderly” appearance in their farm fields, necessitating practices which negate organic or ecological agriculture and which strongly favor chemically-based crop monoculture. It shows in its sometime rejection of rotational grazing and the not particularly aesthetically pleasing movable fences which such grazing practice requires. It shows in its demand that no weeds be tolerated, rather than taking satisfaction from the elimination of most, once again bringing to bear heavy chemical application. It shows in the desire for orderly “machinable” or “machine-friendly” rows, rather than the seeming chaos of companion planting and intercropping. It shows in its rejection of prairie plant protection and encouragement, again with the seeming chaos which accompanies such planting. And it shows in the positive attitude toward showplace barns, dairy and otherwise, which are immaculately clean, bright and shiny, and which represent fantasy and entertainment rather than either serious agriculture or serious education. The latter is a particular problem for institutions with many visitors from the general public, a public which would seemingly rather be entertained than educated, at least in the eyes of the institutions sponsoring such “showplace models”. For example, concern over appearances eliminates grazing potential at one New England showplace institution

#### THE HIGHEST EFFICIENCY

**The greatest most efficient example of integrated agriculture, where every feature and element of the system supports and supplies every other feature and element, with almost no outside inputs, is described in detail, with full operational instructions, in Takao Furuno's book, *The Power of Duck: Integrated Rice and Duck Farming*. This is the story of a completely integrated duck-rice-fish food production system in Japan which is applicable in modified form in North America. It represents nearly 100% efficiency and can be carried out on very small pieces of land. (1)**

because the managers want to keep the cows in confinement close to the visitors rather than scattered out on the pastures, even though efficiency and sustainability goals would be far better met with the cows on the pasture. Another New England showcase institution wants white painted wooden Kentucky Blue Grass style fences which are useless for rotational grazing, and, further, doesn't want movable electric fences to "spoil the ambience" of the agrarian scene, maintaining a fantasy image, albeit a pretty one, for the public. The latter institution thus, for the sake of appearances, loses an excellent chance to teach intensive rotational grazing as an important tool of sustainable agriculture.

All of these traits, traits seemingly embedded in the contemporary American psyche, can be seriously problematic for individual farmers and for institutions which would rather do things right, do them sustainably, do them ecologically. Such farmers and institutions are precluded from doing so by the psychic circumstance of modern society, a circumstance which too often dictates a high energy input and anti-ecological, and certainly unrealistic and unsustainable, practice which can succeed only as an entertainment, as a fantasy.

Such a modern industrial form of agriculture, is the enemy of all forms of biodiversity. It is the antithesis of sustainable or ecological agriculture. The American lawn, and attitudes surrounding it, are the ultimate personal symbol of this industrial agriculture.

## People on the Land

Wendell Berry, dean of American agrarian philosophers, has steadily condemned absentee ownership of farmland, writing that the only hope for true farm stewardship and care lies with the farm owner. Allan Savory's Holistic Resource Management (HRM) has been shown not to work when the owner is absentee and land decision-making and management are in the hands of hired help. It is likely that intensive rotational grazing will not work either, or at least not work well, if the decision-making, and particularly the work of animal movement from paddock to paddock, is placed in the hands of hired help or other non-owners of the animals and the land. This suggests a particular challenge for universities and colleges of agriculture in any effort to maintain and seriously model grazing herds using management intensive methods. College and university herds on intensive rotational grazing patterns will likely face great challenges, and the pastures even more so, if responsibility for animal movement is left to institutional employees and/or students. There is a high risk that things will too often be done incorrectly, mainly not on time, a disaster for rotational grazing as it is for HRM. These systems, while not capital-, or energy-, or even labor- intensive, are highly management-intensive. Excellent judgement and on-time physical follow-through are absolutely necessary. This suggests that institutions such as universities will have to try to replicate as closely as possible the circumstances of the private farm, giving selected employees not only management responsibility but perhaps also some type of stake in the ownership of the animals, and perhaps usage rights to the pastures, and do this long-term. That way, the employed farm management staff, or at least some of them, will have a strong incentive toward grazing success, as do the purely private graziers.

On a recent day I encountered two young boys, perhaps seven years old, excitedly conversing with one another and looking up at the very large photo suspended above them in the supermarket aisle. They recognized the farmer in the picture, had seen him somewhere locally, and undoubtedly presumed he was a very important person to have such a large photo of his image prominently displayed in a very public place. (Our local supermarket has many such large farmer photos displayed above the aisles, all representing local suppliers of a wide range of the food products sold in the store.) In most of America, heroes to five year olds would be sports figures, entertainers or cartoon characters. I don't know about your town, but in mine farmers are heroes.

And why not? Isn't good food more basic than anything that entertainers would have to offer? Perhaps the several hundred people whom MOFGA Executive Director Russell Libby tells us want to become Maine farmers, mostly younger people without much capital, are the end result of those big photos hanging in our supermarket aisles!

Joel Salatin has written poignantly, very much in the philosophy of Wendell Berry, that viable farms demand a population return to the land. He speaks of "fertilizing" our farms with people. In an article for *ACRES USA*

entitled “People Fertilizer: The Need to Repopulate Our Farms”, Salatin writes “To make the case for fertilizing our farms with people, let me start by brainstorming some of the benefits:

More hands multiply the efficiency of certain jobs...

Predators become more leery when people constantly traverse the land...

A group of people working at a task can easily turn it from drudgery into a party...

Additional people enable farmers to travel, or at least get away for some rest and relaxation...

Brainstorming sessions are much more profitable when many minds rather than just one focus on the issue...

Leveraging mature experience on young labor is perhaps the most historically consistent and successful way to run a business – especially a family business...

A multi-person work crew offers everyone a variety of jobs...”<sup>(1)</sup>

**What we want to do is increase the “eyes to acres ratio”, a reference to the vital need for observation, for intimacy, intimacy with the soil, the plants, the animals, if organic agriculture, or any truly sustainable agriculture, is to succeed.**

Salatin argues for complementary enterprises, for complementarity when it comes to farming practice. He says “We must cease and desist being cattle farmers, grain farmers or orchardists. Rather we need to view ourselves as land stewards and landscape architects.”<sup>(2)</sup> And he writes of “stacking” enterprises on the land, as first described by J. Russell Smith in his classic book, *Tree Crops*. As examples of such “stacking”, Salatin writes “Vegetables planted between widely spaced grapevines ... can greatly increase income per acre. Planting bramble fruits under widely spaced, thin-canopied orchard trees reduces mowing and increases per-acre production. Grazing poultry or sheep under orchards is a historically tried-and-true program. The animals mow, de-bug and sidedress the trees with fertilizer. The trees in turn provide shelter and predator protection for the animals.”<sup>(3)</sup> The current experience in Nova Scotia of raising pasture pork on “drops” in apple orchards is a further example.

Part of the argument Salatin makes for re-populating farms is also based on season extension (greenhouses, root cellars), and on winter farming and forestry. To truly extend the season and practice year-round farming, he says “One of the best investments many farmers could make would be a commercial kitchen in which stored summer products could be further processed....Anything to add work during the valleys but not during the peaks can help generate labor requirements.”<sup>(4)</sup> He further speaks of agri-tourism opportunities and value-adding opportunities like wood-working and on-farm baking. Salatin decries the historic position of farmers which has always been how to eliminate people rather than how to add people. “Placing more loving stewards on the farmscape is every bit as important as proper soil fertility, animal selection and horticultural care”, he adds. “The gardener is certainly as important as the tomatoes. The herdsman is surely as important as the herd. The sower has to be as important as the seed”<sup>(5)</sup>, Salatin concludes.

## On the Back Porch, Comfortably Rocking

Distinguished economist and sustainable agriculturist John Ikerd of Missouri, farmer Joel Salatin of Virginia and agrarian philosopher-writer and farmer Gene Logsdon of Ohio would agree that the central emblem of their agricultural philosophy and, at the same time, the central activity of intensive rotational grazing, is the image of being “on the back porch, comfortably rocking”. All three jokingly tell audiences that this is their favorite farm activity. (Salatin likes hammocks.) Similarly, a hard-working Vermont organic dairy farmer told me that the favorite part of his work, as well as his true leisure, was lying in the pasture among the cows on a sunny day watching them chew their cud, rest and make milk (and thus money income) for him.

Does this mean they’re lazy? Of course not. Does this mean they’re work averse? Of course not. But it says much about how they work, at things to be done and at leisure, and how being “on the back porch comfortably rocking” fits in to their practice of sustainable agriculture.

These four are people who thoroughly enjoy their work, who work seriously at their leisure, and who see earned income as a byproduct (a necessary byproduct, of course, but still a byproduct) of this work, with animals, with land, with people.

For John Ikerd, an economist by background, the beautiful economic efficiency of sustainable agriculture, an efficiency which can be seen as poetry in motion, and a realization of the graceful linkages of ecology and economics, is likely the end product. For Joel Salatin, a farmer through and through, it's more likely opening a paddock and leading his animals, much like a pied piper, to new grass, an activity which is his end product. For Gene Logsdon, a philosopher-writer and farmer, it's the effort and the work of writing about and telling the world about his farming experiences on his small-holding. And for the Vermont dairy farmer, it's likely gazing at the beauty of his cows on grass, even doing so at their level, of joining them in a way, which becomes the end-product of satisfaction. (As a professor all of my adult life, and as a writer of eleven books, one could say that I'm in love with ideas, which I believe is what a professor is, a person in love with ideas. I love to write about them and play around with them. Perhaps that's my own end-product.)

What is work? And when are we doing it? What is leisure? And when are we doing it? If and when we saw either, how would we know? Likely, these farmers can't readily answer these questions. Nor can I. Such a high level of integration, such a high level of integrity, precludes an easy answer. What constitutes a good life? What constitutes joy, happiness, pleasure, fulfillment? Those are more important questions. And these farmers, not only Ikerd, Salatin and Logsdon but all the farmers this volume is about, have answered those questions and answered them well. We can all learn from them.

## What Do You LIKE To Do?

As a university professor of environmental studies for nearly four decades, I'm often facing students who are burdened with the question, What can I do about the world, the environment, my society? What should I do with my life? These are not easy questions, especially for young people. A worthwhile answer can only come from serious reflection, from contemplation. And it starts with an observation of oneself, for one must seriously ask, What do I LIKE to do? All of us humans have things we very much like to do, enjoy doing. (That is not to say there aren't some things in life we must do which we don't enjoy doing. There are.) Can we figure out what we like to do, and thus create a starting point for the big question: What should we do? We each have a calling or vocation. One person's calling is not another person's calling. And it takes a little time, perhaps, to figure out what that calling is. The message here concerns the importance of cultivating and promoting peoples' inherent sources of happiness and satisfaction and, in so doing, maximizing their productivity and benefit to society.

### WOMEN ON THE LAND

**New Hampshire (25%) and Maine (22%) are the nation's first and second states, respectively, in percent of farmers who are women. Women all over New England are taking up farming at a rapid rate, in Maine 81 per year between 1997 and 2002! (2)**

Bringing these questions to the subject matter of this book, I think of our local regional farmers market. At that market is a farmer who produces and sells the finest poultry and pork this side of paradise. You might say he is a chicken and pig man. (Of course, there are other sides to his life. He is not one-dimensional any more than you or I.) He does his work well, enjoys it and is proud of it, and has a very appreciative clientele. Some years ago he also grew and sold produce – but clearly did not enjoy that as much. Got out of it, he says, because there was too much competition, there were plenty of other produce providers at the market. But I suspect that produce was not his calling. He has found his calling: chicken and pigs (and now beef). Hooray for us.

There is another farmer at the same market who is into greens and eggs. Proud of his laying hens (a couple of which accompany him to the market each week). Proud of his great varieties of greens. Proud of his very strong organic standards. I have observed that this farmer, too, has found his calling.

The fact that a person at the farmers market (or anywhere else) is a specialist does not necessarily mean that they have found their calling. Any farmers market, for example, has vegetable producers, meat producers, flower growers, jam and jelly makers, etc., etc. These things may or may not truly reflect each individual's calling. But when we find our calling, we know it. And so does the world around us. Because it is through that calling that we put our all into what we are doing and can do no less. In the world of sustainable agriculture, it is critical that we identify our calling and that we help one another in the identification of a calling for each one of us. Those of us who take on leadership responsibilities must learn how to help people within our area of responsibility to identify their calling, and then help them achieve it. All are rewarded from this exercise.

## The Lesson of Trauger Groh of New Hampshire

In the words of New Hampshire community supported agriculture pioneer Trauger Groh, a man who might be called New England's Joel Salatin, the higher the on-farm diversity of plants and animals, the higher the production from the farm, because species support each other. And, in fact, according to agricultural writer Michael Pollan, animals are fertility generators on the farm.

Trauger Groh, New Hampshire farmer, writer, lecturer and early founder of the Community Supported Agriculture movement, is, like Joel Salatin, a natural when it comes to both the theory and practice of on-farm integration and farm biodiversity. And, like Salatin, his focus on such biodiversity and utilization of all the services that each of the farm elements, animal and plant, are capable of giving, makes him a champion of low input (and even no input) techniques. Groh believes that farms and forests are the only places in the world where a natural true production can happen without input. And he believes that we waste this possibility, partly because we count everything in money and not in true values. He sees an opportunity here to bring together a growing number of energetic young people without farms or other capital with the growing desire of many people for healthier food. The key is in low input systems which make full use of biological and ecological services offered by each of the farm's units. Believing that land should be connected to an idea, not to a person, and that what brings people together is ideas, not economics, Groh advocates extreme low input (and therefore of necessity highly biodiverse) systems as that central idea. Ecological agriculture is the natural result.

The higher the biodiversity, the higher the production, says Groh. And "economic" is what we produce with the least input of capital and energy. Nature never makes a monoculture because it's fundamentally uneconomic, Groh believes. And great diversity leads to harmony, landscape harmony (woods, fields, pastures in balance), animal harmony, ecological harmony. As one example of animal harmony, he points to his own intermixture of four sows with thirty-five milking cows on straw bedding. The four sows eat the hay and other roughage not consumed by the cows, and the cow manure as well, gaining nutritionally from the cow manure. He notes that ten sows in this scenario might upset the balance and become a nuisance. But four is right. He then asks how many chickens can run there? The chickens pick out all undigested grain from the cow manure. And the pigs eat the bird droppings, nutritionally perfect for their needs. Harmony, along with maximum productivity of cows and milk, pigs and chickens, results, at very, very low input.

Another area of interest to Trauger Groh is the idea of closeness and intimacy which is contained on a farm. For example, ruminants (cows, sheep, goats) adapt to the particular grasses and other vegetation growing on a particular farm – they develop intimacy with a locality. As the ruminants are fed through these grasses, they grow up with their "answer" (i.e., respond to) the grasses and soils with their manure, developing bacteria and fermentation in just the right way to serve that place. To manage, therefore, through a strong inner rotation of substances which "closes the circle of the farm", you bring harmony to the farm. The natural consequence of that harmony is the necessity for very low input. We thus achieve a certain ideal: we produce enough

and intimacy which  
sheep, goats)  
growing  
locality.  
they  
their  
the



food adapted for the needs of the local population, and do so with great diversity, while the input from outside goes toward zero, becoming less and less every year. To use Trauger Groh's words, we set the wheel of life into motion. And Groh takes this a step further by saying that if we can represent or model these ideas, we can attract attention, interest and participation, and fulfill Trauger Groh's belief that the land and people must be connected to a concept, an idea, before one can have a successful farm.

Groh speaks to the importance of having "creative animal communities" on the farm. Another example he provides in this direction is that of Devon cows and sheep on pasture. Devons are a triple purpose cow – beast of burden, milk and beef producer – and are perfectly suited to New England pastures and climate. They live on roughage rather than grain and have very good ability to use the roughage, even inexpensive low quality hay, very efficiently, making them an ideal animal for an organic farm. The addition of sheep to the Devon pasture makes for greater pasture fertility, for sheep have "golden hooves": sheep's hooves compact only the surface soil, and very lightly, enabling highly valued white clover, an ideal forage, to grow. And the sheep receive predator protection from the Devons and their horns (although Groh throws in one donkey to the mix, guaranteeing no sheep loss to predators).

Groh also speaks of domestic animals having a certain usefulness and great flexibility to live and work with people, traits unknown among wild animals. So we naturally draw domestic animals to ourselves. A cow, for example, is flexible and adaptable, like humans. One cannot change a wild animal (and receive service from it) like one can change (i.e., breed, adapt) domestic animals. Since we need them, we must take care of them. He also notes that each contributes different elements to the farm. For example, chickens give phosphorus, pigs give potassium. Pigs also clean up the place. Groh argues that every farm should have pigs for their service. He says that when he visits a farm without pigs, he knows who the pig is! (Another way to understand this integrative link between plants and animals is to understand, as Michael Pollan tells us, cheap corn is the cause of animal factory farming: beef cattle feedlots, large-scale hog and poultry confinement cannot exist without cheap corn.)

In all of this it is important to understand Groh's view that the economic goal of the farm is to meet the costs but not to make profit. And, like Amish farmers, labor is counted not as a cost but as a benefit. The farm budget represents spiritual intentions, Groh says, and we should realize our spiritual intentions by spending money. Obviously, therefore, one is not speaking here of agribusiness or commodity production or, needless to say, of industrial agriculture in any form. Trauger Groh's world is the agrarian and ecological world of Wendell Berry, of Joel Salatin, and other such farm thinkers and practitioners represented in this volume. No clearer statement of Trauger Groh's New Hampshire-applied philosophy is to be found than that which appears in his book, *Farms of Tomorrow Revisited*, in which he writes, "Take all of the initiatives for your actions on the farm out of the realm of the spirit, not out of the realm of money... for this spirit organizes nature with the highest economy".(6) Trauger is fifty years a farmer, has been working New Hampshire soil for thirty years, and knows whereof he speaks. Wise words for people on the land.

## On Permaculture

D Acres Organic Farm and Educational Homestead in New Hampshire described permaculture thusly:

"Permaculture, a framework created by Bill Mollison and David Holmgren in the 1970s, is a design system for creating sustainable human environments. The word itself is a contraction of Permanent and Agriculture (as well as Culture), which indicates the importance of sustainability in all its design components.

In permaculture theory, each element of the system performs many functions. An example of this would be a chicken. Chickens produce eggs for eating and poop for fertilizing the gardens; their natural tendency to scratch the ground can be utilized to incorporate compost into garden beds; they can warm a greenhouse with their

**"Making animals happy is the key to making them healthy."**

**Joel Salatin**

body heat and provide CO<sub>2</sub> for the plants, and ultimately, they can be eaten.

An apple tree can also serve several functions: the good apples can be used for eating, baking, or making cider; the bad apples can be fed to pigs, chickens, goats and cows; the leaves that fall each autumn provide mulch, which improves the soil below; the tree itself can provide cover for shade loving perennial plants; pruned branches can be utilized to make wooden utensils; and in the end the tree can be harvested for lumber and firewood.

Permaculture teaches us to design the areas around our homes, schools and workplaces in order to benefit in as many ways as possible from the combination of plants, animals, fungi, buildings, water and energy sources. It teaches us to think about our specific weather patterns, soil types and natural land formations, but above all, to create systems that mimic the way nature works.

Permaculture and sustainable agriculture both lead toward energy independence and self-empowerment. Permaculture is a very creative process. It's filled with indigenous systems. We can emulate what nature is doing. You can never see bare soil in permaculture. There's very heavy reliance on mulching. Least energy input – no machines. Integrating good housing with landscape with the lowest possible energy inputs. It's a design system following an engineering principle, the principle of life. It's greatest expression is in the natural forest system. Permaculture is about empowerment, about life skills, not just about gardening or design or architecture.”<sup>(7)</sup>

**An Observation: The new breed of New England farmer is less grounded in notions of wanting, having and doing, and far more grounded in being. And while this new breed of farmer has no lack of things to do, that doing is accomplished from a base of being and much less from a base of wanting or having. A high quality of life for such a person, therefore, is predicated on being and not on acquiring or accumulating. What do you LIKE to do becomes a critical question.**

## **Balance and Integrity: The Wisdom of Two Iowans With a Message for New England**

Although farming in Iowa, Dick Thompson, founder of the Practical Farmers of Iowa (see my earlier volume, *The Wisdom of Small Farms and Local Food*), offers New England words of wisdom on the question of balance and integration of plants and animals, of crops and animals:

“Is it possible a farm is not really a farm without a balance and integration of soil, crops, livestock, and family?

Is it possible we tamper with a wise and intelligent order of things when we separate out the crops from the livestock as we have in recent years?

Think about it.

Since we lost the cow – since we lost animals and livestock as an integrated part of the farm – the fabric of rural life has been steadily unraveling.

When we lost the cow, we stopped planting oats and hay, we lost our crop rotations, and we lost the best source of our soil fertility – animal manures. We gained costly inputs, eroding soils and impaired waters.

When we lost our animals, we turned our grass, our pastures and our meadows over to row crops. We gained lower grain prices, greater weed and pest pressure, and a less diverse and resilient landscape.

When we lost our livestock, we lost much of the hard work of the farmer, we lost chores for the kids, and we lost a cooperative spirit with our neighbors. We gained outside jobs, aimless youth, and the need to gobble up our neighbors' farms to stay in business.

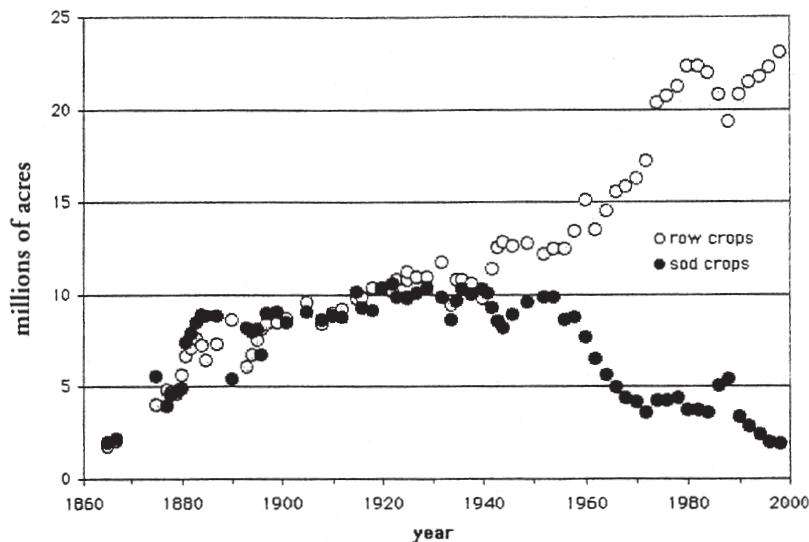
When we lost the balance of crops and livestock, we lost a farm that needed a whole family to work together. We gained farms that could be run by one person and lots of equipment. We gained boredom and fragmentation of the family.

When we concentrated the livestock, farms began to struggle economically, we began to lose more and more farms, and we lost the vitality of our small communities. We gained boarded-up Main Streets,

empty churches, and consolidated schools.”<sup>(8)</sup>

According to Thompson, we obviously lost a great deal. Thus, we have much to gain by reinstating farm integration and diversification!

In perfect juxtaposition with this statement is a graph from Dana and Laura Jackson’s book, *The Farm as Natural Habitat*, as recognized by Iowa farmer and writer Maury Telleen. This graph, according to Telleen, “shows that from the moment the plow met the prairie ... there was a rough balance between row crops and sod crops. From the first settlement (by our kind) clear up into our entry into World War II in 1941, that balance did not change much”. The change occurred “from 1940 to 1960, before the wholesale abandonment of this rough equity of “mixed farming” with its old contracts of crop rotations, diversification, and the inclusion of a livestock program of some type. High-tech farming, increased specialization, and chemical weed control finally did it... It should come as no surprise that all this voiding of so many unwritten contracts destroyed more than



Change in the relative amounts of row crops (corn and soybeans) and sod crops (crops planted close together, such as small grains and hay) from 1865 to 1999, based on Iowa agricultural statistics.

just farms. It also rendered obsolete neighborhoods, small towns, schools, and rural society generally...”<sup>(9)</sup>

This graph from Iowa covers 135 years and is representative of other farm states as well. It speaks volumes to New England, clearly showing the intensification of monocultural row crop production (corn and soybeans), starting about 1940, with an explosion of such production starting in 1960. This explosion signified the rush of cheap processed food, plant and animal, to New England, and the resultant economic destruction of New England family farm agriculture.

## High Priest of the Pasture: The Polyface of Joel Salatin

“Pigness”, “cowness”, “chickenness”, etc. are all ways of summarizing the philosophy of Virginia’s Joel Salatin. There are other ways: service from all creatures on the farm; return on investment; minimalization; implicit ecological soundness; diversity, biological and economic; independence. More such terms could be added.

Virginia farmer Joel Salatin, he of “salad bar beef” and “pastured poultry profits” (subjects of two of his very popular books), has been using the term “hog heaven” for some time, early on as the title of the keynote address for the Soul of Agriculture Conference at the University of New Hampshire, and now as the title of his new book, *Holy Cows and Hog Heaven*. But just what does he mean by “hog heaven”? A hog that is fully being a hog is an animal that is happy, satisfied, content, an animal that is in what is for a hog “hog heaven”.



The meaning of “heaven” obviously differs for other animals, including humans. Salatin is here exhibiting a supreme appreciation of the “isness” or “beingness” of hogs and of all other creatures, including humans like himself.

**Said UNH Dean of Agriculture Bill Trumble as he opened a UNH Permaculture Seminar, “Permaculture takes sustainable agriculture to the level of sustainable living.”**

Salatin writes, “...(H)ere at Polyface, we graze cows, egglayers in a portable hen house we call the Eggmobile, and pastured broilers. The poultry stimulates grass production for the cows. The cows mow the grass ahead of the poultry, which like tender, short grass shoots, thus stimulating the poultry to ingest more salad material, which is key to proper nutrition. The layers follow the cows and scratch through the cow paddies, turning fly larvae into chicken eggs and scattering the imbalanced manure over a broader area. An acre of pasture actually grows more insects in terms of animal protein than milk or meat. The layers convert this resource into eggs as well. When it’s all said and done, the multiple enterprises turn \$3000 per acre, rather than just a couple of hundred from grazing herbivores

Our solar- heated hoopouses, built initially to house laying hens in the winter, also house rabbits at eye level and grow vegetables in the spring. This year-round multi-speciation reduces disease problems by breaking host accessibility and cranks far more income per square foot of infrastructure than would be possible from any enterprise by itself. Finally, the cumulative effect of all these enterprises creates enough cash flow to justify owning better equipment because not only does the equipment get used more frequently, but its cost is also spread over multiple enterprises. A tractor does not generate any income sitting in a shed; it only becomes an asset when it works. And the more jobs, the more work it does.”<sup>(10)</sup>

It has been said that Joel Salatin’s secret is the grass, and, for him, “it is in the pasture that everything begins and ends”.<sup>(11)</sup> Such is his fame and his connectivity to pastures and grazing that Salatin has even been referred to as the “high priest of the pasture”. Salatin’s Polyface Farm represents the highest level of on-farm integration of which I am aware, at least here in the United States.

## **Integration and Biodiversity**

Farm integration can be viewed at different levels:

1. the internal, on-farm level, as practiced by Joel Salatin and others;
2. the inter or between farm level, as is currently being studied in Maine with potato-dairy combinations of whatever kind (see *The Wisdom of Small Farms and Local Food* for details);
3. the market level, as is currently being carried out by an alliance of multiple CSA farms around Concord, New Hampshire.

The first results in very high energy and capital efficiency on the farm. The second assists the economic development of a region and may easily mean the difference between farm survival and farm abandonment. The third represents a strong enhancement of direct marketing, and thus a very strong income flow to participating farms, also enabling farm survival.

Biodiversity, economic diversity and integration are the key to success in the small-scale ecological farm. Diversity, bio and eco, are dictated by the principles of ecology and by the warning not to put all one’s eggs into one basket. Integration, likewise, stems from ecological principle and from risk avoidance. But integration is also credited to the need for service from each of the component parts, not the least to reduce the cost of inputs, a key to financial success and economic survival. Crop-livestock integration; species integration, both plant and animal; agroforestry (especially to maximize the on-farm value of wood in New England’s forest-based environment); market integration, in all cases through direct marketing, farmer to consumer, are all crucial elements of the needed integration. And the need for such integration, while protecting ecological and economic integrity and sustainability, is also to learn limits, limits as to size and scale, for an ecological agriculture is an

agriculture which knows and respects its limits. In this kind of system, success breeds not increased size and scale but rather multiple smaller-scale and thus decentralized operations in the hands of many different farmers. It presents something for many while maintaining decentralization of wealth and power.

Industrial agriculture centralizes wealth and power, and is monocultural. It rejects integration. Ecological agriculture is decentralist agriculture, philosophically guided by decentralist values and opposite in every way from the industrial model. It is multicultural and, at its best, maximizes integration and the profit therefrom.

The ideal level of high diversification is in the individual farm unit. But this is not always possible. The next ideal, therefore, is among multiple individual farms in reasonable close proximity to one another. The effort in Maine (mentioned above) toward potato-dairy integration is of the latter variety. This project, as described in *The Wisdom of Small Farms and Local Food*, incorporates work at three land grant universities – Maine, Michigan State and Iowa State – in order to better understand the potential for inter-farm integration involving various combinations of crops, animals, and particularly rotations.

## The Power of Duck: The Supremacy of Integration

One of the world’s most intense models of biodiverse ecological integration leading to very high productivity is found not in New England but in far off Asia. And if it weren’t for Wes Jackson of the Land Institute in Kansas and his many lectures around North America, the model likely would not be known here. I refer to Takao Furuno’s integrated rice and duck farming project, described in his remarkable book, *The Power of Duck*. Why a project in far off Asia and of what relevance to this book? While New England models of sustainability and ecological efficiency are of greatest value for obvious reasons, certain success stories from farther afield may be of value for their sheer scale, not scale in size but rather scale of integration. The Salatin integration model in Virginia may be the nearest rival in this country.

*The Power of Duck* tells the story of an integrated farming method in Japan which organically combines fruit growing, stockbreeding and aquaculture. It is possible in such systems for a small farm’s annual income to greatly exceed the income of a much larger farm. Fully integrated, recycling all wastes on-site, and fully organic, a small farm of this type, at less than five acres in size (a little over half devoted to rice and duck, the rest for mixed vegetables), can yield vegetables, rice, ducks, and chicken and duck eggs sufficient to feed one hundred consuming families. The animals become the labor force and the manure factory, not unlike the model found at Joel Salatin’s Polyface Farm in Virginia.<sup>(12)</sup>

## On Chickens and Efficiency

E. F. Schumacher, the 20<sup>th</sup> century British economic philosopher, often spoke of the fascination of young children with “high technology”, giving the example of their enchantment with rocket ships going to the moon. He contrasted this fascination with their (and modern society’s) disparaging attitude toward the “lowly” barnyard chicken. The latter is looked upon as dirty and stupid and perhaps a creature to be laughed at, not

### APPLE-PORK INTEGRATION AND CHEESE-PORK INTEGRATION

New Englanders can no longer rely on a wholly unsustainable pork supply based on large-scale industrial hog confinement facilities in Iowa, North Carolina and elsewhere. Nova Scotia is providing an answer which is especially applicable to New Hampshire, Maine and Massachusetts: pigs pasturing on apple drops. These three New England states are truly apple country. This means many drops, some of which goes to cider. But pork can also be a valuable product of these drops: great tasting pork with apple flavoring and available for very little effort, using pasture pigs. The Agricultural Experimental Farm at Kentville, Nova Scotia, is pointing the way. When one couples this with the natural combination of pigs with Vermont cheese whey in that state (there is hardly a better nor more nutritious food for pigs than whey, making Vermont a logical place for New England pork production), it’s easy to see how New England can take care of much of its pork needs, and produce an exceptionally high quality pork product while, at the same time, enriching our apple, cheese and dairy producers.

looked up to. And yet, as Schumacher said, contained within that barnyard chicken and its scavenging for food is a “technology” that is far more sophisticated than that of the moon-bound rocket ship, and a technology far more basic and important to the lives of human beings. For we know that the chicken, operating with incredible efficiency, has the ability to convert insect, vegetable and inorganic matter, most of which is not edible by humans, into highly nutritious eggs and flesh, and to do so very rapidly – a true miracle. No peasant farmer anywhere in the world would make the mistake of not appreciating the chicken for what it is and for what it does for us. But we “moderns”, adults and children alike, consistently fail to so appreciate, and at our peril. (Perhaps we believe that the rocket will ultimately take us away from here and solve all our problems.)

So, the chicken, and indeed all poultry, are highly valued by practitioners of ecological agriculture. Indeed, they should be, for their role, their high efficiency, is critical. And, as Joel Salatin tells us, on pasture, birds naturally follow ruminants, giving that lowly chicken a very high place indeed, a very important role, in the building of pasture and the production of eggs and even meat, their own and that of the ruminants.

## **Integration With the Sea**

New England, and three of the states in question, have a long coastline and, as well, a long history of looking at and using the sea. It is natural, therefore, that estuaries be recognized here, as well as the sea itself.

The sea and the estuaries have been a source of nutrient for New England farm fields for nearly four centuries. The collection of saltmarsh hay for farm nutrient continues today. The “staddles” or grouping of wooden posts in the midst of marshes are witnesses to an earlier time of saltmarsh-dependent agriculture. And many a dairy cow has been fed from saltmarsh hay cut and piled on the staddles to dry. (After the marshy soils froze, wagons and oxen transported the hay to upland farms.)

Maine is famous for its saltwater farms, as they are called. These are not simply shoreline or near-shore farms, but traditionally they are farms that have depended on marine plant and animal life for their nutrient balance and agricultural productivity.

The aquatic environment can continue to be such a nutrient source into the future, particularly along the coast, up the estuaries, and even near some of the large freshwater lakes. Proximity to the aquatic environment is crucial to such nutrient utilization, given the high transport cost of marine and other aquatic-based nutrients (sea weeds, other aquatic vegetative matter, etc.). (An exception to this is high value-added fish and shellfish based fertilizers, most of which are sufficiently valuable to process, package and distribute with expectation of a reasonable economic return.) Use of these soil amendments might further assist in the reduction of invasive species of marine and aquatic plants, plants which can be heavily harvested for purposes of management, control or removal. Given the centrality of soil health to ecological agriculture, and given the governing principles of biodiversity inherent in such agriculture, not to mention the proven effectiveness of marine fertilizers, it is natural to develop this farm input source wherever it makes sense to do so. New England coastal areas, of course, hold the greatest potential.

## **Integration With the Forest**

New England is one of the most forested places on earth. New England soil wants to grow trees. Trees appear inevitable almost everywhere across New England. The two most heavily forested states in all of America are Maine (over 90%) and New Hampshire (over 80%). Vermont would be among them if it weren't for pastures and dairy cows.

The New England culture is a wood-based culture: wood for home construction, wood for fuel, and, in more modern times, wood for pulp and paper, most recently wood for electricity. Trees for maple syrup. Trees for Christmas. So, wood, forest, New England are synonymous, biotically and culturally. It would be foolish,

## THE WISDOM OF WES JACKSON

**“Land grant universities are losing graduate students in agriculture. If you don’t have students, a vacuum is created, providing an opportunity for the paradigm shift to sustainable agriculture. As well, a paradigm shift is occurring more rapidly than might be expected due to the vacuum created by departed and unreplaced agriculture faculty.”**

**“Proper sustainable agriculture, ecological agriculture, could be said to be about elegant solutions predicated on the uniqueness of place.”**

**“Technological fundamentalism is more destructive than religious fundamentalism.”**

**“200,000 years – age of our species”**

**10,000 years – age of agriculture**

**300 years – age of industry (and therefore of the industrial model)**

**“We have an addiction to mobility and stuff, but no sense of frugality.”**

therefore, to ignore the potential of agroforestry in any future role for agriculture in New England.

