

THE REAL DIRT

Toward Food Sufficiency and Farm Sustainability in New England



by
John E. Carroll

Forewords by Mark B. Lapping and Matthew R. Simmons
Paintings and Book Design by Karen Busch Holman



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Editorial assistance by Dr. Abigail L. Carroll



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FOREWORD

By Prof. Mark B. Lapping, University of Southern Maine

In the late 1970s there was a national strike by independent truckers. Political leaders at the federal level, most notably Silvio Conte and Olympia Snowe, held hearings on the causes and consequences of the strike and how solutions might be found and crafted. Conte came from Massachusetts and Snowe still represents Maine in the U.S. Senate. It was not a coincidence that both were from New England. As John Carroll points out, the region was –and remains– at the end of the food pipeline given that so much of America’s food travels by truck. No region was as hard hit by the strike as was New England. Put another way, what there was on New England’s shelves was all there was and food shortages were beginning to develop. In time the strike melted away but the reality of being “at the end of the pipeline” has remained. Indeed, New England is also at the end of the “energy pipeline;” no region is as dependent upon imported oil as is New England. The reality is, then, that those who live in a region which prides itself on “Yankee ingenuity,” independence, and self-reliance – these are among the quintessential qualities of the New England “brand,” if you will– are hardly that at all, at least in terms of food and energy. And these two things, as Carroll writes, are themselves highly interrelated because the US food system is so very dependent on cheap oil. This is the essential theme of the very first chapter in this important book.

Real Dirt is the third book of Carroll’s trilogy on the region’s food system. The first book, *The Wisdom of Small Farms and Local Food*, dealt with the pioneering work and ideas of the great soil scientist and early land use planning pioneer, Aldo Leopold. Carroll shows that, though Leopold is a Midwesterner, his ideas, especially that of the “land ethic”, are so crucial and appropriate to Yankee agriculture. The second volume, *Pastures of Plenty*, was something of a rediscovery of the value of the grasslands of New England and how a grazing animal agriculture holds enormous potential for a revival of Yankee farming. The present volume is Carroll’s most proscriptive and, in a sense, his most daring, provocative and adventurous.

It is unusual, I think, to speak of an academic’s work with such words as “daring,” “provocative” and “adventurous.” But *The Real Dirt* is just that. This is John Carroll not only at his best but also at his most imaginative and devout. For John is a deeply spiritual person. I have known him for close to three decades and over that period of time our paths have crossed often and we have worked together on various projects. I know that John takes his faith seriously and nowhere is this manifested more directly than in his reverence for the land, its plants, its animals and its people. Rural New England is his church, and few know its towns and its people, and especially its farms, as well as John Carroll.

Whether it is his discussion of my hometown of Burlington, Vermont, with its success in “eating local,” or his portraits of the various experimental farms run by the region’s land grant universities, which remain seed beds of innovation and enormous potential, *The Real Dirt* is that clarion call for the renewal of Yankee agriculture in a way that feeds the region with safe, wholesome foods while helping to revive much of the Yankee countryside.

Some years ago I had the privilege to edit and abridge for paperback publication the classic history of New England agriculture, *A Long, Deep Furrow: Three Centuries of Farming in New England*, by Howard Russell. It is no less a pleasure to provide this preface for John Carroll’s *The Real Dirt*. It is a fitting companion to Russell’s magisterial work.

Mark B. Lapping

Cumberland Center, Maine

Mark Lapping, Distinguished Professor of Public Policy and Management and former Interim Provost and Vice President of Academic Affairs at the University of Southern Maine, has held senior academic and administrative positions in agriculture and rural land use planning at the University of Vermont, Rutgers and Guelph Universities. He is an author and co-author of *Rural Planning and Development in the United States*, *The Small Town Planning Handbook*, *Rural America: Legacy and Change*, and *A Long Deep Furrow: Three Centuries of Farming in New England*.

FOREWORD

by **Matthew R. Simmons,**
Chairman Emeritus, Simmons and Company, International

Professor Carroll's excellent trilogy on the need to re-establish local farming throughout New England is a remarkable and timely piece of work. He not only outlines the virtues and economic benefits New England will receive by embracing local food, but more importantly, argues for the necessity of such a change based on the intense energy required to sustain our current globalized food system.

For half a century, the world embraced a concept that local farms and ranches had become economically obsolete, as they were far too labor intensive for the relatively small amount of food they produced. This led to the establishment of large-scale agricultural farm systems in the world's warmer regions, thus eliminating the need for winter heat and promoting the growth of crops year-round in places where labor was inexpensive. These massive agricultural systems evolved into "semi-artificial food factories" due to all the artificial processes the food underwent before being transported extensive distances (known as food miles) from production point to final consumption, resulting in food with little taste.

A prime example is buying blueberries in Maine before New England's blueberry season begins. All the large food chains now carry blueberries year-round, which mostly come from Chile and lack the real essence of a fresh blueberry. They are essentially ornamental food.

This method of globalized production could have lasted for many more decades or until consumers finally revolted and began demanding "real food," had energy remained abundant and cheap. But as Professor Carroll points out, fossil fuels which anchored this globalized food have now passed peak production and are in decline. The world will not run out of oil or natural gas, but we are fast running out of light, sweet crude oil and conventional natural gas (i.e. the easiest and cheapest to produce energy forms). As there is no end in sight for steadily growing global energy demand, we need to abruptly start changing the least efficient uses of both oil and natural gas. Coupled with ending long-distance commuting, the other most inefficient use of oil is transporting food over thousands of miles under energy-consuming refrigeration systems that prevent the food from rotting.

With the benefit of hindsight, the era of agribusiness was as unsustainable as large plantations which only worked through the use of free slave labor.

Furthermore, there is an even more urgent related issue driving the need for re-establishing local food production. Water is now getting scarce in too many key parts of the world. It turns out that water and oil are far more intertwined than almost anyone ever discussed. The amount of water used to create electricity and produce all but light oil and refined crude into finished products is nearly equal to the amount of water used to grow food.

The beauty of local food is that it can be created with little energy use and low water use too. Far better, it retains its essence and is both healthier and tastier.

Communities who embrace a return to localized food will soon become beacons signaling to the rest of the world the benefits of creating sustainable food with low water use, avoiding artificial fertilization, canning and bottling to preserve fresh food throughout the winter months, and utilizing greenhouses heated by geothermal wells and sunlight. The world must embrace such change or risk social unrest and chaos as both fuel and water shortages become more prevalent.

It would not be surprising to soon see the leading agricultural universities begin to establish databases to record the embedded energy in non-local food by some food mile system, and combine this with the water intensity to begin a bad food metering system in contrast to good food having low energy and low water use.

Farms implementing these changes can hopefully become models for how local farms and gardens can be economically successful. The world can change its wasteful ways and make a graceful transition to a less energy-intense and water-wasting world. If we delay this change, the risk of social upheaval is higher than most think, so the time to change is now. And, implemented correctly, the change can be rewarding to all participants.

I thank Professor Carroll for the opportunity to weigh in on a topic I have spoken out on for the past half decade as a Foreword to his important book, THE REAL DIRT.

Matthew R. Simmons

Rockport, Maine and Houston, Texas

Matthew R. Simmons, investment banker and oil analyst, founder and CEO-Emeritus of Simmons and Company, International, is known as “America’s Banker to the Oil Industry”. He is the author of *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy* and is a respected voice in the international peak oil discussion. He resides in Rockport, Maine.

Executive Summary:

Based on the twin foundations of *The Wisdom of Small Farms and Local Food* (NHAES-2260) and *Pastures of Plenty* (NHAES-2340), both NH Agricultural Experiment Station publications, this volume focuses on the infrastructure of sustainable food systems in the six New England states. It is the third volume in a trilogy on sustainable agriculture and food security in New England. The central themes of Part I of *The Real Dirt* encompass critical energy issues in agriculture, the emerging role of town agricultural commissions, the power of gardens in food security, and what one New England city has accomplished in local food and farming. Part II focuses on the region's six land grant universities, and particularly the status and potential of their multiple university farms, in providing infrastructural support to the growth of food security and sufficiency in New England. This volume further develops themes identified in the earlier volumes of the trilogy, including the importance of on-farm biodiversity and economic diversity; crop-livestock integration; holistic systems approaches; direct marketing; organic and grass-based production methods; and the value of de-centralized small-scale and local approaches to regional food production.

The opinions contained in this volume are solely those of the author and do not necessarily represent those of the University of New Hampshire or the New Hampshire Agricultural Experiment Station.

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Author and Illustrator:

John E. Carroll, the author, has served as Professor of Environmental Conservation at the University of New Hampshire for 36 years, teaching in the areas of ecological ethics and values, sustainability, agriculture and energy.

Karen Busch Holman, the illustrator, is a well known graphic designer and water color painter with many agricultural and children's books to her credit. She resides in East Andover, New Hampshire.

“An Old Saying”

*For poultry, hogs, sheep, cattle
that lived before the oil age, the
old farmers would recite:*

*“Half your feed and half your
hay on Ground Hog’s Day.”*





We are the principal architects of the problems we are trying to solve. Indeed, we have completely embedded ourselves in these problems.

Edward Burtynsky

PART I: INTRODUCTION: THE IMPERATIVE OF LOCAL FOOD

New Hampshire's motto, "Live free or die," suggests Yankee traits of frugality and ingenuity. It speaks to New England's strong sense of independence. But how independent is New England? Not very. At least not in terms of food. Of all the regions in the United States, New England produces the least amount of food for itself. It is the least food secure area in the country and thus the most vulnerable. What will it take to make New England significantly more food secure? That is the question this book seeks to answer.

This book is the third volume in a trilogy on sustainable agriculture and food security in New England. The first volume in this series, *The Wisdom of Small Farms and Local Food: Aldo Leopold's Land Ethic and Sustainable Agriculture* (NHAES Publication #2260), presented a workable philosophy for sustainable agriculture based on Aldo Leopold's land ethic, a philosophy tailored to New England. That volume surveyed sustainable agriculture methodology and institutional development in two New England states, Vermont and Maine. It compared these two states with two selected Midwestern farm states, Wisconsin and Iowa.

The second volume in the series, *Pastures of Plenty: The Future of Food, Agriculture and Environmental Conservation in New England* (NHAES Publication #2340), focused on grazing or, as the Vermonters call it, grass farming, as the key to successful food production in New England's geographical, ecological, and cultural reality. This book looked specifically at the prospects for this method of food production in the four northern and central New England states and described the significant potential of grazing as the key to the region's food security.

The Real Dirt: Toward Food Sufficiency and Farm Sustainability in New England, the third volume in this trilogy, focuses on key areas of institutional and organizational development in sustainable agriculture in New England. It describes the critical link between oil and food, the vast potential of gardens for food production, and shows what has been accomplished in one New England place to achieve a higher order of regional food sufficiency and security than might otherwise be thought possible. *The Real Dirt* finds that university farms and town agricultural commissions are key infrastructural elements in the region's quest for food sufficiency and demonstrates both how they currently contribute to sustainability and what future contributions might look like. Those contributions relate to farmer and consumer education, opportunities for entry farmers, the need for farmland, and integration with local market outlets for products.

New England needs a new understanding of agriculture, but will this understanding come before it is too late? Food shortages occasioned by energy disruption may be in our future, and when they come, hunger will ensue.

This book is about potential. It is about New England's potential to feed itself, to be sustainable, to be secure. It is less the story of

Words of Wisdom from the New Hampshire Board of Agriculture, 1875

"For the present let me urge a more intensive farming. To the question that will arise, How can we make the steady and marked improvement you advise. Commence a system of production adapted to consumption on the farm. I would make clover a special crop, introduce sheep, turn something from the dairy and garden if it was necessary to obtain a little ready cash, and devote a considerable portion of the farm products to raising first class beef. These at present are the cheapest sources of manure. I would, of course, use due diligence and skill in utilizing all of the manure, and sources of manure about the farm. There are many leaks of fertilizing matter about the farm that might be stopped. I would irrigate where it is possible, underdrain where needed, and introduce the cultivation of roots."

NH Board of Agriculture, Fifth Annual Report, 1875

How far can we go in feeding ourselves? Today's mere 5% in New Hampshire, 10% in Massachusetts, and perhaps 20% in Vermont and Maine can most certainly be significantly increased, but by how much?

what has been than the story of what could be. New England's potential has lain nascent for far too long. It is time to engage it. Failure to do so will cause unnecessary hardship for New Englanders. In order to engage this potential, land grant universities – leaders in modern agriculture – will have to change, even make a U-turn. We can only hope that, assisted by their leadership, the people's demand for local food will be met, and, in these times of increasingly precarious energy and environmental circumstances, New England can become agriculturally sustainable and food secure.

Assumptions About Sustainability

The most we can do in forming our assumptions is to make sure they are as grounded as possible. If assumptions are made that change will occur, there is a mutual tendency in all of us to have anxiety and even to fear that change. We are comfortable with the known, much less so with the unknown. Perhaps nothing could cause greater anxiety than a change in our energy future, for nothing is more basic to the daily conduct of our lives. Oil in particular drives everything in modern life. Cheap oil underlies all aspects of our society, perhaps most notably our food system. Oil comes before food. We must have oil before we can eat. Thus, in addition to the deep and broad social movement toward local food and local farms, there is the even deeper and broader question of food sufficiency and food security.

But there are questions that one might ask about the sustainability of the current system of food production and delivery, the system which provides over 90% of all the food we purchase and consume. Fully dependent on oil and natural gas supply as well as availability and price, our present food system is subject to all the vagaries, volatilities, and characteristics of those two forms of energy. It is, therefore, fundamentally unsustainable and un dependable. We have no choice but to develop significantly greater reliance on nearby food sources which are less dependent on fossil fuels for their production and distribution. We are experiencing the depletion of light sweet crude oil and its sister, natural gas (the latter needed as a feedstock for chemical fertilizer). This is essentially the end of cheap oil and, concomitantly, society's now greater dependency on expensive oil from heavy, sour, often non-liquid forms such as tar sands, all in need of expensive processing, and expensive to tap deep water sources. The end of the era of cheap oil signifies dramatic volatility in price and, in some places, supply. This volatility has included rapid increase in price to levels unheard of, and to equally rapid decrease in price. The challenges of rapidly rising prices are obvious, but rapidly falling prices are equally if not more difficult to cope with, for they signify

What would economic development look like in the context of local food? The purchase of local food is said to have a multiplier effect of 4X in the local economy. This means that the money used to purchase local food is respent four more times in the community, creating local jobs. Why, then, do we not think of economic development in the context of local food? The bleeding of monetary wealth, and thus jobs, from the local economy through purchase of so much food and fuel from afar is the greatest possible drag on local economic development.

“[O]ne can say with high confidence bordering on certainty that only a predominantly local food system will ever be sustainable. What I mean by sustainable is the ability to endure ... I conclude that the current globalized food system is a flash in the frying pan because it doesn't respect the first law of thermodynamics ... [T]his fatal flaw [in the global food system] is insurmountable.”

The Thermodynamics of Local Foods,

“The Oil Drum”, September 16, 2009

(www.theoil drum.com)

The Year Without a Summer in New England, 1816

(New England Famine, 1816)

“Months that should be summer's prime

Sleet and snow and frost and rime

Air so cold you see your breath

Eighteen hundred and froze to death”

An Old Rhyme

On the Tombstone of Reuben Whitten (1771-1847), Ashland, New Hampshire:

“Son of a revolutionary soldier,

A pioneer of this town, cold season of

1816 raised 40 bushels of wheat on this

Land which kept his family and

Neighbors from Starvation”

“There is nothing superior, nothing more fruitful, nothing more worthy of a liberal mind, than the pursuits of agriculture.”

Cicero

a drop in investment in energy development (i.e., drilling, refining, transport) and the development of needed alternative renewable energy forms. Dropping prices thus portend serious oil and other energy shortages and the eventual possibility of oil rationing (and perhaps food rationing) in the not too distant future. Likewise, uncertainties abound in the U.S.'s ability to continue to import large quantities of oil from elsewhere.

Eating local is more than a movement. It has become a fact, a reality. One should not underestimate the depth and breadth of the national "eat local" movement and the concomitant effect that that social movement has on local farms and farmers, on farmers markets, and on the purchasing patterns of restaurants, schools, hospitals, other institutions, and on the public in general. The surprising growth in numbers of farms and in retail farm sales in Rhode Island and in southern New Hampshire, both well populated and largely developed suburban areas, is indicative of this social movement. It is fact. It is reality. There is reason to believe it will continue growing as more and more people become wedded to it as a value and as institutions follow their clients and customers' demands.

When one considers the very real social movement of local food along with the equally very real loss of dependability on the present system which supplies the vast majority of our food, one begins to see the absolute necessity of having a local food supply and the truth of James Howard Kunstler's prophetic statement, "Agriculture will return to the center of the American life in a way that we couldn't imagine." He is referring not to choice but to necessity.

Readers of this book and its two predecessors must necessarily differentiate between a farm and a factory, a farm and a business. A farm produces a product but is not, in its essence, an industrial operation. A farm is engaged in business transaction but it is not fundamentally a business nor is it a factory. Wendell Berry has taken this issue further. He considers the phrase "agri-business" an oxymoron: a culture cannot be a business, so if agriculture is a culture, then it cannot, at its heart, be a business, even if it is characterized in part by business transactions. As we remove the industrial or factory model and acknowledge the ecological, the biological model, we open the path to reducing oil dependency.

Large-scale, centralized, energy-intensive, and capital-intensive industrial agriculture is well-named, for it is a model of agriculture which essentially mimics the factory model of industrialization. Its roots are with Frederick Winslow Taylor and "Taylorism," the assembly line approach to production which Henry Ford popularized very successfully in car manufacture ["Fordism"]. It assumes that the agricultural system is a mechanical system producing a manufactured product. Industrial agriculture is a mimic of industrial manufacturing.

"Agrarianism is a culture at the same time that it is an economy. Industrialization is an economy before it is a culture."

Wendell Berry

19th -Century Agricultural Economics and Prophecy

" [W]hen western lands can no longer be obtained at nominal prices, and the era of high culture dawns, there will be an appreciation of eastern lands, especially those of New England, some of which are now the cheapest improved lands in the United States... In 1860 the products of all our manufactures amounted to \$59.76 per head; in 1870 they amounted to \$109.76 – nearly doubled in ten years. This large increase faster than population is partly due to cheap currency prices, but only in part... It points us to no distant day when we shall be a nation of consumers... [T]otal average value of all the products of the soil in 1871 was, for New Hampshire, \$24.96; for Iowa, only \$10.28; for Illinois, \$12.95; for Indiana, \$14.18; for Minnesota, \$11.56 Not a bad showing for our state."

J. W. Sanborn, The Future of Farming in New England

(Fifth Annual Report, New Hampshire Board of Agriculture, 1875)

A 19th -Century Lament

"... Farmers depend too much on the land and too little on themselves. We have not been farmers but robbers. The great mistake of American farmers has been the disposition to pull up stakes and go somewhere else... If you are not satisfied here get satisfaction from better farming where you are, rather than move. When there are six months of growing weather, why ask our fields for but three months of work? Dairying is the key note of success in New England agriculture... We should look up and speak well for New England agriculture."

Granite State Dairyman and New Hampshire Board of Agriculture Minutes, 1889

True then. True today.

The opposite of industrial agriculture and its companion, agri-business, is a biologically and ecologically-placed agricultural practice predicated on the principles of ecology, a more permanent (i.e., sustainable) form of agriculture that is sometimes called permaculture. At its best, it, too, is a mimic, for it mimics nature. It works with nature rather than against nature.

“Because I See New Englandly”: The Importance of Place

What does it mean to “see New Englandly?” This is the question I and others pondered at a conference in the late 1960s. At that conference, we explored the idea of “seeing New Englandly,” that is, seeing things from a New England perspective, from the perspective of New England geographical, ecological, economic, and historical-cultural realities. Our goal was to pull together and develop a sense of New England regionalism.

More recently, a group of historians, anthropologists, folklorists, and others have come together to ponder the same question. The result was an Encyclopedia of New England Culture. The model chosen was the Encyclopedia of the South, a reflection that the idea of regionalism, particularly cultural regionalism, was best developed in the South. The South is obviously a much larger geographical region than New England and, in terms of population, is historically much more homogeneous. But it is a geographical region that has succeeded in developing a regional sense, a sense of common identity and purpose. It might help New England in the coming era of necessary relocalization to recognize the value of a regional identity. And as we do so, we must learn not only to see ecologically but also “New Englandly.”

Given developing realities, we might expect in the future a society with certain different characteristics from the world we know. We might expect:

- a reduction in choices to be made
- a change from a world of ought to do to a world of must do
- a world where peak oil issues will be more immediate than climate change at eliminating choice, with climate change eventually catching up to play its role
- a need to seriously reduce our dependency on fossil fuel in an orderly and rational way
- a need for adaptation to some ecological damage
- a need to adapt to life in a less mobile society, a slower moving society, a quieter society
- a need for re-localization in all areas of life
- a need to learn how to husband wood for fuel in our highly forested landscape, and thus to accept wood as a significant part of our lives

Choice has been a motivator in the past; necessity may be a bigger motivator in the future.

The essence of this book is relocalization. In particular, this book looks at relocalization with regard to agriculture, community, energy, and ultimately food. Chapter One examines the relationship between energy and food: we must have oil before we can eat. Chapter Two argues that, in a region made up of towns, town agricultural commissions are fundamental to in-

“Agriculture is the foundation upon which we build all our sandcastles. No agriculture, no sandcastles.”

Michael Olson, Metrofarm Radio

“Local trumps organic” says the region’s premier organic agriculture organization, the Maine Organic Farmers and Gardeners Association (MOFGA).

“The decision to farm organically was a statement of faith in the wisdom of the natural world.”

Eliot Coleman

creasing food sufficiency. Chapter Three posits that gardens, too often thought of as insignificant, are indeed powerful vehicles of food production which can, in turn, become testing grounds for farms and symbols of sustainability. Chapter Four shows what one city, Burlington, Vermont, the so-called “capital of the localvores,” has done to make “eat local” a reality. Chapters Five through Ten describe and assess the infrastructure and projects at the farms connected to each of New England’s six land grant universities, making recommendations for changes that will help these important public institutions lead New England toward a food-secure future. This book is the first to systematically treat university farms in New England. Chapter Eleven asserts that the food renaissance in New England has already begun.

Since we must have oil before we can eat, Chapter One seeks to investigate why that is so.

*Oil before food. We must have oil
before we can eat*





CHAPTER ONE:

Oil Before Food – We Must Have Oil Before We Can Eat

The focus of this chapter is the interconnection of oil and agriculture and the utter dependency of all New England and American food production, plant and animal, on oil.

We must have oil before we can eat. We are the first people in the history of humanity to require oil before we can eat. This has been true only since the mechanization of agriculture and the conversion of agriculture from a biological to a chemical dependency, a conversion which occurred in the earlier twentieth century as a result of cheaply available oil. Since oil is now at (or has passed) the peak in global production, we know that the supply and price of oil, oil which underlies by far the vast majority of our day-to-day activities and the manufacture of our possessions and literally defines modern life, will become ever more volatile, and prices will climb indefinitely. We have arrived at the end of cheap oil, an event which, because of our addiction to cheap oil, essentially defines not only the end of a resource, but the end of an era – the Petroleum Era.

Agriculture is the first victim of cheap oil. This is why James Howard Kunstler has remarked, “Agriculture is going to come back to the center of the American life in a way that we couldn’t imagine.” It will not return to the center out of choice but rather out of necessity. All things will become more local in an era when the availability of cheap oil is drastically reduced. In this reality, distance becomes money. “Eat Local” campaigns will not be needed, for there will be little other choice. As our energy circumstance causes relocalization in our society, our local reality becomes our central reality.

Here is the present reality:

- New Hampshire is only 3-4% food self-sufficient.
- New England is less than 10% food self-sufficient.
- On average, the food we eat travels over 1500 miles from source to dinner table.
- 90% of our food is transported to us by truck, vulnerable to diesel fuel availability and price, and dependent on deteriorating highways and bridges.
- Only 9.5% of our income goes to food, the lowest percentage in the world – we are under-investing in our food supply and are suffering the consequences.
- “Just in time” delivery means we have only 3 days supply of food here in New England at any one time.
- We import over 60% of the oil we use every day, mostly from distant and unstable locations (and, in fact, countries which themselves are losing their ability to continue exporting oil).
- It will require substantial quantities of cheap oil to establish alternative energy industries – once oil is no longer cheap or reliable in supply, alternatives cannot be established.
- We invest three units of energy into every farm field or farm animal for every one unit we get out, and from ten to thirteen units in for every one out at the dinner table. This is a huge inefficiency.
- Though we live in the wealthy western world, we are not immune to famine. Wendell Berry told us, “Don’t think it can’t happen here. It can.”

This is our current reality, but, imagine a world in which you knew

“[T]he coupling between economic growth and increased oil consumption is decisive. As of late 2009 oil production is around 84 Mb/d. If the next economic upswing requires an additional increase in oil production of 10%, then we would need between 92 and 93 Mb/d. Our calculations show that such an increase is not possible. What will happen now that the fuel for the next economic upswing cannot be found?”

“Peak Oil – Economy and Climate on the Path Down from the Peak” by Global Energy Systems, Uppsala University, Sweden

the farmer who grew your potatoes and the dairy family that supplied your milk. Imagine a world where local is more than a concept. That is the world which our new energy circumstance is now driving us toward.

This chapter on energy is based on the following assumptions:

1. Oil and natural gas are inextricably linked to agriculture, and the dependency of food production particularly on oil, given the way we produce food and therefore eat, is fundamental and pervasive.
2. Our national addiction to oil is based on cheap oil, that is, light sweet crude, which requires little processing and is very high on energy content. Expensive oil, such as heavy oil, sour oil, tar sands, deep ocean oil, will not suffice to maintain our infrastructure, nor the way we organize our institutions and our lives because of its high cost and its lower energy content.
3. Today we are at or perhaps just past the peak of global production of highly processed cheap oil upon which we are dependent.
4. Over 90% of the food consumed by New Englanders is dependent on energy-intensive industrial/chemical agriculture, and transported very long distances by trucks over failing roads and bridges.

A book on food security and sufficiency would not be possible without some attention to energy, and particularly cheap oil. What we need to know here can be related in just a few simple facts that describe our present circumstance:

1. Most energy and oil experts now agree that we have arrived, globally speaking, at the peak in production of light sweet crude. We are now on the downside of production and can expect extreme volatility in price and supply and, overall, significantly rising prices. Expensive-to-process oil from expensive-to-drill locations is not helpful – our world, the entire modern world we know, is designed to depend on cheap, not expensive oil. We can expect less oil in the future.
2. Ninety-eight percent of all the energy in our food at all stages, from production on the ground through processing, preserving and distributing, to the retail market and dinner table, is based on only two forms of energy, both fossil fuels and each related to the other: oil, and its sister, natural gas. (Natural gas is the feedstock for chemical fertilizer, while oil is needed for all else.) Every other form of energy relates to just 2%. Thus, what happens to oil particularly, in supply or price, directly affects all food and this tenuous relationship is the foundation for the statement, “We must have oil before we can eat.” In this reality, agriculture, not transportation or habitat, becomes the first victim of peak oil.
3. Competition for land caused by the emergence of biofuels, particularly corn ethanol which is highly government subsidized and thus has higher market value than crops for food, drives up food prices and increases food scarcity.
4. There is an increasing need to lower our carbon footprint and reduce CO₂ and other greenhouse gases, thus reducing dependency on fossil fuel in the wake of climate change realities.
5. Couple these things with extraordinary droughts in important food-producing regions and a globally contracting economy, loss of investment in the development of energy alternatives, loss of investment in food production firms, reduction of credit to those firms and to large commodity farmers, and one finds a serious lapse of food security.

All of these energy and economic realities speak to a rise in dependency on local food production for local use to a much greater extent than we have heretofore witnessed. Invigoration of small farms, new farm start-ups, farmers markets, CSAs,

“We eat oil. Today the food that we consume would never arrive on our table without oil. A study from the USA shows that every 1000 kilocalories on our table require more than 5000 kilocalories of oil and natural gas to get there ... 60 Mb/d of oil and natural gas is needed just to put food on all our tables, and that is more than 40% of the total production of oil and gas.”

“Peak Oil – Economy and Climate on the Path Down from the Peak” by Global Energy Systems, Uppsala University, Sweden

In fact, our food is 98% oil and natural gas in terms of the energy required to produce and distribute it.

Agriculture is virtually inseparable from light sweet crude.

serious food production gardens, a thriving local foods movement, and “eat local” campaigns are all a natural result. Agriculture will, indeed, return to the center of the American life.

A focus on grand solutions is self-defeating – we’re already beyond that. A number of scholars as early as the 1950s concur on this point. John Michael Greer in *The Long Descent* claims that the scale of national infrastructure projects in our past can no longer be replicated. He writes, “One of the core implications of peak oil is precisely that the huge projects of the recent past – the interstate highways and the Apollo programs – are slipping out of reach as the surplus energy that made them possible depletes out from under us... [T]hinking of peak oil as a problem we can solve by some grand project, or combination of projects, misses some of the most crucial features that define the crisis of the contemporary industrial world. The essence of that crisis is that we no longer have the resources or the time to bring about changes in our infrastructure or technology large enough to make a significant difference on a national or international scale. We threw away that opportunity when the industrial world abandoned the steps toward sustainability taken in the 1970s.”

Earlier still, in 1955, Harrison Brown reached a similar conclusion in his prescient work, *The Challenge of Man’s Future*, a book which undoubtedly influenced those who followed. Professor Dennis Meadows of UNH continues to issue these warnings today. If a focus on grand solutions is self-defeating, then we need to start with a close look at the resources that are actually available for change in the real world with all its political, economic, and cultural complexities. The local food system is one of the most inviting places to start. And it begins with action at the local level, in our towns and communities.

This argument echoes precisely the early warnings presented by the University of New Hampshire’s Professors David Skole and Charles Vorosmarty in their 1986 book, *Beyond Oil: The Threat to Food and Fuel in the Coming Decades*, and are also in synch with Dennis and Donella Meadows’ famous 1972 book, *The Limits to Growth*. Greer writes, “*The Limits to Growth*, the most insightful (and thus the most vilified) of the warnings issued during the Seventies, outlines the resulting predicament in detail. One of the central themes of that study was that constructive change had to happen while there was still a surplus of energy and other resources to fuel it. By the time significant shortfalls begin, all available resources are already committed to current needs, and any attempt to free up resources for some new project comes into conflict with the demands of existing economic sectors.”

“Stored Energy” vs. “Pass-Through Energy”:

Fossil fuels are concentrated energy. Alternative energies are dispersed, and hence weaker forms of energy. When we think about energy, we think about sustainable and unsustainable forms. Non-renewable energy is unsustainable and renewable energy is, by definition, sustainable. Non-renewable energy is “stored energy”, which is “high energy” energy. Renewable energy is “pass-through energy” which is, by definition, “low energy” energy. Our agriculture will be forced to adapt to the latter, to pass through energy.

What Two Investment Bankers to the Energy Industry Have to Say:

“The only fix is making a sprinting retreat from our use of oil today.”

Matthew Simmons, oil analyst and investment banker to the oil industry

“The future will look a lot like the past. And that means more farms ... (N)ow unsalable real estate in the outer suburbs will be converted back into farmland ... Where is the food of the future going to come from? Your own back yard...The higher oil prices get, the more expensive distance becomes”

Jeffrey Rubin, Chief Economist, CIBC, 1988-2009

\$200-\$225/barrel of oil by 2012

\$7/gallon gasoline at the pump in the U.S. by 2012

These are forecasts by one of Canada’s preeminent energy economists, Jeffrey Rubin. They may be right. They may be wrong. But they are from a credible source, are endorsed by other credible sources, and may not be prudently ignored.

Stored energy is energy of the past, developed over eons, and includes coal, oil, natural gas (the “fossil fuels”), and uranium, all originating from past sunlight. They are nonrenewable. “Pass-Through” energy is energy of the present (wood, solar, wind, and hydro). It is a product of present sunlight and is renewable.

The energy that has built our society is the nonrenewable “stored energy” of fossil fuels, and most recently uranium. The Btu (British thermal unit) or energy content of oil is very high, and thus the energy that has been available to us to operate our society has been, until now, exceptionally abundant.

Renewable energy is “pass-through” energy which represents far less Btu or energy content. Depending on renewable but limited “pass through” energy (e.g., biofuels) to provide the quantities of energy we are accustomed to using can only result in destruction of the food supply, if corn, soybeans or other crops are used as the energy base, or destruction of the forest system if wood is used as the base.

Biofuels, as renewable forms of energy, including switchgrass and trees, as well as certain oil crops such as sunflowers, can assist our energy needs. But they will have to be coupled with major lifestyle changes which involve significant reduction in energy demand. There is no way that biofuels of any kind can replace the energy content of fossil fuels without destruction of our food and fiber resources. Hunger is the direct result.

If indeed our oil-based food system is on the brink of decline, then we must take up the task of separating agriculture from fossil fuel. Our land grant colleges of agriculture in New England are perfectly poised for this task. But how can they lead the way? Here are some concrete steps:

- reduce significantly the long distance transport of basic food and completely revise agricultural practice away from energy-intensive and capital-intensive agriculture
- focus on smaller-scale local agriculture and a closed systems approach to farming
- end energy-intensive animal confinement
- bring animals to food rather than bringing food to animals
- decentralize, not concentrate, animal waste, and treat that “waste” as the resource it is
- graze animals on grass, not feed them grain
- extend the season through capture of solar energy
- provide local food for local markets
- direct market, farmer to consumer
- and, for New England, increase significantly food production capacity for each of our six states.

These initiatives require the serious involvement of each of the land grant university colleges of agriculture, their agricultural experiment stations, and their extension services. The land grant universities are the historic leaders. They have the infrastructure, the cultural tradition, and the mandated mission – in research, teaching and extension – to lead again.