Agroforestry is a source of on-farm energy, and a source for nutrient (mulch, soil amendment). And agroforestry can be an important supplemental source of farm income. Such small-scale forestry, carried out in conjunction with agriculture, is important to the future New England ecologic, economic and natural resource mix.

The Virginian Joel Salatin writes of his own extraordinary economic fortune with on-farm wood supplies, including, in his case, finished lumber with very high economic return for small investment (predicated on the new generation of small-scale and portable saw mill technologies). Salatin also operates a thriving firewood business for extra farm income. He claims to take advantage of the many folks in the rural and suburban environment who need an excuse to use their often under-utilized pickup trucks to collect his firewood, and thus enable him to avoid the expense of delivery – a very workable scenario in New England. New Englanders can do even better than this by adding high efficiency wood stoves and wood furnaces to the mix, and new uses for wood

chips as well.

Our predecessors here in New England accepted the ecological principle of nature as guide, as teacher, as text, and, during the long period of European settlement of this region, read the landscape and particularly its forest habitat to seek guidance for proper land use. Robert Thorson in his book *Stone by Stone* writes “... (T)he original settlers used the forest composition – the species of trees – to determine what use to put the land to.”<sup>(13)</sup> He cites forest ecologists David Foster and J.F.O’Keefe from their book, *New England Forests Through Time*, “(S)ugar maple, beech and ash grew on productive sites that were suitable for crops; chestnut and oak dominated the broad moderately productive uplands that made good pasturelands; and hemlock and red maple sites were usually wet and rocky and less suitable for agriculture”.<sup>(14)</sup> This is an important reminder to contemporary New Englanders that wooded or forested land should not necessarily be thought of as non-agricultural simply because it has trees on it. If left to nature, nearly all land in New England would go to forest. We must be able to envision, therefore, both tillable land and pasture land of the future on sites which are wooded today. In that way we can begin to see the true possibilities for food production in our region.

## Integration and On-Farm Energy

GAS and OIL PRICES CLIMBING HIGHER...AND HIGHER...AND HIGHER – these are familiar words. The volatility in prices (and perhaps soon in supply) of oil, gasoline and natural gas, and the increases in those prices is obvious to all, not the least to farmers. All farmers have numerous on-farm needs for these three commodities, and all farmers benefit from any opportunity to reduce this input cost and dependency. Growing a crop of oil plants to make small supplies of biodiesel fuel is an obvious response, as long as local processing is available in the vicinity. Such also presents an opportunity for farmers to offer processing services to other farmers, thus themselves creating a new local source of income.

If biodiesel is to be portrayed as “green energy”, it must be produced from organic sources. It makes no sense to base it on GMO soybeans, nor from distant sources in the South and Midwest. It can come from canola,

sunflower and mustard from right here in New England and the Northeast. These crops and their oils are easily produced organically. The Cox Family Farm in Lee, New Hampshire, not far from UNH, is showing the way.

## Integration and Local, Ecological Agriculture as a Reducer of Pollution

Could nitrogen and other nutrient loading in New England be significantly reduced by an increase in sustainable agricultural practice (i.e., local food for local markets) in New England? Would (could) a significant increase in sustainable agriculture in New England (i.e., local food for local markets) lead to a significant decrease in nitrogen loading into the New England environment? Would such sustainable agriculture (i.e., rotational grazing, organic agriculture) result in a general improvement in the New England environment and quality of life?

We are familiar with agriculture as a polluter.

Richard Manning in his book *Against the Grain: How Agriculture Has Hijacked Civilization*, writes,

“We can trace the Green Revolution’s swath across the planet ... by focusing on a single element – nitrogen”.<sup>(15)</sup> (We) “underappreciate the seriousness of the single problem of nitrogen pollution. It is becoming clear that human-produced nitrogen, largely from fertilizers, is altering the conditions of life on the planet. Humans now contribute more nitrogen to the global cycle than do all natural terrestrial sources. This scale threatens consequences equal to those caused by human disruption of the carbon cycle.”

Manning specifically identifies corn and soybean production, mainly in the Midwest, as the leading contributor to the problem. And he tells us that, in destroying the productive Gulf of Mexico fishery, by creating the Dead Zone in the Gulf, we have lost a high quality, low cost source of protein and replaced it with a low quality, high-input subsidized source of protein which blankets the Midwest – a very bad trade. (Corn farming accounts for 57% of all herbicides and 45% of all insecticides applied on all U.S. crops. Soybeans account for 19% of herbicides and 1% of insecticides.<sup>(16)</sup> Both are leading contributors to soil erosion and groundwater pollution.)

So what does this have to do with New England? Terrestrial ecologist Dr. John Aber of the Center for Complex Systems at the University of New Hampshire, has done extensive work on the problem of excess nitrogen in the New England environment, particularly in the region’s forests. This nitrogen both comes in on the air and arrives in the form of fertilizer. But it is also present within the enormous quantity of food we import into the region, pure surplus not balanced by any export of farm products. Could some significant portion of this excess nitrogen be alleviated by changes in agriculture and food choices, in other words, by a significant slowing of food importation compensated by more food production within the region? Likely, yes.

For one thing, the purchase of food grown locally precludes and replaces reliance on food grown in the large-scale fertilizer and energy-intensive industrial agricultural model employed in the Midwest (as well as the South and California). This results in a reduction in market demand in a major market, the Northeast, and, ultimately, a smaller industrial agricultural production in the Midwest. Benefits accrue to the Gulf of Mexico and Gulf fishery and to reduced nitrogen movement via air pollution and acid rain from the Midwest to the Northeast. And Midwestern supply is replaced by much less fertilizer-intensive and less energy-intensive forms of farming in the Northeast, forms which are not significantly nitrogen-dependent (i.e., grass-based and organic systems).

### THE WISDOM OF FUKUOKA’S “ONE STRAW REVOLUTION”

The great Japanese organic farmer – philosopher Masanobu Fukuoka, in his classic book, *The One Straw Revolution*, perhaps expresses it best when he writes, “I was aiming at a pleasant natural way of farming which results in making the work easier instead of harder. How about NOT doing this? How about NOT doing that? – that was my way of thinking. I ultimately reached the conclusion that there was no need to plow, no need to apply fertilizer, no need to make compost, no need to use insecticide. When you get right down to it, there are few agricultural practices that are really necessary.” He argues that, in farming, there is no need to plan, apply fertilizer, apply compost, apply pesticide. The only reason for the need of such measures is that the natural balance has been so badly upset beforehand by those same techniques that the land has become dependent on them. Salatin and Logsdon would agree.<sup>(3)</sup>

Masanobu Fukuoka

The somewhat higher retail food prices resulting are easily off-set by the economic benefits of a more ecological form of agriculture. A further reduction in New England nitrogen loading will be experienced by change in food consumption. Today, human waste in New England and the Northeast contains excess nitrogen because of heavy human consumption of nitrogen-laden foods, foods shipped from those nitrogen-laden Midwestern farm fields to the Northeast where it ultimately enters area watersheds and ecosystems, both as food waste (which is considerable) and, as well, as human waste.

Thus, in addition to the environmental benefits of open space, reduced sprawl, increased biodiversity, and wildlife habitat, New England gains a much-needed respite from nitrogen overload through enhancement of its own agricultural potential and through change in its food consumption choices. Local New England sustainable agriculture becomes, therefore, not only an antidote to problems of acid rain, air quality, loss of biodiversity and climate change, but also to the increasingly observable challenge of nitrogen-overload and resultant forest destruction as well. Higher food prices are a small price to pay for such value.

## Haying Then and Now: One Key to Biodiversity and Integration in New England

A few years ago the Museum of Fine Arts in Boston featured a major exhibition of the work of 19<sup>th</sup> century New England painter Martin Johnson Heade. Though including paintings from around the world, the exhibition focused on Heade's brilliant and historically valuable paintings of a particular type of New England agriculture: saltmarsh haying. Images of huge haystacks built upon and around staddles, a type of wooden frame to hold the hay; cattle and horses in the great marshes; tidal pools amidst the saltmarsh grasses, *Spartina alterniflora* and *Spartina patens*. The site of Heade's paintings was not more than forty or fifty miles from the museum, in the great marshes of northeastern Massachusetts, stretching from Essex, Ipswich, Rowley and Newbury north to the Hampton-Seabrook marshes of adjacent New Hampshire.

More recently Jane Brox, agrarian writer of this same area, used Heade's painting, "Sudden Shower: Newbury Marshes" to adorn the cover of her 2004 book, *Clearing Land: Legacies of the American Farm*. She relates that she would never have known of the salt hay harvest had she not seen this painter's work, and she writes, "What Heade painted was the last strong time of salt hay harvesting. The cutting of *Spartina*, which had receded as the country expanded westward across the ranges and into the prairie, enjoyed a nineteenth century revival when Northeast farms began to grow as the textile cities crowded in and the factories grew larger and farmers began to increase their herds to satisfy the demand for milk. They lacked adequate tillage land for their cows since many of the old fields had grown up into impenetrable thickets, then woods, but the saltmarshes - the ones that hadn't been cut off from the sea by roads, or drained for development, or turned into cropland for corn, onions and strawberries - remained open... (S)ometimes a different grass might have moved onto the marsh but because of the salt nothing of any stature - no cedar or pine, oak or hickory - had taken hold... At the end of the nineteenth century those open marshes seemed more valuable than ever..."<sup>(17)</sup> (Soil scientist Sid Pilgrim notes that this passage could imply soil drainage to grow their crops, noting that the soil chemistry, the pH, changes radically under that circumstance, from 7.0 all the way down to 3.0, making most farming impossible. It is more likely the farm value would be in the harvesting of the saltmarsh hay, rather than on any attempt to till the saltmarsh soils.) Of course, this farm economy, the second time around and re-born from an earlier version, eventually again disappeared, unable to compete with food and feed sources from the west.

Today, at the start of a new millennium, we are

### HOW WE THINK:

**"We need sensitivity to organic needs. There's a problem when grant requirements dictate over organic biology."**

**"We need to think right. If you're used to the industrial ag and the control that it involves, you are ill-equipped to make the right organic decisions. This is another example of the need for an organic rather than an industrial mind-set."**

**"Organic farming depends less on trying to direct what happens than on promoting what wants to happen."**

**Prof. Charles Schwab, UNH dairy scientist**

witnessing a new renaissance of agriculture in New England, one supportive of haying once again. (This is not saltmarsh haying, though there is still a small demand for that type of hay for mulch for crops within the newer styles of local farming.) It is, rather, upland haying. Haying in New England in recent decades has been somewhat sustained by the good prices wrought by horse-rearing, the hobby of middle and upper class suburban and urban folks. But “sustained” is now evolving to growing as the demand rises for certified organic milk, and for natural and organic beef and other grass fed animals. Organic hay is coming into its own and commands a rising price in the region. Likely even more significant, however, is the failing competitiveness of hay from the West, whether organic or not, as fuel prices soar and thus transport costs make hay importation into the region more economically difficult. Perhaps a sign of the new story is the re-establishment of hay farming in southern New Hampshire with its recently developed haying operations very near those salt marshes painted by Heade. It remains to be seen if this and other farms, including the great Appleton Farm’s 1000 acre pasture in Ipswich, represents a third coming of hay farming to this near-to-Boston and highly populated New England region. (Appleton Farm is so near to the city, in fact, that it is daily served by frequent commuter passenger rail.) It also remains to be seen if this area’s remaining salt marshes will witness yet another agricultural revival – perhaps driven by consumer demand for organic product (saltmarsh hay being mostly organic by nature, and, importantly, weed-free) as well as nearby local product involving low transit cost.

**“Potatoes are more productive than any other staple on a yield per acre basis. The production on one acre can feed ten people for a year! Thus, a family with a potato field and a cow (or goat) is set for life.” (4)**

**Jack Kittredge**

North of the border, Canada’s Tantramar Marshes of New Brunswick and Nova Scotia, among the largest of salt marshes in northeast North America, hold potential to feed many in the region, with hay, pastures and grazing as a base. Saltmarsh agriculture holds potential for future food production in both the Maritimes and New England.

A regional increase in haying in general, including the production of organic hay, can be a key to the renaissance of animal agriculture across all of the region.

## **On Organic and Local**

### **Organic Means Local**

Most people today are familiar with the U.S. Department of Agriculture’s organic label on certified organic food, and know that the USDA sets the specific rules for organic certification. New England, however, has had a much longer history of experience with organic certification. USDA may establish the national organic standard, such as it is, but here in New England it is not USDA which establishes the norm for what people expect an organic label to represent. Perhaps first and foremost it is MOFGA, the Maine Organic Farmers and Gardeners Association, long Maine’s certifier, which is looked to for guidance, known well across Maine and respected outside that state. Except in New Hampshire, where the state’s Department of Agriculture and Markets has always been the certifier, New England and the Northeast often rely on the various NOFA (Northeast Organic Farmers Association) chapters for certification and, for many years before USDA arrived on the scene, for standard-setting. The Vermont and Massachusetts NOFAs have been particularly important. And two quarterly publications, *The Natural Farmer*, representing the NOFA Interstate Council (New Jersey to New Hampshire) and published in Massachusetts, and the *Maine Organic Farmer and Gardener*, published by MOFGA, have documented and guided the organic movement and organic standards in the region. The new series of NOFA Handbooks, covering everything from *Organic Dairy Production* to *Organic Soil Fertility Management*, to *Organic Seed Production and Saving*, to *Whole Farm Planning*, and many other areas, are now supplementing the two quarterlies. It thus could be said that observance of USDA standards, while necessary for certification, is not sufficient for full organic certification in the eyes of many, if not most, New Englanders. And, since the organic norms (not the official legal standards but the norms) are established and maintained by these organizations and their publications, public credibility inheres in the word of these organizations. Land

grant universities, among others, who claim to be observing organic standards, if they wish to protect their credibility, must attend to the MOFGAs and the NOFAs and keep current with their findings, decisions and pronouncements. As Sir Albert Howard tells us, “When we said organic, we meant local. We meant healthful. We meant being true to the ecologies of regions. We meant mutually respectful growers and eaters. We meant social justice and equality.”<sup>(18)</sup>

## Local Trumps Organic

In many ways, “local” has become the new “organic”. In my book, *The Wisdom of Small Farms and Local Food*, I reported that the Maine Organic Farmers and Gardeners Association (MOFGA), a standard setter for all such organizations in the Northeast, has long held the philosophy, in spite of its name, that local trumps organic. MOFGA believes it is more important for people to purchase from local farmers, and to use that support to encourage those local farmers to go as far down the path to organic as they can go. To a great extent, “organic”, at least in the Northeast, means local – shortness of distance between producer and consumer is critical to the idea of organic. Farmer and agrarian writer Joel Salatin of Virginia, a former certified organic grower himself, likewise champions local, and is highly critical of the emerging long distance industrial organic food system which, to both Salatin and many New Englanders, is not at all in keeping with true organic agricultural philosophy. USDA organic standards, recently arrived on the scene, much exacerbate the problem of organic, encouraging a lot of large-scale industrial producers in search of good profits, to become organically certified while they push the envelope as to what can and should be required for organic production. All of this is promoting the idea of local production (and what it makes possible, “relationship agriculture”) to the fore and, simultaneously, is beginning to reduce the significance of USDA organic certification which is viewed skeptically and often not trusted by serious organic consumers. Thus, when we say organic, we mean local and healthful. We mean being true to the ecologies of regions. We say (and mean) far more than what the USDA requires for an organic label.

## The “Will Haves”

We know about the “haves” and the “have nots”. Although there is debate as to where the line might be drawn between the two, there is little disagreement that there is such a line. The idea of this duality attracts attention, perhaps overly so. How different might things be if we focused on “will haves” instead? In farming, in agriculture, there are established conventional economically healthy farmers (the “haves”), although their numbers are dwindling due to ever higher input costs and declining commodity prices. And there are struggling farmers operating at the edge (the “have nots”) whose position is always precarious and never secure.

But what about the “will haves”? These include people, young people and mid-career people, who want to farm but who have little to no capital or access to capital, people with farming skills and experience who have no access to land or animals. And they include people with neither experience nor capital who have deeply held desires to farm but who need both mentors and capital. If we are to insure and secure our future food supply in New England, we must pay attention to and support our “will haves”, our future New England farmers. Good steady dependable markets for local food will ensure the future of our remaining farmers. Such markets must also yield financial support to rebuild and renew our human infrastructure as well. Integrated agriculture, biodiverse as well as economically diverse agriculture, is a necessary characteristic of this new smaller-scale local agriculture. It is the younger generation, the enthusiastic “will haves”, who must be nurtured to develop this new agriculture. Saving what we have is not enough. It is an agriculture of integrity which will make possible a future of “will haves” on the land, and therefore the local nutritious food and the open space and healthy environment which we

**“... (I) f we wanted to produce more food, then the answer is not GMOs. The answer is synergistic, symbiotic, diversified models. The answer to sick chickens in a factory confinement house is not a new drug that they’re not resistant to. The answer is to shut down the factory and grow the chickens under a totally different paradigm. It’s soul-destroying to continue year after year, repeating the same mistakes.”**

**Joel Salatin**



all need to survive and prosper.

Putting all these forms of on-farm integration into practice requires a satisfied, confident and happy farmer on the land. Handling such diversity and integration requires something more, however. It requires creativity.

We will revisit this theme in Chapter Seven on marketing. For now, however, we must devote more attention to our natural resource base. Of all the elements that constitute the integrity of the sustainable farm, why is soil central? And on what grounds do we assume that New England has such extraordinary grazing potential? For answers to these most compelling questions, we turn to Chapter Four.

## ENDNOTES:

1. Joel Salatin, “People Fertilizer: The Need to Repopulate Our Farms”, *Acres USA*, Vol. 34, No. 12, December, 2004, pp. 1,10.
2. *ibid.*
3. *ibid.*
4. *ibid.*, p. 10
5. *ibid.*, p. 11.
6. Trauger Groh, *Farms of Tomorrow Revisited: Community Supported Farms – Farm Supported Communities* (Kimberton, Pennsylvania: Biodynamic Farming and Gardening Association, 1997), p. 32.
7. D Acres of New Hampshire, *Annual Report*, 2005, p. 4.
8. Dick and Sharon Thompson with Robert Karp, “Restoring the Balance”, *Farming*, Vol. 4, No. 3, Fall, 2004, p. 19.
9. Maury Telleen, Commentary, *Farming*, Vol. 4, No. 3, Fall, 2004, p. 20.
10. From Joel Salatin, “People Fertilizer”, *ibid.*, p. 10.
11. See Todd S. Purdum, “High Priest of the Pasture”, *New York Times Sunday Magazine*, May 1, 2005.
12. For complete information and numerous wonderful diagrams of this model, see *The Power of Duck* by Takao Furuno.
13. Robert Thorson, *Stone by Stone*, p. 91.
14. *ibid.*
15. Richard Manning, *Against the Grain: How Agriculture Has Hijacked Civilization* (New York: North Point Press, 2004), p. 100.
16. *ibid.*
17. Jane Brox, *Clearing Land: Legacies of the American Farm* (New York: North Point Press, 2004), p. 121.
18. See Sir Albert Howard, *An Agricultural Testament* (New York and London: Oxford University Press, 1943), 253 pp.

**“Since agriculture was the last economic sector to move from the agrarian to the industrial economy, it will be the last to exit.”**

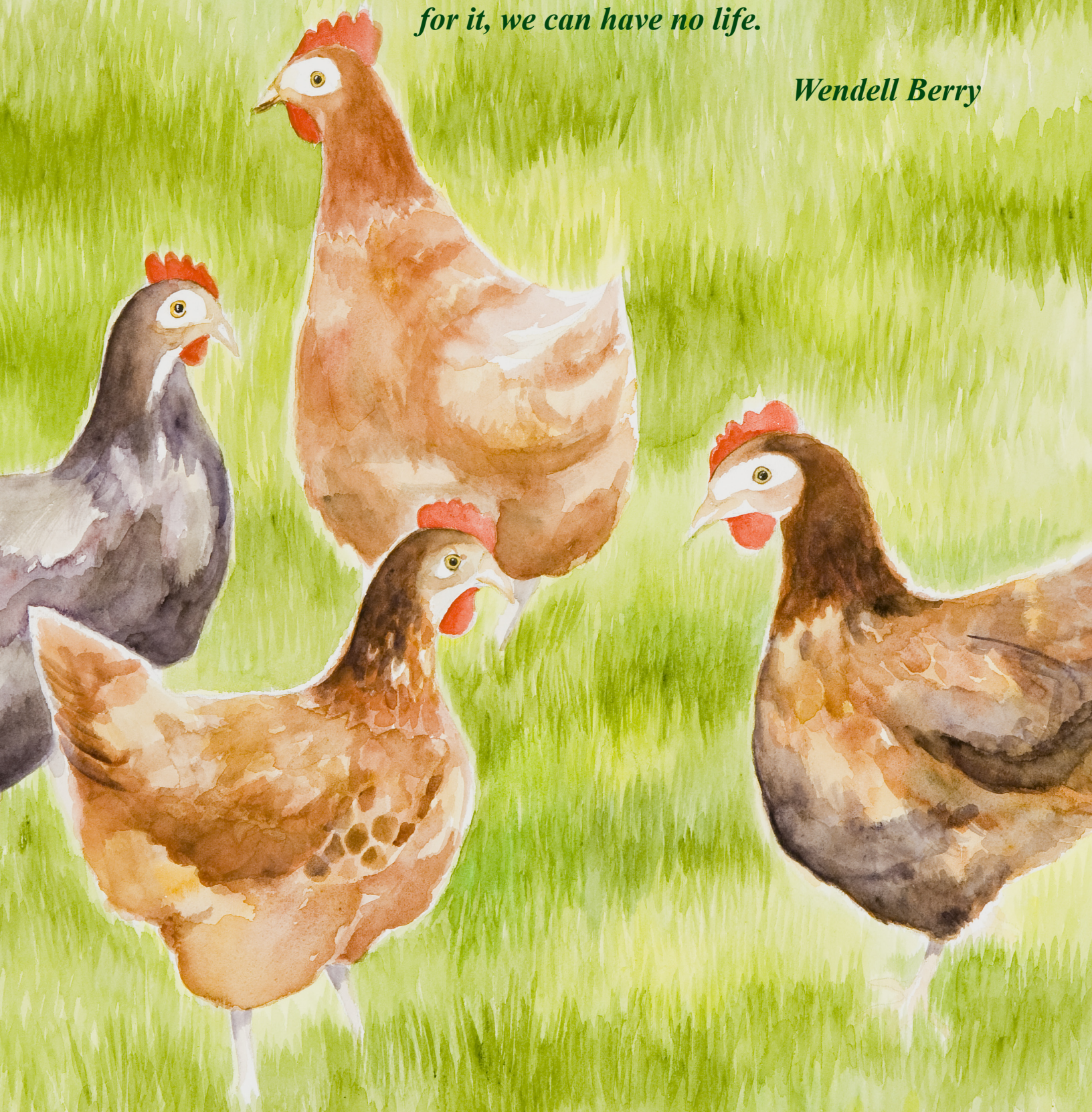
**Joel Salatin**

## BOXNOTES:

1. This book is available from Tagari Publications, 31 Rulla Road, Sisters Creek, Tasmania 7325, Australia, and may be accessed on Tagari Publishing’s website, [www.tagari.com](http://www.tagari.com).
2. Portland Magazine, Vol. 22, No. 7, October, 2007, pp. 36-37, 76-79.
3. *The One-Straw Revolution: An Introduction to Natural Farming* (Emmaus, Pennsylvania: Rodale Press, 1978, p. 15).
4. *The Natural Farmer*, Fall, 2006.

*The soil is the great connector of lives, the source and the destination of all. It is the healer and restorer and resurrector, by which disease passes into health, age into youth, death into life. Without proper care for it, we can have no life.*

*Wendell Berry*



## Chapter Four

### *Soil: “The Tablecloth Under the Banquet of Civilization”*

In the entire range of literature on sustainable agriculture, both academic and popular, the central place of soil is ubiquitous. The health of the soil is central to all considerations of sustainable agriculture practice. And the farmer/landowner’s relationship to soil needs to be one of intimacy. It is appropriate, therefore, that this study have something to say about New England soil relative to agriculture. So often, the general popular attitude toward New England is as a land of stony soils on rolling to steep slopes, and not particularly fertile. When combined with a relatively short growing season, the common image of New England is that of a region which is not, and cannot be, a food producer. This is an erroneous image: New England’s food production capability has been seriously underestimated.

It is true that New England is not Iowa with its flat fertile prairie soils. And New England is not even Pennsylvania or New York with their potentials for tillage and crop production. But New England is a land of pastures, historic pastures and potential pastures. It is a land of fine fertile grazing soils, with a well-watered climate supportive of grazing and the important products that grazing can yield. Grazing animals are not perturbed by rocks and stones, as are tractors and tillage equipment. And when one combines such agroecological conditions of soil and climate with the very strong factor of nearness to markets, one can immediately recognize the potential of New England’s existing and future pastures to play a central role in the region’s future food production and food security.

Thanks to the effort of New Hampshire’s former State Soil Scientist Emeritus, Prof. Sid Pilgrim, who served in that post from 1964 to 1989, and thanks to the technical capability of USDA’s Natural Resources Conservation Service (NRCS) in the four states included in this study, we now know that New England is filled with soils rated “good” to “excellent” for grazing. This includes not only present pasture but abundant potential new pasture now covered with scrub vegetation and pole-stage woodland, land which can be renovated and reclaimed for pastoral agriculture. Indeed, the conclusion with which we are left is that, contrary to common opinion, New England is, indeed, an agricultural region and could do a far more significant job of feeding itself from its own resources.

In the early 19<sup>th</sup> century, from 1820 to about 1850, the New England states had more sheep than people. And most of present day New England woodlands, so well marked as they are with stone walls, were at that time well grazed sheep pasture. Where today 80% or more of the land is forested, a mere 25% was in forest at that time. In later years cattle became more common on the remaining pastures, with surplus pasture returning to woodland. Grazing practice largely died out by the late 1950s, to be followed by both expanding food importation from the West and by “confinement agriculture”, in which ruminant animals were confined indoors and on controlled diets. Grazing had fallen from favor, and with it knowledge of the practice of New England grazing, the grazing breeds, the pasture grasses, and, of course, the soil, the foundation of it all. With grazing now returning after a half century out of favor, knowledge of those soils must inevitably also return. This book is, thus, a contribution to that return.

#### **ON THE PLACE OF SOILS:**

**With respect to Massachusetts a century and more ago, Jane Brox writes of**

**“...an agrarian society in a time when the quality of soil marked your life and determined your chances...” (1)**

**Jane Brox**

### **Soil: The Foundation of It All**

Edward Hyams in his book, *Soil and Civilization* (1952) writes, “As commonly used the word soil means that granular matter which forms the skin of a great part of the planet and in which vegetables grow. But for me

**“If you eat from the soils of your home, you are an embodied expression of your place.”(2)**

the word means much more ...”<sup>(1)</sup> He then goes on to provide a definition which encompasses no less than twenty-one substantial paragraphs consuming nine pages. Those pages define an entity so complex, so dynamic, so integral that such a definition could

never be simplified or made more concise and still be complete. Soil, to Hyams, is much more than a thing, an object. It is rather a holistic process deeply embedded in and interrelated with other limitless earth and biotic processes. Hyams treats science in the same manner, as his book begins with a distinction between poetic and scientific truth. Science, he says, is a good servant but an infernal master. But the poet is the true interpreter, not the scientist, for the poet sees the given facts, scientific or otherwise, in the harmonies of wholeness. Hyams is writing in the early 1950s, a half century ago and before the new agrarianism and, as well, before the development of much modern ecological science. Nevertheless, he accurately captured the world-view, the manner of interpretation, of finding meaning used by the farmers described in this volume, not only for soil but for life as a whole, and, indeed, for reality.

In the agrarian and ecological value system, in an agriculture which is truly sustainable, soil is central. Soil is key. These words, this idea, cannot be overstated. This is true not only as a general rule within sustainable and ecological agriculture. It is also specifically true in grass farming and intensive rotational grazing, in New England as elsewhere. It all starts with soil.

In conventional industrial agriculture as it has been practiced in the latter twentieth century, soil is only one among numbers of components in the mix of farm inputs, along with water, chemicals, nutrients, labor and technology. It is nothing more. Often it is viewed (and treated as) little more than a physical foundation for the production of crops and animals, a mere substrate. It is taken for granted, its depletion assumed, its abuse found acceptable. It is a footnote in the bigger picture.

Yet, in the agricultural philosophy which this book represents, soil takes on a much different role. A scan of all of the 19<sup>th</sup> and 20<sup>th</sup> century literature of organic and related ecological forms of agriculture shows that the central place of soil is clear and absolute. Soil is to be revered, protected, built up and improved by the farmer. This is similar to the American Amish dictate: Amish people are commanded by their religion, by their interpretation of Christianity, when they take leave of life or farming, to leave the soil in better shape than it was in when they inherited it. Most Americans assume that farming must, of necessity, deplete the soil, use it up. For the most part, that’s the only scenario Americans have known: abandon the soil and move west, opening up ever new frontiers. Respond to market bubbles and temporary high crop prices by planting fence row to fence row. Somewhat of a lesson from such a disaster was learned in the 1930s’ Dust Bowl era and the Roosevelt Administration’s ambitious attempts at soil conservation. That lesson was to be lost, however, a mere few decades later. As the twentieth century progressed, more marginal lands were to be planted, so that, by the century’s final decade, U.S. national soil erosion was as bad as it had ever been. It was, however, less apparent, given somewhat less visible water erosion in contrast to the more visible and dramatic wind erosion of the earlier part of the century.

Soil is basic to any and all practitioners of ecological agriculture, not to mention believers in an agrarian value system. And the great New York naturalist John Burroughs’ nineteenth century writing accurately reflects views held today by



New England’s ecological farmers. On the status of soil, Burroughs wrote “About all we have in mind when we think of this earth is this thin pellicle of soil with which the granite framework is clothed – a red and brown film of pulverized and oxidized rock ... but it is the main thing to us. Out of it we came and into it we return.”<sup>(2)</sup> And Burroughs on the dynamic of soil, “The trembling gold of a pond lily’s heart, and its petals like carved snow, are no more a transformation of a little black mud and ooze by the chemistry of the sunbeam than our bodies and minds, too, are transformations of the soil underfoot.”<sup>(3)</sup> This certainly places soil at the center!

It is well known that New England has a sparseness of what are commonly, and perhaps misleadingly, called “agricultural soils”. But, in most peoples’ minds, such refers to tillable lowland, level and nutrient-rich, often alluvial, crop-producing soils. Such soils are certainly not represented across hilly, stony and rarely flat New England. But pasture grazing for livestock, for meat and dairy, is a very different story. And history has demonstrated that story, a story of rich agricultural production based on grass. Well-watered New England, stony and hills notwithstanding, appears to offer much potential for food production from grass. (And such grass farming does not suffer as much from the short New England growing season that limits crop agriculture.)

Physically, grazing and New England’s stony fields and pastures are not at odds, particularly for the heritage breeds of farm animals which do so well with grazing, with or without stones. In fact, numerous stones in the fields can even be viewed positively, as heat sinks in a cold climate, and as moisture conservers during periods of drought. And soil erosion challenges on sloping land are precluded by the good practice of intensive rotational grazing technique which, in fact, prohibits the land, the soil, from eroding.

But the question remains, are there good (or even exceptional) soils in New England which are conducive to productive and profitable grazing? If so, where might they be found? It appears that there are such soils, in some abundance, and they are rather widely distributed, as is clear from the grazing soils maps developed for this volume. (While tillable soils can also be very good grazing soils, the better tillable or classic agricultural soils of New England are not included in this grouping, since they themselves are relatively rare in the region, geographically restricted, and more productive of food and income when used for crops. Grazing should not, therefore, in the view of the author, compete for their use.)

## Sid Pilgrim on New England’s Grazing Soils

Former New Hampshire State Soil Scientist and University of New Hampshire Adjunct Professor of Soils Sidney A. L. Pilgrim has identified a number of northern and central New England soil types (or soil series) as being especially valuable to support pasture grasses and livestock grazing in the region. These include the series known as Plaisted, Bangor, Howland, Paxton, Woodbridge, Marlow, Peru, Winnecook, Bernardston and Pittstown. According

to Massachusetts State Soil Scientist Bruce Thompson (personal communication), Plaisted was established (i.e., identified as a soil class) in Aroostook County, Maine, in 1960; Bangor at Orono, Maine, 1909; Howland in Aroostook County, Maine, 1960; Paxton in Worcester County, Massachusetts, 1922; Woodbridge in Essex County, Massachusetts, 1925; Marlow in Cheshire County, New Hampshire, 1939; and Peru in Berkshire County, Massachusetts, 1923. (Gratitude is also extended to Maine State Soil Scientist Wayne Hoar and New Hampshire State Soil Scientist Steve Hundley for their assistance in this identification.) The distribution of these and the Winnecook, Bernardston and Pittstown Series appears on the accompanying regional maps, these maps thus indicating prime soil regions which will support healthy grazing.

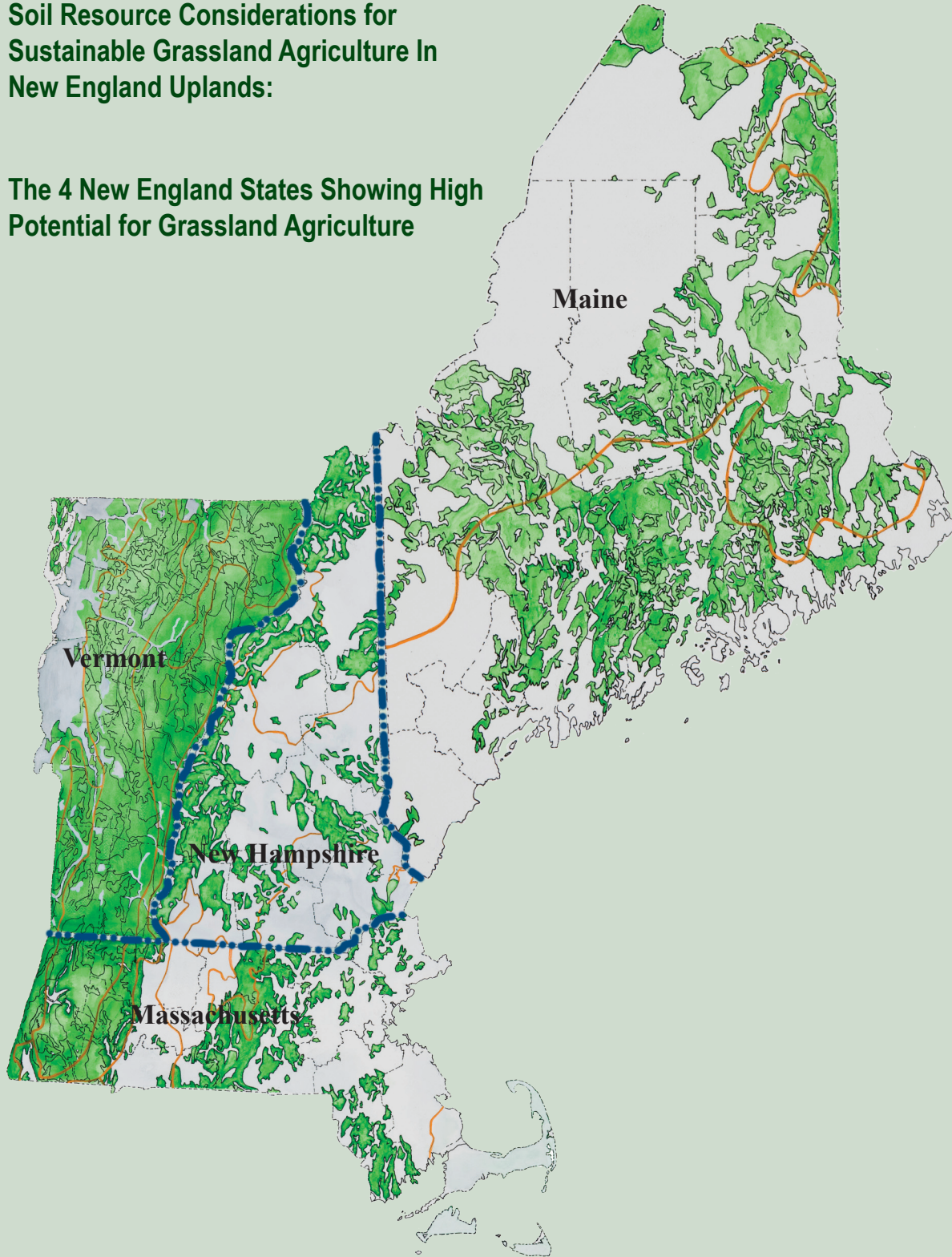
A glance at the new soils maps developed by Prof. Pilgrim and a team of NRCS state soil scientists for this volume will reveal the situation. These maps indicate that the four New England states studied here are potentially superb food-producing agricultural states, containing extensive coverage of fine soils for grazing. These maps are followed by Sid Pilgrim’s interpretation.

**Among the best grazing soils/soil series which are not often tillable are:**

<b>Plaisted</b>	<b>Paxton</b>	<b>Marlow</b>
<b>Bangor</b>	<b>Woodbridge</b>	<b>Peru</b>
<b>Howland</b>		

**Soil Resource Considerations for Sustainable Grassland Agriculture In New England Uplands:**

**The 4 New England States Showing High Potential for Grassland Agriculture**



# New Hampshire

Sources: MLRA and STATSGO Soils, USDA, NRCS  
 Interpretation by S. Pilgrim 4/05  
 Artist Rendition of Map by D. Richard Map date: 9/05  
 SUSTAINABLE GRASSLAND AGRICULTURE  
 HIGH POTENTIAL SOILS –  
 New Hampshire

## High Potential for Grassland Agriculture

Component percentage matching criteria:

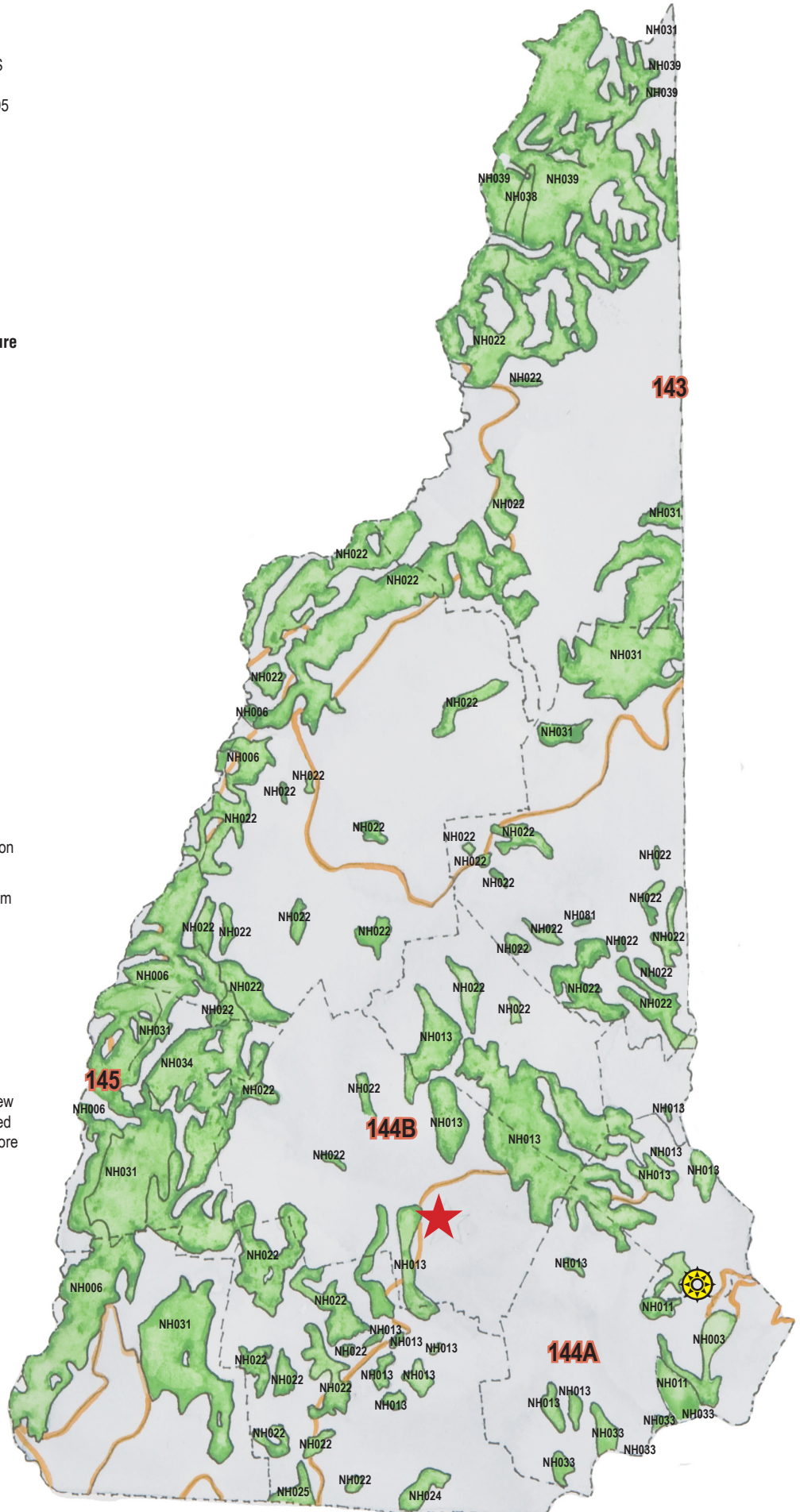
- NH003 PAXTON – 14%
- NH006 BERNARDSTON – 28%
- DUTCHESS – 11%
- NH011 PAXTON 16Y%  
CHARLTON – 22%
- NH013 - PAXTON – 39%  
WOODBRIDGE – 10%
- NH022 MARLOW – 25%  
PERU – 13%
- NH024 BERNARDSTON – 20%
- NH025 PERU – 30%  
MARLOW – 22%
- NH031 MARLOW – 42%  
BERKSHIRE – 14%
- NH033 PAXTON – 35%  
WOODBRIDGE – 22%
- NH034 MARLOW – 30%
- NH038 PLAISTED – 15%
- NH039 PLAISTED – 25%  
HOWLAND – 30%

- 145** MLRA boundary - refer to text for description
- ★ State Capital, Concord
- ☀ NH Agricultural Experiment Station, Durham
- State Line

User note:

This map presents a Level One assessment – very general. The next step is to reference county soil surveys for more detailed information on presence of surface stones, steep slopes, etc. A site walk is recommended to verify the interpretive map and evaluate any land use changes in recent years – new housing developments, etc. Only upland soils derived from glacial till have been evaluated. See text for more discussion.

Enlarged maps with greater detail may become available. These are for general reference only.



# Vermont



## SUSTAINABLE GRASSLAND AGRICULTURE

### High Potential Soils

VT001	DUMMERSTON 30%
VT003	NELLIS 32%, GEORGIA 16%, STOCKBRIDGE 15%
VT004	BERKSHIRE 17%
VT005	DUMMERSTON 63%, FULLAM 7%
VT006	BERKSHIRE 20%
VT008	PITTSBURY 34%, BOMOSEEN 32%, DUTCHESS 12%
VT009	PAXTON 32%, STOCKBRIDGE 27%, AMENIA 14%
VT010	PITTSBURY 20%
VT015	PAXTON 24%, AMENIA 22%, BERKSHIRE 8%
VT022	BERKSHIRE 40%, MARLOW 38%
VT028	GEORGIA 13%, ST. ALBANS 9%
VT032	AMENIA 14%
VT033	AMENIA 11%
VT034	MARLOW 24%, MUNDAL 18%
VT035	MUNDAL 26%, MARLOW 15%
VT036	MUNDAL 17%
VT037	BERKSHIRE 34%, PERU 33%
VT038	MUNDAL 17%
VT041	PERU 34%
VT042	PERU 17%, MARLOW 16%
VT043	DIXFIELD 15%
VT044	BERKSHIRE 15%, DIXFIELD 11%
VT046	MARLOW 11%
VT051	FULLAM 28%
VT052	BERKSHIRE 21%, MARLOW 20%
VT053	MARLOW 11%, BERKSHIRE 11%, FULLAM 10%
VT056	COLRAIN 27%, BUCKLAND 27%
VT059	BUCKLAND 27%, VERSHIRE 17%, COLRAIN 12%
VT060	COLRAIN 23%, BUCKLAND 17%
VT063	DUMMERSTON 18%, FULLAM 16%
VT066	VERSHIRE 22%, COLRAIN 16%
VT067	COLRAIN 23%, PERU 9%
VT072	FULLAM 20%, PERU 9%
VT075	BUCKLAND 35%, COLRAIN 9%
VT076	PERU 30%, MARLOW 22%
VT076	BERKSHIRE 10%
VT078	AMENIA 36%, PITTSBURY 17%
VT079	HOWLAND 30%, PLAISTED 25%
VT080	MARLOW 25%, PERU 13%
VT085	STOCKBRIDGE 27%, GEORGIA 24%, NELLIS 20%
VT086	DUMMERSTON 12%
VT089	BERNARDSTON 27%
VT090	BERNARDSTON 11%
VT092	BERKSHIRE 10%
VT094	BERNARDSTON 28%

- 149B** MLRA boundary - refer to text for description
- State Capital, Montpelier
- Vermont Agricultural Experiment Station, Burlington
- County Line

#### User note:

This map presents a Level One assessment – very general. The next step is to reference county soil surveys for more detailed information on presence of surface stones, steep slopes, etc. A site walk is recommended to verify the interpretive map and evaluate any land use changes in recent years – new housing developments, etc. Only upland soils derived from glacial till have been evaluated. See text for more discussion.

#### Sources:

MLRA and STATSGO soils, USDA, NRCS

Interpretation by S. Pilgrim 4/05

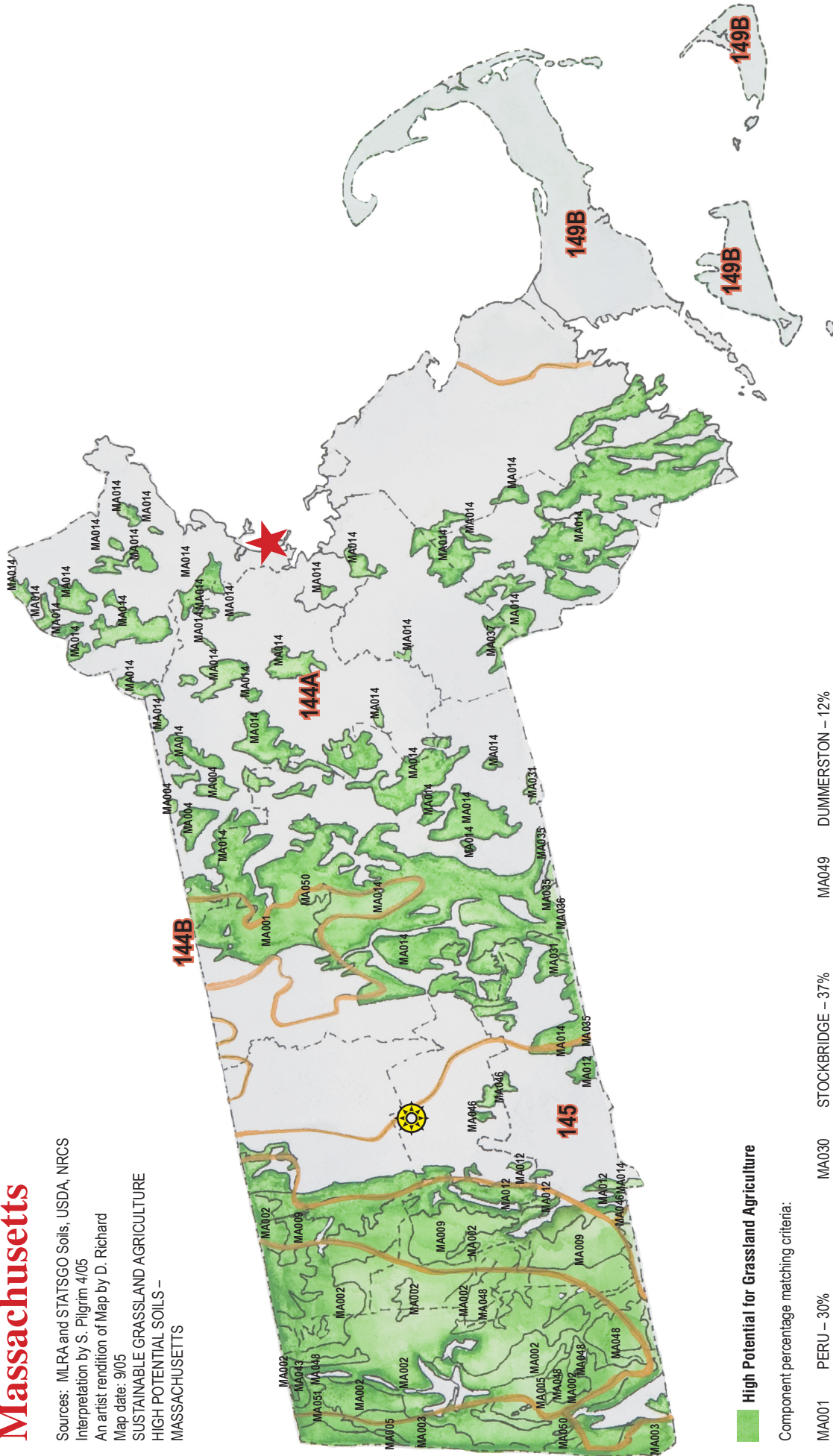
An artist rendition of Map by D. Richard  
Map date: 9/05

Enlarged maps with greater detail may become available. These are for general reference only.



# Massachusetts

Sources: MLRA and STATSGO Soils, USDA, NRCS  
 Interpretation by S. Pilgrim 4/05  
 An artist rendition of Map by D. Richard  
 Map date: 9/05  
 SUSTAINABLE GRASSLAND AGRICULTURE  
 HIGH POTENTIAL SOILS –  
 MASSACHUSETTS



## High Potential for Grassland Agriculture

Component percentage matching criteria:

MA001	PERU – 30%	MA030	STOCKBRIDGE – 37%	MA049	DUMMERSTON – 12%
MA002	MARLOW – 22%	MA031	CHARLTON – 13%	MA050	BERKSHIRE – 10%
MA003	BERKSHIRE – 10%	MA036	CHARLTON – 23%	MA051	AMENIA – 36%
MA004	LANESBORO – 11%	MA037	PAXTON – 14%	MA053	PITTSFIELD – 17%
MA005	ERNARDSTON – 20%	MA040	CHARLTON – 31%		PAXTON – 35%
MA009	AMENIA – 36%	MA046	BROOKFIELD – 40%		WOODBIDGE – 22%
MA012	PITTSFIELD – 17%	MA048	CHARLTON – 31%		
MA013	SHELburne – 16%		NEWPORT – 30%		
MA014	WETHERSFIELD – 47%		PITTSFIELD – 24%		
	BROOKFIELD – 30%		PAXTON – 35%		
	PAXTON – 35%		WOODBIDGE – 22%		
	PAXTON – 12%		PERU – 30%		
	WOODBIDGE – 22%		MARLOW – 22%		

### User Note:

This map presents a Level One assessment – very general. The next step is to reference county soil surveys for more detailed information on presence of surface stone, steep slopes, etc. A site walk is recommended to verify the interpretive map and evaluate any land use changes in recent years – new housing developments, etc. Only upland soils derived from glacial till have been evaluated. See text for more discussion.

Sources: MLRA and STATSGO Soils, USDA, NRCS

Enlarged maps with greater detail may become available. These are for general reference

# Maine

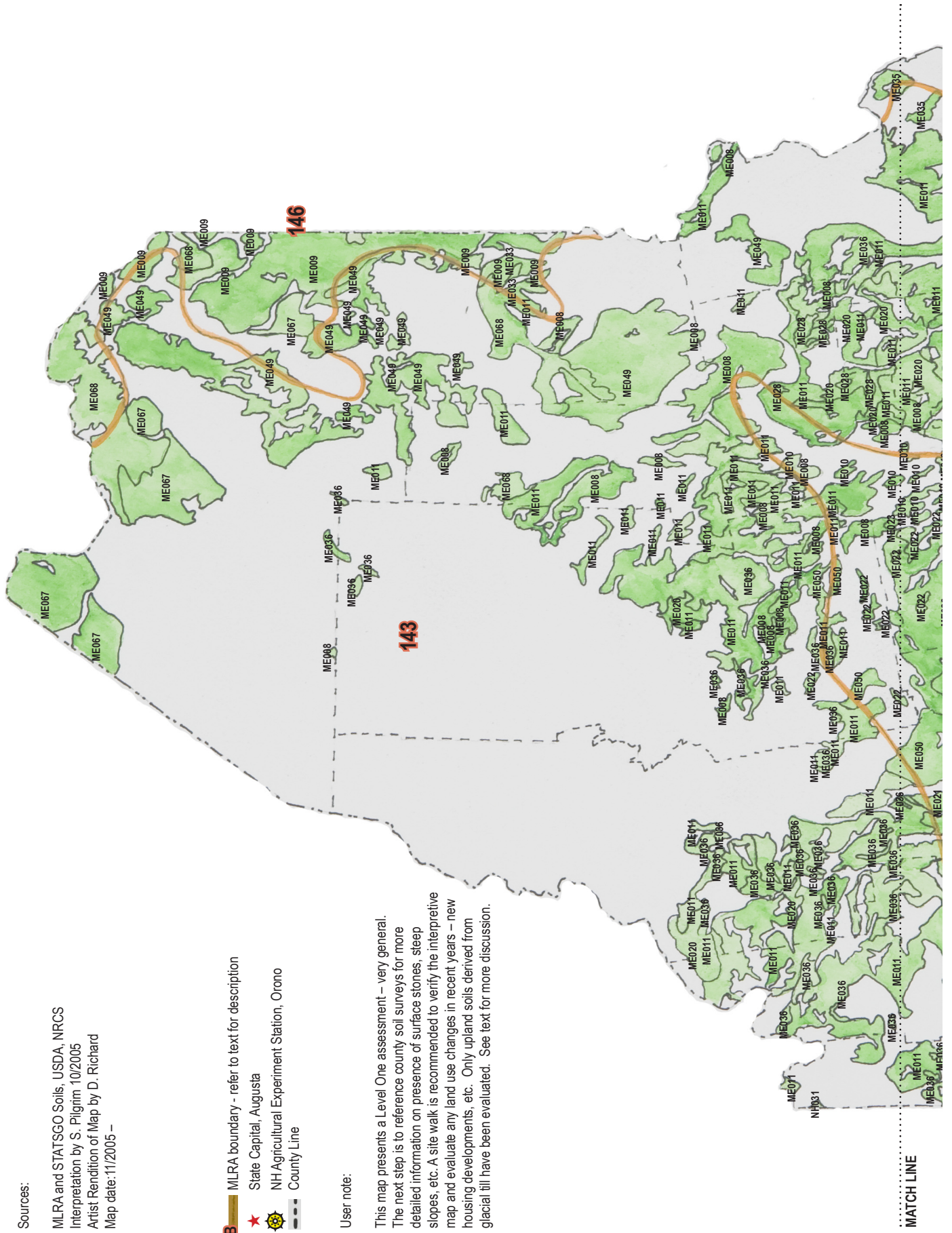
## Sources:

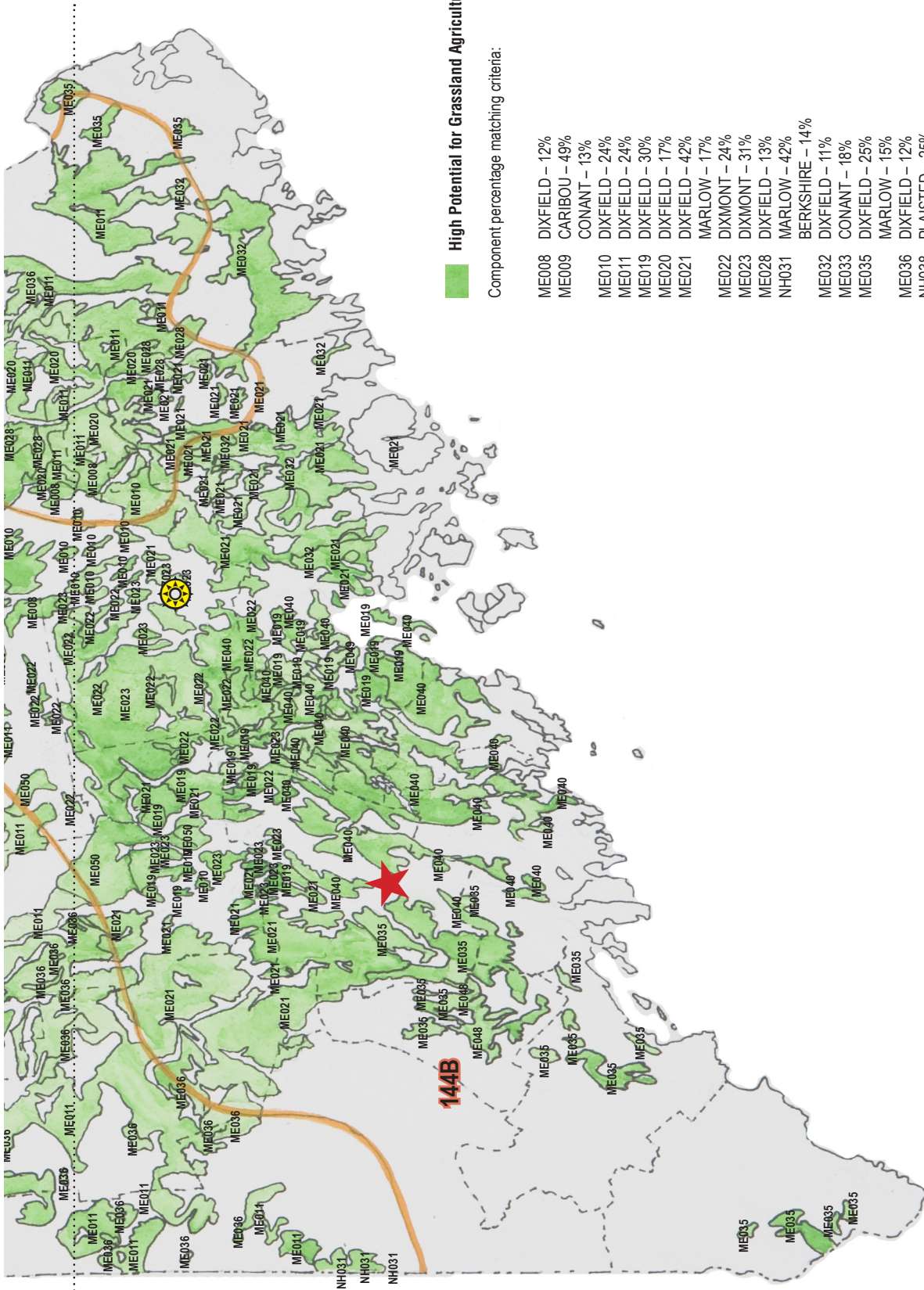
MLRA and STATSGO Soils, USDA, NRCS  
 Interpretation by S. Pilgrim 10/2005  
 Artist Rendition of Map by D. Richard  
 Map date: 11/2005 -

- 149B** MLRA boundary - refer to text for description
- ★ State Capital, Augusta
- ⚙ NH Agricultural Experiment Station, Orono
- County Line

## User note:

This map presents a Level One assessment - very general. The next step is to reference county soil surveys for more detailed information on presence of surface stones, steep slopes, etc. A site walk is recommended to verify the interpretive map and evaluate any land use changes in recent years - new housing developments, etc. Only upland soils derived from glacial till have been evaluated. See text for more discussion.





### High Potential for Grassland Agriculture

Component percentage matching criteria:

ME008	DIXFIELD – 12%
ME009	CARIBOU – 49%
ME010	CONANT – 13%
ME011	DIXFIELD – 24%
ME019	DIXFIELD – 24%
ME020	DIXFIELD – 30%
ME021	DIXFIELD – 17%
ME022	MARLOW – 17%
ME023	DIXMONT – 24%
ME028	DIXMONT – 31%
NH031	DIXFIELD – 13%
ME032	MARLOW – 42%
ME033	BERKSHIRE – 14%
ME035	DIXFIELD – 11%
ME036	CONANT – 18%
NH038	DIXFIELD – 12%
ME040	MARLOW – 15%
ME048	PLAISTED – 25%
ME049	HOWLAND – 30%
ME050	DIXFIELD – 17%
ME067	CHESUNCOOK – 14%
ME068	PLAISTED – 19%
	HOWLAND – 14%
	CHESUNCOOK – 20%
	PLAISTED – 25%
	HOWLAND – 13%

Enlarged maps with greater detail may become available. These are for general reference only.

## Soil Resource Considerations for Sustainable Grassland Agriculture In New England Uplands: Interpretation of the Maps

By Sidney A. L. Pilgrim

The interpretive soil map for each of the four states represents soils with a high potential for sustainable grassland agriculture. Only upland soils derived from glacial till were analyzed. High potential soils of the floodplains and associated terraces are excluded so as to avoid conflicts with the more intensively managed agricultural lands. The focus is on alternative agriculture, often involving modest financial resources. Agricultural operations planned for high land value areas may consider the option of leased lands. This does not detract from the favorable soil and climate to grow grass in the uplands of this four-state region.

Soil quality features considered in this analysis include loamy textures to depths of forty inches or more. These textures provide medium to high water-holding capacity to sustain plant growth throughout most growing seasons. Natural soil nutrient status and pH vary, dependent on the soil resource base provided by the glacial till parent materials. Only well drained and moderately well drained soils are considered. Amounts and quality of soil organic matter in surface horizons vary, in part due to current and prior land use.

Each state soil geographic data base (STATSGO) map is used for the initial very general soil analysis. Many of the soil quality features outlined above can be derived from this map. However, important soil features such as slope gradients, presence of surface stones and former land use cannot be derived. Map symbols for areas delineated on the STATSGO map can be referenced to soils listed on the map legend. For example, map symbol NH 003 references Paxton soils. The legend also provides an estimate of the percent of each soil within the delineation. The map does not show where the soil occurs within the delineation. However, the more detailed County soil maps can be referenced for location of specific soils. County soil maps also provide information on slope gradients and presence of surface stones. County soil survey information can be obtained through county USDA, Natural Resource Conservation Service offices. Information may also be available on line at <http://websoilsurvey.nrcs.gov/app/>

A site walk is recommended as a third step in this analysis. The purpose is to verify the information on the County Soil Survey and, if forested, make a preliminary determination on prior land use – was this land farmed at some point in the past?. Delineations on County soil maps also have inclusions of different soils. Thus, the site walk provides an opportunity to make observations of the soils by digging a small pit and matching the soil color, texture, etc. of the various soil layers or horizons with the description in the County Soil Survey. For example, if the high potential soil designated on the map is Paxton, then the field observation is made to verify this information. If the soil observed is significantly different from the Paxton description, it is appropriate to have a soil scientist prepare a revised map.

Another soil quality feature, important in this analysis, is the amount and degree of decomposition of soil organic matter. Soil cores taken to a twelve inch depth reveal much as to the prior use of the land. If the land has always been forested, soil organic matter will be concentrated in the forest floor or "O" horizons. This organic matter is often not well decomposed and contains a high percentage of raw fiber. The underlying mineral horizons will have much less organic matter. Generally, there will be no mineral "A" horizon. If the soil has been tilled at some time in the past, or is a formerly grazed pasture (perhaps for sheep in the early 1800s), a mixing of the original forest floor with underlying mineral soil can form a thin mineral "A" horizon up to three or four inches in thickness. This can be observed by taking a soil core. The mineral "A" horizon will appear as a darker color than the underlying subsoil. In subsequent years, if a forest stand becomes established, the soil core will show the "A" horizon, often with an overlying new and more recently developed forest floor. The underlying mineral "A" horizon also contributes to the soil organic matter profile. This organic matter is often well decomposed, thus enhancing soil quality.

The boundaries for Major Land Resource Areas (USDA Agriculture Handbook No 296, 1981) are shown on each interpretive State Map. This publication provides useful ecological information. A brief excerpt from each MLRA description follows: (Note: The land use estimates have not been updated since 1981.) For each of the MLRAs below, soil resource information can be derived using the interpretive map for the state(s) in question. After locating the area of interest, record the map symbol. Then refer to the map legend for soil names. Detailed soil descriptions are provided in published County Soil Surveys. Also, check for availability on the website listed above.

### **MLRA 142 – St. Lawrence-Champlain Plain – Includes areas in Vermont and New York**

Most of this area is in farms or forests; only about six percent is used for urban development or for other purposes. About one-fourth is cropland, and less than one-tenth is pasture. Hay for dairy cattle is the principle crop.

The average annual precipitation is about 900 mm and is evenly distributed throughout the year. Snowfall is heavy from late in autumn to early in the spring. The average annual temperature is 4 to 7 degrees C. The average freeze-free period is 120 to 140 days. Precipitation, numerous perennial streams, and ground water provide an abundance of water.

### **MLRA 143 – Northeastern Mountains – Includes areas in Massachusetts, Maine, New Hampshire, Vermont and New York**

More than 90% of this area is forested. Most farming is a part-time enterprise.

The average annual precipitation is 875 to 1,325 mm. More precipitation falls in summer than winter. The average annual temperature is 3 to 7 degrees C. The average freeze free period is 80 to 130 days.

Ground water is scarce in the till and bedrock uplands.

### **MLRA 144A – New England Upland – Southern Part – Includes areas in Massachusetts, New Hampshire, Vermont, New York, New Jersey, Connecticut and Rhode Island.**

About three-fifths of this area is in hardwood and pine forests. About one-sixth of the area is in crops and pasture; the acreage in crops is somewhat greater than that in pasture. Many farmsteads are used as rural residences and the residents earn their living from non-farming occupations. About one-eighth of the area is urbanized and the acreage used for this purpose is increasing rapidly.

The average annual precipitation is 825 to 1,275mm. Precipitation is evenly distributed throughout the year but near the coast it is slightly lower in spring and summer. The average annual temperature is 7 to 10 degrees C., increasing from the north to the south. The average freeze-free period is 120 to 200 days, increasing from the north to the south.

Ground water is scarce on the till-mantled uplands.

### **MLRA-144B – New England Upland – Northern Part – Includes Massachusetts, Maine, New Hampshire, Vermont and an area in New York**

About four-fifths of this area is in hardwood and conifer forests. About one-eighth of the area is in crops and pasture. Many farmsteads are used as rural residences and the residents earn their living from non-farming occupations. About five percent of the area is urbanized.

The average annual precipitation is 900 to 1,225mm. Precipitation generally is evenly distributed throughout the year. Heavy snowfall commonly occurs in late winter. The average annual temperature is 4 to 7 degrees C. The average freeze-free period is 110 to 160 days.

Ground water is scarce on the till-mantled uplands.

### **MLRA-145 – Connecticut River Valley – Includes Massachusetts, New Hampshire, Vermont and an area in Connecticut**

About forty percent of this area consists of hardwood and pine forests. About twenty percent of the area is in farms, on which about sixty percent of the area is cleared and used for crops and pasture. About thirty-five percent of the area is used for urban and other community developments.

The average annual precipitation is 1,025 to 1,275mm. Precipitation is evenly distributed throughout the year. Snowfall in winter averages 102 cm. The average annual temperature is 7 to 11 degrees C. The average freeze free period is 150 to 190 days.

Ground water is scarce on the till-mantled uplands.

### **MLRA-146 – Aroostook Area, Maine**

About sixty percent of this area is cropland (1981). Most of the remaining area is forestland.

The average annual precipitation is 925 to 1,025 mm. Precipitation is fairly distributed throughout the year. Snowfall is heavy in the winter. Average annual temperature is 3 to 6 degrees C. The average freeze free period is 100 to 120 days.

Ground water is scarce on the till and bedrock on the uplands.

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### **WES JACKSON'S WISDOM: GAINING SOME PERSPECTIVE ON SOIL**

The fossil fuel epoch with its subsidy of fossil carbon into agriculture, which sponsors other nutrients, obfuscates for most of us today how little natural capital becomes available in the soils of the globe when fossil fuel-based fertility is introduced. In a touching reference to David McCullough's popular biography of John Adams, wherein McCullough reminds the reader that the 39 signers of the American Declaration of Independence were signing their death warrant and would have been hanged if captured, Wes Jackson says that we could have perhaps afforded to lose the revolution, and perhaps we could have afforded the loss of those 39 men, but we absolutely cannot afford to lose the battle to save the soils of the planet. Jackson tells us that we must build an agriculture which is as sustainable as the nature we've historically destroyed. One might be tempted to ask the question, If that nature was so sustainable, then how could it have been destroyed by us? People of Jackson's ecological mindset would undoubtedly reply that that destruction of nature is now destroying us, that nature will ultimately survive with or without us. Jackson relates that the chemistry of plant roots makes the soil, and he also tells us that we need to make sure there are enough things chewing around underground to recycle the organic matter, to preserve the moisture, and so on. Wes often counsels "Let nature never be forgot. Consult the genius of the place in all."

## Soil Resource Considerations for Sustainable Grassland Agriculture in New Hampshire by S. A. L. Pilgrim

Given the following assumptions,

- That modest financial resources are available for the operation;
- That proper selection of appropriate soils may be a key to long-term sustainability;
- That potential tracts should avoid conflict with the highly productive soils of the flood plains and associated terraces (corn production, etc.);
- That high land value areas of the state (cost/acre) may not present viable opportunities, with the exception of possible leased lands;
- That focus is on privately owned lands, excluding holdings of large forest tracts,

### **Here is a Strategy for Selecting Soil Resources in Support of a Sustainable Grassland Agriculture in New Hampshire:**

- Focus on glaciated upland soils.
  - As a first cut, select soils with a relatively high natural fertility level, considering New Hampshire's modest soil resource base. Soil nutrient status and natural pH should be considered.
  - Soils inherently low in rock fragments and surface stones will help reduce initial land preparation costs and subsequent stone removal costs. (New Hampshire stones have a habit of continually coming to the surface.)
  - Areas with dominant slope gradient of 20 percent or less are perhaps the most desirable. Areas with steeper slopes may also have potential.
  - Soil depths of 60 inches or more provide the better potential for adequate soil moisture storage and availability for plant growth. However, areas with two feet of soil over a fractured or highly weathered bedrock may also provide a suitable rooting zone for grass and legumes.
  - Forested soils, as well as formerly farmed lands that have reverted to forest, are viable candidates for conversion to a grassland operation.
  - Three areas of the state may offer the best opportunities for sustainable grassland agriculture:
1. The Colebrook – Stewartstown – Clarksville – Columbia area:  
The Plaisted-Winnecook soil areas that can be expanded to include Bangor and Howland soils may offer a nucleus for sustainable grassland agriculture. The climate in this area, although a short growing season, is highly suited to grass production.
  2. The narrow band of uplands adjacent to the Connecticut River Valley (3 to 5 miles east of the river) extending from southern Grafton County through Sullivan and most of Cheshire County.  
The Bernardston – Pittstown soil areas that can be expanded to include Dutchess and Cardigan may offer a nucleus for sustainable grassland operations.
  3. Several other upland soil areas also merit further analysis. These include the Paxton – Woodbridge and Marlow – Peru areas. One concern for these soils is the long-term available nutrient status to sustain crop yields.

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## On New England's Prime Grazing Soils

This book represents what is likely the first effort, at least in modern times, to map the soil series of central and northern New England for the purpose of identifying which series constitute what are likely the best and highest potential grazing soils in the region. These soil series appear in the above descriptions by Sid Pilgrim on the specially drawn state maps of Vermont, New Hampshire, Maine and Massachusetts displayed in this chapter, and on more detailed maps depicting each of the counties of these four states.