A Grand Turning

What does a certain executive in the oil industry and a northern New England country fair have in common? They both represent a grand turning, a turning away from oil dependence. Maine and the Maine Organic Farmers and Gardeners Association’s Common Ground Country Fair, an icon of low-energy food production and lifestyle, could almost be said to be a direct response to oil man Matthew Simmons of Houston, Texas, and Rockport, Maine. Author of *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*, and anchor of the “Oil Peakists,” Simmons is among the most serious and respected advocates of the idea that we have now arrived at the peak of global oil production and thus the end of the era of cheap oil. And Maine’s Common Ground Fair, well established in Maine society for over thirty years, is a direct response to our necessity to accept the end of oil as we know it. Simmons and other oil and energy specialists are now warning us that agriculture, and thus our food system, is the first victim of peak oil, and the model of the Common Ground Fair represent our path to food security without (or with significantly less) oil dependency.

“A Farm for the Future”

Grounded in peak oil discourse, this 49-minute film draws on notable peak oil experts Colin Campbell, Irish petroleum exploration geologist, and Richard Heinberg, U.S. human ecologist. These scholars inform the film’s focus on energy, while British farmers and permaculturists inform its agricultural base. By exploring the food-energy interface, the film is a strong statement about Britain’s food future and, by extension, the rest of modern society’s food future as well.

After analyzing the totality of modern agriculture’s oil dependence, the film focuses on a number of low energy permaculture models. The film is particularly applicable to areas such as New England where small-scale farming and small-holdings flourish and are rapidly growing.

New England farms will only truly be farms for the future when they commit themselves to the notion that we must separate ourselves from oil before oil separates itself from us. And this BBC documentary film, A Farm for the Future, points out the direction that such a separation might take.

TWO NEW RESOURCES

As our economy and society contracts rather than expands, and as our world becomes more local due to economic and energy realities, two new resources are beginning to emerge: space and labor.

SPACE: Around us we see empty storefronts, empty big box stores, empty car dealerships and gas stations, empty parking lots, even empty shopping malls, not to mention empty residential properties, both condos and detached houses. This abundance of newfound space is a natural consequence of over-building and, to a great extent, these spaces will not be re-used for their original purposes. Some will be demolished for salvage, to reduce taxation expense or to create open space and for re-use of the land. But many will just sit there empty, perhaps for a long period of time. This built space and its infrastructure (electricity, water, heat, as long as they flow) has value. How can we imaginatively and creatively put it to use? This will be both a challenge and an opportunity for local government and organizations. But built space is a resource and clearly has economic and social value. It is a particularly good resource for food storage, processing and distribution, all of which are space-intensive.

TIME: We now have an official national unemployment rate of about 10%, and rising. Counting the amount of involuntary partial employment, the true national rate of unemployment is perhaps 17%-18%. Not only are people losing full-time jobs with limited prospect of re-employment, but others are experiencing mandatory downsizing to partial employment, while yet others are facing unpaid furloughs of varying lengths. We have a growing population with unanticipated time on its hands. Some will use it to spend more time with their families, to garden and to landscape the home grounds, to renovate the house. Others will scramble for piecemeal work to earn at least some income. But can people with unexpected time contribute some of it on behalf of the community, including increasing the economic viability of their community (food, transportation, other forms of local economic development and community betterment)? What might this look like?

Can this unexpected excess of space and time be put to use in support of community needs, community security and improvement? This will undoubtedly become a greater challenge as energy prices rise, and as distance, any amount of distance, comes to represent a higher cost in energy and in money. Local reality is quickly becoming our central reality. Welcome to the neighborhood!

So, do we need oil before we can eat? We certainly do now. Our ability to sustain ourselves in the future, however, will depend on to what extent we can innovate a localized agriculture free from fossil fuels. In particular, can we separate ourselves from oil before oil separates itself from us?

We now turn more directly to local food production and the important infrastructure of the town agricultural commission to help accomplish such production.



Farmer Involvement

It is essential that farmers serve on agricultural commissions. If farmers do not step up to the plate and accept responsibility to serve on Town AgComs, then maybe others will fill in the roles and not do justice to the farmers (even while possibly meaning to do so). It's also important for farmers to serve on other boards of town government and to run for election.

Town of Carver AgCom



CHAPTER TWO:

Our Towns and Agriculture: AgComs to the Rescue

The focus of this chapter is the role of town government in New England affairs; the developing Massachusetts movement to establish municipal-level agricultural commissions (AgComs) and food policy councils which are spreading from Massachusetts into New Hampshire and other states in the region; what these commissions are organized to do, and what they might achieve in the future. AgComs represent agricultural development at the utmost grass roots level.

Although change can be inspired from top-down, true change derives from the grass-roots, bottom-up. For this reason, town agricultural commissions (known as AgComs), as evolved in the Massachusetts model, take on a particular importance. For it is the Town Agricultural Commission which holds the greatest hope for identifying to the community the farmers working in the community. Such commissions hold the greatest hope for avoiding or ameliorating conflict. These commissions can serve to educate local people about the importance of local food and, therefore, the importance of local agriculture to provide that local food. It is such commissions which can enhance relationships between the community, its farms, and its farmers - its food source. Thus, as a concept, the Massachusetts-style Town Agricultural Commission holds great promise for the New England region, a region in which towns and town government are the center of the community. Churches and community organizations can readily ally with the town commission to accomplish the task at hand, further strengthening the effort to achieve successful small-scale and, importantly, local agriculture. This model significantly enhances the possibilities of local agricultural production, at the market level and even at the community garden and home garden level.

An AgCom is an advisory commission or committee in town government composed of local citizens who are appointed by the town selectboard or town council. AgComs are composed of both farmers and non-farmers, although often only the farmers may vote. AgComs are established under Massachusetts and, more recently, New Hampshire statutes, with other states likely to follow. They have no statutory authority and may only advise the town. Town Food Councils are in essence similar although they are not yet as common, except in a few cities. They may be more appropriate for less agrarian regions.

In an era of a contracting economy and a rising need for decentralization and relocalization at the grass roots, the New England states find a great asset in their traditional town-level form of government, the most grass roots and democratic form of government in the

TOWN AGRICULTURAL COMMISSION ROLES

- as correctors of misconceptions about agriculture, they point out the need for measures that facilitate farmers' needs, like crossing roads with their herds so that adjacent pastures can be fully utilized in an expanded grazing scenario
- as facilitators of local food production
- as educators of the public and as resolvers of misconceptions about local farming and the needs of local farming
- as conflict avoiders and conflict ameliorators
- as architects of agricultural overlay districts in town zoning
- as designers of agricultural incentive agreements for local farmers and land owners
- as a voice on the municipal level
- as facilitators of tools for land conservation and open space protection, including outright acquisition, conservation easements/restrictions, and as other forms of assistance which vary from state to state, depending on state assistance programs
- as activists in questions of food security, fuel costs
- as definers of rural community and rural character
- as securers of future generations of farmers and as educators of those new farmers
- as participants in community land trusts

Town AgComs can:

- **compile a detailed inventory of operating farms, as well as teach historic farm and agricultural land use (a vision of the past as crucial to a vision of the future);**
- **assess the contribution of land currently in agriculture**
- **determine the rate of loss of farmland**
- **calculate existing undeveloped land that could be used for agriculture in the future**
- **analyze the benefits of locally grown food and products**
- **provide for human health and ecosystem health, and regional farm sustainability**
- **research the incentives and impediments to agriculture at the local, regional, state, and national levels in order to recommend policy change**

As the creator of the concept, the Commonwealth of Massachusetts has essentially established the definition of a Town Agricultural Commission, or “AgCom”. Under Massachusetts law, an AgCom is a committee established at the town level of government formed at Town Meeting through the passage of a local by-law. Each town can decide what the duties and responsibilities of the AgComs will be and these are then outlined in the by-law. Generally, Massachusetts AgComs:

- **serve as a local voice advocating for farmers, farm businesses and farm interests;**
- **provide visibility for farming;**
- **work with other town boards about issues facing the town;**
- **help resolve farm-related problems or conflicts;**
- **protect farmland;**
- **assist with natural resource management.**

United States, the government closest to the people and the epitome of both democracy and self-government. All other regions have devolved power to a higher level of government, whether county or state. While the need for effective local government is rising everywhere, agricultural commissions are poised to serve farmers and the growing local farming/food movement, as can food policy councils and committees, simply because they are local and grass roots and have the confidence of the people. They can do so by building on the New England tradition of town government.

New England, more than any other region of the U.S., has been and is a land of towns. The town level of governance has always reigned supreme and does to this day. In my earlier book, *Pastures of Plenty: The Future of Food, Agriculture and Environmental Conservation in New England*, I mentioned the large quantity of flags draping the walls and ceilings of the Great Hall of Flags at the Massachusetts Statehouse in Boston, probably the greatest physical display anywhere of the great number of towns that makeup New England states. I noted that each one of the flags, all 301 towns and 50 cities of Massachusetts, is the flag of a town or city bearing that town's or city's great seal, most of them originating in the 18th century. Americans from outside New England would be amazed to see the abundance of such flags, in a state that most Americans would consider small. Even smaller New England states have a similar abundance of towns.

New Englanders know what it means to live in a local reality: they live in a region of numerous small towns. Those flags are evidence for this claim. The town is the essential level of governance in New England. It is the New England reality. It is also the quintessential and ultimate example of highly decentralized and truly local governance. It is localization at its highest level, and it matches well with calls for a relocalization of our society, particularly calls governed by energy realities and the new reality that monetary cost increases proportional to distance. Thus, distance is costly. The organizational set-up is an asset during a time of relocalization and energy crises. And AgComs are local institutions that build on traditional New England town government.

The New England town meeting, held annually, is the last vestige of direct democracy remaining in the United States; all other forms are representative rather than direct. This is the basic governance procedure for these towns, where the budgets are set and the big decisions are made, later to be carried out by small elected boards of selectmen (now known as selectboards). It is in Massachusetts towns that, in the 1960s, the idea of town conservation commissions was born, a Massachusetts contribution which has now spread through New England and New York. And it was in more recent years that Massachusetts towns have given us the town agricultural commissions, now to be found in well over one hundred towns across the Commonwealth, and, not surprisingly, now crossing state lines into New Hampshire and elsewhere. Soon all of the region's states will have picked up on this Massachusetts idea.

The town is also the place where accommodation must be reached between countervailing viewpoints and forces – there is no way to steer around the requirement of accommodation. The modern world of most New Englanders is far removed from agriculture and the land. With such distance, the possibility of disputes and, therefore, of conflict resolution is endless. The serious cultural gap between a farming and a non-farming population must be remedied, at least to the degree that a non-farming population comes to understand what behavior and practice might be necessary to produce food, both plant and animal, for local people. The contemporary urban-suburban mindset, so distant from the land, must come closer to the culture of the soil, the ecosystem, and food and its production. There must also be accommodation between the farmer and the environmentalist, always, of course, within the context of ecological rather than industrial or energy and chemically intensive factory agriculture. But accommodation there must be if local food is to be produced. Likewise, there must be accommodation between and among farmers themselves, with larger-scale practitioners of industrial agriculture learning how to adjust to low energy, sustainable agriculture, sometimes organic, sometimes grass-based (i.e., grazing). Accommodation between “unlike-minded” groups will be among the AgComs’ most challenging and important tasks but, as options for food choice become reduced with increasing anxiety over food sufficiency and security, these challenges should become less difficult to confront.

AgComs were initially established to give those still farming the land a voice in local government and to raise public awareness of the issues they faced. Eventually the commissions took on other roles, not the least of which is the amelioration of disputes between farm and non-farm interests. Sensitive issues include noise, odors, dust, slow-moving farm vehicles on roads, water issues, and others. Farmers’ firing off loud “cannon” to scare marauding birds out of cornfields is not only an issue of noise but, what’s worse, a misunderstanding that the birds are being shot. Folks living in large areas of northern Vermont and Maine still have their ties to and are knowledgeable about the land. But many others have lost those ties. There is a cost to this modern disconnect from nature and the land: a reconnect must be made. Such re-connection will be made over time as the circumstances of energy and of the economic organization of society begin to require such reconnection. Agrarian thought and agrarian ways will return. In the meantime, numerous local disputes between farmer and non-farmer, disputes which would not have arisen in an earlier time, will continue for awhile and conflict resolution services, by town AgComs and others, will be needed during this time. As the basic need for local food increases, understanding will win out and fewer such disputes will occur. In time, therefore, misunderstandings about farmers and farming will decrease, as will the need for conflict resolution.

Massachusetts Chapter 61A – Differential Assessment Law:

- provides large local tax benefits to property owners looking to make a long-term commitment to farming (on a minimum of 5 contiguous acres)
- requires for its implementation a history of 2 consecutive years of farming, the production of \$500 gross sales for the first 5 acres and \$5 for each additional acre (it might be better to have criteria related to poundage of food production, or allow for this if food is donated or bartered)
- provides the town first right of refusal on land sale

The law also provides for a Conservation Restriction with Agricultural Provisions, an agricultural easement with no minimum acreage requirement, and major federal income tax benefits.

Ultimately what’s important and what will drive everything else is the poundage of food sold directly by local farmers to local consumers – that’s even more important than the revenue because it creates a true dependency on the farmers by the consumers and not the other way around. It is not wise for the farmer to be dependent on the consumer. Everyone who eats gains when the farmer is in the driver’s seat.

Massachusetts APR Program:

For owners of “prime” and “state important”-designated agricultural land, permanent restriction with continued agricultural use is available. The farmer receives one monetary payment consisting of the difference between fair market value and agricultural value. The law requires a half acre minimum, with the land in agriculture for at least two years prior.

APR Municipality Program (MUNI) – provides grants to towns with 20% town match if the town has at least 400 acres in agriculture.

Massachusetts ranks first in the nation for the average value of farm sales direct to consumer. Barnstable County’s value of agricultural products sold directly to the consumer is up 44% from 1997 to 2002.

“Milestones”, the quarterly newsletter of the Dartmouth Natural Resources Trust, Inc., is an example of a Massachusetts town natural resources publication and its organization which is moving significantly toward the idea of local food and agriculture and local small-scale farming as an inherent protector of open space and natural resources. This is an important sign of environmental conservationists and natural resource professionals crossing the cultural divide and embracing local food and farming as a basic tool in their tool box of ecological and natural resource conservation and land protection.

Agricultural Commissions of Cape Cod have allied and are holding joint meetings for the purpose of looking at a regional approach to food production and how AgComs can work together within a distinct region. They are focused on protecting small acreage agricultural ventures; on no net loss of agricultural lands; on trying to inventory undeveloped land in the town and the county and how it might be placed into agricultural production. They have an overall focus on land available for food production to feed the local population, and are looking at food security earlier than AgComs in other parts of the state. To them, economic development is secondary. Falmouth folks in particular have begun to think about planning for the time when Cape Cod might have to feed itself. And they’ve concluded that, in hard times, the rich farm production of southeastern Massachusetts will all go to Boston, leaving the Cape hungry.

While farmer-neighbor mediation is the big work for many commissions (including the production of information/education pamphlets to alleviate this need), other important activities include the development of shared commercial kitchens; regular farmer/townsperson dinners using mainly local food; market development through Harvest Handbooks, Buy Local campaigns, and working with local restaurants and institutional food buyers; placing low-cost housing on farms to house farm help; establishing a graziers’ group where appropriate; work on the town government’s relationship with agriculture and local farmers; and sponsoring specialty workshops (organic vegetables, ginseng, lavender, herbal medicine, etc.)

An important reason for the establishment of some town AgComs is a desire on the part of the farmers to gain recognition for their work.

A further critical reason for the establishment of town AgComs has been agricultural land and soil protection. As is well known, an appalling amount of good farmland in New England and the Northeast has been destroyed, giving way to housing subdivisions, commercial development, parking lots, roads, and highways. This process of destruction continues to the present time, in part because the most developable flat land is farmland, including that with rich alluvial flood plain soils. More than a few town AgComs have been born out of conflicts over the best use (so-called “highest use,” economically speaking) of agricultural lands and the strong societal and economic bias favoring destruction over protection. Development and growth are always defined by residential and commercial development, never by farmland or open space protection. Such “development” always has the upper hand in the legal structure and in prevailing politics. As strong as open space and land conservation movements have been at certain times and in certain places, the basic fundamental bias toward a narrow definition of development may well not change until there is serious anxiety over food shortage. Therefore, it behooves the town AgComs to take the next step and to start assigning themselves a much more significant task: that of food security and food sufficiency.

In some communities, Food Councils have a more valuable cachet than AgComs. In those suburban towns which have lost the agrarian culture they once had, the word “agriculture” just doesn’t cut it. Ironically, in more urban places, the word “agriculture” has a value related to “urban agriculture” (i.e., gardens for food) and the rising popularity of farmers markets and CSAs in cities. Agricultural attitudes are actually developing and growing in cities. But, in many suburbs and cities, food, with a constant reminder of the connection between “food” and “agriculture,” would be a more effective approach. In some cases the joint phrase “food and agriculture” will work. For now, however, suburban towns need serious Food Councils, entities that oversee the local food system, perhaps in place of AgComs, and strongly linked to local food and, therefore, local farms and farmers. People who do not feel connected to agriculture or farming do identify with food. Urban and suburban areas will more often strongly identify with food than with farming.