Absent from these maps are agricultural soils of primary tillage value for crops, including highly tillable richly fertile alluvial and bottomland soils. Such soils are, of course, very productive for grazing as well but, since New England has such a sparseness of tillable cropland, it is the author's view that these soils should be protected for that purpose rather than dedicated to grazing. However, it should be noted that crop tillage integrated with grazing on such soils is very practical and can be profitably pursued.

It should also be noted that, as we are told by veteran graziers and researchers Joel Salatin, Bill Murphy, Sarah Flack and others, pasture can be built, can be constructed, by proficient use of grazing animals and their manure, in their rotations and sequencing, in their breeds and varieties. Hence, good pasture can undoubtedly be created on a wide variety of soils. The best grazing soils, as depicted on these maps, represent a head start, but grazing prospects are in no way restricted to these soils. Indeed, many dedicated and successful graziers believe grazing prospects can be built or enhanced over time on many different soils.

## Changes, and a New Recognition of Soils and Grazing

Pre-1960 New England agriculture had a much greater grazing and grass farming component than has been the case for the region's agriculture in the past fifty years. That being the case, the consciousness of soil scientists, land managers, farmers and the region's citizenry in general was far more focused on the necessary inputs to good pasture production than has been the situation at any time since. From about 1960 to the present, animal confinement has replaced pasturing and grazing, as has a considerable increase in the importation of food into the region from away. It is logical, therefore, to seek insight into grazing and grazing prospect by studying the work of an earlier time. Scientific understanding of soils and other elements of the environment from earlier eras is, of course, based on the science and scientific techniques and technology of that earlier time, techniques and technology viewed as perhaps more primitive than and thus less accurate than present approaches. Nevertheless, such earlier investigations were filled with certain insights no longer available. With the disappearance of grazing and its replacement by animal confinement, it is natural that regional knowledge and insight into grazing would recede. Retrieving such insight thus requires going back to the 1950s or earlier, and, as well, a dependency on both the science and the experience of that day. With the greater dependency on successful pastures for food production at an earlier time, it is also natural to conclude that greater insight into the workings of the pasture environment and the animals' relationship to those pastures would be found. We can thus learn from the past, but we must then follow up this mastery with the application of more modern technologies of scientific investigation. (Today's intensive rotational grazing is, in fact, based on new technology, the development of new light-weight movable fencing and solar energy technologies which were not available in the past. Thus, the present level of technological development and its application for such intensive grazing could not have been as easily doable at an earlier time.)

## Robert Thorson on New England Grazing Soils

Further making the case for good New England grazing soils, in his book *Stone by Stone* the geologist Robert Thorson writes, with respect to the geological sediments in New England, "This sediment paste would eventually produce soils that were almost magical in their ability to absorb heavy rainfalls without violent runoff, yet could retain subsurface water during the driest days of late summer, keeping pastures green and cattle satisfied. These soils were perfect for growing hay and planting apple orchards...(S)oil developed upon



this glacial paste were considered stronger than sandy lowland soils, meaning that they would remain fertile much longer”.<sup>(4)</sup> Thorson relates that Rev. Timothy Dwight, an early President of Yale College bragged of these soils:

“The hills of this country, and of New England at large, are perfectly suited to the production of grass. They are moist to their summits. Water is everywhere found on them at a less depth than in the valleys or on the plains. I attribute the peculiar moisture of these grounds to the stratum lying immediately under the soil, which throughout a great part of this country is what is here called the hardpan.”<sup>(5)</sup>

Finally, Thorson observes, with reference to the dense almost cement-like substratum of the lodgement till, “Although coarse and obdurate, it was the otherwise luxurious raw material on which New England’s pastoral economy would be based.”<sup>(6)</sup>

Thorson further writes,

“The contemporary view is that colonial agricultural soils were stony and difficult to work. However, Peter Kalm, from the University of Abo in Sweden, a professional botanist who toured New England during the colonial period, made a glowing assessment of its forest soils: ‘Thus the upper fertile soil increased considerably, for centuries; and the Europeans coming to America found a rich, fine soil before them, lying loose between the trees as the best bed in a garden. They had nothing to do but to cut down the wood, put it up in heaps, and to clear the dead leaves away’. Timothy Dwight agreed, noting that the rich agricultural soils of the New England Plateau came from ‘grounds long forested’”<sup>(7)</sup>

Let us, therefore, recognize and pay homage to this wonderful resource, the grazing soils of New England. One of the most important applications of these grazing soils is as a basic support for New England’s dairy industry. Chapter Five investigates that prospect.

## ENDNOTES:

1. Edward Hyams, *Soil and Civilization* (New York: Thames and Hudson, 1952), p. 17.
2. John Burroughs in “Clothing the Rocky Framework of the Globe” by Jeff Walker, in *The Land Report*, No. 80, Fall, 2004, p. 3.
3. John Burroughs from his 1908 essay “The Grist of the Gods”, as quoted in Walker.
4. *Stone by Stone* by Robert Thorson, p. 43.
5. *ibid.*, p. 44.
6. *ibid.*, p. 46.
7. *ibid.*, p. 57.

## BOXNOTES:

1. *Clearing Land: Legacies of the American Farm*, p. 154).
2. The Editor, *Orion Nature Quarterly*, July-August, 2004.
3. Good descriptions of the characteristics of these soils can be found in such works as *Soils of New Hampshire* by S.A.L. Pilgrim and N.K. Peterson (1979); *The Soils of Maine* by John A. Ferweda, Kenneth J. LaFlamme, Norman R. Kalloch, Jr. and Robert V. Rourke (1997), and *Soil Survey in New Hampshire, 1899-1999*, by Sidney A. L. Pilgrim (1998), among others.
4. Advisor to UNH Organic Dairy, and UNH Soils alum, distinguished author in organic animal health.

**“If the soils are healthy, the plants are healthy; if the plants are healthy, the animals are healthy; if the soil, plants and animals are healthy, people are healthy; if people are healthy, the community, the society, the nation is healthy. It starts with soils.” (4)**

**Dr. Hugh Karreman, D.M.D.**

### FRED KIRSCHENMANN’S WISDOM

**Nutrient recycling in the soil is the key. The trick is to find the nutrient balance of intake/ outtake. Livestock manure is one of the best sources of micro-nutrients. Finding the right crop rotation for one’s own land is central and key – if you don’t get that right, you don’t get anything right. A good strategy for survival is to avoid buying as many inputs as possible where you can’t control the price.**



## **Chapter Five**

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### ***Pastures of the Milky Way: Dairy in New England***

Dairy is important. Garrison Keillor tells us that “Dairy farming was what permitted very industrious people to earn a living on poor land, it’s fundamental to our culture...”. Dairy is part of farm life in New England. The region is very well suited to dairy production, particularly grass and pasture-based. And dairy is an important cultural component to life in New England. The eras of sheep and beef cattle have passed. Poultry has passed. Potatoes are in decline. But dairy survives. Down, certainly, but not out. And today the buzz is all about organic dairy.

### **Organic Dairy as Generator: One Thing Leads to Another**

Most New Englanders, upon hearing the word “organic” as applied to food, think of greens, of mixed vegetables, of fruit. They do not as quickly think of dairy products, of meat, of grain, but all of that is making its way into New England’s organic lexicon. While conventional dairy in much of New England is dying, organic dairy is rapidly growing. Just a few years ago there were no organic dairies in Maine. Today, 20% of the state’s total dairy production is organic. (Organic farms in Maine are up, overall, from 15 in 1986 to 320 in 2006. New Hampshire has risen recently from two to more than a dozen such dairies, including what is possibly the only new start-up organic dairy, i.e., not in transition, in all of New England. Vermont has a whopping 209 organic dairies, while Massachusetts has only a few.) MOMP, VOMPA, MOFGA, NOFA, NODPA are all acronyms signifying the arrival of organic dairy on the New England scene. And the Northeast Organic Dairy Producers Association (NODPA); the Maine Organic Milk Producers (MOMP), and the Vermont Organic Milk Producers Association (VOMPA), are now all active players on this scene. Through the efforts of the latter groups, milk prices to farmers are staying up and remaining healthy. Recently, the major retailers of organic milk, perhaps fearful of losing retail markets through price increase, and in spite of unprecedented demand for their product, wanted to deny the region’s organic dairy farmers a much needed increase in the wholesale price. Without this increase, there would be less incentive for new entry organic dairy farmers or for conversions from conventional to organic, in spite of the high market demand. The concerted negotiation of NODPA, MOMP and VOMPA insured the price remained at a level sufficient for the farmers. Thus, New England organic dairy continues to grow. Not only cow’s milk but goat and even sheep milk are arriving on the scene, the latter two often for cheese and butter as well. And we must not forget organic yogurt and ice cream!

Perhaps the biggest single cost factor, the most expensive input, to the organic dairy farmers, and a big reason for the need for a price increase, is the substantial cost of certified organic grain, the only food grain allowable under organic certification laws. The answer to reducing this cost is, wherever possible, grazing, and for as long as possible each year. This entails developing and maintaining healthy pastures, and a willingness to rotate the animals frequently, as discussed elsewhere in this book. But there are other ways to supplement pasture grazing/grass farming: the on-farm production of certified organic forages and hay, both for grazing and for storage for winter feeding; and the on-farm production of certified organic grains, thus avoiding the high cost and uneven quality problems associated with off-farm inputs of both organic forage and organic grain. Furthermore, on-farm grain production entails a determination to process the grain, to mill it, skills and infrastructure largely lost to New England but not impossible to bring back.

Such “in-house” or on-farm processing of certified organic grains right on New England farms or in local New England communities will likewise bring two other big benefits to this region: organic feed supply for poultry, beef and other livestock, and organic wheat, barley, oats or other grains for bread and other baked goods for the local market. In addition to spawning a local organic baking industry, such will also provide a hardy source of extra income to our farmers. Finally, some of this may well link to the production of biodiesel or biofuels, true “green energy” if derived from organic oil seed crops. The latter, in addition to providing an added source

of income to farmers, could provide fuel for on-farm vehicles and other equipment, especially if it can be processed on the farm. In this new era of high fuel prices, this is a great potential savings to our local farm economy. Large-scale centralized biodiesel in this country is very questionable from an energy, and possibly from a moral, perspective, but decentralized local on-farm produced biodiesel is a different matter.

So, organic dairy not only produces a valuable product in its own right, but it triggers important downstream products that could even have higher value (meat, baked goods, fuel), not to mention cottage industry, in cheese, in baked goods, in bio-fuel processing and in other areas.

## **Grazing An Entre into Organic**

Although the USDA is today the national standard setter in the United States for organic certification standards, it is MOFGA and the seven NOFAs, along with the Pennsylvania Association for Organic Agriculture, which effectively sets the norms for organic agriculture in the Northeast. They have been at this task for over thirty years and are well established and recognized to do so. In the dairy field, NODPA, MOMP, VOMPA, all new arrivals on the scene, and the older established Vermont NOFA, are the norm-makers. This is particularly true for organic product produced within the region, and these organic certifiers and norm-setters are focused on both regionalism and localism, a championing of the idea that organic means local. (The idea of “local” is not at all a component of the national USDA standards which pay no attention to place or place of origin. The latter idea is, however, part of the functioning organic concept as it operates in the Northeast.) Given the requirements of both the legally official USDA organic standards and, as well, the established organic norms and expectations of the region, rotational grazing becomes a serious entre, not only to grass-based agriculture but also to organic certification and, therefore, to the higher income associated with organic marketing.

An example of regional norms and standard-setting occurs in the area of organic dairy in New England. Conversions today from conventional dairy to organic dairy are rapid in the region, especially in Maine and Vermont, and likely soon in New Hampshire and Massachusetts. Such conversion represents in many ways an embrace of the idea of lower milk production per animal and per farm, but with higher prices and lower input costs, leading to higher profits. Acceptance of lower productivity and the attractive feature of lower stress (to both farmers and animals) are stimulating some change to breeds of animals which are better suited to grazing (i.e., cross-breeds and non-Holstein breeds like Jerseys), and also a reduction of milking from three times per day to two times per day.

The norm or standard in New England for organic dairy farms is two milkings per day. The higher price of organic and the lower input cost make two milkings per day, and the lower milk production inherent therein, economical. Further supporting the economics of two milkings per day is the value added of increasingly common on-farm processing (cheese, ice cream, yogurt, butter, other dairy products, all organically certifiable) and the biodiversity/economic diversity inherently a part of organic agriculture. This means the availability of other salable farm products as well. Direct marketing, farmer to consumer, and the much higher income associated with such marketing, together with lower vet bills, are other important economic characteristics of this system. (New York dairyman Rob Moore reports that his vet bill for a dairy herd of seventy animals went from about \$8000 per year to nearly nothing since he converted to a grass-based operation.) This is a reduction of input costs coincident with reduction in stress of the animals, and is further economic enablement of the reduced milk production which comes with twice per day milking. A longer lived cow with less culling of the herd is a further economic benefit of such ecological dairying.

There are some who worry over increased mastitis, a common dairy cow disease, and, as well, increased somatic cell counts, with reduced milking. But New England’s organic dairy farmers are not reporting increases in either mastitis or in the cell counts. Reduced animal stress and better overall health of the animals, particularly those on grass and on pasture, are likely contributors to avoiding these problems.

The organic dairy sector is growing rapidly in New England, especially in Maine and Vermont. Dairy was the fastest growing segment of the organic industry in the latter half of the 1990s, with sales growing by 500%.<sup>(1)</sup>

Price premiums were between 50% and 75% higher than regular milk, a very tempting lure to go organic.<sup>(2)</sup> This growth is spurred by a strong market demand and good price for organic milk, organic cheeses and organic yogurt and ice cream, at a time when conventional milk production has lost most of its public subsidy with the demise of the Northeast Dairy Compact. The latter circumstance has exacerbated the ongoing decline in conventional dairy production across the region.

The linkage between the move to organic dairy and the role of grazing, particularly intensive rotational grazing, is not always recognized but is undeniable. Grass-based agriculture, i.e., pasture grazing of cattle, can be a direct entre into certified organic production, making such production economically far more possible. And dairy farmers who wish to convert from standard conventional animal confinement-based milk production to organic production can do so more easily if they can seriously attempt whole or partial conversion to a grass-based operation at the same time. A basic reason for such a move to pasture is the high (and economically discouraging) cost of organic feed grains, grains most of which must be shipped in from the Midwest region. The key to the grass/organic linkage is feed, the single largest expense for organic dairies, accounting for 44% of the average operating expenses in Vermont<sup>(3)</sup>. Organic grain runs 1.7 to 2.3 times the cost of conventional grains.<sup>(4)</sup>

That being said, there is no necessity that grass-based dairy be organic, and likewise no necessity that organic production be grass-based. The two just naturally provide support for one another. And the market price premium for organic milk is not now shared by grass-based milk or grass-based other dairy product. (There may come a price-based premium for grass-based dairy and meat product at a future time. The relatively new label “Pasture Perfect” constitutes a kind of informal certification, but not one which is yet widely familiar or one which necessarily commands a premium.)

## **Joint Research – The Shape of Things to Come**

According to a 2005 joint University of Maine – University of New Hampshire research proposal (since funded), in minimizing the expense of purchased supplemental feed, organic dairies share a common goal: to maximize on-farm production of energy and protein. Even though dependency on pasture can significantly decrease reliance on purchased concentrates during the growing season, the shortness of the growing season, especially in Maine, leaves half the year unsupplied. Organic growers thus need to know whether it pays for organic dairy farmers to grow their own organic grain. This decision is central to many other on-farm decisions related to machinery purchase, labor schedules, weed issues, crop nutrient demand, and exposure to risk. By increasing crop acreage to support the animals, such a decision potentially increases the overall agricultural base as well as food security in New England. And, while corn silage is the heart of most conventional feed programs, corn is difficult to grow organically and, as well, is energy-intensive and soil depleting. More likely, New England organic farmers will turn to production of small grains such as barley, wheat and triticale, with sorghum – sudan grass and perennials also coming into play.

This joint research project of the two land grant universities, embraces the general organic (and grass farming) philosophy that “... the conventional strategy of pushing cows towards the highest production at the lowest cost may be at odds with the animal health and welfare philosophy inherent in organic husbandry”.<sup>(5)</sup> The research proposal for this project suggests that “Strategies that lower milk production but produce more feed on-farm may be one way to maintain profitability without compromising the health of the cow”.<sup>(6)</sup>

The proposal continues, “Lower milk production per cow can also have benefits other than animal health”. In recognition of the value of grass forage (and grazing), the proposal acknowledges that “Diets heavily supplemented with grain have a negative impact on digestion efficiency in ruminants<sup>(7)</sup>

And, positively, “Decreasing the level of supplementation with concentrated feeds can increase the feed utilization efficiency, meaning more of the feed ingested is translated into milk<sup>(8)</sup>

All of this bespeaks grazing at all times possible, and non-grain (i.e., grass) supplementation when pasture grazing is not possible.

Characteristically, organic dairy farms

- typically have lower animal density;
- lower grain imports;
- generally contain a greater proportion of arable land in perennial forage crops;
- produce a higher proportion of energy and protein grains while feeding them at lower levels;
- use less corn silage than conventional farms (15% vs. 50% in Maine, according to MOFGA).

All of these characteristics point toward both rotational grazing and to on-farm production of forage, both grass and grains. Both are likely outcomes for New England farms and farming. The joint UMO-UNH research, originally instigated by MOMP, NODPA and MOFGA, is overseen by those three organic farming organizations and by producers Horizon, Organic Valley (CROPP) and Hood.

This project, initiated as a formal proposal at (and by) the University of Maine, invited partnership with the University of New Hampshire, and has done so for a basic reason: UNH has a certified organic dairy herd, the first in the nation at a land grant university. (UMO's circumstance doesn't easily allow for such a herd.) Thus, each university needs the other, each benefits from the partnership.

## **UNH Organic Dairy**

The UNH Organic Dairy is discussed in some detail in Chapter 8. Interestingly, the decision at UNH to create an organic dairy has other repercussions for the university and its lands, not the least being to develop a new UNH commitment to serious grazing, both on its own merits and to reduce the cost of purchased grain. UNH is actively identifying certifiable organic pasture on university farmland. It is also identifying land for organic forage crop production, both on university land and on leased land. There is, further, a recently acquired herd of Jerseys, superior grazing animals and a first straying away from Holsteins for the university in recent history. Some of the milk product will go to Organic Valley for liquid milk and much of it will ultimately go to New Hampshire's Stonyfield Farm, a well known yogurt producer. In the public eye, this organic dairy effort will be associated with the university's new organic Campus Community Garden, a mixed vegetable garden which is a source of education and training for students and a source of food for UNH Dining Services. The demand for organic food, and for dairy in particular, continues to outstrip supply, insuring the continued popularity both of on-campus organic dairy research training and production and, as well, dairy farm conversion across the region. Compared to neighbors Vermont and Maine, New Hampshire currently produces only a small quantity of organic milk, much of it from the UNH herd. Ironically, as organic milk under the Stonyfield label gets marketed around the country with the name "New Hampshire" prominently displayed on the container, people assume that New Hampshire and its university are far greater generators of organic milk than they actually are. The fame of this first in the nation university organic dairy at UNH encourages this belief, paving the way for UNH to emerge as a major player in research in this field.

## **The Issue of Organic Feed Grains**

I had a call recently from a well known local organic farmer asking for help. As a land grant university we are here to help local farmers. The farmer told me of the now familiar high costs of organic grain necessary to feed his chickens and keep up his organic egg production. And he told me of the importance of creating more demand for organic grain, including bulk sales, in our area of southern New Hampshire so that a good regional source for such grain, now serving the northern part of the state just a few hours away and at a good price, would become willing to deliver to our area. University purchase of the grain, in bulk, for its own farm animals could make the difference for this and other farmers, and, as well, area farmers now or soon-to-be converting to organic. It meant my farmer friend could reduce the retail price on organic eggs from \$4 per dozen (likely as high as he could go and still have a market) back down to \$3 per dozen. Such a move by the university would provide a major service to local farmers and would win many friends for the university.

But there is a dilemma. The organic grain in question, albeit from a nearby source requiring no excess transportation cost nor excess fossil fuel consumption, and thereby inherently both ecological and energy sustainable, was from Canada, specifically Quebec. Canada in general, and Quebec in particular, provides substantial subsidy to its farmers, enabling them to sell cheap in the U.S. This creates what could be viewed as an unfair competitive advantage over U.S. sources of such grain. But domestic U.S. sources, aside from being higher priced to begin with, are, for the most part, farther away (assuming the Quebec source is in Quebec or eastern Canada rather than from the Canadian Prairies), and thus require longer distance transport and more fossil fuel consumption. These raise the cost to the farmer even more, and are responsible for a larger ecological footprint.

Helping local farmers with their feed grain costs, helping the university's own budget for such inputs, and reducing the ecological footprint for the acquisition of organic feed grain into the area are all in the best interests of the university. And pasture grazing of cows and poultry are likewise in the best cost-cutting interests of the university, as is the modeling of low-input grazing systems.

However, the stifling of New England farmers' willingness and ability to ultimately provide their own organic feed grains, something that cheaper Canadian grain arriving in the area could do, would not be in the university's long-term best interest. Thus, the answer to the dilemma may lie in temporarily relying on nearby (and subsidized) Canadian sources, while at the same time contracting with our own farmers to provide the grain as soon in the future as they become able to do so. This would appear to be a win-win for all, and certainly for the people of New England and their land grant universities. The ultimate ecological answer to this dilemma is, of course, to encourage local farmers to grow for their own and regional needs. With the university's own extensive farmland, the answer for UNH is to grow its own, and perhaps provide some to area farmers until they can find local sources themselves. (And, in terms of cows and other ruminants, to reduce grain consumption in favor of grass.)<sup>(9)</sup>

## Research Needs in Support of Organic and Grass-Based Dairy

One of the most compelling topics for organic dairy in New England is the need for research to assist the farmers (as well as to assist the university itself in its own production). Here are some expressions of research needs in New England organic animal agriculture:

1. Research needs from a local organic dairy farmer's perspective - research areas and questions needing answers include:
  - GRAIN – some sort of Facility? Rail? Storage? Shared equipment?
  - GROUP PURCHASING – Fuel? Grain? Other inputs?
  - ON-FARM STORAGE – Grain, Sawdust
  - WEED MANAGEMENT – Equipment (i.e., flame-weeding?) IPM?
  - PROCESSING – Milk, Grain, Butter
  - BEEF – Networking for Culls, plus to create Organic Beef Market
  - VERTICAL INTEGRATION – Grain, Milk, Beef
  - BIOSECURITY – diseases ( Johnes, Leukosys, etc.) Testing
  - TRANSITION – Organic vs. Conventional Animals Transitioning
  - LAB WORK – Independent Lab Testing of quality and components<sup>10</sup>

Mia Morrison, Charleston, Maine (e-mail)

2. Research needs from a dairy science academic's perspective: Prof. Jim Riddle's General Research Categories for Organic Animal Production, as presented at dairy conferences nationwide:

- Economics and profitability of organic animal production;
- Approved organic methods of parasite management;
- The Relationship between organic soil-building methods and livestock health and nutrition;
- Analysis of the nutritional and health value of organic animal products; and
- Approved health care options for organic animals.

Within these broad categories can be found the top twenty needed research topics for

### **ORGANIC LIVESTOCK RESEARCH NEEDS: Top Twenty Topics<sup>(11)</sup>**

1. Catalog animal health problems for various species, listing approved health care options and allowed medications.
2. Analyze the nutritional and health value of organically produced animal products, especially pasture raised or grass-fed animals.
3. Explore impacts of “systems” approach (rotational grazing, multispecies grazing, etc.) on external and internal parasite loads for various species.
4. Analyze Organic methods for building soil fertility to optimize animal health and thereby reduce or eliminate the need for medications, vaccines, parasiticides, and supplemental vitamins and minerals.
5. Analyze Organic Best Management Practices (OBMPs) for least toxic parasite management for various species.
6. Identify OBMPs for prevention and treatment of mastitis.
7. Examine naturally occurring sources of vitamins and minerals within organic feed compared to use of supplementation materials.
8. Analyze distribution channels used for organic animal products and recommendations for improved processing, handling, and distribution systems.
9. Develop manure management systems which do not contaminate crops, soil or water with plant nutrients, heavy metals or pathogenic organisms and which optimize recycling of nutrients.
10. Develop animal record-keeping systems for sound management, profitability and organic certification compliance.
11. Compare investments needed, rate of return, and profitability of organic and non-organic livestock systems.
12. Study impacts of organic animal operations on local and regional economic development.
13. Analyze how livestock production impacts the entire diversified organic farm, including impacts on fertility management; weed, pest and disease pressure; utilization of resources; water quality; farm labor; and profitability.
14. Survey the Market for supply and demand for organic meat products in the region.
15. Determine breeds of various species best suited to organic production – feed utilization, grazing response, disease and parasite resistance, ease of reproduction, and minimization of stress.
16. Determine nutritional value of weeds, how they can best be utilized in animal diets, and identify threshold levels for inclusion in livestock rations.
17. Compare grain-based organic livestock systems with grass-based organic systems.
18. Identify OBMPs for least toxic fly control. Examine holistic strategies, including: 1) augmentation or introduction of predators or parasites; 2) development of habitat for natural enemies; 3) non-synthetic controls such as lures, traps and repellents; 4) manure management systems; 5) pasture rotation; 6) use of clean, dry bedding; and 7) impact of moisture control.



19. Identify OBMPs for the prevention of various diseases in various livestock species and breeds.
  20. Develop organic management systems to produce high quality beef – grade, tenderness, flavor, etc.
3. Research needs from the perspective of Dr. Sue Ellen Johnson of the New England Small Farm Institute, Belchertown, Massachusetts: (e-mail)
    - Health benefits to animals on pasture.
    - Season extension and wintering the cows outside.
    - Species management of pasture grasses and legumes.
    - Entry-level farming.
    - Using animals like goats, sheep, pigs to bring back pasture areas (multispecies research).
    - Human health/nutrition from grass-based animals.
    - Small grain production.
    - Independent seed research.

Research on lending for grazing (including particularly for fencing, important for you can give back a combine that's not paid for but you can't pull up the fence.)

Dr. Johnson adds that whatever's done here needs to be convertible to commercial, and especially small and moderate size farms.<sup>(12)</sup>

If this needed research does not occur and if our organic farming community goes without needed assistance, we may well be fulfilling our organic dairy needs from far-off New Zealand and other distant places.

### **Powdered Milk from New Zealand?:**

When the demand for a product begins to substantially outdistance the supply, what happens? In the long-term, local entrepreneurs eventually get the message, obtain financing as necessary, and eventually begin to try to supply the need, to the extent they can. In the short-term, however, other entrepreneurs who are more prepared, and who can often act more quickly, move in to fill the breach. Sometimes such entrepreneurs are overseas and take advantage of loose trading rules to enter the market. There has been talk in the northeastern U.S. that this may be what we'll witness in the organic milk market. One can't get much farther distant from the northeastern U.S. than New Zealand. And yet, we are beginning to hear of New Zealand's exporting organic milk in powdered form to begin to answer the considerable demand, and lucrative willingness to pay, now forming in the U.S. Northeast. For those who would like to see a conversion of conventional milk production in the U.S. Northeast over to organic, this could be bad news, especially if off-shore milk producers undersell the local organic producers (as they may since New Zealand has considerable production surplus). Such will make it more difficult for local conventional farmers to remain solvent.

If the choice is light-weight organic powdered milk transported all the way from New Zealand to New England vs. heavy-weight organic liquid milk from, say, Michigan or Wisconsin (800-1200 miles), from an energy perspective New Zealand wins. But neither choice is energy or ecologically acceptable, for the answer is to build an organic New England milk production capacity, and one which is based on grazing and locally grown organic forage. What is thus needed is a faster conversion in the Northeast from conventional to organic to answer the expanding local demand and to prohibit or slow overseas producers from gaining a foothold. (Of course, the remaining local conventional dairies could be pushed more rapidly into organic conversion from cheaper New Zealand competition as long as the market demand continues to grow as rapidly as it has in recent years. But they could also be driven out of business, further endangering our regional food security.)

All of this argues for rapid conversion across New England to lower-cost grass-based systems, especially for new start-up dairies, as well as more rapid conversion from conventional to organic. This, combined with the

higher fuel demand of long distance transport, will help to make our local dairy system cost competitive in the face of rising oil prices.

## Corn and Dairying: What is this thing about Corn?:

On the positive side, and a rationale for the widespread popularity of corn, a dairy colleague of mine with long experience in dairy cow nutrition<sup>(13)</sup> reports that “Corn is an excellent rotational crop for legumes and grasses, and corn silage gives the highest annual yield of harvestable digestible energy that a farmer can grow. In addition, it is harvested as a single crop...thereby minimizing the number of trips over a field and the expenses associated with that. Because of its high content of digestible energy, feeding corn silage reduces the need for supplemental grains. It is also an excellent complementary feed to grasses and legumes...higher in energy than grasses and legumes and lower in protein. Fed together, the total forage component of the diet contains more digestible energy than if only grasses and legumes are fed and the surplus rumen degradable protein in the grasses and legumes is diluted out so the environmental impact of high urinary excretion of nitrogen is reduced.” It is for these reasons that we continue to see growth in the use of corn silage in dairy cattle diets. It is no wonder that corn is so popular.

Increasingly, however, there are broader and deeper arguments against the American fixation with corn. Popular agricultural writer Michael Pollan likens corn in the United States as the “second great American lawn”. Corn has become such a basic component that, Pollan says, it explains everything about the cattle industry, beef and dairy. He and others write of the immense amount of fossil fuel, the great quantity of fertilizers and pesticides and the tremendous soil loss associated with corn production. He notes that it takes the energy of half a gallon of gasoline to grow every bushel of corn.<sup>(14)</sup> In spite of these costs, in the U.S. corn leads all other crops in the value and volume of production – more than double that of any other crop. And corn is the nation’s chief crop export, total bushels exported exceeding total bushels used domestically for all purposes combined. Much of this enormity in the role of corn is based on very high government subsidy. (And now, the subsidy to encourage corn-based ethanol is a further nudge to corn production, albeit corn which is removed from the food system.) All these factors have combined to create “King Corn” in American agriculture, and have contributed to the positive attitude (some would say fixation) of conventional farmers, including dairy farmers, in New England and elsewhere, on corn as a critical component of their feed mix. This fixation is so great as to lead such farmers to think that anyone who does not abide corn is pretty radical, or at least very different.

Writing particularly of the Midwest, agricultural writer Richard Manning says “Corn and soybean production is the leading contributor to all the nation’s farm-related environmental problems”. It is the source, via the Mississippi River, of the problem of the infamous “Dead Zone” in the Gulf of Mexico. Manning writes “The Dead Zone has already seriously damaged what was once a productive fishery, meaning a high quality, low cost source of protein is being sacrificed so that a low quality, high-input subsidized source of protein can blanket the Upper Midwest.<sup>(15)</sup> Corn farming, according to Manning, accounts for 57% of all herbicides and 45% of all insecticides applied on all U.S. crops. Corn and soybeans are the leading contributors to soil erosion and the leading source of groundwater pollution from both pesticides and nitrates, and corn is the second leading user of the nation’s irrigation water.

Corn has never been as highly prized among organic dairy farmers, partly because it’s more difficult to grow organically (not impossible, but challenging), and



### THE ULTIMATE STATEMENT IN DAIRY – THE FAMILY COW

**“The cow is the most productive, efficient creature on earth. She will give you fresh milk, cream, butter and cheese, building health or even making you money. She will provide rich manure for your garden or land. Each year she will give you a calf to raise, or sell for beef. Everyday she will enrich the quality of your life as you benefit from the resources of the natural world. Quite simply, the family that keeps a cow is a healthy family.”** *Keeping a Family Cow* by Joanne Sills Grohman.

partly because of soil compaction and erosion, heavy fertilizer requirements, expense of heavy equipment to deal with corn, and nitrogen pollution. And there is a general bias among organic growers and others involved in New England sustainable agriculture in favor of pasture grazing and grass farming alongside a bias against grains for ruminant animals. My dairy colleague acknowledges the problems that UNH has faced in soil compaction because of that heavy equipment needed to apply liquid manure, a strong factor, he believes, in reduced corn silage yields, and, as well, the problem of weed control in fields continuously sown to corn. Wendell Berry also reminds us later in that same essay that “Corn, whatever its market price, is not cheap. What is cheap is cow-grazed grass...”<sup>(16)</sup> While for all of these many reasons, corn is an understandably great temptation as a basic source of animal nutrition, an ecologically based animal agriculture must, for equally valid reasons, move toward grass and toward a greater diversity of small grains for its nutrition base. New England would be well advised to significantly reduce its corn dependency.

## **Eyes of Hope: A Journey to the Heart of Sustainable Agriculture in New England**

The breed of cows known as Jerseys are typically viewed by humans as exceptionally cute, as attractive, as beautiful, small cattle who are a joy to be with.

Perhaps it's their big beautiful eyes. Perhaps it's their spirit and demeanor, perhaps their smooth, glossy light brown hide, perhaps all of these things. Whatever it is, humans respond to these beautiful animals with warmth and affection, and seem to get the same in return. As I surveyed the herd of organic Jerseys at the University of New Hampshire's university farm, a colleague of mine remarked that what we were viewing was the future, a future, he said, of hope. And that this was the way our students could view it. These newly arrived organic Jerseys were our students' future, our students' hope. Perhaps it's their eyes that brings about this reaction in the human mind. Perhaps it's the realization that organic agriculture, and particularly organic dairy cows grazing on a New England pasture, that represents a path to a future that is sustainable. Through these eyes of hope, both those of the cows and those of the humans gazing upon them, the reader is invited to take a hope-filled journey to the very heart of sustainable agriculture in modern New England. Stop by and visit our Jerseys!

“The color of milk ... is the color of nurture”, said the French philosopher Gaston Bachelard. Nurture and hope, what could be better? The progressive leadership of dairying, therefore, can pave the way for New England to more fully realize its food production potential.

At this point a word is necessary on the role and high value of heritage breeds of animals (and, by extension, of heirloom varieties of plants) in any serious attempt to achieve a modern revival in New England agriculture. Being better adapted to New England ecological realities and to grazing, such breeds are an invaluable and necessary component on the agricultural scene. What are these breeds and how are they important? These questions are addressed in Chapter Six.

### **THE NEW ENGLAND ADVANTAGE**

Ohio dairyman Nathan Weaver says that, in terms of organic agriculture, it could be argued that “cool season forage production is our single greatest cost of production advantage over the rest of the nation”. (*Farming*, Vol. 4, No. 3, Fall, 2004, p. 13) Weaver refers here to higher elevation areas of the eastern U.S., states with a close proximity to the Great Lakes, and ALL OF NEW ENGLAND. He is speaking of cool wet climates with mean temperatures between 45 and 72 degrees (F), and has in mind cool season perennial grasses such as bluegrass, brome, fescue, festolium, orchard grass, ryegrass and timothy, and legumes such as alfalfa, red clover and white clover. All the rest of the nation, he says, experiences extensive slumps in cool season forage production.