AgComs must, therefore, become “FoodComs” as well. Of course, not all agriculture is food-related. There are fibers, the most important of which for New Englanders is wool – we may see a return to wool. And there is energy, particularly wood energy for the broader society and on-farm production of biofuels for on-farm use. (Wisdom suggests that farm production of biofuels for off-farm use is generally not efficient.) So AgComs must consider fiber and some energy production in their portfolio, but food, of course, dominates. It is ironic that some of the most economically valuable agriculture in all of New England in modern times has been landscaping plants

and turfgrass (sod) and, as well, production of hay for horses used for show and recreational purposes, all non-food purposes. The burgeoning landscaping industry has been developing largely at the expense of food production, as it has its core in the too-often farm-destroying residential and commercial development which has a high requirement for landscaping plants. Residents in all six New England states ask why the emphasis at their land grant colleges of agriculture on non-food subjects (turf grasses and landscape horticulture) at the expense of basic animal science, agronomy, pomology and other food areas of teaching and research? The answer lies in the much greater immediate economic value of those non-food areas in the local economies. Deep down people know that, if we are to eat, this situation will have to change at the land grants and across the society. Municipal AgComs and FoodComs can pave the way. If New England is going to be food-challenged at some point in the future, it is the local level, the town level, which will feel it most directly. It is the town level, therefore, which must be prepared to respond.

New Hampshire, which appears to be the first to adopt the AgCom concept from Massachusetts, has published "Creating an Agricultural Commission in Your Hometown." In the words of the author, New Hampshire Agriculture Commissioner Lorraine Merrill, who was then representing the NH Coalition for Sustaining Agriculture, "An agricultural commission has no regulatory or enforcement authority ... [it] serves a similar role for local agriculture as a heritage commission for historical resources, or as the non-regulatory aspect of a conservation commission for natural resources."

According to Commissioner Merrill, an agricultural commission may:

- advise and work with other boards and commissions on farming issues in the town
- conduct inventories of agricultural resources
- conduct inventories of historic farms and farm buildings
- educate the public on matters related to farming and agriculture
- serve as a local voice advocating for farmers, farm businesses, and farm interests
- provide visibility for farming
- give farmers a place to go for help
- help resolve farm-related problems or conflicts
- help protect farmland and other resources.

Town of Carver AgCom's Ten Point Plan:

Buy local produce

Be a good neighbor

Give a thumbs up for farm traffic

Know that farmers use best management practices

Respect farmers' private property

Support farms

Understand that farming is a business

Learn how agriculture benefits the town

Communicate (farmer/non-farmer)

Volunteer (to promote local agriculture)

This list is, of course, biased in favor of the farmer. This is in deliberate recognition that, with the decline of agrarian culture across most of New England, the farmer and farm sector are discriminated against on a steady basis in many aspects of town life, largely as a result of the failure of the general public to understand either the workings or the needs of agriculture. The point of the AgCom is to rectify that imbalance of knowledge and attitude in the public interest of all town residents.

Additional roles for Town AgComs can include distribution of seeds to local townspeople for their vegetable gardens, along with provision of basic printed information on how to garden and on the importance of gardening to produce local food.

The Town of Carver has demonstrated what one town can do by publishing its model "Report on the Economic Impact of Agriculture on the Town of Carver, Massachusetts" (First Pioneer Farm Credit, ACA, March, 2006). The study is based on 165 farmer surveys, with 77 surveys returned representing 80% of the agricultural acreage in the town.

Expressing some degree of frustration over regulations, a local farmer quipped, "We've got to defend ourselves in order to grow food for people!"

• Preserving “Rural Character”

Much is made in New England towns about preserving and protecting rural character, but agriculture provides rural character. And agriculture provides economic benefits, making it an important form of economic development.

• As Good as Their Membership

“Town AgComs, like almost any component of local government, can be used for good or ill, depending on who is serving in them. If you have yeoman farmers, they can be stalwart defenders of all that is right in rural life. If you have agri-business skills, you can have apologists for industrial agriculture who declare GMOs to be best management practice and prevent towns from expressing concern about them.”

Jack Kittredge, Mass NOFA

• Friends of AgComs

Should AgComs actively invite local institutions and businesses that are purchasing local food or otherwise relying on local agriculture to be involved with the Commissions? Or are they more appropriate as friends of the AgCom groups? It is important to have farmers as the voting members of the AgComs, but a different category of membership, the non-voting “Friends of Agcoms,” will do most of the work. So, there needs to be an “interested in farming” category which opens AgCom membership to new farmers and would-be farmers.

- **Land trusts increasingly believe they need to keep the land working and thus want to support the idea of a “working landscape”, in contrast to supporting only “natural” or “forever wild” landscapes.**
- **Lee is now so prominent in New Hampshire in its AgCom activity that, at a recent state-wide AgCom meeting in Manchester, the little town was cited so many times that someone from upcountry remarked, “This must be the Lee meeting!”**
- **An AgCom could become such a powerful tool for conflict resolution that it could entice elected officials to establish a similar commission to resolve conflict. The AgCom, therefore, needs a place at the table alongside the Planning Board, the Conservation Commission, the Historic District Commission, and other Town Boards.**

Commissioner Merrill also notes potential future activities of town AgComs:

- publicizing farm retail outlets in the town
- fundraising for farmland protection and economic development
- collaborating with other town boards to review development proposals
- holding educational workshops on intergenerational transfer of property
- conducting an inventory of farms and barns
- discussing state and federal grant and land protection programs
- starting local farmers markets
- obtaining technical assistance on conservation easement planning, woodlot management, nutrient management, environmental stewardship, and non-point source pollution management
- adopting local right-to-farm bylaws (specifically to reinforce community support for the NH Right to Farm Law [RSA 432:32-35] and NH’s legal definition of agriculture [RSA 21:34A], thus protecting the farmer)
- hosting farm festivals.

Commissioner Merrill cites strong Massachusetts models in the towns of Rehoboth, Hatfield, and Westport, and New Hampshire’s town of Lee. The latter hosts a town agricultural commission and is New Hampshire’s most active and ambitious town when it comes to a model of how an AgCom could be operating.

Conclusion:

Since all towns and municipalities, even the City of Boston, can produce some food, a case can be made for all local governments in New England to organize AgComs. At the very least, since all people eat, municipalities should organize Food Councils if they identify more closely with food than with agriculture or farming. An important goal would be an AgCom for each municipality in the state. If a town has a Planning Board (and all do), it should recognize that planning for a secure food supply is more critical than anything else one might plan for! Town AgComs can be securers of local food and guardians of local food sufficiency. The bottom line is local food production here in New England, insuring both food security and food sufficiency.

We now turn to the unimagined power of gardens to increase local food production capacity.

Getting Creative

Creatively speaking, town AgComs could:

- **create agricultural overlay districts as a community bylaw to reduce development impact on farms**
- **organize agricultural incentive agreements, offering tax rebates for ten years to keep the land in farming**
- **encourage local businesses to direct purchase from farms**
- **provide seed distribution for landowners with “how to” instructions (especially as seeds are now becoming more difficult to obtain, or as competition for seeds rises)**
- **provide locally grown seedlings**
- **arrange the processing of local compost from food waste, including the collection of waste from food service institutions and restaurants and the distribution of the compost to farms**
- **promote on-farm energy, including creating supply and solving demand problems and including collaboration between and among adjacent and nearby farms**
- **promote local and regional heirloom varieties of plants and heritage breeds of animals, particularly those which are part of local history**
- **encourage less common value-added possibilities, including table grape production in the vineyards and vodka/spirits production from local apples, potatoes and grains**
- **create new pastureland and farmland through land conversion and renovation**
- **educate the townspeople on the insecurity of their conventional food system, based on the insecurity of the oil upon which it is dependent**
- **promote local food gardens (home gardens, school gardens, church gardens, community gardens)**
- **encourage investment in small-scale local food processing facilities, regional meat processing infrastructure, grain processing infrastructure, community kitchens, etc.**
- **collaborate with land trusts and open space conservation organizations to get more land into farming**
- **create and operate winter and all-season farmers markets**
- **study other town AgCom experiences in both more urbanized and more rural environments, and learn from their experiences**
- **forecast the impact of national events on one’s own town’s food supply.**

The Department of Agricultural Resources for the Commonwealth of Massachusetts has published a remarkably detailed 43 page book, “A Handbook for Agricultural Commissions” which may be downloaded from the Department’s website. The Table of Contents includes “Creating an Agricultural Commission,” “Established Agricultural Commissions,” “Business Meetings,” “Communications,” “Public Records,” “Board Member Responsibilities,” “Use of Town Counsel,” “Resources,” and numerous additional pages of Appendices.





Mountain-Top Garden

There was even a war garden on Mt. Washington in New Hampshire right next to the tracks of the Cog Railway: "...[T]he tiny garden on the cloud-capped slope of the White Mountains was wholly utilitarian. A patriot hand had planted it and loving fingers tended it, in the hope that it would bring forth, perhaps, a few dollars worth of food; in the belief that its product would lessen, though ever so little, the pressure on our commercial food supplies... The same spirit of helpfulness... animated countless other Americans." (*The War Gardens Victorious*, p. 35)



“(M)an’s work is nothing but this slow trek to rediscover, through the detours of art, those two or three great and simple images in whose presence his heart first opened.”

Albert Camus

For many, that would be gardens!

CHAPTER THREE:

Small is Beautiful: The Power of Gardens as Sustainability Models

The focus of this chapter is the enormous potential of gardens for food production. We will never know the true extent of food production from private, home and community gardens across the nation, the product of which is privately consumed, given, donated, or traded for goods and services.

The Power of Duck, a strange expression, perhaps, but the title of a recent book which describes in great detail a very important subject, the enormous quantity of food that can be produced on a surprisingly small piece of land, as in an urban environment, a backyard. The phrase refers to the Asian system of producing a great quantity of rice, fish, various vegetables, and, yes, duck, hence the book title (and sometimes chicken or other animals) from an aquatic pool with very little input of capital, energy, or even labor. The key is that every unit of the system serves every other unit and thus works at maximum efficiency, a much higher level of efficiency than we are accustomed to witnessing. America’s version of the “power of duck” is the work of California’s John Jeavons whose bio-intensive methods of raised-bed vegetable production have led to his book, *How to Grow More Vegetables Than You Ever Thought Possible on Less Land Than You Can Imagine*. Eliot Coleman of Maine, and the “father of season extension,” Otho Wells of New Hampshire, have given us similar examples of efficiency and high productivity in their pioneering work in season extension and all-seasons gardening in a cold environment. And there’s Joel Salatin of Virginia, the master of efficiency in livestock production, albeit with larger space requirements. The focus of this chapter is not on ducks but on the power of small.

Never under-estimate what a garden can do. We have a heritage of gardening in this country, and this chapter explores some of that heritage in war-time gardens, experimental gardens, university gardens, and Extension gardening instruction. Many gardens provide models which may prove to be a key for sustainability and food security, both now and in the future.

GARDENS

In most peoples’ minds, the word “garden” connotes small size, aesthetic beauty, production of flowers and other ornaments, perhaps landscaping, and something fulfilling an avocational or hobby interest rather than a vocation. In our culture, “small” is equated with unimportant, even when what is referred to as small is so common that its totality is, in fact, large. In our culture, bigger has long been better, and small has been taken less seriously. This is a real mistake. Consider the potential of that which is small but numerous, especially when the small is well tended and filled with purpose. Indeed, the potential of small gardens to produce significant quantities of food has been proven historically in the examples of Victory Gardens, Liberty Gardens, and Relief Gardens. These were part of a gardening movement that started with the less well known “Pingree Potato Patch Gardens.”

In difficult and challenging times, gardens have proven their food production ability. During the six years of widespread unemployment and loss of housing following the Panic of 1893, Americans grew and fed themselves from “Pingree Potato Patch Gardens.” This was the country’s first national gardening movement. Other garden movements followed: the Liberty Gardens of the WWI era (1916-1920); the Relief Gardens of the Great Depression (1930s); and, of course, the better known Victory Gardens of WWII, gardens which provided 40% of all U.S. vegetable production in 1943 (and 80% of all U.K. vegetable production in the same year). Today, we are experiencing the fifth great national movement toward community gardens, as yet unnamed, though I would suggest that “Sustainability Gardens” might fit the bill. Gardens are indeed powerful if we choose to make them so.

Community gardens, school gardens, even church and other institutional gardens are popping up all over. Undoubtedly, there is also today a substantial increase in the numbers and size of home

While researching the earliest American public experimental gardens at the Georgia Historical Society in Savannah, I discovered publications describing the earliest origins of such public gardens in the United States, the ten-acre Trustees Garden of James Oglethorpe’s Georgia Colony in Savannah in 1733-1734.

Research vs. Demonstration

There is an argument between experimental or research farms vs. demonstration farms. Not everyone believes that the university farms should be used for demonstration, but rather only for research. There is no question, that they are being used for Extension purposes, including specifically demonstration, as well as research and teaching. However, a given university may want to emphasize some purposes over others.

Savannah Plan

The Savannah Plan provides a model for highly sustainable urban design and development. It features gardens and food production in the middle of city squares and behind homes (kitchen gardens), shops and other businesses together with residences on the periphery. James Oglethorpe, the founder of the Georgia Colony and the designer of the City of Savannah, gave us a physical model of community sustainability, as John Seymour has given us a model for small-holding sustainability.

What about experimental gardens and/or demonstration gardens at the local level, including county farms and other public lands? County farms in particular, especially in New England, tend to contain some of the most fertile agricultural soils in an area.

and kitchen gardens. Home gardens, kitchen gardens, community gardens, school gardens, church gardens, corporate or company gardens, market gardens, urban gardens, homegrown chickens and eggs, a family cow, pigs, goats, rabbits – all are growing in popularity. And supporting gardens and gardening across the Northeast has been Cooperative Extension's Master Gardener Program. What is now needed for local food production and food sufficiency and security is: Market Gardeners programs – these would train gardeners to grow for market, in support of the many Farmers Markets emerging in the region.

It is time to re-frame our thinking about gardens, gardening and food production, and recognize the Power of Gardens.

On Victory Gardens:

Victory gardens were vegetable, fruit and herb gardens planted at private homes in the U.S., Canada, the U.K. and Australia during both WWI and WWII to reduce the pressure on the public food supply brought on by the war effort or to strongly supplement publically available food during the two wars. They were also regarded as a morale booster to gardeners because of the empowerment felt by those participating. Victory gardens became a part of daily life for many homeowners and even apartment dwellers who planted on the rooftops. (Urban parkland was also planted: the Fenway Victory Gardens in Boston are still active.) The nation's First Lady, Eleanor Roosevelt, famously established such a victory garden on the White House lawn, a strong symbol that has a contemporary counterpart in conservationist Roger Doiron's successful effort to convince the current first family, the Obamas, to do likewise. In 1943 there were over twenty million victory gardens in the United States.

Few people now living have any personal memory of Victory

Gardens from the WWII era. And yet the words "victory garden" are widespread throughout the culture. Awareness of these gardens from many decades ago is high, as if people today had those personal memories and experiences themselves. This means that the concept of a victory garden is now a powerful cultural symbol holding great potential. While the war-time victory gardens stood for victory over an enemy in war, they can just as well represent, in symbol and in action, victory over the national dependency on foreign oil, the unsustainability of our present food system. During the Second World War, victory gardens provided nearly half of all vegetables consumed in America, freeing up farm production to go overseas where it was desperately needed. This is not an insubstantial quantity of food. Americans also grew and raised much of their fruit, dairy, eggs and meat.

WWII victory gardens were a popular expression of patriotism. Sustainability is no less a call to patriotism today. The purpose of war gardens and victory gardens was to release food from commercial production to feed our armed forces and our overseas allies. Today, the same behavior is called for in order to achieve sustainability and maintain independence. Those were trying times – so also today. Through the schools, millions of children awakened to the value of gardening as a worthwhile patriotic effort. "In the development of school gardeners, two ideas were given consideration. An immediate increase in food production went hand in hand with the educational value of the work," the end result being the creation of "a vast army of future citizens trained to intelligent application of the principles of thrift, industry, service, patriotism and responsibility." (The War Gardens Victorious, pp. 73-74) Gardening worked closely with food conservation through home canning and drying. And community gardening was considered to be putting "slacker lands", that is, unused land, to work.

In the modern context, victory gardens, which still maintain such a compelling and powerful image in the American psyche, can be established to fight global warming, conserve energy, reduce America's fossil fuel dependency and dependency on foreign oil in particular, respond to current economic realities (i.e., food prices and supply) and, in general, achieve sustainability and adopt "green" behavior. The "victory" in the victory gardens has been re-defined in the pressing context of sustainability. And now landowners can participate through community gardens, through cultivating a neighbor's land and bartering the produce, through roof-top gardens, and even through small-scale but effective container gardening. Cooperative Extension, and particularly Master Gardener Programs, can provide helpful assistance. We are challenged by our lack of sustainability in the way we live today. Modern victory gardens as a challenge to our lack of sustainability could become a major antidote. And for those unable or unwilling to garden themselves, good job-creating services could be developed to do this for them on their own homesite. There is much acreage of lawn in all the New England states, as elsewhere, just waiting to be converted. The concept of the victory garden is and remains a powerful idea in our memory and culture, and this power can be drawn on for what it represents.

Victory gardens are proven success stories: they can provide for neighbors and friends as well as the gardening family, and they are such powerful symbols in the national cultural psyche that they should be considered a valuable tool today in the national effort to achieve food security and sustainability. Larger victory gardens can even become market gardens providing food to small local farmers markets and for local schools and other community institutions, including church and other food pantries.

The war-time victory garden concept is apt today. Victory in achieving a genuinely sustainable agriculture, local and healthy, is a victory over a fundamentally unsustainable food system upon which we've been dependent, at great ecological, energy and social cost, for the past six decades. Americans universally recognize the idea of the victory garden, and thus it is an idea which can profitably be resurrected. The widespread presence of such victory gardens in the community will be a tangible sign of the victory of an ecological and truly sustainable ethic, a land ethic in Aldo Leopold's sense, over the anti-ecological and clearly unsustainable ethic of development and exploitation which has been a driver for too long in our society and on our fragile planet.

Master Gardener/Market Gardener:

Master Gardener programs as a form of adult education are now offered to residents who have skills already and are a competitive program. They are ubiquitous at land grant universities in New England, and university farms generally host the Master Gardeners' garden plots that serve such programs, programs which in turn serve people seeking to hone their gardening skills or even to learn from scratch. Often the Master Gardener Program participants, and particularly program alumni, are playing an important role in support of the university farm. Master Gardener programs are sponsored by Cooperative Extension. The gardens used for study are on university farms. These gardens are scaled to the homeowner/landowner involved in these increasingly popular programs. Indeed, in a few cases these programs and the public demand for them are providing additional rationale and political support to shore up the university farms' role in support of Master Gardeners programs.

But home gardening is not for everyone. Constraints on home gardening range from lack of land to lack of interest in or inability to do the work. However, all people eat, and thus could benefit from these programs. At the same time, local farmers markets almost universally have a demand for more farmer/vendors. It is natural, therefore, to move at this time to the

Charles Lathrop Pack wrote the 1919 book, *The War Garden Victorious*, which includes chapters on "How Big Business Helped," "How the Railroads Helped," "The Army of School Gardeners," "Cooperation in Gardening," "War Gardens as City Assets" and "Cooperation of the Press." These chapter titles provide both the flavor of the book and the thinking of the time.

Gardens of Colony and State

"Gardens were a fact from the very first... In the early garden records of New England, there is not, lamentably, pleasure of any kind."

"The wave of horticultural enthusiasm which we find all through the young republic from 1800 to 1840 was noticeably strong in Massachusetts and was directed with admirable intelligence."

Gardens of Colony and State: Gardens and Gardeners of the American Colonies and of the Republic Before 1840

(Smallwood and Stewart, Publishers, for the Garden Club of America, 2000, pp. 19-20)

next step: market gardens and the training of market gardeners. The land is available to do it at the university farms and sometimes at Cooperative Extension centers in the counties (even sometimes at county farms, a generally unused remnant of the county correctional or “poor farm” system of the last century). As more people turn to the farmers markets, Community Supported Agriculture (CSA), and direct marketing for food, interest in and demand for Market Gardeners’ training programs will increase and land grant universities, cooperative extension services, and university farms are well equipped to serve this need. These universities should be setting aside acreage now on their university farms for the expansion of these Master/Market Gardeners programs and organizing alumni to teach with them, both to answer the need for more Master Gardeners and to serve the newer need for Market Gardeners. And the certification program now in use for the established Master Gardener program can carry over directly to equally certifiable Market Gardener programs.

Community Experimental Gardens:

Local victory gardens are very important, but they are for local food production, not research or demonstration. We also need local experimental gardens for research and demonstration in support of future local food production.

A step beyond victory gardens, whose purpose is local food production, is experimental gardens. An experimental garden is one established to provide opportunity for trying new varieties of plants and new ways of planting and cultivating to see what will work best in a given place. Such gardens, because of high public interest, would become the talk of the town and attract a good deal of public attention. Georgia’s ten-acre Trustees Garden, established in 1733 in Savannah (which was known as the “cradle of applied botany”) was perhaps the first example in the U.S. of a public experimental garden for food production – it focused on introducing exotic varieties of plants and animals, silk worms, wine grapes (which did not succeed), but also less exotic varieties which did succeed such as peaches and pears, helping Georgia later become the “Peach State.” It was inspired by the Apothecaries’ Garden in Chelsea, England. Today’s version of such experimental gardens would focus not on exotic introductions but on native heirloom varieties and heritage breeds. These are highly adapted to the local area and feature low-input,

Lawns to Gardens?

“...There was probably no town in the United States that did not have within its boundaries at least fifty acres of idle soil. In the larger communities where garden space was needed most, the aggregate area of vacant lots was astonishing...Altogether there were hundreds of thousands of idle acres in or near our towns and cities – the only places where labor was available for working them; and much of this land was suitable for gardening...Millions of ‘Allotments’, as they were called, were asked for, and the production of vegetables increased incredibly...”. (Pack, The War Gardens Victorious, p. 38) The “slacker land” of today is less often vacant lots (except perhaps in Detroit and a few other cities) and is more to be found in the form of lawns surrounding homes in subdivisions all over America.

SPIN Gardening and Locavoria

SPIN gardening, a recent development in the local food movement, stands for “Small Plot Intensive” agriculture and is seen as a method of bringing small-scale commercial gardening into a city. The city environment offers surprising advantages for growing food: a more controlled environment, fewer pests, more warm days (due to the urban heat effect), and, for those who want to sell what they grow, instant access to market.

Locavoria – a new small local food distribution system that relies on the internet to connect farmers and consumers. How it works: area farmers post their produce on line and families place their orders, also on line.

Needed Today

Books, pamphlets, websites on “how to” in gardening and preserving the product

Teachers of gardening

Canning, drying and preserving lessons, manuals and equipment

A restored and strengthened Cooperative Extension Service

Pingree Potato Patch gardens. Liberty gardens. Relief gardens. Victory gardens. Sustainability gardens. All powerful metaphors for the demonstrated power of gardens. Home gardens – up until the 1970s how many native New Englanders with even the tiniest patch of land did not have a garden? Experimental gardens – they date to the earliest days of the republic, in New England as elsewhere. Garden clubs in each community – a powerful grassroots social movement. Strong native traditions ingrained. Bio-intensive methods. Companion planting. Double-digging. Triple-digging. Compost and its home production. Other local soil amendments. Small-scale animal-plant-soil integration. How you can grow more vegetables than you ever thought possible on less land than you can imagine. Four-season gardening. Community gardens. Church and congregation gardens. School gardens. Garden care services replacing lawn care services. New local jobs. Bartering food for service and food for other goods. Schools for new gardeners. Canning and preserving. Solar greenhouses. High tunnels. Hoophouses. Season extension. Eliot Coleman. John Jeavons. The New Wave born and blooming everywhere!

Written at the summer lakehouse gardens of one of New England's consummate gardeners, UNH's Donna Simpson, the "Fern Lady of Sebec", who claims both Maine and New Hampshire as home.

low-cost returns in terms of highly nutritious and very tasty local food products with special characteristics, products that don't travel well and don't last long. These gardens could be established and situated on local public and quasi-public lands, including town and municipal lands, school district lands, church lands, and conservation easement lands. In fact, this is an excellent opportunity for conservation easement lands to make a return to the community. Management of these lands could be coordinated by the county or regional Cooperative Extension Agricultural Educator, when possible in conjunction with a local garden club. Garden clubs should have a clear and significant role in the organization and operation of such local community experimental or demonstration gardens.

Agrarian writer Gene Logsdon of Ohio expands the traditional role of gardens to what he calls "garden farming." This approach includes some animal husbandry, forestry-orcharding and home manufacturing as an extension of gardening, not something new or different. He tells us that "The differences between garden farming and factory farming are at least these eight:

Garden farming is craft work; factory farming is assembly line production.

Garden farming is extremely diversified in production; factory farming tends toward specialization.

Garden farming is essentially noncommercial, that is, free to operate outside the structures and strictures that bind factory farming to definite criteria of profitability.

Garden farming is primarily an avocation; factory farming is primarily a job.

Garden farming is low-volume, low-cost production; factory farming is high-volume, high-cost production.

Garden farming arises out of the activity of willing individuals in social groups, usually the family; the work environment is therefore usually happy and positive. Factory farming sets up a dichotomy of boss-worker relationships, and work therefore proceeds in an environment of latent hostility.

Garden farming is the search for quality; factory farming seeks quantity.

In garden farming, time spent is part of the profit; in factory farming, time is money."

Logsdon predicts "[T]hose of us who have been championing a different approach to food production than that of factory farming are about to be vindicated."

Thoughts From Another Era: “The War Garden Victorious”

“For a decade or more there had been a tremendous exodus from our farms. Our farmers cried for help but their cry went unheeded until we found ourselves facing hunger. Then it was too late.”

(The War Garden Victorious, p. 7.)

With respect to the first “victory gardens,” the Liberty Gardens, people witnessed “little fountains of foodstuffs springing up everywhere, and the products of these tiny fountains, like raindrops on a watershed, uniting to form rushing streams which would fill the great reservoirs built for their compounding. The tiny fountains were innumerable back-yard and vacant-lot gardens. The problem was to create these fountains.” (p.9)

“The sole aim of the National War Garden Commission was to arouse the patriots of America to the importance of putting all idle land to work, to teach them how to do it, and to educate them to conserve by canning and drying all food they could not use while fresh. The idea of the ‘city farmer’ came into being...In every part of the country were communities where land and labor were already together...Near every city were vacant lots, ‘slacker lands,’ as useless as the human loafer...Whether the land to be cultivated was a back yard or a vacant lot, it was a potential source of food supply, and the raising of food on these areas would solve many problems besides that of food production...There were no problems of transportation or distribution to be solved in such food production.” What was created from this was an army of “soldiers from the soil.” (p. 10)

“...[I]mmediately after the United States entered the war everybody was patriotically desirous of rendering help in some form...Because of this they wanted to take an active part in some effort which would show tangible results in the struggle for right and justice. War gardening offered the opportunity.” (p. 12). True in 1919 when these words were written just after WWI. These words are likely just as true today as they were then. In the WWI era, “anti-loafer” laws were enacted putting everyone to work, and “slacker lands” were identified, that is, idle soil with growing potential so located that it could be worked. And there were then, right within our cities and towns, thousands upon thousands of acres of idle real estate. Few people realize how many thousands of such acres in aggregate exist and are standing useless, at least from a food production perspective. This is land suitable for gardening and very near to where labor can be available. “Put the slacker land to work” became the cry then, and we might issue it today. Once again the nation harkens to John F. Kennedy’s call to ask what you can do for your country. Plant a garden!

Experimental gardens face two challenges:

1. How to involve garden clubs in these new Community Experimental Gardens, as well as in a modern version of local victory gardens, most of which would be on private land.
2. How to accommodate livestock such as chickens and other poultry, goats, pigs, rabbits in these local experimental gardens. This second challenge may prove more difficult and more complex than the first because of the need for more intensive management. Conservation easement land in private ownership and management perhaps makes the best sense for these kinds of animal projects, especially where the landowner is involved; in some cases local schools and possibly churches could get involved on the animal side.

Experimental gardens could be most effective if they focus on the local, decentralized, small-scale, production of heirloom varieties/heritage breeds, on participation of garden clubs and Cooperative Extension with some attention to the rich history of experimental farms, and on local adaptation. Importantly, this work is highly appropriate for the involvement of churches and church congregations, garden clubs and Cooperative Extension, and it ascribes a new and important role for conservation easement lands.

From War Garden to Modern Community Necessity

Just as the war garden was a war-time necessity, so is the community garden a modern necessity. Why? Because our energy circumstances make it so. Current circumstances demand a reduction in our dependence on oil and other fossil fuels, and thus establish the place of the community garden (the modern day victory or war garden), at least as wisdom if not perceived as absolute necessity at the moment. They are key to relocalization.

What Inexperience Combined with Will Can Accomplish: A White Mountains Tale (1919)

“Up at the Dixville Notch, in the White Mountains in northern New Hampshire, is a magnificent summer hotel, The Balsams. It was customary to ship in from a considerable distance the bulk of its vegetable supply. Last summer ... eight young women ... cultivated a three-acre garden at Dixville Notch, on the property of the hotel corporation. They lived in one of the company's attractive little houses which looks out over a great expanse of country. From Brooklyn, New York, Lakewood, New Jersey, Rockland, Maine and Keene, New Hampshire, came these young women farmers. They were farmers in more than name; for in addition to cultivating their large vegetable garden, they found time to assist the neighboring men farmers in making hay, cultivating potatoes, and performing other farm labor.

“The desire to serve, not the wish to have a good time, led these young women to engage in this work; and so successfully did they perform their tasks that the hotel management promptly arranged to continue and expand the work in future years. Thus, in addition to upbuilding themselves physically in the most gratifying way, these young women opened the way for others of their sex to perform service at once essential and useful. How useful may be judged when we realize that but for their work it would have been necessary to haul hundreds of bushels of garden-stuff long distances over the steep mountain grades. The car-space and fuel thus saved were applied to the hauling of shells and cannon and other supplies that our soldiers so much needed. If ‘they also serve who only stand and wait’, how much greater is the service of those who labor while they wait?

“Since the labor of these young women marks a new phase of food production, in this country, a phase that is certain to appeal more and more to tired school teachers, clerks, and other indoor workers, it may not be amiss to tell in detail of the life of these girls at Dixville Notch.

“Their home was in a cozy little cottage, from the windows of which one could look off in any direction on most beautiful mountain scenery. It was situated only a few miles south of the Canadian border, in a region whose towering mountains are pine-clad and gemmed with clear, cool lakes and embroidered with foaming mountain brooks. The girls received regular monthly wages from the hotel, but provided their own meals, with the privilege, however, of purchasing supplies from the hotel at favorable rates. Two at a time they kept house, while the other six looked after the gardens.

“None of these girls had had any previous experience worth mentioning in the cultivation of the soil. Yet they made very rapid progress in the art of gardening. Their success was undoubtedly due to the fact that they stuck to a few staple crops and did not attempt too diversified gardening. They raised peas, lettuce, radishes, carrots, beans, and other common vegetables. Upon beginning their work they received instructions from the hotel farmer, Henry Bemis, who looks after some of the larger tracts of land owned by the hotel management, which are given over almost exclusively to the raising of hay for the dairies. Such instruction was not long necessary, however, as the young women farmers speedily acquired considerable skill.

“Even gardening and haying did not occupy all their time. One rainy day, when no gardening could be done, they went to a neighboring farm where there were several thousand bushels of potatoes which had begun to sprout. The visitors started “sprouting” with a will and at the end of the day had averaged twenty-five bushels each. They were told that ten bushels had always been regarded as a fair day's “sprout”. They continued at this task until the entire lot of potatoes was finished. Then they assisted other farmers whose potatoes were sprouting; for labor had become as scarce on New Hampshire farms as it was on farms everywhere else.

“Thus these women not only blazed a trail for their sisters, but proved what thousands of other women are proving in industry – that woman not only is not an inferior workman, but that her nervous make-up enables her to work faster than man. These women gardeners did their share in the fight for freedom – not merely that political equality for which men and women struggled on the fields of Europe, but that greater freedom, human equality. Even to that cause has the war garden contributed materially.

“If the work of these young women proved anything, it was that in union there is strength. The strength that comes from union it was found advantageous to utilize in many another war garden, by operating it on the community plan. Instead of allowing each gardener to till his own land, it was better, where possible, to have a large area properly plowed and harrowed and then allow the gardener to care for his individual plot. The advantages of such community action proved great. The land was uniformly and properly prepared and at small expense. Community gardening made for both better gardens and better communities, for the spirit of emulation at once led each gardener to do his best, while common toil for a common end made for better understanding and better acquaintanceship; and sympathetic understanding is the rock upon which democracy is founded.” (Pack, *The War Gardens Victorious*, pp. 39-44)

Interestingly, a major argument for the early war gardens was a need to relocalize society and get off the dependency on long-distance transportation, a need we very much have at the present time. Early war gardens were inspired by the felt need to contribute to a war effort then, to a sustainability challenge today. In WWI, the world food supply system was thrown entirely out of balance by the war – this is akin to the present energy circumstance we find ourselves in, so richly described by Paul Roberts in his book, *The End of Food* (successor to his book, *The End of Oil*).

This is a circumstance occasioned not only by the erosion of soil, water problems, and other threats to crop productivity but also by competition between food and fuel, a competition which fuel will always win under present circumstances. There are even similarities between global systems of interdependency extant during WWI (and so easily disrupted and destroyed by war) and the vast and complicated global interdependencies of today, interdependencies equally vulnerable to disruption. And the similarity between the loss of farmers to the war effort of earlier times and the loss of the very existence of sufficient farmers today is uncanny.

Food shortage was the result then. It can well be the result today in the not too distant future. War-time conditions and curbs on transportation certainly translated into the necessity and efficiency of local production for local markets. Today's energy challenge leads us to the same place: reduction of distances and local production for local markets, indeed, the most local possible.