Dairyman and dairy writer Jim Van Der Pol has recently written, “When livestock replace a machine, the farm becomes more financially sustainable. When the machine (replaced) is a tillage tool, the farm becomes more environmentally sustainable. When the cropping rotation can be timed a little differently, saving the cost of a chemical (cutting the oats early), the farm becomes more satisfactory in a way that all farmers understand.” (1)

## ENDNOTES:

1. Dimitri, C. and C. Greene, 2002, "Recent Growth Patterns in the U.S. Organic Foods Market", USDA Economic Research Service, Washington, D.C.
2. *ibid.*
3. Northeast Organic Farming Association of Vermont, 2001, "An Economic Comparison of Organic and Conventional Dairy Production, and Estimations on the Cost of Transitioning to Organic Production". Technical Report by L. McCrory.
4. USDA Report, 2003, "Organic Feed for Poultry and Livestock: Availability and Prices".
5. Sundrum, A. 2001. "Organic Livestock Farming: A Critical Review", *Livestock Production Science* 67: 207-215.
6. Schested, J., T. Kristensen and K. Soegaard, 2003, "Effect of Concentrate Supplementation Level on Production, Health and Efficiency in an Organic Dairy Herd", *Livestock Production Science* 80: 153-165; and Padel, S., 2000, "Strategies of Organic Milk Production", 3<sup>rd</sup> NAHWOA Workshop, 21-24 October, 2000.
7. Agnew, R.E., T. Yan and F.J. Gordon, 1998, "Nutrition of the High Genetic Merit Dairy Cow – Energy Metabolism Studies", in Garnsworth, P.C. and J. Wiseman (eds.), *Recent Advance in Animal Nutrition* (Nottingham, U.K.: Nottingham University Press), pp. 181-208.
8. Kuoppala, K., S. Yrjanen, S. Jaakkola, R. Kangasniemi, J. Sariola, and H. Khalili, 2004, Effects of Increasing Concentrate Energy Supply on the Performance of Loose-Housed Dairy Cows Fed Grass Silage-based Diets", *Livestock Production Science* 85: 15-26.
9. Lessard of Quebec does use Quebec and possibly Canadian Maritime sources for organic grain, in addition to more distant sources. Lakeview Organics in New York is oriented to local New York State sources and is a smaller more local producer. New England Feeds in Fitchburg, Massachusetts, one of the principle organic feed grain distributors in the region, gets all or nearly all of its supply from the U.S. Midwest, transported via rail.
10. Mia Morrison (Maine dairy farmer), e-mail.
11. Jim Riddle of the University of Minnesota

### ON "DUNGING"

Cattle are generally thought of as being raised and maintained for one of two products, meat or dairy, or sometimes both over time. Cows (or other farm animals) are not generally thought of as being raised for their excrement, their manure. We do know that, in the pasture grazing model, the sustainable agriculture model, and among intensive rotational graziers, cow manure is highly prized for its ability to build soil and to improve pasture quality, in its support of white clover and other valuable pasture plants. But not even graziers or sustainable agriculturists can outdo the high value placed on cow manure by the 19<sup>th</sup> century calico textile mills at Dover, New Hampshire. Here we encounter something called the "dunging of printed goods". According to historians,

"The (calico) Print Works ... owned a large herd of cows on Milk Street (Dover, N.H.). In order to print rich textured clear colors on the cloth, the cylinder-printed fabrics had to be run through a "dung bath" that "set" the colors and produced the desired rich hues and bright shades on the printed material. This process is otherwise known as the 'dunging of printed goods'. Over 30,000 bushels of cow manure were needed annually for their "bath". The milk from the cows was incidental and was sold cheaply or even given away to factory employees." (Calico Printing – The New Horizon in the museum exhibit, "A Bright Future for Looms: The Dover Manufacturing Company, 1822-1827")

The present-day Milk Street in Dover, New Hampshire is named after this process as it was the site of a 100' long cattle barn which produced all of the cattle manure (dung) and a lot of free milk for the mill employees as well.

Such techniques for color and design in fabric may have been superseded by modern technology, and we should not expect to see clothing or other textiles taking a "dung bath" anytime soon. But the story serves to remind us we should not be too quick to apply negative value or cost to animal excrement. It has served us well in the past, continues to serve us today in its nutrient value, and may serve us in the future in other ways, not the least being biomass for energy. It is, indeed, not a waste product but an important natural resource.

is one of the most sought-after experts in the United States on the subject of research needs in organic animal agriculture.

12. Dr. Sue Ellen Johnson, New England Small Farm Institute, Belchertown, Massachusetts, personal communication.
13. Prof. Charles Schwab, University of New Hampshire dairy scientist, interview, 28 May 2005.
14. See Michael Pollan's *The Botany of Desire, The Omnivore's Dilemma*, and other writings, for insight into corn.
15. Richard Manning, *Against the Grain* (New York: North Point Press, 2004), p. 100.
16. Wendell Berry, "Let the Farm Judge", in *Citizenship Papers, Essays by Wendell Berry* (Washington, D.C.: Shoemaker and Hoard, 2003), p. 59.

### BOXNOTES:

1. *Farming*, Vol. 4, No. 3, Fall, 2004, p. 9. All of this speaks well to the New England reality.
2. *A Changing World: New England in the Photographs of Verner Reed, 1950-1972*, ed. by John Stomberg (Beverly, Massachusetts: Commonwealth Editions, in association with Historic New England, 2004).

### "LIKE A CHURCH ...":

Garrison Keillor has given us a social commentary on the role of dairying in our society with his remark, "Dairy farming was what permitted very industrious people to earn a living on poor land, it's fundamental to our culture ..." (Garrison Keillor, *Home Grown Democrat*). Closer to home, in Webster, New Hampshire, 1955, New England photographer and photo-journalist Verner Reed has given us a religious, a spiritual, perspective on the milking of a cow. Elaborating on his famous photograph "Evening Chores", he speaks of the warmth and togetherness of the New England farm family, the feeling of the barn interior in the photo being almost church-like. The lighting is like a church, it's almost a holy picture, he tells us. It can be said that this is a reflection of the social structure of the farm family.

There are, we can see, important reasons beyond milk, cheese, land conservation and a local economy why we must maintain dairying in New England, a land of such considerable dairy capacity.(2)





*“My butter’s No. 1, My eggs are Grade A, I can make delivery up to fifteen times a day.”*

*“A Big Butter and Egg Man”, with apologies to Louis Armstrong and Merle Haggard.*

## Chapter Six

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### ***Breeding in, Breeding Out: The Business of Breeds***

Why should this study concern itself with breeds or varieties of agricultural animals and plants? How does that relate to the future agricultural sustainability and food security of this New England region? The reason is simple: most of the very small number of breeds and varieties of animals and plants in common usage today are products of and in service to large-scale industrial models of agriculture, models which are predicated on confinement agriculture and grain-based diets with respect to animals, and to transportability and shelf-life when it comes to plants. These traits do not serve the interests, needs or circumstances of smaller-scale local and sustainable agriculture.

Needed is a return to those many once common but now rarer breeds of animals which can thrive from grazing and grass-based diets. Such animal breeds can also both survive the weather and be more resistant to disease, as well as offer more nutritional value and a higher quality and tastier product. Needed also are plant varieties which offer fine taste and high nutritional value. Such plant varieties do not need long shelf-life or transportability, since they are direct-marketed, and marketed to a clientele which values taste and nutritional value more highly than does the average consumer.

So, the questions arise: What are the best breeds for grazing? What are the best varieties for distinctive taste? What are the best breeds or varieties that yield positive environmental benefits? Which ones are those that can stand on their own with minimal assist from antibiotics, from chemical nutrients, and, in other words, require low input costs? And, as importantly, what are the best breeds for this area, for its soils and climate?

Rare breeds, heritage breeds, heirloom varieties must, therefore, be given serious consideration. In most cases the breeds and varieties in common usage in the era just prior to the age of industrial agriculture, those most common in the decades of the 1930s, 1940s, 1950s, the last decades of grazing and the last decades of widescale local agriculture in New England, offer the desired types of animals and plants. And because so much of the potential for a rejuvenation and renaissance of local agriculture in New England is anchored in grazing and grass farming as the linchpin of the new agrarianism, the return of grazing breeds of livestock is essential. Thus, Jerseys, Guernseys, Devons come into their own as dairy and all-purpose cows, Herefords and Red Angus as beef cattle, New Hampshire and Rhode Island Reds among the poultry, Gloucester Oldspots and Tamworths among the pigs, and Katahdins, among others, among the sheep. And all differ from the common breeds of industrial confinement agriculture.

### **The Business of Breeds**

There’s a farmer up the road from here in York County, Maine who grows 78 varieties of tomatoes (yes, 78!), including delicious black tomatoes that are so dark (blackish-red) that one wonders if any customer would risk buying them or know what to do with them. There are apple orchards in the region increasingly producing varieties whose names and even sometimes appearance would seem strange to most people. There are potato growers now producing very colorful varieties often of highly unusual shapes and sizes – red, white and blue colored potatoes are very popular around the 4<sup>th</sup> of July. No, these are not an imaginative use of some kind of food coloring. Far from it. These potatoes, like the apples, tomatoes and other kinds of fruits and vegetables, are heirloom varieties. The word “heirloom” is somewhat analogous to “antiques”, that is, something authentic from the past. And, like antiques, their authenticity gives them value not only for reasons of age but for reasons of quality, craftsmanship and, important for our purposes, adaptability. But, unlike antiques, these living creatures, these biotic organisms, reproduce themselves, as long as the seeds (or cuttings) are preserved. And they are preserved, encouraged and grown not merely for nostalgia value. They enrich our lives and, importantly, contain answers for the challenges of sustainability. They enrich our lives through their wonderful taste, their diverse appearance, their often very high nutritional value, their connectedness to locality. But, perhaps most

importantly, it is the biodiversity they represent and it is their adaptability to locale and habitat which is most important from a sustainability perspective. Such heirloom varieties and heritage breeds strengthen and insure a local agriculture for local people, a small-scale decentralized highly ecological, highly efficient and highly secure local food source of great nutritional value.

## Heirloom Plants:

Heirloom plant varieties do not fit in the scheme or organization of industrial agriculture as we've seen it develop since World War II. Agricultural writer Jim Hightower, twice elected Texas Commissioner of Agriculture, told us in his late 1960s Harvard doctoral dissertation, later published in book form as *Hard Times, Hard Tomatoes*, that, among other things, heirloom varieties, our original varieties of fruits and vegetables, do not travel well. And they do not last. Thus, they are not at all suited to an agricultural system which depends on 1500 mile travel distances between grower and eater, nor a system heavily dependent on shelf life for its profits. What such a system needs is "hard tomatoes" which can withstand long travel and rough handling. Those delicious and nutritious black tomatoes would not come close to surviving such an ordeal. Nor do heirloom varieties fit what has become the American cultural preference and expectations for a set appearance (i.e., red tomatoes, shiny waxed apples). And what those in the know agree is that the wonderful taste of heirlooms appears to be wasted on an American population which, unlike European and others, doesn't seem to care much about taste, or requires a set uniform taste, or can make do with artificially manufactured taste (manufactured in industrial plants in New Jersey, as Eric Schlosser tells us in his book, *Fast Food Nation*). New food-oriented social movements such as the Slow Food movement are now beginning to counter that American choice, however. What those hard tomatoes, standard russet potatoes, red delicious apples and other highly standardized vegetables and fruits do fulfill, however, is what has been a non-negotiable American preference for cheap prices. That, indeed, is the essence of the American chemically-based industrial food production system. Small-scale local growers, organic growers, producers of widely diverse and locally associated heirloom varieties cannot compete on price. There is no way that a people who spend only 9.5% of their income on food, in fact, the lowest figure in the world, can afford to encourage heirloom varieties or, for that matter, to support ecological agriculture.

## Heritage Animals:

All of the above applies equally to animals. What are heirloom varieties in the plant world are "heritage varieties" or "heritage breeds" in the world of farm animals. The characteristics of biodiversity, of attachment to a locale and its particular ecological characteristics, and of high efficiency as well as nutritional value, are as characteristic of heritage breeds as they are of heirloom varieties.

There are breeds and there are breeds. In the practice of sustainable agriculture, the question of breeds and the correct matching of breeds to the environment and local circumstance is often of critical importance. This is true of heirloom breeds and varieties in the plant world, and it is even truer of heritage breeds, in the animal world. There are breeds well adapted, for example, to grazing, and those very poorly adapted. In general, the older heritage breeds are much better adapted to grazing and have far more efficient input-output ratios than do modern breeds which are too often a product of industrial agriculture and require high input costs. For example, modern Holstein cows are far better matched to high milk production and indoor animal confinement than to grazing, and often don't do as well at grazing. In contrast, lower producing but lower input-demanding American Milking Devons, an all-around breed perfectly adapted to New England, do very well at grazing and require few inputs. They even birth unassisted. The same holds for other farm animals, sheep, hogs, poultry, etc. American agrarian writer Wendell Berry perhaps captures it best when he writes on the significance of breeding and the value of heritage breeds:

"To me, one of the most informative books on agriculture is *British Sheep*, published by the National Sheep Association of Britain. This book contains photographs and descriptions of sixty-five



British sheep breeds and ‘recognized half breeds’. I have spent a good deal of time looking at the pictures in this book and reading its breed descriptions, for I think that it represents one of the great accomplishments of agriculture. It makes a most impressive case for the intelligence and the judgement of British farmers over many centuries.

What does it mean that an island not much bigger than Kansas or not much more than twice the size of Kentucky should have developed sixty or so breeds of sheep? It means that many thousands of farmers were paying the most discriminating attention, not only to their sheep, but also to the nature of their local landscapes and economies, for a long time. They were responding intelligently to the requirement of local adaptation. The result, when such an effort is carried on by enough intelligent farmers in the same region for a long time, is the development of a distinct breed that fits regional needs. Such local adaptation is the most important requirement for agriculture, wherever it occurs. If you are going to adapt your farming to a variety of landscapes, you are going to need a variety of livestock breeds, and a variety of types within breeds.”<sup>(1)</sup>

Wendell Berry also reminds us later in this same essay that “Corn, whatever its market price, is not cheap. What is cheap is cow-grazed grass ...”<sup>(2)</sup> Grazing, and breeds adapted thereto, suggest true economy.

Trauger Groh of New Hampshire, founder of CSAs in Germany and the founder of one of the first CSAs in America, Temple-Wilton Community Farm in southern New Hampshire (established the same year as Robyn Van En’s Indian Line CSA Farm in western Massachusetts) first expounded to me the necessity of an animal presence on any farm claiming to be sustainable. And it was Trauger Groh who first exposed me to the benefits of Devons as a cattle breed on New England farmsteads. The all-purpose cow, he called it: high quality milk, meat, predator control, and even as beasts of burden (oxen), all wrapped up into one. The Devon, with its imposing horns, would readily protect sheep at night from any predator in the area. Sheep know instinctively to flock close to the Devons at night, and the Devons’ mere presence would take care of the rest. No need for indoor confinement, llamas or other forms of control. Oh, and I must mention that Trauger, a biodynamic farmer in the Rudolf Steiner style, is strongly opposed to de-horning. But the biggest point that Trauger would make about Devons, very similar to the thinking of Bill Murphy, was their efficiency: while milk production in Devons is not particularly high, production cost per gallon for this high quality dairy product is exceedingly low. Devons take care of themselves, are perfectly adapted to New England weather and the New England winter, do not require high quality pasture, typically have a very efficient grass to milk conversion ratio, yield high quality milk, give birth easily with very low mortality, and bring very, very low vet bills. In other words, as Bill Murphy would say, this breed, while not particularly high on quantitative output, is exceptionally low on input cost and yields many other values. Both Murphy and Groh think alike and are outside of the mainstream of dominant American thought, thought which focuses on high production, regardless of the cost in either inputs or in ecological or social damage.

Organic graziers in New England often favor Jerseys, sometimes Guernseys, sometimes a handful of once more common other breeds, because of their grazing ability and efficiency and because of their low input costs, as long as they are out on pasture. Less frequently do New England organic graziers favor the Holsteins which are so dominant in confinement agriculture. This preference relates to grazing ability, low vet bills, other inputs at the low cost end, and a quality dairy product. Such graziers are well enough integrated in their farming operations and have sufficient on-farm biodiversity and economic diversity that they are less interested in the basic per cow productivity of cattle such as Holsteins.

## **Breed Requisites and Breed Types:**

What are the requisites, what are the characteristics, for the right breeds for New England? They would include:

1. Good grazing ability (including that for poultry and pigs which are not technically grazers but feed beyond grasses to many types of vegetable and animal matter);

2. Good adaptation to local (i.e., New England) soils, topography, weather and climate, including an ability to endure the New England winter;
3. Good ability to “get along” on low inputs and make do (i.e., a high level of independence);
4. Little need for veterinary care and strong disease resistance;
5. Easy reproduction, an ability to reproduce with little assistance.

### What animal breeds meet these requisites, particularly with respect to grazing?

The Director of Community Education in Animal Agriculture at the University of Massachusetts recommends the following breeds as being best adapted for grazing in New England:<sup>(3)</sup> (with my additions in parentheses)

Dairy Cattle	Beef Cattle	Sheep
Milking Devon	Redpoll	Dorset horned
Milking Shorthorn	Highland Cattle	Karakul
Dutch Belted	Devon	Oxford
Ayrshire	Dexter	Tunis
Kerry (Guernsey and Jersey)		(Katahdin)

Pigs	Goats	Poultry
Gloucestershire Old Spots	TN Fainting Goats (meat)	Dominiques
Large Black	Nigerian Dwarf (milk)	Bronze and Slate Turkeys
Red Wattle (Tamworth)	Oberhasli (milk) (Boer – for meat)	(RI & NH Reds)

### Breeding for Sustainability

Gene Logsdon writes in his book, *All Flesh is Grass: The Pleasures and Promises of Pasture Farming*<sup>(4)</sup> that, according to Ohio dairy farmer Nathan Weaver, “What we really need now is the right cow for grazing. That’s the missing link to progress in grass dairying. Cows have been bred for over a century to produce lots of milk on a high grain ration. We need to start breeding for thriftiness and high milk production on pasture. Grazing cow genetics in the U.S. is a wide open field. Sometimes I think we’re still lost in the woods somewhere.”

In other words, we need to breed for sustainability, both biological and economic. If sustainability in the context of the New England reality requires grazing, then we must breed for grazing. Since we did this in the past but have not done so for half a century, we likely must go back to where we left off at mid-century, albeit while employing the latest available appropriate technologies. We also, therefore, must seek to bring back the breeds which are most adaptable to grazing and grass farming realities. Energy and capital efficiency (i.e., input energy and cost vs. output energy and cost) will be a critical consideration.

And we must always strive to match our animals and our plants to our immediate ecological reality, our soil and our climate. If these are right, and if the taste and nutrition we offer is all it can be, the market should take care of itself.

The key to the success of local agriculture is the ability of the farmer to directly market the farm's product to the consumer without going through a third party. That is the important topic investigated in Chapter Seven.

## ENDNOTES:

1. From "Let the Farm Judge" in *Citizenship Papers: Essays by Wendell Berry* (Washington, D.C.: Shoemaker and Hoard, 2003), p. 57.
2. *ibid.*, p. 59.
3. Carrie Chickering Sears, personal interview, 2006.
4. Gene Logsdon, *All Flesh is Grass: The Pleasures and Promises of Pasture Farming* (Athens, Ohio: Swallow Press/Ohio University Press, 2004, p. 42).





## Chapter Seven

### *Direct Marketing and “Relationship Agriculture”*

Dr. Fred Kirschenmann, former Director and now Fellow of the Leopold Center for Sustainable Agriculture at Iowa State University, a pioneering organic farmer in North Dakota, and no stranger to Massachusetts and New Hampshire, is a strong proponent of direct marketing and relationship agriculture. His Center has been conducting serious research on direct marketing for some time. Concerning relationship agriculture, Kirschenmann has written “...(T)he pleasure of good eating does matter ... The pleasure of good eating is not about fast, convenient and cheap, but about memory, romance and trust. To be successful in today’s food market requires offering products so good that customers will say ‘Wow, where did that come from. I want that again’ (memory). We also need to provide customers a genuine food story so they can feel good about eating that good tasting product. Increasingly, customers want to know who produced the food; what kind of environmental stewardship was practiced in growing, processing and transporting it; how the animals were treated; and so on (romance). And customers want to be active participants in the food chain – to be able to access information and have a relationship that reaches all the way back to the farmer (trust)”.<sup>(1)</sup> New England is very well suited for the kind of food scene described by Kirschenmann. New England has never been and likely will never be a player in large-scale industrial model commodity and export driven agriculture, with very few exceptions. Perhaps the Aroostook potato industry in northern Maine, one very large poultry operation in central Maine, and the Vermont conventional dairy industry are those exceptions. New England’s geography, its topographical features, including the distribution of its soils, does not lend itself to the mechanical and other infrastructural requirements of such agriculture. Nor do the cultural history and economic situation of the region, including the costs of labor and energy, support the type of large-scale agriculture along the industrial model which has become so prevalent over much of the rest of the country.

Thus, New England, with its heritage of small and mid-scale farms and its local base, together with its exceptional nearness to large markets, is well attuned to the contemporary rise in local foods, local agriculture, and, as well, to organic agriculture. Being thus, New England agriculture is well situated to support direct marketing as a serious option for its farmers. And direct marketing is an absolute necessity for securing the revenue stream for the local foods/small-scale agriculture whose renaissance we now witness. There is little to no room for what most call “middlemen” in this region’s farming system if farmers are to generate enough income to succeed and survive financially. (A few well-placed “brokers”, who are in fact middlemen, are the exception to the rule. One example is that of “Red Tomato” in Massachusetts. But the scale is small and the characteristic remains rather direct, farmer to consumer.)

#### **A TRIBUTE TO THE POWER OF MARKET VISIBILITY**

**When I asked the question, “Why is the Organic Agriculture Center of Canada, the national research institution for organic agriculture in Canada, located in Truro, Nova Scotia, rather than more centrally or in a larger agricultural region, I was told that Premier Cameron of Nova Scotia had been Canada’s Consul General in Boston, and, while in Boston, was converted to the growing significance of organic agriculture in New England and, by extension, Canada’s Maritime Provinces. His influence was used on Agriculture and Agri-Business Canada, the federal agency, and the Center thus came to be situated in Nova Scotia. This influence on an influential Canadian serving in Boston, which led to such an important outcome in Nova Scotia, is, more than anything else, a testament to the growing market power of organic food on the Boston and New England scene.**

## The Many Forms of Direct Marketing

The direct marketing methods and tools available to farmers are becoming better known to them and to the society at large. They include:

- farmers markets (such having sufficiently strict criteria of participation so as to insure that vendors are indeed the farmers who grew/raised the product, or members of their immediate families);
- community supported agriculture (various CSA arrangements);
- farmer-owned cooperatives;
- natural food stores, and other retail grocery stores seriously purchasing from local farmers;
- farm-to-school programs (including colleges and universities);
- farm to restaurant contracts (as in the Vermont Fresh Network and a similar effort in Hancock County, Maine), as well as individual farmer to restaurateur arrangements;
- farm to institutional cafeterias, including hospitals, employees' cafeterias in government buildings, and others.

Direct marketing income can be significantly enhanced by any degree of processing or value-added that can be applied to a plant or animal product, furthering the economic security of the farm.

### Some of the critical marketing mechanisms are:

1. The Farmers Market, in New England generally June to October, is the first form of farmers' direct marketing that comes to most peoples' minds. Such markets are now ubiquitous across the region and growing in number, size and economic strength rapidly. All days of the week except perhaps Sunday now offer such markets, and the markets are to be found as much in the central business districts of larger cities such as Boston, Portland, Worcester, Manchester and Burlington as they are in countless small towns throughout the region. Many public entities such as local governments, as well as churches and other institutions, are providing the space, and the markets are thriving.

A much needed development in the evolution of farmers markets, as with New England agriculture as a whole, is season extension. The addition of a mere two weeks at either end of the growing season can translate into substantial money in the pocket for area farmers, and might even spell the difference between financial success and failure. But even more important is the advent of year-round farmers markets. The first in New Hampshire has just gotten started at Amherst, and the jury is still out as to its long-term viability. Another new one has been launched at Norwich in the Connecticut Valley of Vermont. In Canada, Fredericton, New Brunswick, Quebec City and Halifax, challenged by climates as cold or colder than New England, and with very short growing seasons, have maintained year-round farmers markets for more than a century. Ditto Royal Oak, Michigan, a suburb of Detroit, and other American places. If such places can overcome the challenges of year-round farmers markets (obviously dependent on substantial meat, dairy product, and value-added preserved canned fruits and vegetables, as well as root crops, greenhouse product and hand-made goods), then New England, given the will, should be up to the challenge. The advent



of successful all year farmers markets in New England will enable many more people to farm in the region. This could well be the single most lucrative innovation in direct marketing.

## 2. CSA- Community Supported Agriculture:

Community Supported Agriculture (CSA) is a method whereby families can directly support farmers economically, while the farmers produce an abundance of fresh local food for the families. Non-farming families become shareholders in the production of the farm through the upfront purchase of shares. Although an idea imported from Europe and Japan, it took root in New Hampshire and Massachusetts and has spread from there to the rest of the nation. Trauger Groh of New Hampshire and the late Robyn Van En of Massachusetts are its progenitors, as is Elizabeth Henderson of New York.

More and more New Englanders, as other Americans, are showing an interest in Community Supported Agriculture (CSA). They are thus buying their shares up front, and enabling area farmers to receive their revenue before production occurs. This sharing of the risk with the farmers enables an economically healthier farm system, and can be locally important. CSA is also a very important educational tool to convey the value system of local, small-scale, ecological (and often organic) agriculture to the broader public. CSA members are enthusiastic, often directly involved on the farm, and serve as ambassadors and celebrants of local food and agriculture to the broader public.

## 3. Restaurant Contracts:

For some years New England's best (and priciest) restaurants and their chefs have been utilizing local farm products for the pleasure of the taste it offers and the culinary practices it enables. Only more recently have mid-scale "family style" and even a few "working class" less expensive restaurants, generally locally owned independent businesses, taken an interest in what local farmers have to offer. The much celebrated Farmers Diner in Vermont now leads the region in this effort. But it is clear that the local foods movement is spreading from exclusively upscale to lower scale, lower priced, less elite restaurants. Both are important to the farmers who supply them, but the more ubiquitous lower-priced restaurants hold much greater potential for being able to absorb bigger quantities of local farm product.

Increasingly, restaurants actually cite on their menus the names of the supplying farms, and this in itself has become a marketing tool. Farmers who can supplement their farmers market sales with restaurant contracts will be in even better financial shape than those in farmers markets alone.

## 4. Schools and Other Institutions:

To the degree that local farmers and their products can break through to institutional prepared food providers, particularly schools, the healthier the New England farm sector will be. This market involves schools of all levels and types, colleges and universities, hospitals, nursing homes, and some companies that feed their employees. The central incentive is nutrition, particularly in schools, and the movement is as much predicated on negative attitudes toward the nutritional poverty of most institutional foods as it is to positive interest in local foods for nutritional and other values. In addition to nutrition, college and university dining services are beginning to use fine food, including local and organic food, as a lure to student enrollment in their institutions. Such institutions can become major contributors to the revenue stream of local farmers. Interestingly, most Swedes will tell you that the now world-famous organic farming movement in Sweden derives originally from the parents of primary school students who became concerned over the poor quality and low nutritional quality of food served in those schools. The schools converted to organic and significantly local foods, and, from that base, the organic and local food movement spread to all other sectors of society in that country. In the United States today, parental and broader societal concerns over childhood obesity, the diabetes and asthma epidemics among children, and the increasingly realized link between health and nutrition are spurring the farm-to-school relationship in the U.S. today. Local farmers can only gain from this development.

The New Hampshire Farm-to-School movement is a case in point. This project connects farms and schools in the state by integrating agricultural production, school food procurement and school

curriculum. It is a collaboration of the UNH Office of Sustainability and the New Hampshire Coalition for Sustaining Agriculture, with SARE funding.

## 5. Retail Food Stores:

Another important, although in some ways less accessible, opportunity for local farmers' direct marketing is retail food stores. The greatest opportunities are in the smaller and independently owned food stores, including numbers of natural and health food stores. (The demise of the Portland Public Market in Maine should be noted here. The success of such stores is not guaranteed, and owners must be careful to observe good business planning and be sure their effort is reasonably adjusted to the values and the economic capacity of the local customer base. Portsmouth Health Food Store and Exeter's Blue Moon natural foods grocery store, both in New Hampshire and both independently owned, are examples of success stories in this area. And there are many more such success stories throughout New England.) Large corporate chain food stores sometimes take small amounts of local foods for retail sales, but in general such stores have built-in structural difficulty (and little appetite for) accessing their food supplies in this way. They resist dealing with a large number of small scale local suppliers, and their systems for computerized purchasing and their distaste for writing small checks hampers their involvement. (A mid-size supermarket which is a remarkable exception to the rule is Durham Marketplace in Durham, New Hampshire. Originally a Hannaford Shop N Save but now independent, owner Chuck Cressy's personal commitment to supporting local food and farmers and providing his customers with this option for freshness and nutritional value has enabled this very successful exception to the rule. This New Hampshire food store offers a new model for mid-size grocery stores, perhaps to be emulated elsewhere.) Marketing local foods through retail food outlets is challenging, but could perhaps best be accomplished by use of a broker. And a few in the region are finding employment as such.

**"There is no way to make food choices without making moral choices as well."(1)**

**Sir Albert Howard**

## Failing to Connect Nutrition and Health

Direct marketing is not the dominant form of food access in the United States for a number of reasons, including cost of food and profits, but, at the consumer level, there is a clear failure to understand the connection between nutrition and health.

I had a visit recently from the public health officer of a local small city. The city public health department has, as its prime responsibility, the protection of the health of the residents of the city. I mentioned to the health officer that a critical event occurs every week literally before the front steps of the main entrance to the Health Department's building, City Hall. Nutrition is basic to personal and public health. And the local farmers market, the primary source of fresh local food and therefore a primary source of nutrition in the community, operates every week, coincidentally at the entrance to the Health Department. There is no awareness, and certainly no policy, in the Health Department connecting the Farmers Market with the central mission of the city health department. That connection needs to be made – our problem is the inability of people and their institutions to make the connection.





So far are we from the land, from nature, from our food sources that municipal health department officials in a nearby city attempted to discourage a farmer from bringing a few live caged chickens to the city's farmers market, while showing at the same time no concern at all over the lack of health benefits and poor nutrition associated with much of the food, including chicken, sold in the city's grocery stores. Such health officials also sometimes call for excessively cold refrigerator temperatures for meats on sale at the farmers market, another issue discouraging farmer vendors from selling meat at the market. This is not to say that such health officials don't have a job to do in protecting the public's health, but isn't it ironic that these officials are not prowling the aisles of large supermarkets raising concerns about the health effects on people of so much of that product in those aisles? At the Farmers Market, the farmers won.

## **The Question of Debt and Its Avoidance**

“We humans are of far too much value to be emotionally chained and shackled to debt, to endless earthbound economic demands and expectations.”<sup>(2)</sup>

Perhaps the most onerous of burdens carried on the shoulders of American farmers today is debt. This debt arises from a combination of high input cost and low commodity prices. While the condition of indebtedness is no stranger to many Americans, farmers, more than most people, have become enslaved by it and are losing their options, if not their farms, sometimes even their very lives.

Other Americans, those who would like to take up the lifestyle that occupied the lives of fully 90% of Americans in the early days of our nation, namely farming, are discouraged from doing so for lack of the enormous amount of capital necessary to enter conventional farming.

Loss of freedom for the first group, loss of opportunity for the second. Enslavement. Preclusion. How un-American! It is a purpose of this book to show that these negative circumstances need not prevail. And to do so in the context of one American region, New England. As we've seen, it is in intensive rotational grazing where an answer might be found. And it is also in relationship agriculture where this answer truly comes to fruition. It is more than an answer. For it is in such a form of activity, of livelihood, of community economic development, that we may come to understand joy and happiness. Indeed, we might come to understand something I have been calling the ecology of happiness, of joy. And all of us can share in this joy, through open space, through contact with nature, plants and animals, and, not the least, through the pleasure and nutritional value of good food.

A basic way out of debt, the way for farmers to avoid or at least lower debt, is through elimination of the middleman. It is through direct marketing, farmer to consumer. It is through farmers markets and the other tools described in this chapter.

## **To Have a Relationship**

Recent announcement of a day-long conference at City University of New York Graduate School on West 42<sup>nd</sup> Street in New York City on the subject of local food and local agriculture is indicative of a rapidly spreading interest in this topic in large urban centers. A conference on local agriculture in Times Square at the City University would have been unthinkable just a few years ago. This is one of many signs that local food and agriculture concerns are about to burst on the scene among a larger number of consumers, even in the most urban and agriculturally removed of locales, an encouraging sign for local farmers, as New England's cities are not far behind. It is a sign of the success, thusfar, of direct marketing, farmer to consumer, even in the midst of the largest of cities. It suggests great hope for small scale farmers, both crop and livestock, who are not far removed from such markets. We already see this on a smaller scale in the chain of New York City “Greenmarkets” (which are true farmers markets); in the subsidiary smaller-scale corner markets in low income and new immigrant neighborhoods which purchase at farmers markets and re-sell at cost in neighborhoods not themselves able to support full-scale farmers markets or being in locations which farmers might not choose to

come to); and countless other urban and suburban big city markets popping up from Boston to Seattle, almost all doing very well and selling to all ends of the income spectrum. With this kind of market potential, new farmers, very small-scale farmers, farmers with little capital should be able to develop and enhance farms in many well-populated locales, in spite of often high land prices in these areas. This bodes well for the farmers and future farmers of this region. Farms and farmers in New Hampshire, southern Maine, and eastern and central Massachusetts have an extraordinarily bright future from a marketing perspective, being as close as they are to a very high and rising demand for their products.

Those who follow the farm economy and matters agricultural are aware of the fact that income to the farmer has dropped dramatically in the past half century, from perhaps half of the farm dollar fifty years ago to only less than a tenth of that dollar today. All of the difference has accrued to the middle man, to the processor, the distributor, the advertiser. Sustainable agriculture, in order to be sustainable, requires that the farmer recover as much of this lost income as possible. This means direct marketing from farmer to consumer, with no middle-man. And sustainable agriculture is and will be ever more enabled by “relationship agriculture” and by “identity-preserved agriculture”, two of the most exciting social developments to occur in this country in a long time. And those who follow food at the consumption end realize that something deeper is going on there.

“Relationship agriculture” is predicated on a growing phenomenon in American society, the deepening desire of many Americans to have a “relationship” of sorts, to feel a connection, with the supplier of their food, the farmer. This emerging phenomenon, psychological in nature, can be fulfilled in a number of ways, ranging from visits to the farm and farmer who supply the product; by knowing the name and the location of the farm and having the knowledge that one can visit if one wishes; by being a member of or a “subscriber” to a farm, i.e., a CSA; by meeting the farmer weekly or monthly at the farmers market; or by receiving photos and/or information about the farm. It can even be supported by viewing large colorful photos of farmers suspended in the food store directly above the product sold, as is the case in some food stores, particularly co-ops. This latter was pioneered in New England by the small Bread and Circus chain in the Boston area (now owned by the larger Whole Foods enterprise), and by the many food coops across Vermont, such as those at Brattleboro, Montpelier and Burlington.

Relationship agriculture stems from a positive desire for a feeling of attachment and connectedness to one’s food source, both the farm as land and as a place and, as well, the farmer and farm family who produce the food. Identity-preserved marketing has elements of this desire for connectedness and attachment, but it also contains elements of a distrust of sources of conventional food. Such distrust is predicated on fear of food contamination and disease (salmonella, listeria, mad cow, etc.).

But industrial agriculture is, of necessity, predicated on an inability to identify source. One need only realize that one hamburger from industrial agriculture could represent parts of hundreds of cows from many different places to understand the magnitude of the challenge facing large-scale corporate industrial agriculture in this area of market demand. It could safely be said that the industrial food system is built upon a foundation which prohibits the preservation of source identity. This weakness in the dominant system represents an opportunity for smaller scale ecological farms to carve out a market niche. In the thought of family farm philosopher Ronald Jager, this agriculture constitutes a form of resistance to the status quo, to market forces, to the bigness and anonymity of conventional industrial agriculture, whether that resistance be implicit or explicit.