Food Production

One acre = 21 40' by 50' gardens

One 40' by 50' garden = sufficient land to feed a family with surplus for canning, drying and winter storage

SMALL-HOLDINGS

John Seymour's Sustainable Small-Holding:

While on sabbatical in the United Kingdom some years ago, I came across a name not well known to Americans: John Seymour. Subsequently, I corresponded with John Seymour, and he graciously provided me a copy of one of his many published books, a volume entitled *Retrieved From the Future*. Authoring books on sustainability during his long life in England and Ireland (where he founded his School of Sustainability), Seymour focused on the idea of the sustainable small-holding, an individual family's home and surrounding land involving perhaps one hectare (2.5 acres). Motivated by the recent and brutal U.K. experience of WWII and its aftermath, including ten post-war years of food rationing which did not end until 1955, Seymour and his peers took very seriously the importance of true sustainability. Seymour's work has been published posthumously in two fine volumes available in the United States entitled *The Self-Sufficient Life and How to Live It*, and *The Concise Guide to Self-Sufficiency*. These volumes present in detail, in text and in substantial illustration, how his ideas can be implemented. Few models anywhere paint a picture of such a powerful and serious level of sustainability, a characteristic that is, indeed, very rare in today's world: they present true rather than superficial or cosmetic sustainability.

Throughout his books, John Seymour provides vivid descriptions of the ecologically sound small-holding and covers topics including gardening, animal husbandry and even foraging. He addresses home dairy production, the organization of the kitchen, brewing and wine-making, energy and waste, and crafts and skills. In his closing chapter of *The Self-Sufficient Life and How to Live It*, he discusses becoming a "self-supporter," "getting it together with others," "building a community of support." Additionally, he provides guidance in measuring progress in everything from food to household goods to transportation to water and "gray water" to waste to clothes, to such matters as lifestyle changes, barter and social credit, self-employment, taxes, pensions and life insurance, bank accounts, insurance and even craft associations and making your own entertainment.

Seymour believed that the best food of all comes from our own land. The next best is food from a local farm or farmers market, and then food from a local store. He claims that a good size suburban garden can practically support a family. (He writes of a woman who grew the finest outdoor tomatoes he ever saw in a window box twelve stories up in a high rise, too high up to get blight!).

Just One Backyard

One 40 by 40 backyard garden in Pennsylvania yielded over half a ton of 24 different kinds of foodstuffs using early 20th century technology (The War Gardens Victorious page 29):

Beets – 25 bunches

Carrots – 2 pecks

Radishes – 15 bunches

Rutabagas – 64

Early peas – 32 quarts (pods)

Potatoes – 7 pecks

Cabbage – 20 heads

Cauliflower – 14 heads

Tomatoes – 6 baskets

Bunch beans – 2.5 pecks

Telephone peas – 40 quarts (pods)

Peppers – 9 dozen

Cucumbers – 100

Celery – 450 stalks

Rhubarb – 10 bunches

Scallions – 12 bunches

Parsley – used freely

Dried beans for winter use – 20 quarts

Peaches, from two trees in corner of garden – 7 baskets

Lettuce – equivalent of 60 heads

Horseradish – all desired

Onion sets – 3 quarts

Onions dried - .5 bushel

Pole beans – 108 quarts

In 1918 a careful survey revealed that there were 5,285,000 Liberty Gardens. But 10,000,000 such gardens were deemed possible, yielding five million tons of vegetables and fruits.

Seymour's concept builds on a type of 19th-century European farming which carefully worked out a balance between animals and plants so that each fed the other: the plants feeding the animals directly, the animals feeding the soil with their manure, and the land feeding the plants – all requiring a high level of on-farm biodiversity. And it involves a basic principle: take the animals to the crops, not the crops to the animals. Take the animals to the food, not the food to the animals. These ideas are, in fact, the most basic principles of sustainable agriculture today.

On Small-Holdings:

I am grateful to colleagues in the United Kingdom and Ireland who, in the 1980s, drew me to the work of visionary John Seymour and his pioneering work in regional food sufficiency, and the infrastructure of local small-scale agriculture necessary to insure such sufficiency. And I am grateful to Dr. Gerold Rahmann, Director of the German Government's Organic Agriculture Research Institute at Trentorst, Germany who, on a visit to UNH's Organic Dairy Research Farm, reminded me of the usefulness and potential of John Seymour's visionary models to the 21st-century needs of New England for both small-scale sustainable agriculture and regional security of our food supply. On a mere single hectare (about two and a half acres), in Dr. Rahmann's view, UNH could develop a biodiverse, fully integrated small farm producing food (plant and animal) and fiber in an ecological manner with very minimal fossil fuel or other outside inputs. This model, directly inspired by Seymour, fits well with the teaching and practical application of farmer and writer Joel Salatin who has been much discussed in this series, *The Wisdom of Small Farms and Local Food and Pastures of Plenty*. Salatin is a champion of low energy and low external inputs and in the wisdom of taking advantage of all the capital and services which nature offers, making all elements of the farm serve all other elements in a nearly closed system.

Seymour's philosophy can be applied to land grant universities. Each of the land grant university colleges of agriculture in New England and their Agricultural Experiment Stations feature university farms as part of their heritage. They operate these farms, whether at Orono, Durham, Burlington, Amherst, Kingston, or Storrs, in the conduct of their land-grant mission of teaching, research, and outreach/extension. To a great degree the farms have been under-utilized in recent decades. A vision is very much needed as to what these farms, which are critically important capital assets to their universities and states, could do to help New England achieve a higher order of food sufficiency.

I conclude that the highest use of university farmland would, indeed, be highly integrated biodiverse use of those farmlands, with as great an amount of plant and animal diversity as possible in such small model farms, to teach, demonstrate and, as well,

The Philosophy of John Seymour

On Energy:

“If it is true that the only person over whom I have control of actions is myself, then it does matter what I do.”

“I count planned tree planting and coppicing as one of the best solar energy devices.”

“Let us never forget that energy saved is as good as energy bought. It is often much cheaper to buy energy-saving equipment than to pay for the energy used by less effective arrangements.”

On Transportation:

“If we could once again run our world on a local scale, with decisions made on a local basis, then many of our problems would be stopped in their tracks.”

“We are all pretty much ‘locals’. We live somewhere and what goes on in the locality of where we live is much more important than what goes on elsewhere.”

On Work:

“To say that an invention is labor-saving is the highest praise, but it never seems to occur to anyone that the work might have been enjoyable.”

“There is not necessarily anything wrong with doing things that are profitable. It is when ‘profit’ becomes the dominant motive that the cycle of disaster begins.”

On the Home:

“A true home should be the container for reviving real hospitality, true culture and conviviality, real fun, solid comfort, and above all, real civilization. And the most creative thing that anybody can do in this world is to make a real home.”

On Food:

“The best food of all comes from our own land. Next best is food from a local farm or farmers market, and then food from a local store.”

“A good-sized suburban garden can practically keep a family.”

“I know a woman who grew the finest outdoor tomatoes I ever saw in a window box 12 stories up in a high rise. They were too high up to get the blight.”

On High Farming in Europe:

“High Farming in Europe in the 19th century was a carefully worked out balance between animals and plants so that each fed the other: the plants feeding the animals directly, the animals feeding the soil with their manure, and the land feeding the plants. Take the animals to the crops, not the crops to the animals.”

On the Natural Cycle and the Law of Return

“The soil feeds the plants. The plants feed the animals. The animals manure the land. The manure feeds the soil. The soil feeds the plants. True ‘husbanding’ homesteaders will wish to maintain this natural cycle but to do so they must become part of the cycle themselves. They do this by observing the Law of Return. All residues, animal, vegetable and human, should be returned to the soil, either by way of the compost heap, or the guts of an animal, or the plow, or by being trodden into the ground by livestock. Whatever cannot be usefully returned to the soil, or usefully used in some other way, should be burnt; this will make potash for the land. Nothing should be wasted on the self-sufficient farm.”

conduct research. All the New England land grants could readily do this on their farms, and some farm staff at a few of the land grants indicated to me the desirability and appropriateness of doing just that.

Ideally, the university farms will continue to be used to maintain present on-going research in soils, field crops, grains, livestock, fruits and vegetables, and forestry/woodland management, albeit more intensively. The university farms can also be used to produce food for on-campus consumption to answer growing needs and demands of students and campus communities for local nutritious food. But they can be used to demonstrate and model small-holding sustainability in the manner of John Seymour and his modern disciple, Gerold Rahmann. (See Chapters 5-10 for further detail on the university farms.)

CONCLUSION

In conclusion, we return to the model given to us from an earlier time in our own country: the Victory Garden. The Victory Garden of the two World Wars may be successfully pursued on even the tiniest piece of land, and is particularly well suited to the grounds of American residential subdivisions on open land now mostly occupied by lawns. A substantial acreage of U.S. land is devoted to residential lawns in the U.S. Can you imagine how much food this acreage could be made to produce? And how close all of this is to the consumers of the food, in economic terms the market for the food? We know that in 1943 victory gardens alone produced over 40% of all the vegetables in the U.S. And, nutritionally, our immediate forebears ate well! And some victory gardens, if a bit larger, can produce fruit, dairy product, eggs, and even meat. We are surrounded by possibility. Of course, gardening is not for everyone: some are not physically able, and some do not want to do it. No matter. There are no doubt many who will provide the service, even on one's own land, for an agreed upon fee or barter arrangement. In this way, victory gardens can become a source of local employment. Never underestimate what a garden can do. Never underestimate the power of small. Small is beautiful.

We now turn to a model of food sustainability in New England.

From Pingree's Potato Patch to Today's Sustainability Gardens: Digging Our Way Out of Recession

There are four eras of serious food production from community and home gardens in U.S. history, the first being the Pingree Potato Patch Gardens of the 1890s and early 20th century. Named after their founder, Mayor Hazen Pingree of Detroit, the Pingree Potato patch gardens emerged in the 1890s in response to the Panic of 1893 and ensuing home and business foreclosures and widespread unemployment, spreading out from Detroit to many North American and European cities. Liberty Gardens helped feed hungry Americans and Allied Europeans during WWI, as did Relief Gardens of the Great Depression era and the famous Victory Gardens of WWII. We are today in the fifth era of such gardens, which I would call the era of Sustainability Gardens. From 1941 to 1943 the United States went from 2% to 40% in terms of the total national supply of vegetables produced in these gardens. Great Britain topped 80% of consumption from those gardens during WWII, so there can be no doubt that an enormous quantity of fresh and highly nutritious food can be produced from small gardens, even including some dairy and meat.





CHAPTER FOUR:

Burlington, Vermont: Capital of the Localvores

The aim of this chapter is to answer the questions, why should the city of Burlington, Vermont be called the “capital of the localvores,” and why should it be referred to as the epicenter of the local food movement?

Deep in the bowels of Burlington, Vermont’s City Hall, a path-breaking entity known as the Burlington Food Council meets regularly. Representing institutions and organizations throughout the city and the adjacent foodshed of the Champlain Basin and northwest Vermont, the Council, recently strengthened by a City Council resolution, is an entity of city government. It is coordinated by two employees of that government housed at City Hall. Just outside the building in City Hall Park, the Burlington Farmers Market, the largest in the region, convenes every Saturday morning, supplemented by other farmers markets elsewhere in the city and in nearby communities on other days of the week. What could be a more powerful public symbol of accomplishment at the local municipal level of government than Burlington’s involvement in food? It is no wonder that popular food writer Michael Pollan (*The Omnivore’s Dilemma*, *In Defense of Food*, and other well known books) refers to Burlington as the epicenter of sustainable food, indeed as the “Capital of the Localvores,” and writes from his Berkeley, California, home on the passion of Burlingtonians and Vermonters for local food.

What is it about Burlington that has earned it a reputation as the epicenter of the local foods movement? The answer is very simple: the high quantity of food for the city’s population which comes from both within the city limits and from nearby communities in the Champlain Basin and immediately beyond. And not just the food produced in Burlington and its backyard but processed there as well – food from both animals and plants. In the style of local foods production and consumption, there is less processing involved than in the conventional industrial food market, partly because a higher percentage of the food consumed is unprocessed – and in no need of preservatives or preparation for travel – and, significantly, because much more home processing, cooking, canning, baking, is characteristic of the local foods and farming movement. Local value-added processing at small scale is increasing to further meet Burlington’s food needs.

What does it mean to be the “Capital of the Localvores,” the epicenter of the local foods movement? What does this look like? The parent of local food is local farms. There can be no local food without local agriculture. Likewise, without local marketing, direct markets, and the sound revenue stream they provide, local farmers cannot survive. The two are intimately attached. Therefore, the first step in sustaining local agriculture, keeping farmers on the land, supporting new farmers going onto the land, is what I would call “demand construction,” that is, building local demand for local food wherever possible and to the greatest extent possible. The second is capacity-building, the building of means to produce food locally. But demand must come first. The City of Burlington - its Mayor, City Council, municipal departments, and employees - are doing precisely that, building demand and capacity through the city’s Food Council and its relationship to numerous non-profit and public service organizations. The recent passage by the City Council of a Burlington Food Policy in June, 2009, is sharp evidence of Burlington’s intent. The city, Vermont’s largest, builds such capacity through its Legacy and Sustainable Burlington programs and through these programs is demonstrating to the nation what all local governments could be doing.

There are multiple reasons for Burlington’s local food interest. Beyond the love and true appreciation of fresh, highly nutritious local food, and beyond the desire to keep farmers on the land and to keep open space open, to halt destruction of farm land and agricultural soils, there lie additional realities: the need to respond to the global call for greenhouse gas (especially carbon) reduction in the light of what we now know of climate change, and a growing consensus that there is something fundamentally wrong with the present system. The dominant industrial food system has compromised health, namely by providing insufficient nutrition which results in disease; it has also compromised environmental health by burning a high level of energy in food production and transformation. Like other American cities and towns, it is obvious in Burlington that the health of its children and adults is compromised – obesity is all too common, as are a variety of diseases that shouldn’t exist. And perhaps more than most American communities, Burlington sees the handwriting on the wall when it comes to energy realities. Burlington has not quite experienced the price shock and energy shortages of some other American regions – but the city knows it is coming. So, through its response, Burlington is earning the title “Capital of the Localvores.”

UVM

UVM is a key player in the local foods movement in Burlington. About half of the city's local foods' initiatives are associated with UVM's faculty and staff. UVM serves the entire state of Vermont and is governed by all Vermonters, not just Burlingtonians; nevertheless, Burlington benefits from the university's involvement in local food the most. This is because of the school's strategic geographical location within the city of Burlington and the fact that many of its employees are Burlington residents. Additionally, many of UVM's students live off-campus in Burlington, eat there, and are part of the community. There are nearly twenty UVM programs and initiatives that have an effect on the local foods movement in Burlington. They include:

UVM Center for Sustainable Agriculture

UVM Cooperative Extension Programs

UVM Center for Rural Studies

UVM Environmental Program, offering an undergraduate degree in Environmental Studies

Vermont Pasture Network

Northeast Center for Food Entrepreneurship and Vermont Food Venture Center

UVM Small Ruminant Dairy Program

Vermont Grass Farmers Association (VGFA)

Rural Vermont

UVM Office of Sustainability

Growing Vermont (student-operated Vermont Products Store at the Davis Student Center)

UVM Growing Local Colloquia

Food Systems Minor in UVM College of Life Sciences and Agriculture

UVM Ecological Agriculture Program (undergraduate degree)

Taste of Place Conferences (Vermont-Quebec-France)

"Taste of Place" courses in Human Nutrition (involving City Market and Middlebury College)

"Environmental Cooking" courses

UVM Common Ground Farm (see University Farms)

Northeast SARE Program Headquarters (USDA)

Winter pasture, other grazing research, plant and animal science research for Vermont farms (CALs and Vermont Agricultural Experiment Station)

While UVM Programs are obviously designed to serve the whole state equally, Burlington and its vicinity benefits most directly.

Uniqueness of Burlington:

When it comes to food, Burlington is unique. It has:

-A City Food Council which meets at City Hall and is coordinated by city employees

-A City Food Policy established by a unanimous vote of the City Council, placing two city councilors on that Food Policy Council

-A large, elaborate, active city schools' Farm-to-School Food Project

-A sustainable schools program that features food as a centerpiece and conducted in collaboration with the City Council

-A place of food in the school curriculum and at science camps, summer camps, on field trips, as well as in school dining service (both meals and between-meal snacks)

The City of Burlington's Climate Action Plan has serious targets with implications for local food:

80% reduction of CO2 emissions by 2050

20% reduction of CO2 emissions by 2020

2% annual reduction until 2020

1.5% annual reduction until 2050

Center for Sustainable Agriculture:

Perhaps UVM's most significant contribution to the world of local farms and food is its Center for Sustainable Agriculture. This state-wide program fundamentally supports the local and small-scale farming efforts that are blossoming all over the Champlain Basin and beyond. Conceived in the late 1980s as an effort of Vermont Extension and established in 1994, the Center has sponsored initiatives in renewable energy, local food, a small ruminant dairy project, and sustainable horticulture.