## Meat in the Marketplace

When people think of farmers markets or community supported agriculture, they think of greens, of mixed vegetables, perhaps even of flowers. Rarely do they think of beef, lamb, pork or poultry. And yet the local farmer, the local farms, must obtain important revenue and, as well, agricultural services from animals, and from the sale of animal products. A healthy farmers

**“Local allows you to ask your own values questions.”**

**Lisa Johnson**

market, therefore, must include a range of meat, eggs and dairy products, along with the produce. But it is important to differentiate between locally produced meat and all of the many serious arguments that can be raised against industrially grown meat products. Meat has a place in the diet (for those who so choose), and meat as well has a place in the farmers market and hence in the revenue stream coming to the farmer.

Many arguments against beef and other meat consumption do not hold water when applied to grass-based and/or local production. There are a number of commonly made and valid arguments against meat consumption in the United States. These arguments are of an environmental nature (as found in any environmental text or guide discussing common practices of Americans) and, as well, of an energy (i.e., waste) and health nature. Such arguments are partly based on the high per capita consumption of meat by Americans; partly on the long distance transport of these products from producer to consumer; partly on animal welfare and animal rights issues; partly on antibiotics and food contamination issues; and partly on human health issues.

None of these common meat stereotypes hold for grass-fed meat, particularly if it is raised locally. Local grass-fed meat does not deplete water resources, or depend on western irrigation; is not energy-intensive; does not require fossil fuels for long-distance transport; does not usually involve antibiotics; and does not contain threats to animal welfare. In all of these ways, grass-fed meat is exactly the opposite of industrial agriculture's feedlot beef and pork and other confinement meats. Arguments raised against meat consumption, and sometimes in support of vegetarianism, arguments to be found in a variety of books and films focused on environmental and animal welfare concerns, pertain almost exclusively to the large-scale industrial model, and do not at all pertain to local pastured and free-range animals, with or without supplemental feed grain.

Likewise, dietary and health concerns so prevalent today with respect to large-scale American meat consumption, from antibiotics to growth hormones to mad cow disease, salmonella, e. coli and other contaminants now found in American meat, are not relevant or applicable to locally raised grass-fed animals. In fact, very much the opposite is true, as indicated by the extensive work of Jo Robinson, the Weston A. Price Foundation and Utah State University, among others. Grass-fed meat is healthy and nutritious, not only in comparison to grain-fed animals in the industrial production model, but even in comparison to many other kinds of food. Among the most discussed of these health-engendering components of grass-fed product, both meat and dairy, are the presence of the omega-3 fatty acids and conjugated linoleic acid (CLA). Jo Robinson's books, *Pasture Perfect* and *Why Grassfed is Best*, present very readable detail on CLA and other benefits of grass-fed meat, eggs and dairy products.

### **“It’s Payment Enough ... Or Is It?”:**

A Maine organic dairy farmer recently reminded me that there are some in society who think that dairy farmers should feel honored enough for having the opportunity to provide good healthy milk to mothers and children. Producing the milk, in other words, should be its own reward. Farmers, therefore, should feel so honored that they should be willing to work for nothing!

This is analogous to the notion that American farmers need to feed the world – and should feel proud and honored to be able to do so.

Either way, we have a formula which guarantees the destruction of American agriculture, and local agriculture in every local place in which it occurs in America.

Either we properly support American farmers, and our local farmers in particular, and be willing to invest in them, or we lose them, and with their loss we lose our food supply and the health and nutrition it represents.

This leads us to the question...

**Gift Certificates: Why not purchase gift certificates from local farms to present as gifts?**

**This is a way of getting money to farmers early!**

## What Price is Appropriate?:

A local organic farmer who is a regular at several of our area farmers markets sells certified organic eggs by the dozen. Over the years he has always gotten his price. Until recently, his price was \$3 per dozen and he always sold all the eggs he could bring to the market. His major input cost, certified organic grain, is high, and has continued to rise steadily. Because of this input cost increase, our local farmer has had to raise his egg price to his customers to \$4 per dozen. Four dollars per dozen! Some would say, and do say, That's ridiculous! Who would pay such a price? As the customer of this mindset moves away from the stand, another customer is arriving, asking how many dozen can she buy at that price. The Farmers Market opens at 8 A.M. By 10 A.M. this farmer is sold out, at \$4 per dozen. So we have two cultures among the customers. But support for the farmer is secure – such is the quality, appreciation of and demand for high quality, highly nutritious and very tasty fresh local eggs bought directly from the farmer at the local farmers market.

### THE “VAN GOGH OF DOUGH” HAS MET THE “MILLER OF MAINE”:

**Jim Amaral, founder and owner of Maine's Borealis Breads, likes to refer to himself as the “Van Gogh of Dough”. His is a Maine product, certified organic, and increasingly dependent on Maine-grown organic wheat, a fact of which he is very proud. In fact, Aroostook Wheat is now one of the more popular kinds of breads across New England. And Matt Williams, about whom much was said in *The Wisdom of Small Farms and Local Food*, grows and mills that Aroostook Wheat. He is one of very few millers in Maine and is a model not only for county agricultural extension agents making a meaningful contribution to local and organic crops in his state but also a grain-grower himself and, more recently, a processor through his efforts at cooperatively milling organic grain, his own and others, on his farm in Houlton.**

This leads us again to the question, What price is appropriate? Perhaps it ought to be preceded by the question, What price is inappropriate? Americans never address or think about such questions. But we should. In truth, to the typical American consumer, the appropriate price is the lowest possible price for which the product can be obtained, regardless of the circumstances of production, the ecological or social consequences of that production, or the origin of the product. For most, it's all about price.

For many decades supermarket and grocery store windows have sported large price banners, the sale prices of the week. The windows have space for nothing else, including letting light into the store. So, to the buyer, and thus to the seller, price is all. And the pressure is heavy to set retail prices as low as possible. The lowest possible price becomes, de facto, the appropriate price. Inevitably, long shelf life, lack of freshness, lack of nutritional value, the highest possible adulteration by cheap inputs becomes the norm. I do not suggest here that \$4 per dozen is necessarily the appropriate price for eggs, but I do suggest that that price is likely closer to appropriate than the \$1.25 or \$1.50 per dozen often found on store-bought eggs. I for one and my farmer friend will settle for \$3. We are perhaps coming from a very different place, a very different value system than the mass of society. But our numbers are increasing. And the central question is never, How much money do you have? Or, How much money do you make? The real question is, How do you choose to spend the money you have, and in what proportions? It is the answer to that question which reveals one's true values. We can no longer afford what Wendell Berry calls the motto of our food system: cheap at any cost! The food offered directly by the farmers in farmers markets is not at all expensive relative to value received. It is simply the true cost of food.

## A Quest for Quality in New England

Andre Rieu, the Dutch musician and orchestra conductor, on a recent visit to Durham, New Hampshire, expressed his strong sense of place in speaking of his homeland, the province of Limburg in the southern Netherlands. He described an intensely pastoral environment, an inspiration for his own musical artistry and an area known for its dairy cows and its Limburger cheese. I myself have visited the dairy farms of Gruyere in western Switzerland, home of Gruyere cheese. Many other fine cheeses are associated with other European places.

Similarly, New England is eminently well equipped to produce high quality cheese, whether cow, goat or sheep in origin. And admittedly, fine European cheeses are a result of centuries of acculturation and refinement in various European locales. I don't mean to imply that Americans in general, or New Englanders in particular, could produce overnight such recognized high quality product. But I do mean to imply that we can be just as successful. Given New England's geographical and ecological circumstance and character, there is no reason why New England couldn't eventually produce one or more high quality cheeses in considerable quantity, grass-based of course, such that the region would gain fame for its production. I don't mean merely a niche market or a product for a small elite percentage of the population. I mean, rather, a product of sufficient quantity to feed a high percentage of New Englanders, and of sufficient quality that people elsewhere would take notice. Perhaps the serene and ecologically healthy pastoral environment that would result here in New England would be such as to inspire musical composition of a kind produced by Beethoven, by the Strauss families, and by other composers from another time and another place. And the "music" of good food, the pleasure of quality food, would be a byproduct, along with open space and aesthetic beauty. (High quality pork fed on the cheese whey would be a further byproduct.) Like Andre Rieu, Beethoven's pastures, and the aesthetically pleasing Strauss waltzes that Rieu and many others so love, New Englanders would themselves gain a stronger sense of place. We need such a quest for quality, in cheese and in many other areas of farming, food and gastronomy.

## **ORGANIC: MORE THAN A NICHE MARKET**

**The Food and Agriculture Organization of the United Nations (FAO) now reports that organic agriculture is no longer to be considered a niche market within developed countries but a vibrant commercial agricultural system practiced in 120 countries, covering 31 million hectares of cultivated land plus 62 million hectares of certified wild harvested areas. The organic market was worth US\$40 billion in 2006, and expected to reach US\$70 billion by 2012. Part of the benefit of organic, according to FAO, is its lack of reliance on fossil fuel and its reliance on locally available and cost-effective resources.**

**FAO concludes that a broad-scale shift to organic agriculture can produce enough food on a global per capita basis to feed the world's population over the next 50 years. Results from studies carried out by USDA support the FAO findings.**

**As the FAO report points out, organic foods tend to have higher micronutrient content that contributes to better health, lower incidence of non-communicable diseases, and boosts plant and animal immunity against disease.**

## **The Real Dirt – A Day's Experience**

One recent Saturday morning I spent several hours, as I often do, watching money flow directly into the hands of local farmers, in return for their products of the land. That same day I visited a local 255 acre farm (large for our area) where I saw creativity at work: the creativity to make a significantly independent local energy source (biodiesel) to fuel the machinery and vehicles of the farm; the creativity and skill to build healthy fields and pastures; to produce mixed vegetable and berry crops; to produce forage for livestock, dairy and meat; and, soon, the creativity to employ intensive rotational grazing to produce beef, lamb and poultry, all grass-based and organic. All in combination with healthy agro-forestry. And all on one local farm. Much of this is enabled by direct marketing. Given the rising price of fuel energy, the peaking of oil and natural gas production worldwide, and the volatile state of international geopolitics, I believe I was witnessing the future: farmers, our basic producers of food, freed from the shackles of low product prices (through direct marketing), freed from the shackles of many expensive input costs (through the practice of ecological organic agriculture with its low input costs and employment of the services of natural capital), and seriously trying to free themselves from dependence on global fuel markets. Agricultural and rural historians might see a certain déjà vu in this scene (though few modern people would). What I see is poetry in motion, creative genius at work, people who have learned to listen to the land, and then employ what they learn. It may be the only inviting and acceptable future

we have to look forward to. It is a future that the rest of society, including our land grant colleges of agriculture, our agricultural agencies of government, our local planning boards and conservation commissions will have to seriously consider.

## A Land of Towns

New England may be better prepared than most U.S. regions to respond to the call to re-localize, to be better poised for relocalization, as an answer to the challenge of the post-carbon era, the end of the era of cheap oil.

Lying adjacent to the beautiful gold-domed rotunda of the Massachusetts State House in the middle of Boston is the Great Hall of Flags. On display in the hall is an impressive and dense display of flags: one flag for each of the 301 towns and 50 cities in the Commonwealth of Massachusetts. Ultimately, this may represent the reality not only of Massachusetts but of most of New England: the town in which people live. This is the origin of New Englanders' self-identification. It still represents the basic level of governance across the region, whether by town meeting or elected council. And it may, under coming energy circumstances, be resurrected in the minds of most New Englanders, as their basic method of organization and identification. This is not to deny what have become known realities: one place affects all other places and we are all downwind. It is not a denial of something larger but may become simply a recognition of new energy realities as the age of oil passes.

That exhibition of town flags reminds me of the long and very real heritage represented by these flags and their number and density reminds me of the great number and small size, in other words, the intense localism represented by those many flags. This is not to suggest a concurrent return to the watershed, to the river valley, as self-identity in this new localism. But the Massachusetts or New England town is significantly more local than even the watershed.

This high degree of localism can both support and strengthen relationship agriculture. And the farmers markets in particular. But also community supported agriculture, farm-to-school, and other forms of direct marketing are basic tools of community development, and, importantly, community and town coherence and identity.

Local agriculture, and the local foods movement, is not merely a tool for land conservation, but it is a power, a force, a force against sprawl, a force for open space protection and preservation throughout New England. It can be a force against the consequences of peak oil and of energy insecurity. It is, indeed, the most powerful force there is, and environmentalists, conservationists need to learn how to use this powerful tool.

There is no question that, to achieve a sustainable agriculture which is healthy for the soil, for the plants and animals, and for their own bodies, Americans will have to become accustomed to devoting a higher proportion of their income to food expenditures. The figure will have to increase, and probably double from today's 10%. Otherwise we cheat the soil, the

### THE WISDOM OF MICHAEL POLLAN

**Michael Pollan, author of *The Botany of Desire* and *The Omnivore's Dilemma*, has written**

**"Local food economies are our best hope for checking the drift toward the total global economy. A revolt is underway across this country – a revolt of small producers and consumers. Some of the most important politics today are happening at the farmers market." From "Beyond the Bar Code: The Local Food Revolution".**

**"The farmers market is quickly emerging as the new public square in this country."**

**"We will not reduce our dependence on foreign sources of energy or confront the issue of climate change without dealing with the industrial food system, which consumes 17% of our fossil fuel."**

**"I say we put our faith not in technology or regulation but in relationships, relationships with small farms."**

**"We are building a local food economy simply by getting out of the supermarket, by growing our own food, by joining the CSA and by shopping at farmers markets. We are voting with our forks and it is a very important vote."**

**And, with respect to animal agriculture, "Animals are fertility generators on the farm!"**

agroecosystem and our own bodies to our detriment. Ultimately, we make ourselves unsustainable. And Americans, who desperately need reconnection with nature, with the land, with their own food sources, and with the people who grow that food, must see that the money they invest goes directly for the benefit of those entities and is not detoured in other directions. It is one of the best investments we can make. The Europeans, most of whom have a higher standard of living than do we, do it. So can we. Indeed, we must. We must secure our local food sources. Direct marketing and relationship agriculture provides a path.

**The Consumer Price Index (CPI) for all food increased at an annual rate of 2.3% in 2006 and is forecast to increase 3.0% to 4.0% in 2007 due to the rising cost of energy (and undoubtedly ethanol diversion of corn as well!). This is good news for local farmers for it will help level the playing field and enable them to compete, the result being higher prices for the product of industrial agriculture.**

Perhaps New England's land grant universities can be a source of new found hope for local agriculture. Chapter Eight takes a closer look at the land grants, and particularly at what's been going on lately at the University of New Hampshire and its first-in-the-nation university organic dairy.

### ENDNOTES:

1. Fred Kirschenmann, "Fred Kirschenmann Addresses the Disappearing Middle", in *The New Farm*, website of the Rodale Institute, December 17, 2003 ([http://www.newfarm.org/depts/talking\\_shop/1203/biodynamic2.shtml](http://www.newfarm.org/depts/talking_shop/1203/biodynamic2.shtml))
2. Raylene Funkhauser Nickel, *A Prayer for the Prairie: Learning Faith on a Small Farm* (Kief, North Dakota: Five Penny Press, 2004).

### BOXNOTES:

1. Sir Albert Howard, as told by Steven Shapin, "Paradise Sold" (*The New Yorker*, May 15, 2006, p. 87.)







## **Chapter Eight**

### ***Vital Infrastructure: Our Land Grant Universities***

#### **The Place of the Land Grants**

The people of land grant universities, their researchers, their faculty, their outreach and Extension personnel, owe their first obligation to local people. Their responsibility is to the people of their state, first and foremost. They are obligated to their state’s farmers and gardeners, the growers of food; to their state’s communities and the health of their community structures and local institutions; and, in terms of food and agriculture, to all those in their state who eat, and who are, therefore, stakeholders in the security and health of their food and food system.

Land grants since the later 20<sup>th</sup> century have significantly lost their way, have veered from the path. They have focused much of their attention on those entities that have less need of assistance, large-scale agri-business and large-scale commodity and export agriculture, entities of globalization and the industrial model of agriculture. But this does not change their basic responsibility, their authentic responsibility, to their state’s people. This is the very definition of who they are as public land grant universities. And it is the responsibility of these public land grant universities to use their infrastructure and their brainpower to engage with and help to educate a whole new generation of sustainable farmers and would-be farmers in every place in each of their states. With the support of this infrastructure and brainpower, small and economically secure farms sustainably producing local food for local people will become common here, as much a signature of the New England landscape as the region’s ubiquitous stone walls or Fall color.

This is an important part of the need for a vision of what can be. It has been said that, without a vision, the people perish. It is up to the land grant universities, the people’s universities, to help people to regain that vision, to see what could be, rather than limit them to a narrow notion of what is. It is in that spirit that this book is written.

#### **I. Land Grants as an Idea**

A big question for our land grant universities is whether and to what extent they can return to their original mission of serving more directly the people of their states and regions. The universities must have the vision before they can share or teach it. This is not to suggest that these large and important public universities shouldn’t be teaching or operating in the international and global arenas. But it is their absence from their traditional role, on the land, in the community, that has separated them far too much from their natural constituencies. If they are to retrieve some semblance of constituency support, if they are to be true to their mission, if they are to be in accord with coming energy, environmental and food security realities, the land grants will likely have to become more locally grounded than they have been at any time in the last half century. An important functional role in sustainable ecological agriculture, in low energy-input systems, in local food systems, including organic farming and intensive rotational grazing, will of necessity propel them into a new future, in synch with local people in local places across the breadth of their states and regions. This is no less true in New England than it is elsewhere in the nation.

#### **Farmers and the Land Grants**

Recently I attended a day-long workshop at a land grant university’s agricultural research farm (experimental farm) in the Midwest. The subject was forages for grazing livestock. The audience was largely area farmers and the leaders were university agronomists and their graduate students. The picture was as it should be: the

publically funded land grant university attempting to assist the state's farmers to achieve a more successful agricultural production.

However, the farmers present shared some of the skepticism toward land grant university professors and scientists which one finds in other places across the country, skepticism as to the university's biases, values, source of funding, and motives. The essence of this particular workshop was to demonstrate grazing forage options for the farmers and to make recommendations to them. About mid-morning one of the farmers present asked the university researchers how much grazing was done by the university's own herds of cattle. The answer was none. Out the window went most of the credibility which those university researchers, with their doctorates and specialized research experience, should have had before the farmers. In further discussion it became obvious that the farmers knew more (both from their own experiences and from their study) than did the university researchers, and could well have been the teachers in this scenario. As with most land grant universities, grazing practice ended and animal confinement began more than forty years ago. The land grants, while astute at animal confinement as an agricultural practice, were totally incapable of handling, or even of understanding, modern grazing. The alternative agricultural literature, largely based on actual farmer experience, is the source of serious discussion and information exchange on grazing. But this literature is often viewed with disdain by the land grants and is not often present in their thinking. To once again become serious and respected players in animal grazing and grass farming, the land grants will have to accept, with some humility, that knowledge also comes from the bottom up, from the grass roots, from farmers' actual experience on each farm in each locale. It cannot and does not only come top down. This is especially true in grazing, where there is no track record, no experience, in "research at the top" in this area of agriculture. (The same could be said for organic agriculture.) Land grants must publically admit this nearly half century gap, this hiatus in their knowledge, and become open to learning from the grass roots, from the grass farmers themselves and from their organizations and their alternative literature. They will find some help in this from an engagement with the work of their own predecessors in the land grants of half a century or more ago, albeit work which reflects the scientific knowledge and techniques of that time. Grazing in many forms is certainly represented in that earlier work. But missing is intensive rotational grazing, since the success of such is significantly predicated on the benefit of inexpensive, light-weight and often solar-powered paddock-fencing technology, a development of more recent decades.

This leads to another directional change for land grant agriculture. Even as research in animal confinement systems is becoming less needed in the face of the need for research focus on unconfined animals on pasture, so also research based on the acquisition and use of heavy mechanization is less and less needed, to be replaced by the need for research in low input (i.e., low energy and low capital) systems.

Across the United States the land grant universities and their extension services have repeatedly signaled to farmers that it's OK, even necessary, to go into debt. This book is the story of farmers who largely rejected that advice. A recent visit to eleven organic dairy farms in New England (five in Vermont, six in Maine) revealed that none of them had any significant debt. In modern agriculture, that is extraordinary. Small-scale alternative agriculturists, including practitioners of organic and/or grass-based agriculture, are debt averse. They would readily identify with the statement, "We humans are of far too much value to be emotionally chained and shackled to debt, to endless earthbound economic demands and expectations".<sup>(1)</sup> They resent paying interest

to banks, they are creative at making do, they keep their own demands low, and they lead a lifestyle not dependent on significant income or borrowed funds. They value frugality and, at the same time, what they would call a high quality of life, the "good life", to use their words. They are far closer to the values of Wendell Berry, and of Maine's Helen and Scott Nearing, than they are to contemporary consumption-oriented values. (The Maine Sustainable Agriculture Society's film, "Conversations With Farmers", provides a fine introduction to this breed of farmer

**According to Robert Thorson in *Stone by Stone*, the very first agricultural college in New England was the Dariner Lyceum in Gardiner, Maine, which opened in 1822. Specialty trade journals for eastern farming began also in this period, notably *The American Farmer* (1819) and the *Albany Cultivator* (1834). New England was, from the very beginning, in the forefront of agricultural education in the United States.**

in that state.) Such farmers know how to obtain service from all elements of the on-farm system, how to make every part serve every other part, how to achieve a high level of biodiversity and economic diversity. They are serious believers in and practitioners of not putting “all your eggs into one basket”. They reject dependency on large machinery and the debt service that comes with such investment. They pool, they share resources whenever possible. They are strong believers in community, which makes such pooling possible. They are oriented to cooperation rather than to competition. They eliminate or at least reduce dependency on markets which control the prices (e.g., commodity markets), and they maintain small but diversified scale. In many ways they are true practitioners of ecological agriculture. Most significantly, they are skeptical of and have rejected that land grant university advice which would have them go in the opposite direction.

What does this say to the land grant universities? It says we must model to, we must effectively try to help the small and medium-scale producer marketing to the local market, and that we must use highly efficient low input systems to do so. We can do this through conversion from animal confinement to animal grazing systems. We can do it through modeling smaller scale and less expensive technologies (such as the small-size milking parlor that UNH is now modeling at its organic dairy, to the acclaim of area farmers). We can do it through arguing against indebtedness, through arguing for biological diversity, through advising in support of direct marketing and, in general, through both supporting and practicing ecological agriculture with its low energy input / low capital input systems. Appropriately, in addition to economically strengthening current farmers of average income, this behavior supports lower income farmers who need help; small-scale farmers who are too often ignored and not taken seriously (who are, indeed, “underserved” by the land grants); and, as importantly, future farmers, would-be farmers, new farmer entries, all important if we would stem the decline in practicing farmer numbers and insure local food security.

The land grant has a serious role to play in assisting current farmers and in assisting others to enter farming. They have a role to play, of course, in educating their enrolled students, undergraduate and graduate, full and part-time. And they have a role to play in educating the public about food and agriculture, about conservation of land and natural resources, about ecology and environment. But they do not have a role to play providing entertainment to the public. Far too often, they worry about what the public will think, based on superficial appearances. Such worry can distort their role and their work.

A land grant university wishing to become a player and teacher in sustainable agriculture, in ecological agriculture, must decide for whom it is modeling itself: farmers and producers of food, present and future, or the general public. Sometimes such universities are driven by the notion that “The public wants this ...” or “The public wants that...”. Do we want our efforts to model or demonstrate for the public, or for the farmer, including the farmer- to- be? Do we want our efforts to model or demonstrate only for the wealthy farmer or for all farmers, including those of limited means, including those farmers to be who have very limited capital to invest? These are different things and we are too often confused about whom we want to serve. The land grant is here to educate the public, but not to entertain the public. It is here to help the farmer and future farmer, and to insure a future food supply for its region. This may speak, in terms of buildings, to economical hoop structures, to bedded pack barn design, to smaller facilities, to grazing, and to generally low capital investment and low energy input. That’s the New England way of organic and grass-based dairying, in keeping with the organic philosophy developed and practiced over three decades in this region by MOFGA and the NOFAs. At the same time, we owe our visitors, the kids off the school buses, the families of our college students, and the general visiting public, information and education about what we are doing, and why. This can be accomplished through good clear and inviting signage on-site, through publications, and through direction to websites. But we should not compromise our facilities and their appearance by public-enticing design which doesn’t serve our interests, which doesn’t garner the respect of farmers already experienced in organic methods, grass-based and low input. Doing things “the right way”, which we all want, does not necessarily mean spending a large sum of money on “bricks and mortar”.

## University as Model, University as Researcher

There is a real value in an ability of the land grant university college of agriculture to model its activity in agriculture in such a way that is realistic to the working farmers of the state. Such is important for credibility. However, that same land grant college of agriculture also has a responsibility in research which may put it at odds with a modeling role. The modeling role is perhaps best conducted with low capital input technique such as grazing techniques and systems. It may be least realistic in high capital-intensive activity such as expensive milking parlors which have the capability to generate a lot of precise data electronically, useful for research but far too expensive for the average dairy farmer. While the modeling function may thus be limited in some areas of land grant sustainable agriculture research activity, it is important for land grant faculty and deans to give care to weighing these two considerations for an optimum outcome.

## II. Land Grants in New England

In his recent article “Three Simple Questions”, prairie writer Jerry Glover writes in *The Land Report* of the Great Plains as transitioning “from a sustainable economy based on native grass to a doomed one based on extraction”. And he asks us, in consideration of a long-term strategy for living sustainably in his region, the High Plains, three simple questions: “What was here? What was required of us here? And what will Nature help us do here?” New England is not the land of stark contrast which marks the Great Plains. But New England has experienced such a transition from a native grass base (pasture, a sustainable economy), to an industrial base (textile mills), to a cheap energy-driven extractive service economy which produces little of its own food and few of its own necessities, a totally unsustainable economy of both food and energy insecurity. And New Englanders can be said to face the same three questions:

- What was here? (Answer: Woodland, field and pasture, rock and marsh.)
- What was required of us here? (Answer: Sustainable forestry, crop production, and a sustainable form of grass-based animal agriculture.)
- And what will Nature help us do here? (Answer: Make wood products and fuel. Grow crops sustainably. Convert grass to milk and to many other dairy products. And convert that same grass to meat, eggs, wool and other animal products.)

These three questions revolve around a central organizing theme: “here”. The questions are the hallmark of one of the nation’s premiere institutions of sustainable agriculture, the Land Institute in Salina, Kansas. And they should be the hallmark of all land grant universities. It all starts here, in this place, in the locale, in the neighborhood – the international and global reach of such institutions starts at home and it starts on the land. The notion that “All politics is local” is superceded by the broader reality that all is inevitably local. Local is the starting point – a good lesson for our land grants.

A particular land grant university challenge for New England might well be a reconsideration of Aldo Leopold’s conservation ethics focused on land health as a central organizing principle. New Englanders know that their region is a land of forests. But they have forgotten that theirs, too, is a land of pastures and grazing. Herein lies the secret of New England’s food production, of New Englanders feeding themselves to a much greater extent. Protecting the capacity of New England to feed and care for itself, protecting the region’s resource security and independence, and mapping and organizing its ability to do so, can and should be a prime goal of its land grant universities, their colleges of agriculture and agricultural experiment stations, their departments of natural resources. While doing all of this, we are developing a local and regional sustainable economy.

## On Collaboration in Sustainable Agriculture in the New England Land Grants

The small land grant institutions of the New England states have much to gain from mutual collaboration in sustainable agriculture. The people of New England will be the beneficiaries.

The developing collaboration between the University of New Hampshire (UNH) and the University of Maine (UMO) on organic dairy research is an important case in point. UMO tried unsuccessfully to secure funding support for a major long-term dairy forage project in order to better serve that state's ever-growing organic dairy industry. The lack of a certified organic herd at the university itself worked against the university's prospects. When the land grant university just next door, UNH, decided to establish an organic dairy herd, a door opened for Maine, initiating a bi-state, bi-university collaboration. This collaboration, for purposes of securing one research grant, now shows strong promise of expansion into other areas of organic and sustainable agriculture. Maine has much to offer, given its nearly twenty year-old undergraduate major in sustainable agriculture; its unique relationship, contractual and otherwise, with the Maine Organic Farmers and Gardeners Association (MOFGA), and its important research on crop/animal on-farm integration, an integration which is crucial for agricultural sustainability. In addition to its organic dairy herd and its expertise in dairy animal nutrition, UNH has market resources to offer, given its location near major New England population centers.

The University of Massachusetts (UMASS), at Amherst in the agriculturally rich Connecticut Valley, is presently contemplating establishment of a New England Pasture Research Center, and a commitment to grass farming and pasture grazing in the region. Given historical state rivalries, there is sensitivity between and among these states and their universities. Such has promoted an assurance from UMASS to UNH and UMO that they do not wish to duplicate the work of the latter two universities. A nice gesture but, given the nature of ecological sustainable agriculture, it is not a necessary gesture. A basic premise of this kind of agriculture is that all places are local places, all places differ from one another, and the genius of the land requires the duplication which UMASS has sought to avoid. In this way of thinking, one size never fits all. If we are to consult the "genius of the place", to use agricultural scientist and sustainable agriculturist Wes Jackson's phrase, then we must recognize that duplication, that is, the unnecessary or wasteful kind, is not possible and we need not worry about it: grass and grazing studies must be carried out in each different place, as is the case for all organic and low-input and ecological agriculture. Duplication aside, there will still be ample opportunity for considerable collaboration between and among these institutions. UMass should continue on its path and, as well, seek full collaboration with its neighbors. And the University of Vermont (UVM) should expand its current collaboration with Maine and include both UNH and UMass.

The small New England land grant universities of Rhode Island and Connecticut, although not the focus of this study, will likewise find ample opportunity to collaborate with their northerly neighbors, to the benefit of all New Englanders.

## Finding the Land

Land grant universities in the Northeast should not encounter overwhelming difficulties in finding the land upon which to conduct work in the practice of sustainable agriculture. This includes especially the animal and rotational grazing aspect of that practice. Leaders in the intensive rotational grazing movement, including Joel Salatin of Virginia and Bill Murphy of Vermont, make three things quite clear:

1. Less acreage is needed than is often thought to be the case when one thinks of grazing – this is due to the nature of the movable paddock system and the rotation of the land, including the rotation of species upon the land;
2. Grazing pasture can be created through judicious use of the animals – the animals don't take from the pasture as much as they give to it, if land and animals are properly managed;
3. Pasture land can be restored and can be created from other conditions and uses, including woodland.

Soil scientists indicate that a wide variety of New England soils, including stony rocky soils, can support grazing. And advocates and practitioners of this form of animal agriculture report, as mentioned, the ability of even seemingly poor sites to be both restored and converted over time to suitable sites for this kind of activity and for the production of animal products.

On the crop side, while tillable land with good productive soils is at a premium in the Northeast, especially in New England, the sustainable practices of intensive production, including raised bed, double-digging, and various European intensive cropping techniques, all ecological in nature as well as low in both energy and capital inputs, are available. None of these systems is land intensive (albeit they are management and labor intensive). High integration of animal and crop systems further permits practice on smaller pieces of land.

Land fragmentation for animal agriculture is somewhat more problematic in the region. Where usable pieces of land are close but separated by roads, our society needs to be taught the value of walking livestock over the roads – the local culture needs to change to accommodate that practice, as the practice would have been accommodated in the past. The production of local food, and the practice needed to sustain it, is simply too important to permit foolish and unnecessary barriers to prevail. Efforts need to be made to consolidate land as much as possible in support of animal agriculture. Motorized transport of animals is wasteful and not practical, and could well be detrimental to the health of the animal. It is also increasingly expensive.

As agricultural scientists retire and are not replaced by other agricultural scientists on land grant faculties, due to eliminated budget lines or other priorities, their research sites on university farmlands are abandoned, and competition for competing uses are reduced. At least some of this newly freed acreage is available on land grant campuses for grazing and other purposes in sustainable agriculture. Under-utilized university farmland needs to be put to full use.

The Northeast land grants, having witnessed declining agriculture in their region and a concomitant decline in their own agricultural programs, are sometimes plagued by a lack of vision and imagination, and a “can’t do” attitude. Such an attitude can insure a “can’t do” result. No change for the better, no improvement, only utter stagnation can be the consequence.

## **Finding the People**

Land grant universities, especially in the Northeast, have lost much of their specialized agricultural expertise with individual crop and animal types. Affected are specialists in poultry, sheep, goats, pigs, small grains, grains in general, and sometimes agronomists, soil scientists, and plant and animal scientists more generally. This results from retirement, resignation and death of specialists in these areas over recent decades and failure to replace them. In some cases, positions have been eliminated outright. In other cases, positions have been converted within the land grant colleges of agriculture to molecular biology, genetic engineering, and related non-agricultural scientific areas. This loss of agricultural specialists mirrors the general loss of farms and the decline of conventional agriculture across the region over recent decades. To some extent this represents a loss of industrial model conventional agricultural values, values which would likely have precluded movement toward the ecological agrarian value system reflected in this publication. All of this comes at a time when it is reported by MOFGA that Maine now has an excess of potential farmers over available land.

The current growth of new more alternative small-scale farming across the Northeast region is increasing the demand for a return of agricultural specialties in the land grants and in their associated Cooperative Extension Systems. Current budgets do not permit the simple hiring of new personnel with such expertise. What land grant university administrators and faculty must now do is search from among their still active personnel, particularly older personnel, the presence of earlier established expertise among those employees. They must seek out possibilities and any enthusiasm extant among younger employees who might begin some work in these areas, work propelled by their personal interest and excitement. They must scour their Extension programs for personnel both at the land grant campus (their headquarters) and in the counties for such expertise and/or interest in developing that expertise. They must seek the assistance of their available and interested retirees.

They must seek the talents and interest of their students, graduate and undergraduate. They must seek the interest and assistance of federal and state agricultural personnel living and working in their region who might be willing to participate, including those who can become formally housed at the land grant university.

Each land grant institution will need to cobble together area specialists and interested parties to support the maximization of species diversity in their own teaching and research farm programs. In doing so, they will likely secure some support and assistance with a range of animals and crops (particularly forage and grain) which will be a positive development in support of needed agricultural diversity. In time, the land grants (and Cooperative Extension) will reinvigorate their ability to be an active player in the new agriculture.

## **Credibility and the Land Grants**

How can land grant universities have credibility in sustainable agriculture, or in organic agriculture, with little to no experience with these philosophies or with the practices which ensue therefrom? Land grants which practice animal confinement do not have credibility with graziers and grass farmers, as we saw with the Wisconsin experience described above. Land grants which can't provide for any of their own food are likely to face a limit to their credibility when it comes to broader aspects of sustainable agriculture. There is a sizable gap between the land grant universities' zero experience with organic philosophy and practice and the norms, the standards, the requirements, the expectations of those with twenty to thirty years' of experience in organic systems, most of whom are outside the land grant system. Step number one for these institutions is to realize and understand their predicament, and then take necessary remedial steps.

## **III. The UNH Story**

Organics and grass appear to represent UNH's farm and food future. That being said, it is the mission of the University of New Hampshire, as it is that of all land grant universities, to teach both enrolled students, undergraduate and graduate, and the society as a whole; to conduct research for the betterment of society; and to provide public service directly to the state and nation. In order to perform these tasks, it must also conduct a sizable on-campus support mission in support of its nearly 13,000 students and several thousand employees. The university must also manage its lands, its buildings and all of its physical resources and infrastructure. To some extent, roles merge, as we now understand that how the institution conducts itself, how it manages its resources, is also a form of pedagogy, of teaching, both of its own students and the general public. (This is now expressed at UNH with the acronym CORE, which stands for Curriculum, Operations, Research and Engagement, the new element being the operation of the institution.) Naturally, the institution's credibility before students and the public is related to its conduct, to the way it does things, to its daily practice. Earlier, we saw a dramatic example of this, as the University of Wisconsin lost credibility with some number of its state's farmers once it attempted to teach one philosophy and practice, livestock grazing, while itself rigidly practicing only its opposite, animal confinement. Farmers concluded, quite correctly, that they, as graziers, were in a position to teach the university, not the reverse.