Under the long-term leadership of Vermont Extension's Vern Grubinger, and later by Lini Wollenberg, the Center for Sustainable Agriculture provides a critical link between Vermonters and small-scale local food production, and, as well, alternative on-farm energy production. It champions agroecology at the pragmatic level in Vermont and also works closely in support of the Vermont Grass Farmers Association (see *The Wisdom of Small Farms and Local Food*, NHAES Pub. #2260, for detail on VGFA). The Center publishes the Vermont Pasture Network Monthly Calendar, a detailed listing of grazing/grass farming events throughout the state. And the Center operates programs such as:

- Land Link Vermont, a matching service that connects new entry and transitioning farmers with returning farmers and non-farming landowners
- Leadership Development, professional development opportunities that increase sustainable agriculture understanding and skills of personnel within Extension and other organizations
- New Farmer Initiatives, addressing the special needs of beginning farmers by enhancing their access to land, capital, markets and production skills
- Pasture Network Program, promoting management intensive grazing through newsletters, on-farm pasture walks and demonstrations, and hosting the annual Vermont Grazing Conference
- Farm Viability Enhancement Program, to help farmers identify new and diversified opportunities for their farms
- Small Ruminant Dairy Project, to assist sheep and goat dairy farmers, especially to support Vermont's growing artisanal cheese industry
- Sustainable Horticulture Program, producing a series of instructional videos and publications by long-time Center Director Vern Grubinger

Although all of these activities are state-wide, the people of Burlington and the Champlain Basin benefit significantly.

Other UVM Programs of Excellence:

Other "Programs of Excellence" range from Ecological Agriculture to Environmental Cooking, from Grazing to Tasting, from Bachelors to Doctorates

Beyond the Center for Sustainable Agriculture, there are a number of other relevant programs at UVM:

USDA Sustainable Agriculture Research and Education Program. This program brings both individual sustainable agriculture researchers and practicing farmers to Burlington, as well as hosts small meetings and larger conferences in the city.

Center for Rural Studies. This 30-year-old research initiative addresses local sustainable agriculture, including particularly rural food markets and value-added enterprises, through its social science research, leadership training, planning methodology, surveying, and evaluating in this field. It is a further UVM resource center for the community. A major focus of its work today is on hunger and food security in Vermont.

The Vermont Products Store. Located at UVM's new Davis Student Center, this gift store is more than a convenient place to buy local products, and thereby benefits local producers. It is a powerful symbol of the importance of buying locally. And the nearby UVM Bookstore has the corner on some of the finest maple syrup in Vermont, the product of UVM's Proctor Maple Sugar Research Farm described in the chapter on UVM Farms.

Winrock International Foundation. UVM partners with the Winrock International Foundation in Arkansas to conduct research on ruminant grazing which both involves and benefits a number of local dairy farmers in the Champlain Valley who provide milk, cheese, and other dairy products to Burlington. The immediate goal of this work is to estimate the impacts of expanded rotational grazing in the northeastern U.S. Burlington's nearby Missisquoi Watershed is a major focus of this research.

UVM Extension and Northern Grain Association. UVM Extension sponsors research on the prospects of bringing back to local Vermont agriculture a wide variety of wheat and small grains to support the local baking industry and, as well, beer microbreweries. The university assists the fledgling Northern Grain Association in carrying out this task.

Northeast Center for Food Entrepreneurship. This Center, a joint UVM-Cornell University venture working with Vermont's Food Venture Center, focuses on the role of local food in economic development.

Vermont Grass Farmers Association (VGFA). UVM is intimately involved in assisting the fast-growing Vermont Grass Farmers Association (VGFA), its famous Winter Conference, its numerous pasture walks near Burlington and elsewhere around the state, and the publication of its newsletter, "The Solar Dollar."

Food Systems Minor. UVM now offers a newly created minor in Food Systems which has an explicit thrust toward small-scale, decentralized local systems. It takes inspiration from Michael Pollan, Wendell Berry, and Vermonter Bill McKibben, and is jointly led by the Plant and Soil Sciences and the Nutrition Food Sciences Departments, the latter represented by noted food writer and teacher Amy Trubek.

Gund Institute. The Gund Institute of Sustainability at UVM supports both university courses and university research/outreach for local foods ideas at UVM and in Burlington. Professors, university staff, graduate and undergraduate students are all supported by this sustainability institute which significantly elevates local food consciousness in northwest Vermont.

UVM's Department of Plant and Soil Science. This department was an early birthplace for sustainable agriculture at UVM and the important work of Professors Bill Murphy (in pastures and rotational grazing), about whom I wrote much in my two earlier books, and Fred Magdoff (in soils and in the long-time leadership of Northeast SARE). Their work should not be underestimated; its impact will be felt over multiple generations.

Integration at UVM. UVM and its College of Agriculture and Life Sciences (CALs) are integrating the Center for Rural Studies with Food Systems Research, thus giving the Center an explicit directive in promoting the sustainability of both rural communities and local food systems in tandem. This Center will demonstrate the relationship between farm-to-school initiatives, international policies and their effect on the American food system, farmer entrepreneurship, agriculture and land use, on-farm energy use, obesity concerns, consumer behavior, and food security. The leaders of these programs expect that this integration will result in an increase in student interest in food systems; an increase in local food sales state-wide; more UVM local food purchasing; an increased number of farms engaged in local sales; and more policy adoption in Vermont and in the nation that enhances local sustainable food systems.

UVM has taken seriously Michael Pollan's comment made at the university in June, 2008, that "Vermont is the epicenter of the sustainable food movement – all eyes are watching you." And UVM has concluded that it is time for Vermont to clearly articulate alternative practices of sustainable agriculture and local food within the dominant conventional policy debate occurring in the U.S. The university sees its new Center for Rural Studies and Food Systems Research as the articulation of this message for the university. The university's current portfolio of projects related to food systems research is provided in the adjacent box. UVM maintains this portfolio based both on its own resources and those of at least fourteen partners across the state:

- UVM Center for Sustainable Agriculture
- The Intervale Center
- Northeast Organic Farmers Association (NOFA)-Vermont
- Shelburne Farms
- UVM Extension
- Food Education Every Day (VT FEED)

- Vermont Agency of Agriculture
- Vermont Fresh Network
- Vermont Food Venture Center
- Vtrim Behavioral Weight Loss Program
- Women's Agricultural Network
- Vermont Department of Health
- Champlain Valley Office of Economic Opportunity
- Northeast Kingdom Community Action

UVM has also announced that it will offer scholarships to faculty and students interested in pursuing degrees in food systems, including a new UVM Food Systems Policy Ph.D program.

As noted in my 2005 book, *The Wisdom of Small Farms and Local Food*, a substantial number of UVM students are using the popular degree program in Environmental Studies (ES) as a vehicle to achieve an agricultural education, often sidestepping mainline agriculture programs, while picking and choosing desired portions of those programs to fill in their education. Aside from coursework, the undergraduate ES degree program requires the research and writing of a senior thesis. A surprisingly high number of these theses are in the area of sustainable agriculture and local food systems, with Burlington and vicinity (for obvious geographical reasons) being the locale of choice for the research. Recent ES theses have focused on the City of Burlington Legacy Project on food sustainability in the city, composting, community gardening, garden-based K-12 learning, young children's behavior in gardens, bio-fuels, permaculture, and on various campus projects and at Shelburne Farms and Burlington's Intervale Center. Burlingtonians are much the better for this knowledge developing in their midst and have great opportunity to collaborate with the students and their professors.

Professor Amy Trubek's widely acknowledged work on the taste of place, and her book of that title, has reached out to neighboring Quebec (as well as France) and is strengthening UVM and Vermont connections with the state's near-north neighbor. Quebec's distinctive food culture, stemming from its French heritage and its serious efforts to promote local organic food, presents Burlington and Vermont with a unique opportunity right at its doorstep.

In the past a student interested in local food would major in the Ecological Agriculture Program. Although focused on food production, that program has always been taught by and populated by people much interested in environmentally friendly food production. It is also the program most closely associated with the student-run Common Ground Farm. The program is housed in UVM's Plant and Soil Science Department and now quite naturally flows into the more recent interdisciplinary efforts to broaden the university's work in this area, most notably the aforementioned Center for Rural Studies and Food Systems Research. The undergraduate curriculum in Sustainable Landscape Horticulture, although less food-oriented, serves as a companion to those programs.

The growing movement toward student-run, on-campus farms, often organic and always ecological in their essence, is represented at UVM in the Common Ground Farm, situated in South Burlington at the university's Hort Farm. This farm serves the Burlington community as a Community Supported Agriculture (CSA) project, with numbers of community shareholders. It also networks with area farmers, donates produce to the Chittenden County Food Shelf, hosts a Harvest Festival, conducts workshops and runs a lecture series to which the public is invited. The farm is a further symbol of the importance of local food in the Burlington area. (See section on UVM farms for further detail.)

Beyond UVM:

UVM is not by any means an insignificant player on the Burlington local food scene. And there are times when the university leads the city on these matters. The well-attended "Going Local Colloquium," which brought out a diversity of town and gown for a major forum on this subject, is a case in point, as are the campus visits of Bill McKibben, Michael Pollan, John Ikerd, and numerous other leaders in this field. But it is the city itself, the city outside the university, and in alliance with other non-university institutions such as Shelburne Farms and The Intervale Center, which is the true leader in making Burling-

ton the nation's epicenter of the local foods movement, the true "capital of the localvores." Even apart from UVM, Burlington is a rich locale for the local foods movement. One can identify over a dozen local foods initiatives, many of them quite sizable and powerful in the community. The most successful of these initiatives includes:

- Northeast Organic Farmers Association (NOFA) -Vermont
- Burlington School Food Project
- Vermont Kitchens Project (of the Micro-Business Development Program)
- Shelburne Farms Programs
- Intervale Center Programs
- Vermont Fresh Network
- Burlington Social Equity Investment Project
- City Market and its Programs (Onion River Coop)
- City of Burlington Conservation Legacy Program
- Vermont FEED (Food Education Every Day)
- Burlington Community and Economic Development Office
- Healthy City Program
- South Burlington Farm-to-School and Farm-to-Campus Programs

Burlington School Food Project

Without a doubt, Burlington's largest and most impressive local foods effort is the Burlington School Food Project. This is a city-wide collaborative formed to facilitate the integration of local foods into school meals and snacks and, as well, combat food insecurity among school-aged children in the city. It seeks to "develop in students and their families an awareness and understanding of food, farm, and nutrition issues such as the benefits of eating local nutritious foods, increase a sense of place, and build appreciation for agriculture and local farmers." Its efforts include the teaching of cooking in the classroom and preparation of community-wide dinners by students using entirely local farm products. Development of school gardens and field trips to farms and farming institutions also constitute the project's efforts. Local food is also entering the formal curriculum in many places. Students learn about where their food comes from, and food becomes part of lessons in other subjects, in fact, everywhere it can be brought in. In the near future, the program will also provide breakfast and after-school snacks. The project has identified the key components of a successful farm-to-school model as three "Cs":

- Community should include farmers, parents, volunteers, and organizations.

The UVM Center for Rural Studies and Food Systems Research has a large portfolio of projects related to food systems research. These projects investigate topics including:

- **food labeling in restaurants**
- **student attitudes about more local food on university campuses**
- **consumer behavior related to nutrition and obesity research**
- **linkages between agriculture, farmers' outlooks, and local land use trends**
- **trends in the consumption of locally-sourced foods**
- **evaluation of farm-to-school programs and food business development programs**
- **applied consumer and vendor studies at UVM's student-run local product store, Growing Vermont**
- **market analysis for new local food consumption and distribution systems**
- **consumer attitudes toward genetically-modified organisms and issues associated with GMO labeling**
- **feasibility analysis for on-line local food systems**
- **the linkage between local food systems and indicators of downtown "health"**

One local food initiative at UVM has proved particularly popular – an Environmental Cooking course. Dr. Cynthia Belliveau, Dean of Continuing Education at UVM, has introduced this popular new initiative available not only to UVM students but to the people of Burlington as well. This course marries established interest in the environment with contemporary trends in cooking. The course explores four dominant perspectives: economic, environmental, human health, and social, and it is divided between the classroom and the kitchen. Students both study and cook as they acquire basic culinary skills. The course is, therefore, experiential, and the syllabus states to the student, "Through your action we will begin to understand the multifaceted, varied and important ways cooking and eating help us understand sustainability issues."

- Cafeterias should include food service staff and directors, teachers, school administrators, students, volunteers, and the business community.
- Classrooms should include students, teachers, volunteers, Food Service staff, and the business community.

“I don’t think we’re going to make real progress on the food system unless we start cooking again ... it’s a very important part of the puzzle.”

Michael Pollan

Taste tests are a key activity. They increase student awareness and consumption of healthy foods, integrate fresh and local foods into the school cafeteria menu, and build relationships among stakeholders. This approach has successfully enabled the integration of many new foods into the students’ diet.

The integration of The Intervale Center’s “Healthy City Project,” an effort to improve dietary nutrition among city residents, into the Burlington School Food project led the students to gain a new love for vegetables (especially carrots, cucumbers), and strawberries and melons; and with pride taking home food which they grew in order to cook the food with their family; and feeling more fit and strong after working on the farm.

The ambitious goal of these efforts is nothing less than a change in the school culture. And while the attention is on the schools and the students, one result is a local farm sector that is economically healthy. The reader is urged to contact the Project for more detail on its program, operation, and methodology.

Vermont FEED

On a broader geographical level, there is the Vermont FEED (Food Education Every Day) initiative, which operates state-wide as a partnership of NOFA-Vermont, Shelburne Farms, and Food Works. A high percentage of Vermont’s Farm-to-School initiatives are in northwest and central Vermont near Burlington and Montpelier. As described above, these initiatives, based in towns and school districts, include school gardens, farm-based field trips, student taste tests, community-led food nutrition committees, nutrition and wellness education, and, of course, the initiative to which all of these eventually lead, purchasing local foods for the cafeteria. In addition to encouraging greater use of fresh local foods, the FEED project assists those who run school food systems in local purchasing, promoting entrepreneurial opportunities to produce healthy school foods, involving children in growing and making food, and linking local farms and schools. Vermont FEED issues a quarterly network newsletter, “Growing Farm to School in Vermont.” Aside from the new gain in healthier children and healthier farms, research suggests that healthy diets positively and directly impact students’ academic performance; that food literate children will impact and change family purchasing, cooking and eating patterns; and that, through growing, harvesting and preparing foods, children gain confidence, develop critical thinking skills, and feel a sense of power and control over their own health and food choices. As Joseph Kiefer, Education Director of Food Works, has remarked, “The farm-to-school movement is one of the most powerful hunger prevention programs because we’re giving kids life-long skills for growing, cooking and preserving food.”

The City

Burlington is likely the most deeply involved American city in these critical matters of food security and sustainability. The City of Burlington’s Community and Economic Development Office at City Hall oversees and assists the farm-to-school efforts of the city schools, and is more broadly involved in issues of food sustainability (as well as energy and environmental sustainability) in the city. This involvement takes place within the Burlington Legacy Project and the Burlington Food Council. In addition, the city has, for many years, been deeply involved in a substantial city-owned acreage called The Intervale. The Intervale is managed by a private non-profit organization formerly known as the Intervale Foundation, now called the Intervale Center. (See below for detail.) Finally, the City of Burlington has not only developed a progressive Climate Action Plan but has devoted a full chapter of that plan to food and agriculture. For this reason and for the others outlined in this chapter, Burlington, as a municipality, is vastly ahead of almost any other local government in the region in connecting the dots to understand the true meaning of what faces us. The city is serving its people well, while so many other places are, at best, spinning their wheels.

In addition to city government, the three other entities that are most prominent in Burlington's food and farming renaissance are the aforementioned Intervale Center, the City Market (also known as Onion River Co-op), and Shelburne Farms.

The Intervale

Over 10% of Burlington's food is grown on the exceptionally fertile river-bottom land called The Intervale. Some farmers say this could be increased to 30%. Subdivided into a dozen or so different farming operations, the Intervale is now known as The Intervale Center, an agricultural oasis which is also a nationally recognized model of sustainability in the state's largest city. At 700 acres, with some room to grow, there are community and market farms, lush gardens, and a well utilized composting company whose mission is to recycle 10% of Burlington's waste and supply 10% of the city's fresh food. The Intervale, once a city garbage dump and Brownfield site, has been converted into its ecological and philosophical opposite, a successful working model of sustainability. Starting with Vermont's first CSA farm in 1989, the Intervale now hosts half a dozen CSAs in addition to market farms serving Burlington's several Farmers Markets, a major wood-fired electric power station accepting all local wood and brush, a retail garden, nature trails and other enterprises, including the offices and public facilities of The Intervale Center. In addition to its active participation in the aforementioned Burlington School Food Project, The Intervale Center operates the Healthy City Youth Farm, a paid, eight-week summer program for teens who work 20 hours per week on the farm, and attend classes, workshops and field trips related to farm ecology and sustainable agriculture, business and marketing, nutrition, health, and even cooking. For those finished school, there is also:

- a youth farming program from May to November, five days per week from 9 to 2:30;
- Saturday workday projects in Spring for all youth, both attending school and finished with school; and
- the Healthy City Gleaning Project (July to November, two days per week) for the harvesting of excess fruits and vegetables, and their distribution to local social service organizations (with 35,000 pounds distributed in 2008 to food pantries region-wide).