UNH has come to the understanding that practice is pedagogy, that the way the institution organizes itself and operates on a day-to-day basis teaches, for better or for worse. It teaches the students, it teaches the general public. That daily operation and practice bears witness in a credible way every day. At UNH, it is the University Office of Sustainability (UOS) which has led the charge in teaching the university of the pedagogical power, the teaching power, of its own practice.

A formidable example, something done every day, is the provision of food to the on-campus community. Between September and May, UNH serves 55,000 to 60,000 meals per week. That is a lot of food! And with the advent very soon of a higher percentage of UNH students living on campus, that meals per week figure will climb. Until recently, almost none of this vast amount of food was produced from on-campus, or even from local sources. Today, a very small amount originates from the new student-operated and certified Campus

Community Organic Garden (though the effect on the students and the university community far exceeds that small amount of food) and still little comes from local farmers (although that is increasing, much to the credit of University Hospitality Services).

It is said that the way any of us, as individuals, can most significantly affect the environment is through our eating choices, choices we make multiple times every day. Similarly, when major institutions make choices involving 55,000 meals or more per week, the impact is obvious. It becomes a question of shifting purchasing orders, and the money behind them. Even if the shift is small, that small alteration can have important (and positive) repercussions for local agriculture, for small-scale farms and farmers, for regional land use, for open space, and even for reduction of sprawl. If the institution in question is in a rural or agricultural area, these effects will be felt close to home. If the institution is more removed from immediate agricultural sources, the effects are felt more broadly and somewhat more distantly across the region.

UNH's University Hospitality Services, the provider of those 55,000 meals per week at the university, is starting with organic greens and mixed vegetables from the Campus Community Organic Farm. It has expanded into eggs, cage-free, from a New Hampshire farmer. This supplies the on-campus demand for "shell eggs" (in contrast to liquid eggs, which is the form in which most eggs arrive on campus).

Such a development could readily lead to demand for a larger conversion both to free range and organic "shell eggs" in the university dining facilities. Business opportunity for local farmers in the region would obviously be the result. A sizable poultry increase in the region could well lead to broilers, to a meat supply of local poultry, chickens and turkeys, free range, pastured and organic. From baby steps far bigger steps can evolve.

## **Baby Steps All Around Us**

I have a colleague who works in the Office of Sustainability at UNH. She often stresses the importance of taking "baby steps". Baby steps, being small, are far too readily discounted as having little importance. But symbols are important. And baby steps are clearly symbolic. In addition, baby steps, as small as they are, are concrete measures, rather than abstractions, and they clearly indicate a direction. Being concrete and visual rather than abstract, as are ideas and words, they help people to have a vision. And they are actions in the right direction. The American song writer, Stephen Sondheim, has written "A dream is just a vision, if it's only in your head. Having just a vision's no solution, everything depends on execution. The art of making art is putting it together." (2) The French pointillist painter, Georges Seurat, as characterized by playwright Sondheim in his production of *Sunday in the Park with George*, tells us that the dream, the mental vision, is not sufficient. Realization is necessary. The "baby step" may be modest but it is the beginning of that very necessary realization. With that realization, many more can be helped to see, to envision, to understand. Change results.

Where baby steps become problematic is when they are used as an excuse for not doing something more substantial. They can salve one's conscience and give people a "feel good" feeling, and yet be much ado about very little. Sometimes they are even used to insure that truly significant measures will not be taken. They can readily become tokenism by those who would take credit for them and use that as an excuse to avoid doing anything more. Such people often do not want change, do not want anything more to happen. At least we are moving in the right direction, they will say. True enough, perhaps, but harmful when used as an excuse to do nothing more. Recycling in the home, turning off the lights, token grazing of largely confinement animals, are all steps in the right direction in terms of ecological and environmental concern and sustainability. But they can be used to erode support for truly achieving something. Thus, such steps can get in the way. Witnesses, therefore, to such baby steps need to be clearly informed that they are, indeed, only the beginning, a means to a greater end, and not an end in themselves. With that, such steps can do their job of assisting people to see, to envision, so that support may be engendered for doing that of greater significance which needs to be done. Going beyond those baby steps, and making serious effort to do so, is the proof of the pudding. Caution, therefore, is advised when boasting too much of baby accomplishments.



## The Campus Community Organic Garden

This section began with a reference to organics and grass as being associated with UNH's farm and food destiny. The initial steps in these directions at UNH may be baby steps, but will not be baby steps for long. The story begins with the College of Life Sciences and Agriculture's decision, with the help of the UNH Office of Sustainability, to encourage the development of a student Organic Gardening Club. In a very short time, in a matter of months, this club had over one hundred members, making it the second largest student organization on campus. The College then designated a twenty acre grassy meadow close to the campus core, and a site prominent along the campus' western gateway, for use as the garden. Simultaneously, the College sought and achieved from the New Hampshire Department of Agriculture, the state's organic certifier, the necessary organic certification. Shortly thereafter, the on-campus dining arm of the university, the University Hospitality Services, informed the student organization of its desire to provide an on-campus food source to supplement its menu. Walking its talk, UHS very quickly cut a check and provided a generous cash advance to the student Organic Gardening Club to provide organic mixed greens and vegetables for the campus dining halls at any time later in the year when it was able to do so. And the No. 2 person at UHS joined the Advisory Committee supporting and overseeing the student organization and, as well, the newly certified Campus Community Organic Garden.

Students working in the UNH Organic Garden are enthusiastic about learning to grow organic vegetables and selling them to the dining halls where they feed their fellow students. From this project the students have learned not only how to grow vegetables but leadership skills, business skills, gardening skills, and the knowledge of biology and ecology that lie behind those skills.

## Early Planning for the Organic Dairy

Given the fame of UNH's organic dairy, the nation's first at a land grant university, it may be of interest to the reader to gain a sense of what transpired at UNH in the early stages of the thinking about the development of the organic dairy.

A major initiative toward sustainable agriculture at UNH was the decision of the College of Life Sciences and Agriculture (COLSA) and the University Office of Sustainability (UOS) to establish an organic dairy. (See Chapter Five for further detail.) The thinking at one point was to convert half of the university's conventional Holstein herd to organic, and house both herds on the same site. Financial assistance was received from New Hampshire's Stonyfield Farm, a locally based and now an internationally prominent yogurt manufacturer, to partially fund the establishment of this new organic herd. Part of the agreement was based on the university's willingness to not only provide some certified organic milk for its own needs but also offer to sell such milk to Stonyfield Farm (within the normal bidding processes), and to do so in a time of demand surplus and supply shortage of organic milk in the region. (At the time, demand was running 20% ahead of supply - this demand/supply imbalance will continue indefinitely.) Such guaranteed market will, in turn, guarantee the university a monetary return on its new herd, in addition to, at some point, an on-campus organic milk supply and a herd available for research to assist the increasing number of certified organic dairies in the region. (It is ironic that Stonyfield, a three decades-old New Hampshire firm, has never been able to obtain a supply of organic milk from New Hampshire sources, and has had to rely on the neighboring states of Vermont and Maine for much of its own supply. A New Hampshire supply has been a long-sought goal for the company.)

### INSTITUTIONAL SUPPORT

**As an undergraduate student of mine, who is also a native of Durham and an excited proponent of the UNH organic dairy, recently wrote, "What is needed is institutional support for a simple connection, the connection of the dairy to the fact that we need organic milk (on campus as well as off), and thus we need models of such sustainable agriculture". By "institutional support" is not meant money alone. What is needed is moral support, and that moral support is exercised first and foremost by full and unequivocal institutional support for the health and well-being of the organic dairy.**

The UNH interest in organic dairy has also spurred the university's interest in grass farming and grazing, agricultural activities that have become foreign to the UNH College of Agriculture, and to most other land grant agriculture colleges, in modern times. The high cost of certified organic feeds encourages these grazing efforts, in addition to growing interest in intensive rotational grazing techniques, per se. At long last, UNH and other land grants are breaking with their earlier decision to exclusively go the animal confinement route.

In the early stage of the planning process for the organic dairy, the search was on at UNH for the assemblage of adequate pasture contiguous to or within reasonable herding distance of the university's Fairchild Dairy Research Center, the principle dairy facility and then the only milking parlor at the university. While pasture was available on at least two other UNH research farms in the area, neither of these farms had a milking facility. These farms, Burley/Demeritt and Kingman, could be used to house and graze a herd of calves not yet started into milking, but funding did not initially exist to construct milking parlors at either farm. Thus, the combination of housing, grazing and milking at the Fairchild Center on the main campus was originally seen as the option which worked. It was and continues to be the most visible locale for educational purposes, and one which is very close to the student body. The challenge was, therefore, to locate adequate nearby grazing pasture. Moore Fields, corn and silage acreage, is close to the Dairy Center, and was briefly considered, but it lies across a major thoroughfare, necessitating an expensive tunnel under the road if cattle were to be moved. For that reason, Moore Fields would better serve as a source for forage production than for grazing.

However, it had been determined that about 35 acres of grazing land could be designated which is contiguous to or very close to the Dairy Center. This includes some woodland in need of conversion to pasture, offering an opportunity to conduct experimentation on such conversion, using animals in service to the conversion. (This technique, generally involving pigs and possibly goats, sheep, beef cattle, dairy cattle and poultry, in that order, provide a steady product of meat protein at the same time that it converts the land. This procedure is described in greater detail elsewhere in this book.) The idea of such conversion through the service of animals is very low energy and has low capital intensity, is highly ecological, avoids the soil compaction and destruction associated with heavy equipment, and provides an excellent opportunity for research in sustainable and ecological agriculture. As a practical technique, it has much to offer at very low investment. It appeared that UNH could locate sufficient pasture acreage at that site to support an organic dairy herd of 35 to 40 cows.

## **The Issue of Organic Forage**

New England's climate means perhaps half a year of non-grazing. So it was early recognized that this period needed to be covered through organic forage, both that grown on university land and perhaps some purchased from nearby farms. And there is likely need for some feed supplementation from organic grains.

Basic ecological and sustainability principles dictate that this certified organic grain should come from a source as nearby as possible. Very little such grain is grown in New England today. In comparison, a considerable amount is now grown in Quebec and the Maritimes, with government subsidy. This can be a good local source for New England until such time as New England grain producers themselves get up and running. (In this regard, Maine, especially Aroostook County in northern Maine, and parts of Vermont, offer the best opportunities.) Central and western New York and Pennsylvania have grain production potential but are farther away. The U.S. Midwest and the Canadian Prairies, both very large grain producers, are sufficiently distant as to require very unsustainable fossil fuel-based long distance transport. A disadvantage with the nearby supply in Canada is the question of government subsidy and the uneven playing field it creates, a clear disadvantage for Americans, including New England farmers. Thus, attention must be paid to developing our own homegrown New England supply, and as soon as possible. Quebec, therefore, may do in the interim until a shift can be made to New England's own production.

In the final analysis, this near-in on-campus site was not chosen for the organic dairy, but we learned something about other pasture possibility, including a potential for multispecies grazing and woodland-to-pasture conversion.

## On Doing “Due Diligence” on University Organic Farms

To protect the integrity of the university’s organic dairy and other organic farms, and to avoid external negative consequences, due diligence must be performed in university operations. As one who has worked for some years in ecological ethics and values, including land ethics and agricultural and food ethics, I know that the risk of serious problems and threats to the university’s organic certification on its farms increases substantially if the university hires as farm staff individuals without real organic experience, and thus without experience with the organic mindset and the value system which goes with it. It is incumbent on any search committee seeking to hire organic farm staff and/or faculty to bring in for interview and seriously consider only candidates with such organic experience. Not only is the risk of problems greater with those without such experience but, more importantly, the university faces risk of exposure to serious problems with donors, major and otherwise; with contractors for its organic product; and with its public image in the state or nation, should a mistake occur. This is especially so if the university has not done due diligence by hiring personnel with the necessary organic experience. While mistakes happen, and anyone can err, if a mistake has been made because due diligence has not been performed, the consequences are much more serious.

How might the university protect itself? There are at least three ways:

- Be sure to have clear and substantial organic experience/organic commitment represented on the Search Committees for personnel and in the personnel hired (and, for practical purposes, grazing experience);
- Consider for interview for the position only those with organic experience or demonstrated organic commitment;
- Establish a permanent external advisory committee to the organic farms which is composed primarily of those with organic experience.

All of these measures will protect the university and its valuable relationship with donors, with the contract recipients of its products, and with the public. Any university organic operation will be closely watched across the region. It is easy to find university dairy and other animal and plant science and farming personnel, faculty and staff, with significant academic agricultural science experience and/or farming experience. It is quite a different matter to secure personnel with substantial experience in organic agriculture. But this challenge must be overcome or serious problems may well ensue.

## Some Arguments Supporting Establishment of an Organic Herd

Significantly supporting the establishment of an organic dairy herd at UNH are:

- The substantial need for research on organic systems, given the dearth of such research in the past and given the need to compare what is being done today in organic vs. what could be done if we had more answers to organic research questions, including the question, “What would organic look like if it had the support of systematic science?”;
- the unique environmental conservation opportunity presented in New Hampshire to integrate land grant organic animal efforts with the significant area land-holdings of the Society for the Protection of New Hampshire Forests (SPNHF), the Nature Conservancy and the Audubon Society of New Hampshire (ASNH), especially where the interests of field-nesting bird habitat can be protected, maintained and even restored in conjunction with organic agriculture; and, as well, the ground-breaking idea that these highly respected conservation organizations will develop a desire to acquire farmland and keep it in ecological agriculture, if organic; and
- the increasing market demand for organic milk, for example, such as to cause Dairy Marketing Services (DMS), a New York firm, to aggressively push the state of New York, including both state agencies and

Cornell Cooperative Extension, to significantly increase organic milk production – this effort includes pressure on Cornell and other units of the State University of New York System to conduct organic dairy research – organic is clearly the right economic direction for the region.

These are among the arguments which swirled around the organic dairy debate at UNH in the early stages.

## **The Dean's Three Choices**

If UNH was intent on becoming the first land grant university in the United States to support an organic dairy herd and facility, and indeed it was, then the Dean of the College of Agriculture was faced with a choice of three options:

1. Convert the entire herd to organic and not support a conventional herd;
2. Convert half the herd to organic, maintaining half conventional, and use a shared milking parlor and barn;
3. Establish a whole new and fully separate organic herd at a separate location, while maintaining the conventional herd at its present site, and construct a new milking parlor and barn for the organic herd, at a cost of \$1 to \$1.5 million.

There were also other decisions to be made, including whether or not to purchase a herd of organic Jerseys and replace half the conventional herd of Holsteins with the Jerseys, or, alternatively, to simply convert half the present herd of conventional Holsteins to organic. But the immediate task at hand, and the most basic and significant one, was to choose from among the three choices above.

Option #1 was tempting on a number of counts. It represented a strong statement, the most dramatic statement that could be made, and would gain the university much recognition and notoriety. It was a progressive and future-oriented move. It was also an inexpensive way to go, since the present dairy facility would become totally available – no need for a new barn or a second milking parlor.

A downside of Option #1 was the uncertain response from conventional dairy farmers and their organizations around the state. A further disadvantage was the inability to conduct research on the conventional herd. Finally, there are a small number of dairy science majors presently working with the conventional herd, some of whom might not wish to or be able to switch over to organic dairy work. This, of course, is a temporary situation, as incoming students would start with the organic herd, a circumstance similar to the closure of any existing academic program and the initiation of any new academic program. Finally, the majority of dairy science faculty wanted both programs to be maintained simultaneously, and opposed conversion of the entire herd to organic.

Option #2, the option with the least support, offered the advantage of having both conventional and organic herds, and at a low cost, given shared facilities. In a way, this was the cheap alternative, but it had high risk of contamination, a nightmare for the farm management staff, and, potentially, a nightmare for both the university and its financial supporter and product customer, Stonyfield Farm. Neither the university nor Stonyfield could afford the bad publicity that would ensue from a contamination incident, should the organic milk supply become compromised. Such could easily happen with a cleaning accident or failure in the barn or milking parlor. Staff must be highly skilled and always alert – a high expectation.

Option #3 yielded the advantage of Option #2, two herds representing both organic and conventional methods, but separated from one another and not subject to the threat of contamination. Each herd would have its own set of facilities, and students and researchers would have both herds at their disposal. However, the disadvantage of Option #3 was substantial: a price tag of well over one million dollars, and possibly as much as a million and a half. This price tag came at a time when the financial condition of the university's College of Agriculture was precarious; when there were only a very small number of dairy science majors being served; and when not too many years had passed since the university constructed a major dairy facility on its campus. The prospect for convincing the university's Board of Trustees, the UNH central administration, and the state's public and

politicians that such an expenditure would be a worthwhile endeavor appeared daunting. Option # 3 was the least certain of the options, barring identification of a significant external monetary source.

The Dean made the boldest choice and Option #3 was selected, on the assumption that it would be possible to attract sufficient donors to support this option and its infrastructural cost. That assumption turned out to be correct, thanks to the hard work of UNH faculty and staff, including particularly the UNH Foundation, the university's fund-raising arm, as well as the University Office of Sustainability.

## **UNH's Food Security**

When we step back a little and gain some perspective on what we are doing at UNH relative to sustainability, agriculture, food in the dining halls, our university lands, campus community organic farm and organic dairy, and the education to be derived from all of this; and when we begin to realize that we serve those nearly 60,000 meals on our campus each week September to May, and perhaps 15,000 or more per week in summer, common sense begins to tell us something. What it tells us is that the University Office of Sustainability, the College of Life Sciences and Agriculture and University Hospitality Services should all focus on deriving as much food as possible, vegetables and greens, meat and dairy and eggs, and, as well, fruit, from on-campus sources, and from university lands in the immediate area, supplemented by the product of New Hampshire and area local farmers. Could we reach the figure of covering 10%? 20%? even 25% or more of our own food needs? Any serious commitment to sustainability, to agriculture, to nutrition, to good use of our campus to help us perform our central mission of education begs the question: How can we not do this? We should keep that figure in mind and not lose sight of it: 60,000 Meals Per Week!

Organic methods. Ecological methods. Grass-based pasture agriculture. All three are educationally important, nutritionally necessary, and contain low capital and low energy input. And if our students are to learn, they must be part of the picture. They must not see themselves as mere consumers. They (i.e., those who so desire) can be producers in this process as well. It wouldn't take many of them to provide for significant on-campus food production, as long as we use our lands well and provide good guidance and leadership.

It starts with a partnership between OSP, COLSA and UHS. It takes off from that starting point. Together we can reduce the outflow of some of that money our students spend each semester on meal plans. Why not keep that revenue here on campus and in the area?

## **Pasture Poultry and Other Pasture and Organic Opportunities**

UNH organic opportunities go beyond greens, mixed vegetables and dairy. At so many meals per week served on campus, UNH serves up a lot of eggs. Currently a high proportion of these eggs arrive in liquid form. But there is still a substantial demand for "shell eggs", as they are called. UNH's own hens once provided this supply. There is no reason why UNH (and other land grants), using pasture grazing and organic techniques, can't do this again, at least to fulfill some proportion of the need. UNH certainly has a big tradition in poultry science. Poultry facilities and poultry expertise exist on campus. The market for local free range organic eggs is there. It's a question of organization and the will to do it. Organic poultry, of course, has a dependence on organic feed grain, although this dependence can be reduced by as much as 30% through pasture poultry production techniques, techniques which also lead to improved pastures for ruminants. (Thus, pasturing poultry provides a subsidy for milk, beef and sheep production.) But on-campus layers can also take advantage of the on-campus need for organic grain for cattle. The bulk ordering which results brings down the price for both. Such bulk need also increases the incentive for the university to use its own land for a portion of its own grain production, and possibly to lease nearby farm land for some supplemental organic grain production. Each element of organic agriculture thus serves each other element, as it should do in a diverse ecological system.

Further possibilities exist at UNH for organic sheep and organic pork production. Likewise, organic meat and dairy goats are possibilities, all grass-based. Agro-forestry can also be incorporated into the mix. On-farm

biodiversity is a watch-word of ecological and sustainable agriculture. UNH, and likely all the New England land grants to a greater or lesser degree, have potential and have opportunities in this area. Sufficient vision and the will to follow through is what is needed. University research should never be limited to the study of what is. It must reach out to what can be. In that way, society will be well served.

#### **IV. The University Farms: Hidden Resource of the Land Grants**

UNH possesses about 1100 acres of farmland and woodland within only six miles of the Durham campus, and easily accessible to all faculty, staff, and, importantly, to all students who can value from such access. Focus here is on UNH's university farmlands.

A critical element in the land grant university role in sustainable agriculture in the New England states is university farms. There are about twenty such university farms among the four states. They include seven in Maine, seven in New Hampshire, four in Vermont, and two in Massachusetts. (These will be described in a further volume.) The Universities of Rhode Island and Connecticut also have university farms.

Formerly well utilized for conventional scientific research experimentation in field crops, horticulture, pomoculture and animal science/animal husbandry, these farms are underutilized today. Use for crops and horticulture involves less and less acreage as the years go by, and fewer livestock species and smaller numbers of farm animals are now housed on the university farms. Grazing animals have largely disappeared, and some of the pastures are being let go for conversion by nature to scrub vegetation and woodland. Some of the former pasture lands are being kept open by hay and forage crop cultivation to feed what remains of the dairy and other animal herds and flocks.

All of the above spells opportunity for sustainable agriculture, including organic agriculture research and practice, provided the farms are not lost to other non-agricultural university purposes or disposed of for sale. Underutilization can invite such problems.

The purpose of these farms relates to all three elements of the land grant mission: research (both Agricultural Experiment Station and other research), teaching, and extension, as the research and demonstration value of these farms benefits the outreach and public education role of Cooperative Extension. Importantly, there is also a role for university farms for the production of food, specifically the production of food for the campus community, and particularly for use in the dining halls. The earlier history of the land grant universities included this role for the farms.

Increasing space available on these farms, especially for intensive rotational grazing of many different animal species, for the production of organic forage and grain crops in place of expensive purchase of organic feed, for the sheltering of farm animals (and the milking of ruminants), for organic and other low energy input crops, fruit and even agro-forestry, all create research and teaching opportunity in the direction of food sustainability. These farms offer more opportunity today than they have ever offered in their entire history – and they provide the foundation for the land grant university thrust into an entirely new direction: that of grass-based agriculture and organic agriculture. They also represent opportunity for long-term research, long-term field trials, and collaborative research between and among the region's land grants, given that the distances between these universities is not great. The university farms also bring to the fore the scientific credibility that these public land grant universities represent (or, at their best, should represent, albeit they have been criticized for not always doing so). Extension outreach carries this credibility from those farms to the public.

Among the greatest value of these farms is, however, their location, which is closely proximate to the student body of each of these public universities, especially at UNH. This means many things:

- easy availability of these farms and farm animals as teaching tools by the faculty during and supplemental to class times;
- the conduct of undergraduate research and research opportunity since the undergraduate students have easy access by a short drive, by cycling, and sometimes, as at UNH, even by walking;

- utilization by undergraduate student organizations, groups which contain many students who are not enrolled in agricultural majors, including UNH's Organic Gardening Club (at 120 members the second largest student organization on campus), students involved with UMO's Black Bear Community Farm and UVM's Common Ground Community Farm, U Mass's farms, and other such organizations;
- the opportunity for establishment of Organic Campus Community Gardens which can produce food for the campus dining halls and other campus eating facilities, CSAs (community-supported agriculture projects), for on-campus and near-campus farmstands, and for local area farmers markets, sometimes paying for themselves (and, as well, creating summer jobs and income for students) from the proceeds of the sales. (UNH's model supports the dining halls and dining hall revenue is paid out to the students, while UVM's and UMO's model depends more on CSA, farmers market and farmstand income);
- countless other opportunities that will present themselves, as long as these university farms are retained and available and as long as the space exists.

By far the most important of these farms will be those that are closest to the main campus of their respective universities, as these offer tremendous daily and regular accessibility to undergraduate students, graduate students, teaching faculty and other university staff (including dining halls), in addition to the researchers. Such close-in university farms also benefit greatly from being seen, being witnessed constantly every day by a large number of people. They are up-front at all times, as is the statement they make, the message they send. And they lend themselves to the opportunity for substantive and highly artistic well designed signage which welcomes the inquiring mind to learn more. Indeed, while all university farms must tell their story to the entire university community and to the general public, through good signage, stimulating brochures with good graphic design, perhaps through video methods, perhaps through the production of recipes, it is especially the responsibility of nearby highly visible university farms to allocate resources and to take this matter of communication very seriously. Pride must be engendered across the entire university community and local public if the role of the university farms is to be made secure and their responsibility consummated.

## Hidden Beauties: The University Farms of Durham, Lee and Madbury

Nestled within just a small radius of the beautiful University of New Hampshire campus in Durham lay five less well known beauties: rare cropland, and pasture even rarer, as southeastern New Hampshire experiences some of the fastest growth rates in the northeastern United States.

Starting on the main campus itself, one finds the Woodman Farm, centuries old farmland occupied by the Woodman Family buried in the little cemetery on the site. Soil augers drilled into the surrounding relatively undisturbed woodlands reveal the long history of agriculture here, from pre-Civil War Merino sheep pastures to post-Civil War mixed crop and livestock usage, up to the present-day Woodman Horticulture Farm of UNH. The entrance to this farm is lined with pastures, fields and forage croplands associated with the UNH Fairchild Dairy Science Research Center and the UNH Equine Program (and, as well, the space-age UNH Astronomical Observatory in the midst of a pasture beside a pond)

**Prof. Charles Schwab, UNH animal scientist and dairy nutrition specialist, says "There's a difference between having an organic dairy herd and having an organic dairy farm". The farm, in other words, involves much more than the cows.**

Woodman Farm, 155 acres in size and surrounded by thick woodlands and wetlands, shows signs of the recent contraction of agricultural research and teaching at this as at so many other land grants: the experimental research plots of horticulture professors now retired whose positions were not replaced. This means that more land is becoming available for other agricultural purposes, including sustainable, ecological and organic trials and experiments in service to that growing community in the state. (Very recently some of this "abandoned"

land is coming back into production with new research plots.) Most of the rest of Woodman Farm is currently devoted to fruit and vegetables. Woodman Farm also hosts UNH's first biodiesel processing facility, an entity largely designed to serve agriculture (as well as future campus transportation fuel needs).

Moving a short three miles away from campus to the adjacent town of Madbury, one encounters the Kingman Farm, a dairy support (forage crop) farm now better known for its much talked about compost experimentation. The production of compost is critical to sustainable agriculture, organic and otherwise. What makes the compost work at Kingman particularly important is its usage of both campus food waste (from the 60,000 meals per week served in the school year) and the waste produce of Durham's principle grocery, Durham Marketplace. In addition to a campus use of this compost, there is the retail sale of bagged compost labeled affectionately "U-Doo". The Kingman Farm also supports oil plants (sunflowers) for biodiesel research.

**Overheard on a recent tour of the UNH Organic Dairy, coming from amidst a group of visiting land grant university researchers from out-of-state:**

**"I don't know how these (UNH) New Hampshire people do so much with so little!"**

**The speaker was responding to the fact that New Hampshire public budgets, including the university's budget, are exceedingly sparse. As a long-term New Hampshire resident, my response is "Why of course. That's the New Hampshire way!" And, indeed, it is the way things are done in New Hampshire, perhaps the most frugal of American states. Be that as it may, very significant progress has been made at UNH to support the notion of a coming agricultural renaissance in the state and region.**

**Faculty and staff of land grant colleges of agriculture, nationwide in my view, are, on average, exceptionally loyal, long-term, and highly dedicated personnel, who operate on limited compensation and budgets. I have seen such spirit and dedication in my own experience at UNH's College of Agriculture, particularly surrounding the recent renaissance of agriculture, sustainable, organic, grass-based, and, as well, allied efforts in nutrition and food systems. If I may be permitted to boast a bit, this may be the cause for the exclamation of surprise by that visiting delegation. How can so much be accomplished on so little?**

Enroute to the Town of Lee, only a mile from campus, one encounters the Moore Fields, UNH cropland devoted mainly to the production of forage for the conventional Holstein herd and to reduce the purchase of expensive imported grain. As the university moves increasingly in the direction of organic production, this acreage will become that much more important as a supplier of forage replacing very expensive imported certified organic grain for animal feed. The more food the university can grow for its own animals, the more control the university will have over both quality and price. Such on-campus production might even constitute an encouragement for local organic and would-be organic farmers.

Continuing farther down the road, a few more minutes drive and one arrives at the Bartlett-Dudley Farm and soon thereafter, the adjacent and better known Burley-Demeritt Farm. The Bartlett-Dudley Farm features pastures and scrub woodland and can be readily designated certified organic in a very short period of time (since the acreage has fallen out of use and has not experienced chemical spraying or fertilizer application for a number of years). It will support the adjacent organic dairy.

Burley-Demeritt, one of the larger university farms at 220 acres, was a bustling center of animal activity, beef cattle, sheep and pigs, up until 1990 when the university sold the animals in a period of declining interest and budgetary reduction. But the land remains available for grass-based and organic animal agriculture today. A recent delegation of pasture-grazing and organic agriculture specialists at the University of Maine visited all the UNH farms and

proclaimed Burley-Demeritt as superb for grass-based organic dairy operations, a key factor in the final decision to locate the organic dairy at that farm. The spaciousness of the farm and the very extensive upland pastures of diverse and generally high quality soils allows also for the simultaneous pursuit of other diverse grass-based and organic crop systems designed to support those animals. The farm was thought by very experienced Maine agricultural scientists to be a true gem with an excellent prospect to achieve not only UNH grass-based and organic objectives but also, quite possibly, future joint University of Maine – University of New Hampshire



organic dairy cattle and dairy forage research as well. This farm also features the historic Demeritt Farmhouse, an elegant and possibly future residence for visiting researchers to the farm, provided funding can be obtained for necessary renovation.

There are also smaller farm acreages in and near campus in Durham, including Thompson Farm.

Unlike other land grant universities in the New England region, UNH is fortunate to have high quality, beautiful and even inspiring farmland, crop and pasture, not to mention interspersed woodland, so close to its main campus and its student body. The potential role this land can play very quickly becomes enormous.

## UNH University Farms and the Raising of Revenue

The land grant university farms of UNH and other New England land grants committed to their traditional roles in research and teaching, and dependent as they have been on federal support, will soon need to seriously seek additional sources of revenue in order to maintain themselves. All of them virtually without exception can themselves generate additional revenue, while not only maintaining present levels of research and teaching but, in fact, also enhancing and enriching those traditional roles. And they can do so while at the same time integrating more fully into the life of the universities of which they are a part. All such university farms, usually located in reasonable proximity to their university campuses, with some immediately adjacent, offer, in addition to research and teaching opportunity, numerous recreational values (walking, cross-country skiing, nature study, photography, etc.). But these values are minuscule compared to the role these farms could be playing in feeding, and even fueling, the on-campus community, not the least the student body or a portion thereof. Students and student organizations can be actively involved, together with university staff, in producing food on the farms, produce, fruits, dairy, and perhaps even meat. And this food can replace some portion of externally contracted food for the campus dining systems. Not only could a revenue stream which currently exists (requiring no new funds) be partially transferred, but the excitement generated in the midst of such enterprise could be used as an effective tool for student recruitment and retention. And many of the farms are physically close enough to campus to make all of this practical. Compost made from the campus food waste is an extra resource revenue, enabling closing the circle in the campus food system.

### WOODLAND TO PASTURE: A UNH WORKING MODEL FOR CONVERSION OF UNIVERSITY WOODLAND TO PASTURE:

Following the initial site selection based on soil, water and other parameters,

1. Harvest sawlog timber and process at UNH Thompson School Sawmill.
2. Harvest remaining timber for firewood (cut, split, and market) or convert to wood chips and use at UNH or sell.
3. Introduce pigs and goats, simultaneously or separately.
4. Seed ground with corn or other treat to encourage pigs to do a more complete job of turning over the soil and rooting the ground.
5. Remove remaining stumps (an easy task) after pigs finish with the land.
6. Remove pigs and goats, use pork at UNH, and market goats (to immigrant, ethnic and prison populations, and to the public).
7. Introduce sheep for conversion to grass.
8. Introduce beef cattle with sheep.
9. Maintain beef cattle and introduce dairy cows (jointly or separately), and dairy goats and dairy sheep, if desired, all on rotational grazing.
10. Introduce poultry into the grazing rotation, following beef cows on the land (recognizing that, in nature, birds follow ruminants), and maintain cattle/poultry rotation, with or without sheep in the mix.

And it doesn't end with food. There is energy for the farms and for on-campus vehicles and heating, sourced from biofuels and biodiesel producible both from campus food waste and, as well, from oil crops to be grown on university farms. At a minimum, university farms, in combination with university dining hall waste, should be able to cover the fuel needs of university farming and other land care. And it may be able to contribute to the reduction of fuel needs and fuel bills elsewhere on campus as well. Student labor for the university farms could

be obtained through food or dining scholarships, that is, free or reduced rate dining hall passes in return for work on the farms.

There is a need for much more in-depth analysis and identification of the potential of the university farms and university woodlands of the land grant universities – material for a future volume.

## **UNH's Food and Society Initiative**

UNH has the first formal university program in sustainability in the nation, backed by a sizable endowment. For a number of reasons, a good portion of the workload effort of the University Office of Sustainability is focused on sustainable agriculture and related questions of nutrition and the food system. Since any land grant university, including UNH, has real academic strength in agriculture, in nutrition and in enterprise, food and otherwise, the University of New Hampshire has put together a powerful effort at the very interface of these three areas. The end result has been a presence and an influence among university leaders in sustainable agriculture (in spite of the fact that, technically, UNH does not offer a major in this area, making the choice of UNH as the location for the 2007 annual meeting of Sustainable Agriculture Program Directors truly unusual). The UNH Office of Sustainability has a leadership presence in food security in New Hampshire at the state-wide level; a notable farm-to-school program moving New Hampshire's farm products into the public school system; a unique new planned undergraduate degree program in Ecogastronomy which molds agriculture, nutrition and food systems (including Hospitality Services) into a unified whole; a special relationship with UNH Hospitality Services (encompassing all on-campus food service) which features very popular Harvest Dinners; a deep involvement in the development and promotion of the organic dairy; and a base for both the Campus Community Organic Garden and the large and popular Organic Gardening Club. There is also a special relationship with Carlo Petrini, an honorary degree recipient at UNH, and his International Slow Foods Movement, including his two schools of gastronomy in Italy. All told, UNH's normally more modest efforts in food and agriculture are substantially enhanced and strengthened, and targeted toward serious sustainability, due to the almost daily presence of the University Office of Sustainability in these endeavors.

The underlying key to the success of the Ecogastronomy Program effort, and, indeed, of the whole UNH Food and Society Initiative, has been the determined and relentless focus on the interface, the interconnection, of food production (agriculture), food's impact (nutrition), and that which enables the interface to work (the food system). Such a focus of attention is truly unique, and broadens involvement in, and the constituency for, all aspects of food and agriculture. This is the forte, the strength, of the role that the UNH Office of Sustainability plays, and the uniqueness of UNH's success in this field of endeavor.

Coming closest to this effort elsewhere in the region is perhaps the University of Vermont's Gund Institute for Ecological Economics which focuses some attention on questions of food and agriculture as related to sustainability. However, the Gund Institute is pulled simultaneously in many other directions and does not have the embeddedness in agriculture that one finds at UNH. The University of Vermont's degree program in ecological agriculture, the University of Maine's long-standing degree in Sustainable Agriculture (both described in detail in my previous volume), and UMass's offerings in agroecology are narrower but positive efforts in the direction of sustainability.

## **Farm Spirit**

On my first visit to UNH's new organic Jersey dairy herd in 2005 (48 animals had arrived at the university's Burley-Demeritt Farm near campus in Lee, New Hampshire), I witnessed a UNH farm worker winter feeding the animals with bales of organic hay. The spirit and enthusiasm of this veteran farmworker and animal care-giver for working with and serving these animals was tangible and quite remarkable. Never in her long experience had she felt such satisfaction, such pride, such pure pleasure in having an opportunity to care for

animals. Joy was present, in the cows, in the farmworker, in university colleagues visiting the farm with me. And one of those colleagues remarked to me that this joyful scene was so exciting not only because it contained beauty in its own right (the Jerseys, the pastures on a mild winter day) but because it represented hope for the future: hope for local agriculture, hope for good food, hope for open spaces and environmental conservation, hope for a judicious use of natural resources, and, most importantly, hope for a university, hope for our students in a world seeming to be lacking in hope. We immediately realized that our students must witness what we had just seen. Gazing into the eyes of happy Jerseys, talking to a spirited enthusiastic farm worker, seeing wonderful pastures (which we do have there in some abundance) could work wonders on the human psyche. And all this in February! I wondered what Spring would bring.

### **“Her Name is Jersey”:**

With these words the UNH Dean of Agriculture opened his address to the Northeast Pasture Consortium, an organization of graziers, grass scientists and public officials from West Virginia to Maine, meeting for the first time in New Hampshire. The Dean of the Granite State’s College of Agriculture thus launched UNH as America’s first land grant university to establish an organic dairy with forty-eight Jersey cows (now about sixty-five animals) taking up residence at UNH’s Burley-Demeritt Farm. This is an historic moment in the Granite State for it represents the entre of an entirely new philosophy of agriculture and food production in New Hampshire. Although containing substantially fewer organic dairy farms than its neighbors, Maine and Vermont, New Hampshire has long been the home of organic yogurt producer Stonyfield Farm and now has a land grant university to match this effort in New Hampshire. (UNH has also decided to maintain its conventional confinement Holstein herd and dairy operation, thus enabling the university to compare the two systems and their underlying philosophies.) Furthermore, UNH’s new organic dairy will be substantially grass or pasture-based, and will seek to grow on its own farms all the organically certified feedgrains it will need to supplement its pasture production. Grazing on pastures and certified organic milk production are two revolutions signifying a renaissance in agriculture both in the Granite State and at the University of New Hampshire.

### **A Closing Thought**

The challenge is there to the three other land grant universities in our region to witness their own agricultural renaissance, each in their own way. Each must be open to seeking the wisdom of their states’ most progressive farmers and organic and grazing organizations. But each must also be prepared to lead their states and their people to envision what can be rather than simply what is.

Hope abounds! What will Spring bring?

This is a place-based book. So, the concluding chapter will take a closer look at our northern New England states, and at food security realities which suggest the idea of food as a central organizing principle in our New England future.

### **ENDNOTES:**

1. Raylene Funkhauser Nickel, *A Prayer for the Prairie: Learning Faith on a Small Farm* (Kief, North Dakota: Five Penny Press, 2004).
2. Stephen Sondheim, “Putting It Together”, from his musical play, *Sunday in the Park With George*.

## **CANADIAN PROSPECTS FOR UNH AND NEW ENGLAND LAND GRANTS: ONTARIO AND THE MARITIMES**

University of New Hampshire researchers and others associated with the new UNH Organic Dairy have already had considerable contact with Canada's Guelph University on their organic dairy initiatives. The Canadians have already been to Durham twice to study the UNH dairy, and UNH personnel have had no less than three visits to Guelph's organic dairy campus at Alfred in eastern Ontario. And prospects are developing for research collaboration with the Nova Scotia Agricultural College (NSAC) at Truro, N.S. (which serves the agricultural academic, research and teaching needs of all four Atlantic Provinces). NSAC also hosts the important Atlantic Pasture Research Group and the Organic Agriculture (Research) Centre of Canada (OACC). Further, Agriculture and Agri-Food Canada's consideration at the federal level of establishing North America's first national experimental research farm for organic agriculture at Nappan, Nova Scotia (near the New Brunswick border) bodes well for the elevation and enhancement of research in organic agriculture to serve this broader region. Critical in these matters is the strategic importance of agricultural and food production potential in the Maritime Canada ecological and economic zone, a region very similar geographically, ecologically and culturally to New England. What holds ecologically for Maritime Canada will largely hold for New England, so organic research activity in that region will be particularly valuable for New Englanders, and vice versa. New England and Maritime Canada have more in common with one another than they do with other parts of their own countries. Likewise, the site for the Guelph University Organic Dairy on the Ontario-Quebec border is not far from Vermont, thereby close enough to be of value to New England.

The beef/sheep integrated pasture research interests at Nappan Experimental Farm in Nova Scotia will be of direct value to similar beef and sheep interests at the University of Massachusetts. Pasture dairy research at Nova Scotia Agricultural College and its many pasture and forage plots, including organic, will be of direct value to University of New Hampshire researchers. Likewise, organic dairy research at Guelph University's Alfred Campus in eastern Ontario will serve UNH directly. The University of Vermont will continue to benefit from nearby Quebec linkages, including both pasture and organic. And the University of Maine will continue to learn from farmers and agricultural extension in bordering New Brunswick, as I described in my earlier volume, *The Wisdom of Small Farms and Local Food*. Canadian organic grain processing in New Brunswick near the Maine border offers infrastructural benefit to New England. Finally, for Canadian organic and grass-based agriculture, the sizable market represented by New England for the maritime region's product will be both attractive and important.





## **Chapter Nine**

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### ***“Life Depends on What Grass Can Do”, and What Four States Have Done***

I teach a graduate seminar at the University of New Hampshire called “The Question of Peak Oil”. And from my research and teaching in the energy field, and on that question in particular, I know that our great coming challenge will be how to practice agriculture and produce food on remorselessly less energy than we have been accustomed to. This conversion in our practice (and, as well, in our thinking) will not be easy.

#### **Aldo Leopold’s Time and Ours**

In Aldo Leopold’s day, farmland restoration meant rescuing land, pasture, cropland and orchard, from severe erosion, both wind and water, and replenishing the productivity of the soil. Such erosion was caused by bad farming practices. This erosion peaked in the 1930s. In our time, in the first decade of the 21<sup>st</sup> century, farmland restoration could well come to mean relieving the land of paving and compaction, and then again of building up the soil to produce pasture, cropland and orchard, and in some places healthy woodland. As the Age of Oil recedes and plentiful cheap supplies of food from distant places are no longer so plentiful or so cheap, the importance and, indeed, the necessity, of such farmland restoration, land near to the people to be fed by it, will become more obvious. The Age of Ecological Agriculture will be upon us, in New England and across our nation.

#### **On New England Food Independence**

The assertion has been made that Massachusetts is capable of providing for one-third of its food needs. That assertion needs to be researched and verified, and similar research needs to be conducted in the other New England states. We are far removed from hard data on such subjects. However, when one realizes what a tiny percentage of its own food needs is actually provided today by Massachusetts, the idea of providing for a full third of the food needs of 6.5 million people is extraordinary, as it would be for any of the other states in New England or the Northeast, a heavily populated region normally considered as non-agricultural. Be that as it may, there is no doubt that the New England states could be providing for a much greater percentage of their own food needs. Economically, this would mean a stemming of the loss of what is today an enormous amount of wealth from the region, a loss which occurs everyday. Our economy is being bled by its habit of shipping so much cash out of the region in return for imported food. Greater regional food self-sufficiency would also have marked effect on land use, on the preservation of open space (and hence a stronger tourist economy). As well, it would contain undesirable sprawl. Any move in the direction of New England’s growing its own food, a move in the direction of food security, is highly desirable.

Too often, people and institutions are glued to a mindset of all or nothing. While there is no way that New England could entirely feed itself at its present population, this does not mean that it can’t do something substantial, or that it shouldn’t try to do something substantial, to provide for a greater proportion of its own food needs. A similar argument often arises at the institutional level. For example, a college or university will sometimes argue that it serves so many meals per day to its students that it couldn’t possibly rely on local farmers or local food sources. Of course, on the whole, this is true. But this doesn’t mean it can’t provide for a portion of its needs from local sources. Such has both important symbolic value and constitutes a start in the right direction, an effort that can be increased over time. The fact that, for example, the University of New Hampshire serves more than 55,000 meals per week does not stop this university and its progressive dining service from buying from local farmers, and even from the certified organic and student-run Campus Community Organic Garden. The fact that this dining service serves thousands of eggs per day does not stop it from purchasing cage-free eggs from a New Hampshire farmer. There is a lesson to be learned here: the magnitude of the demand should never be used as an excuse not to provide

## **POLLUTION AND “CHEAP EATS”**

On a recent visit to the New England Aquarium in Boston, I eagerly anticipated a chance to see the special exhibition on jellies (what used to be called “jellyfish”, a misnomer since they are not fish). Naturally I expected to see these exceedingly graceful and beautiful creatures in large tanks, a mesmerizing scene to be sure. While I was not disappointed in that expectation, I was surprised to learn that the emphasis of this exhibition was not on the jellies, as one might have expected in a famous aquarium, but rather on climate change/global warming and on the human behavior believed to be associated with it. Emphasized, also, was a basic food and agriculture question: non-point source water pollution and the great marine “dead zone” in the Gulf of Mexico which is the direct result of agricultural over-fertilization and the excess nitrogen run-off resulting therefrom on the farm fields of the American Midwest far to the north. The exhibition focused on phenomena associated with climate change, including invasive species and their adverse impact on both more desired native species and on biodiversity more generally. Destruction of the fishery of the Black Sea in Russia from a U.S. Atlantic Coast jelly species, the comb jelly, as well as destruction of the Gulf shrimp fishery by “cannonball jellies”, were featured. The most telling aspect of this exhibition, however, was its focus on our daily behavior, the unecological and unsustainable behavior of all of us. Two issues were particularly highlighted: our eating habits (i.e., dependence on cheap food from the energy-intensive and wasteful model of industrial agriculture with its heavy chemical dependency), and our love affair with cheap energy, especially for transportation, the constant use of single passenger motor vehicles (the “driving alone” phenomenon) being particularly the case in point.

It turns out that the world’s marine jelly species, evolutionarily the oldest life forms on this planet, are survivors in more ways than one. It seems they thrive in the circumstances in which they now find themselves, fed and supported by climate warming and nutrient excess in their environments. At the present pace, it appears, they will dominate and outlive us all. They represent tough competition, thriving in the present circumstance.

In some ways most surprising, this exhibition was sponsored by the U.S. National Science Foundation, an independent arm of a government which refuses to recognize either the problem of global climate change or the problem of government subsidy of energy wasteful and pollution-causing industrial agriculture. The public face of science has taken a strange turn indeed.

what can be provided from local farmers, from certified organic and free range sources, and even from student-run on-campus sources. In this way, the all too common “can’t do” mentality becomes what it must become, a “can do” mentality. Such a can-do mentality will inevitably move beyond produce and eggs and lead ultimately to local and even some on-campus dairy and meat production. This is especially true for the region’s six land grant universities, all of which by definition have a rich agricultural heritage. (In fact, the oldest college at each of them is the College of Agriculture). Until fairly recently, these institutions provided much of their own food. They can and should provide for their own food needs once again.

## **On the Cusp of a Renaissance**

New England agriculture is on the cusp of a renaissance. Poultry and poultry dominance is long gone from New England. Conventional dairying is in collapse, and has been disappearing for years. Much of the region’s tillable land has been lost permanently. And yet the region is looking at an agricultural renaissance. Can this be true?

The answer appears to be yes. The evidence for such a renaissance is becoming clearer each year. And that answer lies embedded in a number of different terms and phrases:

Bio-intensive farming/gardening

Ecological agriculture



## A SON OF INDUSTRIAL AGRICULTURE

I'm a city kid. Born and raised in a town called New York City. Attended high school in Manhattan. Inveterate rider of the New York City subway. And yet, in a strange way, I'm a son of industrial agriculture.

As the son of an International Harvester Company accountant growing up in urban New York City in the 1950s, it is truly ironic that my own career and work is critical of the large-scale industrial model of agriculture. As I look back on my childhood and youth, I wonder, today, why things went from so financially difficult (late 1940s, very early 1950s) to substantially better (mid 1950s-1960s) for no obvious reason other than the strengthening of the national economy in those years. I've come to realize that change in agriculture had something to do even with affecting my own urban existence. It so happens that those early and mid-1950s were years of incredible boom in American agriculture and in the sale of the Farmall tractor, combines and many other farm implements, as our nation's agriculture moved further and further into the much more energy intensive and highly mechanized industrial model. It so happens that my father's employer, International Harvester Company, shared mightily in and provided leadership for much of that revolution on the land. Shorter working hours and somewhat better pay undoubtedly resulted throughout the company. Of course, as the company continued to expand with its success, it eventually reached the point where, as a company, it overexpanded and did itself in, resulting in the bankruptcy and break-up of this very old American firm which had been founded by the reaper's inventor himself, Cyrus McCormick, in the 19<sup>th</sup> century. IH, as it was called, was gone by the 1980s. Unfortunately, the cost was not limited to the company's shareholders and employees. It is shared by all Americans suffering from depleted soils, contamination of ground and surface water, and the whole host of environmental and social problems associated with that form of agriculture which is so philosophically opposite the small-scale, decentralized, sustainable and ecological agriculture which is the subject of this book.

How naïve so many of us were in our interpretation of the American Dream. Life is indeed ironic.

Integrated agriculture

Relationship agriculture

Direct marketing

Women's agricultural networks

Community Supported Agriculture (CSAs)

High efficiency small-scale systems

Low-input/sustainable agriculture

New Farmer entry/land-link programs

Intensive rotational grazing on pasture

### ON EUROPE:

**It has been said that the whole mindset of Europe toward agriculture is born of war and want. The U.S. mindset is based on over-production and plenty. Now, for the first time in history, Europe has a surplus of food. This will make an enormous difference!**

## Highlights of the Renaissance in the States

### Maine:

The historical development of ecological sustainable agriculture in Maine, and particularly at the University of Maine, is documented in detail in the earlier volume, *The Wisdom of Small Farms and Local Food: Aldo Leopold's Land Ethic and Sustainable Agriculture* (Durham, N.H.: University of New Hampshire Agricultural Experiment Station Publication #2260 – see Chapter 6, pp. 81-106)

Maine sports what is perhaps, organizationally speaking, the most important institution in all of New England in support of local farms, local food and sustainable agriculture: the Maine Organic Farmers and Gardeners Association (MOFGA). Running an agricultural fair for over a quarter century which attracts perhaps 50,000 to 70,000 participants every September, and doing so in rather remote central Maine, and publishing a very popular widely read quarterly, the *Maine Organic Farmer and Gardener*, goes a long way to solidifying the leadership position of this organization, not to mention its national fame. And yet, one of the first things to note about this ostensibly “organic” farming organization, which is in fact the organic certifier for Maine, is its advocacy that local trumps organic: In other words, it is MOFGA’s view, in spite of its name and its role, that it is more important to buy local, to support local farmers, whether organically certified or not, than it is to buy organic. And inherent in MOFGA’s view of organic is local. In fact, to most supporters of organic agriculture in Maine and New England, organic means local. MOFGA goes on to say that one should use one’s not insignificant influence as a customer of the local farmer to encourage that farmer to move as far in the direction of organic as possible.

Further strengthening MOFGA’s and Maine’s overall effect on sustainable agriculture is the new more formal relationship between MOFGA and the state’s land grant university, UMO. This has especially strengthened both UMO’s and MOFGA’s capacity for involvement in sustainable animal production, particularly through grass farming/rotational grazing, and through Maine’s considerable advancement in organic dairy production. A new Maine Grass Farmers Association, patterned after Vermont’s more established association, has been a result.

It should further be added that Maine’s Common Ground Fair and its sponsoring institution, MOFGA, are offspring of the American environmental, energy conservation, and back-to-the-land movements of the 1970s. They are very healthy remnants of that era and successfully survived the onslaught of the countervailing philosophies and values of the 1980s, 1990s and 2000s. In the present time of energy and coming related food instability, the Common Ground is gaining further strength, in service to ecological ethics and values in Maine and New England. It is a healthy survivor through an era of countervailing philosophies and lifestyles.

### Vermont:

The historical development of ecological sustainable agriculture in Vermont, and particularly at the

#### MAKING IT ALONE:

*Today recently featured a front page headline saying that in the future, in a time of crisis, the government would not/could not be there to help. We will have to make it on our own.*

*Laurie Garrett, author of *Betrayal of Trust: The Collapse of Global Public Health*, has commented about the loss of services and supplies if a catastrophic event occurred elsewhere (i.e., when people don’t show up for work). She gave the example of non-functioning ATM machines, loss of other banking services, etc. - but WHAT ABOUT FOOD?*

*Are we prepared to make it alone, to survive without government, and without access to the national food supply? And can even local government survive?*

*Do we know anything about such things, or have any answers? Half of all U.S. intelligence analysts have less than five years experience – this doesn’t speak much for the ability of government!*

University of Vermont, is documented in detail in the earlier volume, *The Wisdom of Small Farms and Local Food: Aldo Leopold's Land Ethic and Sustainable Agriculture* (Durham, N.H.: University of New Hampshire Agricultural Experiment Station Publication #2260 – see Chapter 7, pp. 107-124)

The fundamentally important work of UVM's Center for Sustainable Agriculture continues apace, with Founding Director Vern Grubinger having insured presence in southern Vermont, with Assistant Director Allen Matthews at Burlington, and with new state-wide direction under Lini Wollenberg. NOFA-Vermont continues to serve as a bulwark for organic agriculture, not only in Vermont but, importantly, as a leader and model across the New England region. And the Vermont Grass Farmers Association (VGFA) continues to attract an ever-widening audience and to stir grazing interest throughout New England. (VGFA has sired a sister organization of similar name in Maine.) Furthermore, Northeast Sustainable Agriculture Research and Education Program (NESARE) is located in Burlington, Vermont at UVM, piloted since its inception by UVM soil scientist Dr. Fred Magdoff and now led by Vern Grubinger. Vermont graziers, particularly in the dairy cow and sheep sectors, model for all of New England how grass farming should be practiced. And the art of the pasture walk is best developed in Vermont and ready for export across the region.

Of all Vermont's contributions, however, none top the fundamental work in intensive rotational grazing conducted for so many years by America's paragon of this very ecological form of sustainable agriculture, Bill Murphy of UVM. His classic book, *Greener Pastures on Your Side of the Fence*, his many talks and workshops around the state, his pasture walks (and the art of the pasture walk developed from his teaching), his legacy in the highly active Vermont Grass Farmers Association and, most importantly, his legacy in the form of much successful grazing practice across the whole state of Vermont, cannot be topped. This practical teaching of Prof. Murphy has now spread across all of New England and New York, and even has positive repercussions in his home state, Wisconsin, where dairy agriculture is especially important and where graziers' organizations now abound. The grass can be "greener on your side of the fence", and Vermonters and all New Englanders have Bill Murphy to thank for that knowledge.

Vermont is a true leader and teacher for New England in all that this book is about.

## **New Hampshire:**

New Hampshire, while more rural than Massachusetts, has a heritage which is considerably more urban and industrial than its neighbors east and west. It is no accident that New Hampshire has far fewer farms and farm production than its neighbors. It is and has been among the lesser of agricultural states. But perhaps the Granite State's distinction lies in its great sense of independence, its "live free or die" attitude, its tendency toward libertarianism. New Hampshire people are very independent and tend to march to their own drummer, with or without leadership from government. Such tendency leads to some concern over sustainability, not the least in the area of food sufficiency and security which are so necessary for maintenance of that spirit of independence. Thus, the tradition of the small-scale entrepreneur, including, to some degree, the small-scale farmer, is alive and well in this state. Such bodes well for a healthy and increasingly independent, thereby increasingly sustainable, agriculture.

Of all four states in this volume, New Hampshire has undoubtedly the least acreage which most people would consider agricultural. New Hampshire is better at growing rocks than crops, as the old saying goes. But what has been forgotten in modern times is New Hampshire's prodigious grazing productivity of earlier times.

### **WORDS OF WISDOM FROM WES JACKSON**

**"The non-living world is as essential as the living world for making it possible for us to live."**

**"Before agriculture can be transformed, two cultures must merge: the culture of the descriptive (evolutionary biology and ecology), and the culture of the prescriptive (agriculture)."**

**"If we don't achieve sustainability in agriculture, we won't achieve it anywhere."**

Merino sheep and their wool, a milkshed for Boston, poultry production (both broilers and layers with their famous brown eggs from New Hampshire and Rhode Island Reds), assorted meat and dairy production are all part of the New Hampshire story, along, of course, with apples and maple syrup. What New Hampshire has lacked by way of crops has been more than made up for through grazing. And the granite rock so profuse around the state is not an encumbrance to this kind of agriculture. New Hampshire's nearness to the markets of Massachusetts has also served the state well in the past and is undoubtedly beginning to do so again.

Farm product goes south, ideas come north. And the Granite State is well situated for both. New Hampshire today, while perhaps not spawning as many ideas, techniques, practices as its neighbors, Maine and Vermont, is well positioned geographically to learn directly from those two neighbors, both of whom have been ahead of New Hampshire in the modern movement toward sustainable agriculture. (When I myself approached the Agriculture Dean at UNH two decades ago with the idea that we in New Hampshire

should be joining the movement and launching a program in sustainable agriculture, his response was that, since both of our neighbors, Maine and Vermont, had such programs in place, there was likely no necessity for us to be too quick to do likewise. Let's see what we can learn from them first was his response.)

In New Hampshire the private sector is ahead of the land grant university. The very successful Stonyfield Farm, preeminent producer of yogurt and the nation's pioneer in the organic dairy field, was early in establishing an organic farming organization, NOFA-New Hampshire, founded initially by the same entrepreneurs who founded Stonyfield Farm. It was not long, however, before similar organizations in the surrounding states were larger and stronger. NOFA-New Hampshire until recently remained the smallest and weakest such effort among these four states. It is still diminutive in comparison. And New Hampshire is perhaps the last of the four to develop organized interest in grass farming. New Hampshire has been the slowest of the northern New England states to recognize the important role of women in the new ecological agriculture, watching Maine and Vermont organize their Women's Agricultural Networks (WAgNS) statewide. And New Hampshire, as mentioned, has been slow to develop a sustainable agriculture program in its land grant university. On the other hand, New Hampshire has been among the first to move into CSAs and has held its own when it comes to small and beginner farmers efforts and, as well, farmers markets which are popping up all over the state. And New Hampshire has recently produced its Farm Viability Task Force Report, "Cultivating Success in New Hampshire Farms", signaling a rejuvenation of interest in Granite State agriculture at the government level.

Finally, there are today the great strides which are being made at New Hampshire's land grant, the University of New Hampshire, and its Agricultural Experiment Station (as discussed in greater detail elsewhere in this volume); to launch the region's and the nation's first organic dairy among the land grant universities; to support a campus community organic farm; to seriously seek certified organic status for its university farmlands; to involve its on-campus food services in both on-campus and local agriculture; to integrate agriculture, food systems and nutrition into one seamless curriculum called EcoGastronomy; to host the state-wide New Hampshire Center for a Food Secure Future; and, through this and an earlier volume, to document the status of local sustainable agriculture and land ethics in this region.

UNH Cooperative Extension's presence is also felt through the leadership of Agricultural Program Leader Juli Brussell and in the pioneering work of Seth Wilner in grazing-centered whole farm planning.

## PEOPLES' BEHAVIOR

**"Let us suppose that certain individuals resolve that they will consistently oppose to power the force of example: to authority, exhortation; to insult, friendly reasoning; to trickery, simple honor. Let us suppose they accept only the duties and obligations which bind them to other men. Let us suppose they devote themselves to orienting education, the press and public opinion to the principles outlined here. Such people would not be acting as utopians but as honest realists. They would be preparing the future and at the same time knocking down a few of the walls which imprison us today. If realism be the art of gaining the most while sacrificing the least, then who can fail to see the positively dazzling realism of such behavior?"**

**Albert Camus**

## Massachusetts:

Massachusetts and its cities have always been seen by northern New Englanders as the key market for the goods and services they have to offer. Whether those goods be wood products, food, manufactured goods, Massachusetts has been an important, able and nearby market. And northern New Englanders spend much and work hard to attract Massachusetts residents to their tourist offerings. But Massachusetts should not only be regarded as a consumer of what Vermont, New Hampshire and Maine have to offer, for Massachusetts is and can be a producer in its own right. As a source of ideas, Massachusetts has contributed the now regionally widespread institution of the town conservation commission. More recently, and more directly pertinent to this volume, Massachusetts has instigated the establishment of town agricultural commissions (AgComms), an idea already beginning to be looked at by New Hampshire. These commissions not only recognize the importance of local agriculture but encompass and integrate the local food system as well, opening the door for the participation of non-agricultural as well as agricultural towns. These town commissions are an important Massachusetts export to the region and deserve much more study. Additionally, two of the more important ideas contributed to the region (and, in fact, the nation) by the Commonwealth include state acquisition of development rights on prime farmland in order to keep the land in agriculture; and the 1957 Massachusetts authorizing legislation for the establishment of city and town conservation commissions, progenitor of more than 1000 such commissions today – both are responsible for the protection of significant farmland acreage across the whole region.

Massachusetts also offers what is perhaps the region's most successful integration of traditional conservation and land protection, the Trustees of Reservations' evolution toward protecting local agriculture along with wildlife and natural ecosystems. This idea has crossed the state line and has begun to influence New Hampshire's equally traditional and well established Society for the Protection of New Hampshire Forests, the latter seeing its mission expand beyond woodland protection and sound forestry.

The Commonwealth's Trustees of Reservations also offer their stewardship and management of the largest pasture in all of New England, the Appleton Farms in Ipswich, just a few miles from Boston and in the heart of some of New England's densest population. The decision to launch a Community Supported Agriculture (CSA) project on this highly visible land, to farm and graze it while maximizing its biodiversity, to introduce a regimen of intensive rotational grazing of multispecies livestock, to make it into a model of ecological sustainable agriculture bodes well for local food and farming in the region. In its potential, Appleton Farms compares favorably with Vermont's Billings and Shelburne Farms, Maine's Pinelands Farm and New Hampshire's Remick Farm, major demonstrations all.

Massachusetts is also the home of the New England Heritage Breeds Conservancy and, together with the state's Plimoth Plantation and Old Sturbridge Village Farms, has much to teach New Englanders about appropriate breeds of animals for the conduct of grass farming, rotational grazing, and the ecological method of agriculture.

The popular image of Massachusetts is an image all too often of strip development, traffic congestion and run-down industrial buildings. It is rarely the agrarian bucolic image of northern New England. And yet Massachusetts offers the largest quantity of superior agricultural soils in all of New England: the Commonwealth's share of the Connecticut Valley. It offers much continuing small farm potential across the western half of the state. It offers the most moderate climate and the longest growing season of any of the four states in this study. Perhaps more surprisingly, it offers food production potential, including grazing, on small remaining tracts in eastern Massachusetts very close to high demand markets, and on soils conducive to meat and dairy production, as this volume's soils maps indicate.

And, to come full circle, the market demand represented in the Bay State, both from its own production and from that of the three states to the north, can't be beat. Ability and willingness to pay combines with a good food values system to provide a healthy economic foundation for local agriculture.

**Said a Maine farmer, farm animal ID is developing as a disease preventative. "Test and kill'em model" is our approach to disease. Animal ID is a loss of freedom. They can come and destroy your herd.**

This system is further accentuated by ethnic and immigrant population with particular fresh food demands, increasing restaurant and institutional demand for local food, and a healthy state-wide organic farming system (Mass-NOFA and its popular publication, *The Natural Farmer*), an increasing CSA tradition (the American version of CSA having started in Massachusetts at Indian Line Farm in Great Barrington), and fast-growing farmers markets, including those in metropolitan Boston and other urban centers. Massachusetts also hosts Tufts University School of Nutrition and its new farmer entry program for immigrant and refugee farmers in New England. All of this demonstrates that Massachusetts can hold its own when measured against more rural New England states.

## Peak Oil

“Agriculture (and, therefore, the food system) is the first victim of peak oil”, writes petroleum geologist Kenneth Deffeyes of Princeton University. As this research comes to a conclusion, the energy question of peak oil is heating up, while the issue of climate change is further warming. Even petroleum geologist Kenneth Deffeyes, a student of peak oil, concurs. As does Houston oil banker and analyst Matthew Simmons and urban planning critic James Howard Kunstler. All of these decidedly non-agriculturally oriented energy experts agree that food system security is in increasing peril and that the answer is a relocalization of agriculture: local small farms, farmers markets, CSAs, and other local production and direct marketing devices. Anything that avoids the 1500 mile trip from farm to dinner plate and the enormous fossil fuel commitment that such long distance transport requires. Not to mention the extreme 98% fossil fuel dependency of all aspects of American food production and provision. (American food is 98% oil and natural gas in terms of its energy content.) Americans need oil before they can eat!

Given what is happening to oil as we reach or pass the peak in global production (volatility of price on a background of steadily rising prices, questions of the assurance and regularity of supply), and given the increasing global and national demand for significant reduction in CO2 and other greenhouse gas emissions, local agriculture will have to replace our long-distance national system of food production in a significant way. Food for fuel, namely, corn and soybean production for ethanol rather than for food, not insignificantly exacerbates the need for more rapid relocalization of the food system and reduces choice in the matter. Energy now competes for food. If we keep this up, energy will win and food will be depleted. Food security, and food at a price affordable to most people, cannot otherwise be realized. Food localization, local farms producing local food for local people, is rapidly becoming the order of the day.

Prominent American peak oil writer James Howard Kunstler, writing of the future U.S. energy scenario in a post-carbon and peak oil era, said, “The salient fact about life in the decades ahead is that it will become increasingly and intensely local and smaller in scale ... Complex systems based on far-flung resource supply chains and long-range transport will be especially vulnerable. PRODUCING FOOD WILL BECOME A PROBLEM OF SUPREME URGENCY (emphasis added)”.

**I teach a graduate seminar at UNH called “The Question of Peak Oil”. And from my research and teaching in the energy field, and on that question in particular, I know that our great coming challenge will be how to practice agriculture and produce food on what James Howard Kunstler refers to as remorselessly less energy over time. This conversion in our practice (and, as well, in our thinking) will not be easy.**

## Conclusion

In conclusion, we might ask ourselves, Why did the University of New Hampshire commission that study back in 1979 on basic food security in the state? And we might also ask, Why has that study been doing nothing more than gathering dust for nearly thirty years? In 1979 we were afraid of the future, perhaps more afraid than we will admit today. The Arab oil embargo, gas lines and gas rationing, were all very fresh in our memory. These things, coupled with tremendous spikes in oil prices, high interest rates, high inflation, real worry about getting through the winter, trying to figure out what was really happening in the world and what was next. We knew, even instinctively, that our basic food supply, as well as our winter heating oil and our gasoline for transport, were vulnerable. The future was one big question mark and appeared dark.

Then, “It’s morning in America” and two decades of once again cheap energy arrived on the scene, and we began again to believe what we wanted to believe rather than what we didn’t want to believe. Out the window went concerns over food security and energy, out the window went frugality and conservation, out the window went any semblance of a land or environmental ethic. We were once again where we wanted to be, on top, enjoying our hubris, our arrogance. It is only now, faced with the twin concerns of a declining oil supply (from the geologic phenomenon of peak oil), and widening fears over climate change and related greenhouse gas emissions that we are returning (somewhat) to our position of 1970s concern over energy and food security. We are dusting off that 1979 New Hampshire study on food security in the state. In our heart of hearts we know that Wendell Berry was right when, in gazing at empty supermarket shelves, he importuned, with respect to hunger and starvation, that we must never believe that it can’t happen here. It can and it will.

Local agriculture in New England is today experiencing a renaissance. Some of this comes from the desire of New Englanders for fresh, local food; for connection to their food sources; for nutrition and health; for open space protection; for the opportunity for some to farm and earn a living from and on the land. For these reasons or for reasons of decline in the present industrial system of agriculture, James Howard Kunstler’s prophetic words may well be correct:

**“Hope is not optimism, which expects things to turn out well, but something rooted in the conviction that there is good worth working for.”**

**Seamus Heaney**

**“AGRICULTURE IS GOING TO COME BACK TO THE CENTER OF THE AMERICAN LIFE IN A WAY THAT WE COULDN’T IMAGINE.”** James Howard Kunstler

Let us hope that we, in our northern New England home, are ready and able to receive it.

## ENDNOTE:

1. James Howard Kunstler, *The Long Emergency* (New York: Atlantic Monthly Press, 2005), pp. 239-248.

## APPENDIX

On whom do I rely for my sources? Among others, these are sources that inform and inspire me, and are well worth my time and yours to confer:

1. Two quarterlies, the *Maine Organic Farmer and Gardener* (MOFGA) and *The Natural Farmer* (NOFA), are superb. Everything they have to say, all of which is perfectly tailored to our four states, is worth careful consideration.
2. All of the work of Joel Salatin is highly insightful, as well as inspiring, and is a good investment of your time. *You Can Farm* and *Family Friendly Farming*, as well as *The Polyface Farm Video*, are good starting points if you don't know Salatin. Michael Pollan's popular book, *The Omnivore's Dilemma*, also offers an excellent treatment of Salatin, who is as useful for New England as he is for his home region. In addition to Salatin and Pollan, the work of Barbara Kingsolver, particularly her book, *Animal-Vegetable-Miracle*, is valuable.
3. Some of the best technical support for this book is to be found in Bill Murphy's *Greener Pastures on Your Side of the Fence* and its predecessor, Andre Voisin's *Grass Productivity*. These are among the most basic and essential of books on intensive rotational grazing, a necessary practice if New England is to more significantly feed itself and improve its food security.
4. Excellent older works, if you can find them, include *Grass: The Yearbook of Agriculture, 1948* (Washington, D.C.: US Department of Agriculture, 1948), and *Grassland Farming in the Humid Northeast* by Ford S. Prince (New York: Van Nostrand, 1956).

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## About the Author

John E. Carroll, Professor of Environmental Conservation at the University of New Hampshire for nearly thirty-five years, teaches and does research on ecological ethics and values, land ethics and agrarian values, sustainable agriculture, energy (including a graduate seminar on peak oil), and applied environmental philosophy. He is the author of eleven books, including *The Wisdom of Small Farms and Local Food* (2005), predecessor to this volume. He is also author of the recent book, *Sustainability and Spirituality* (State University of New York Press, 2004). A Kellogg Foundation National Fellow, he has also edited *The Greening of Faith* (University Press of New England), *Ecology and Religion* (Franciscan Press), *Embracing Earth* (Orbis Books), among other books, and contributed three articles to the *Encyclopedia of New England* (Yale University Press). He holds the Ph.D in Resource Development from Michigan State University and resides in Durham, New Hampshire with his wife Diana.

## About the Illustrator

Karen Busch Holman left the big city of New York for a quieter life in New Hampshire, but with two sons, a pair of mice, two housecats, a dog, a retired racehorse, and a house filled with artwork projects underway, it's hardly quiet! Karen is currently illustrating a series of children's books for New England. Her new series, *Nicholas, A Massachusetts Tale* written by Peter Arenstam (Mitten Press), is a 4 book series about Nicholas, a mouse who travels throughout Massachusetts, Maine, New Hampshire, and Vermont in search of his family journal.

Karen's earlier work was featured in *The Wisdom of Small Farms and Local Food* by John Carroll, *G is for Granite: A New Hampshire Alphabet* (Sleeping Bear Press) and its accompanying number book, *Primary Numbers*, both written by Marie Harris. Her work can be seen on the New Hampshire Heirloom Birth Certificate and the arts council folklife website. A recent commission is for the new Children's Museum of New Hampshire in Dover where Karen is creating 5 murals. Karen currently resides in central New Hampshire with her husband Jeff and her two sons, Tyler and Todd.





*“Agriculture is going to  
come back to the center of  
the American life in a way  
that we couldn’t imagine.”*

*James Howard Kunstler*