All products are organically grown. As can be seen, these efforts are substantial and are far more than symbolic. What is occurring in Burlington is rare, as it exemplifies true sustainability rather than the much more common token or superficial sustainability efforts of many other places.

(NOTE: The very significant composting efforts of The Intervale may have to be somewhat reduced because of possible water quality issues in the adjacent Winooski River. These matters are now in negotiation between The Intervale Center and the state.)

One of the exceptionally important ways in which the Intervale is supporting local sustainable agriculture is through its Growing Viable Farmers Program, established in 1994. This program empowers new farmers to try out the business of farming without risking large amounts of capital on necessary equipment and land. This gives new farmers access to a supportive community of experienced farmers as well as the training opportunities through The Intervale and other organizations. And new farms and farmers at The Intervale receive the benefit of instant name recognition with a large consumer base in Burlington. Such "incubator farms" rent land and equipment at reduced rates which increase gradually as one's experience increases. All of these farms and farmers are organic.

Intervale Center Programs and Ventures

Calkins Farmstead – Farm Headquarters and Administration

Intervale Conservation Nursery

Healthy City Youth Farm

Intervale Compost Products

Food Enterprise Center

Agricultural Development Services, including the:

- **“Success on Farms” program, which works one-on-one with farmers to strengthen their businesses;**
- **Intervale Farms Program, which leases land and facilities to small organic farmers;**
- **Intervale Consulting, which shares expertise; and**
- **The Food Hub, whose work varies from facilitating the development of a multi-farm CSA, a shared season-extending storage facility and distribution hub, and a brokerage service to consolidate products and coordinate marketing and delivery.**

City Market

Vying with The Intervale as a hot spot on the local foods scene in Burlington is the City Market, also known as the Onion River Co-op. Located in the heart of the city, the market could not be more central. What is more, it is highly accessible to city buses as well as drivers who can park there for free. With a membership program offering discounts and work opportunity, the Co-op is open to the public. Member-owned, as are all true co-ops, City Market is one of a series of similar co-ops state-wide that takes very seriously its mission to focus on local food wherever possible and to develop strong relationships with area farmers. And the Market sponsors a full set of public programs, lectures, conferences and members' meetings. The Co-op is, in fact, the largest and most successful retail food co-op in the United States and is having a powerful philosophical impact on the city while providing a substantial amount of the local populations' food. City Market is another Burlington example of genuine, in contrast to cosmetic, sustainability.

Shelburne Farms

Shelburne Farms in South Burlington is another major player in Burlington's food sustainability. Billing itself as a non-profit environmental education center, Shelburne Farms is far more involved in agriculture and farming education than most other environmental education centers. As a 1400-acre working farm of uncommon beauty along the shores of Lake Champlain, with a beautiful Brown Swiss dairy herd with a sizable cheese-making facility, a popular store and visitors' center, and an extraordinary seasonal inn resembling a European castle, Shelburne is well situated to be a player in Burlington's local food movement. The farm's land use integrates education, agriculture, forestry, historic preservation, and agri-tourism. Shelburne sponsors a heavy schedule of well-planned school field trips, summer camps, workshops, and many other programs for children, educators, and families. It also offers detailed guided tours for the public and hosts a variety of Burlington and UVM agricultural events throughout the year. Part of the great beauty of Shelburne Farms, a prime attraction for visitors, is the pioneering work of its famous designer, Frederick Law Olmstead, Sr., designer of New York City's Central Park and the "father of landscape architecture" in the United States.

Shelburne Farms practices intensive rotational grazing with its dairy herd and maintains organic standards for its vegetable gardens. The 330 acres of managed woodlands are "Green Certified." Shelburne's Professional Development Program for educators includes attention to farm life and management, place-based education, and sustainability education, as well as science and environmental education. Publications and videos are also produced in these areas, making Shelburne Farms an important adult education center in the region. The expansive list of School Programs includes not only the Education Workshops but also On-Site Programs and

City Market's Cooperative Principles:

Voluntary and Open Membership

Democratic Member Control

Member Economic Participation

Autonomy and Independence

Education and Training

Cooperation Among Cooperatives

Concern for Community

Continuing the Mission

The Intervale manages 350 acres of productive land, supports the growth of viable farms, increases access to local organic produce, collects and grows trees for streambank restoration, educates young people about agriculture and healthy food, and gleans produce for families in need. The Intervale now has more than twenty years of developing farm and land-based enterprises that generate economic and social opportunity while protecting natural resources.

In 2007:

Intervale produced more than one million pounds of food.

Intervale Center's Agricultural Development Services (ADS) provided technical assistance to 29 farms.

Food Basket, a multi-farm CSA operation in the Intervale, delivered weekly shares of food to work places in the Burlington area.

ADS assisted the New Farms for New Americans Project, particularly to assist and involve African refugees.

Intervale Conservation Nursery grew and distributed thousands of trees and shrubs for forested buffers along Vermont's waterways.

Outreach programs. More than half of these extensive programs are related to farming and food production. And Special Events are equally extensive, including such important local foods topics as harvest festivals, tractors and other farm machines, cooking (of course!), food preserving, maple sugaring, food fermentation, utilizing the whole animal (with a focus on pigs), sustainable food production, cows and calves, and farmyard work. The central focus of all Shelburne efforts is education, with a very strong thrust toward ecological food production, preparation, and consumption. And Shelburne is spreading the word through marketing and distribution of its own food as well – cheese from Shelburne and many other farm products from local farms marketing through Shelburne. Shelburne is, indeed, a major player, and will be one in the long-term future.

Northeast Organic Farmers Association –Vermont (NOFA-Vermont)

NOFA-Vermont also has an effect on Burlington, especially given that its state-wide headquarters is in nearby Richmond. NOFA-Vermont is among the best supported and most active of the various NOFA chapters in the northeastern states – it even rivals the powerful MOFGA in Maine for its work and accomplishments.

A number of NOFA's summer workshops, pasture walks and other activities take place in the Champlain Valley, and its popular annual Winter Conference is populated by large numbers of Burlingtonians. Through conferences and workshops, NOFA-Vermont provides instruction on a wide variety of topics, including organic gardening, apple production, poultry, maintaining a family cow, cooking, earthen ovens, seed saving, food preservation and storage, organic maple syrup production, soil fertility, on-farm kitchens, grazing schools, organic dairy, on-farm slaughter, season extension for both crops and for animal grazing. NOFA's Farm-to-Community Mentor Program is particularly important, promoting, as it does, the critical role of farmers as both agricultural producers and agricultural educators throughout Vermont. The farms themselves in the Champlain Basin also provide rich opportunity for Burlingtonians to master all of these subjects and many more. Currently, there are no lack of pasture walks led by enthusiastic farmers showing off their farms, pastures, and animals.

Vermont Biofuels, Vermont Fresh and SLIMY

Other efforts in and around Burlington that complete local food activity within the city include the Vermont Kitchens Project and similar local food-based micro-enterprise activities. The Social Equity Investment Project is a city-run initiative that devotes some of its effort to local food and farming. And, more recently, the Vermont Biofuels Association has inaugurated a program called "Alternatives for On-Farm Energy Enhancement in Vermont's Oilseeds for Feed and Fuel." The latter has concluded that production of oil-seed crops (such as soy, canola, and sunflower) for biodiesel, livestock feed, and food-grade oil is feasible in Vermont where, it has been determined, yields for oil-seed crops at or exceeding the national average are achievable.

The Vermont Fresh Network, a farm and chef partnership certifying eating establishments which favor local food, is particularly

What has Vermont learned from The Intervale?

Farm incubation

Farmer training

Municipal/public CSA management and operation

Integrated farm model management (waste-food-farm connection; community-marketing-waste recycling-food connection)

Rental/lease of farm equipment, rather than purchase

Food provision for 500 member households

City/UVM integration

Some Characteristics of Shelburne Farms

Training of farmers

Education of the public

Historical preservation as a curb to some agricultural development

Market Garden – provides 50% of the food served at the Shelburne Inn, Shelburne Farms' Store, and Shelburne Farmers Market

Brown Swiss breed – well adapted to the site, plus quality cheese, and public appeal of this breed

Grazing: Chicken tractors with sheep; pigs to prepare vegetable land

Teaching of livestock slaughter

High extent of cleanliness

High quality equipment

active in Burlington and its environs. There are no less than 30 establishments in the city, with an additional 27 in the immediate suburbs. The Vermont Fresh Network is not only of vital importance to local farms, it functions as an educational tool that raises public awareness about local food too.

Finally, there is a unique initiative in South Burlington which must be mentioned. An organization called Sustainable Living Initiates Motivating Youth (SLIMY) began to work hard to get local food into local schools. With inspiration and some support from UVM, the senior administration of South Burlington Schools has been brought on board and a new farm-to-school program has been launched. This program involves kids in growing, processing, and cooking foods, with the school curriculum fully integrated into these activities. Learning thus becomes hands-on (and extends all through the summer). The program is now called the Farm Campus, and it involves all five schools in the district. Uniquely, the five school districts are seeking to partner with a forest-based community in order to swap both resources (food for wood chips) and curricular activities (sustainable farming and sustainable forestry). South Burlington schools will focus on both growing crops and maintaining animals, and two parcels of land are being looked at as potential sites for the Farm Campus. The organizers see much potential for UVM student involvement, both graduate and undergraduate. UVM professors are committing their support, and a master plan will emerge from courses taught by these professors. This is a most ambitious and progressive as well as creative project.

Change is Afoot

Change is afoot in Vermont as Farmers Markets start seeing significant increase in the proportion of actual farmers among the vendors. Goat dairy and goat meat product in the markets is synonymous with the entry of a whole new population of vendors and buyers in those markets. And the profusion of plant-animal integration and signs informing of whey-fed pigs and grass-raised meat and dairy is symptomatic of Vermont's deepening conversion to an agrarian culture.

Conclusion

From a city food policy and city food council, to a land grant university hyper-active in all aspects of the local foods and farms movements, to unusually strong resources to support local food (The Intervale, Shelburne Farms, UVM farms), to among the strongest local-food-in-the-schools programs to be found anywhere, it is no wonder that Burlington, Vermont's largest city, is the epicenter of the local foods movement in the United States and, indeed, the "capital of the localvores".

Among the strongest and least heralded infrastructure to support the local food and local agriculture movements are the university farms of the region's six land grant universities, their colleges of agriculture and their agricultural experiment stations. The following chapters provide a description and analysis of that important but thusfar underutilized infrastructure.



Question:

Is the land grant university here to serve the world, and indirectly, through trickle down, the people of the state and New England? Or is it here to directly serve the state and New England, and indirectly the rest of the world? This leads to the question, To what extent do these projects serve the near-term and long-term vital interests of the people of the state and of New England?



PART II: THE UNIVERSITY FARMS

Hidden Gems of Our Land Grants

It is the necessary mission of the land grant university's College of Agriculture to help enable the production and provision of food and fiber to the people of the state, in short, to assist the cause of local in-state food sufficiency. Therefore, it is the mission of the college of agriculture to help support the health of the means of production. This includes the health of the soil, the plants and animals, the farm, and the farm community overall. It is the mission of the college to work toward the reduction and ultimate elimination of obstacles to food and fiber sufficiency in the state and neighboring region. The college carries out these roles through its traditional and now nearly century-and-a-half-old mission to teach, conduct research, and conduct extension/outreach activity in service to the people of its state.

One might ask, how or why is this the "necessary mission" of the College of Agriculture? What makes all of this "necessary" at the present time is the energy reality in which we now live. Part II presents what is at the land grant universities and their farms and, as well, a number of different options of what could be in the future in the direction of food sufficiency and security for the New England region.

New England's University Farms: Their Role in Feeding New Englanders

New England's university farms are "worth their weight in gold," as the saying goes. There are six sets of such farms, one set in each state. They are devoted to all forms of New England agriculture, from field crops, including both mixed vegetables and grains, to ornamental horticulture (cut flowers, nursery plants and landscaping) and fruit trees, to all forms of livestock (dairy and beef cattle, sheep, pigs, goats, horses, poultry, honey bees, and others). Much of their research agenda has been funded through USDA and its various programs and subdivisions, although state governments and other monetary sources have played a role from time to time. The farms themselves are often aesthetically beautiful places and provide, in addition to their research functions, a public value through the open space protection which they represent. They will play a larger role in this regard in the future, especially as they are discovered more and more by the public.

There will come a time in the near future when deans of agriculture at land grant universities will be judged by their contribution to increased food production in their respective states. These farms can help the region to increase its food production capacity and are the most visible programmatic element to the public. That is their challenge, to do and to be seen doing.

Linking Our Land Grants: The Hidden Gems of Our University Farms

If we are to meet the food challenges ahead, the land grant colleges of agriculture in New England will need to return to their original mission as servants of the people of their states and regions. They will need to focus their teaching mission on educating and preparing their enrolled students to accept responsibility for the well-being and security of their people, and particularly in the production of food, fiber, and energy. They will need to focus their research, likewise, on the particular knowledge needs of their states and the region, once again with emphasis on the land and the sea, natural ecosystems and the local economies within the framework of their history and cultural setting. And they need to serve the entirety of their populations directly through extension, the infrastructure of their outreach role in service to the real needs of their people on the land, at the local, that is, the county level. Maine and New Hampshire have wisely maintained the infrastructure of their county extension systems. Vermont and Massachusetts may wish to reconsider their surrender of that system.

To paraphrase Wendell Berry, a healthy nation is dependent upon a healthy locale - many, many such healthy locales. And in New England, where states are small and distances short, where there is a common heritage and a reasonably common ecosystem and climate, it is appropriate to think regionally as well. It is appropriate to think regionally within the context of New England, but also with awareness of New England's connections and potential connections to neighboring northeastern states and, equally, to neighboring Canadian provinces. It is appropriate that our land grant universities return to a position of leadership. For that reason, they, and all New Englanders, need a level of awareness of the infrastructural

strength these institutions might provide. It is a purpose of this book to focus on one aspect of that infrastructure which has been increasingly neglected in recent decades – the university farms.

Depletion and Deterioration

The story of New England's land grant university farms is a story of depletion and deterioration – depletion of personnel and deterioration of infrastructure, both buildings and equipment. And yet the story of these farms is also a story of hope and potential. There is much potential embedded in their location relative to students as well as researchers, in the quality of their land, and certainly in the circumstance of their rich agricultural heritage.

Wherever one goes on these farms one witnesses depletion and deterioration in infrastructure but particularly in fewer and fewer personnel. I wrote in *The Wisdom of Small Farms and Local Food* how common it was to go onto a university farm and be shown by the farm manager plots and test trials of various crops which were the earlier subjects of research by former professors now retired or deceased. These professors were never replaced by a younger generation of researchers – in fact we've lost a whole generation – and their test plots and other evidence of their work lies fallow. In a few cases, their work on food plants has been replaced by newer work on turf or ornamentals, but that is not such a problem, for that work can return to food to fulfill growing societal needs. Likewise, one can see empty stalls and empty fields where there once was a range of farm animals. It is the net loss of personnel, both faculty researchers and farm staff, that is the problem. Depletion of personnel to do this work is, indeed, the 800-pound gorilla in the living room, so to speak.

Equally as pervasive is the deterioration of buildings (barns, farm managers' staff homes on-farm, and other agricultural buildings and facilities), as well as all kinds of equipment. This is a clear sign of failure to invest, as if the great stream of food pouring in at cheap prices from far-off places could continue forever. We are smart enough to know it can't, and yet we still hesitate to do what is necessary to feed ourselves and our children – not the least, reinstating the capacity of our six historic land grant universities in our New England states to get busy restoring, renovating, and, where necessary, re-tooling our land grants and the university farms for the task at hand.

Restoring and Re-Tooling the Powerhouses

The land grant universities of the six New England states have historically been the powerhouses of agriculture in their respective states - in agricultural research, in the teaching of agriculture, and, through their extension services, in service to the farmers and the public.

Restoration of these former powerhouses is perhaps more the requisite word than re-tooling, for our primary need is to restore what we once had and over the years have lost. That includes animals on the land grazing the pastures as well as great diversity of mixed vegetables, fruit and berries, and grains of various kinds. But some re-tooling is also called for, that is, using animals and plants to improve the land if we want to maximize the value of these lands for research and teaching on food, as well as some food production itself.

Sustainable Vodka?

Local vodka – apples – Lee, New Hampshire

Local vodka – potatoes – Fryeburg, Maine (and Prince Edward Island, Canada)

Local vodka – grain – a high end use for grain wherever it will grow

“Extension must be based on trust, not on technology; therefore, it must be face to face.”

Sid Bosworth, agronomist, UVM

This need for trust justifies the need for Extension presence and operation at the county level. New Hampshire and Maine have preserved this model, while Vermont and Massachusetts have abandoned it. Extension with a county presence is a sound investment, and particularly so in difficult economic times.

University Collaborative Opportunities:

UNH-UMO: organic dairy forage project (on-going)

UVM-UMO: agronomy (on-going)

UMass-UNH: multispecies grazing

URI-UConn: close geographical proximity for many joint efforts

UMass-UConn: close geographical proximity for many joint efforts

UVM-UNH: small-scale and/or organic and/or grass-based dairy

Some Intensive Formal Collaboration Potentials for the New England Land Grants:

University of Rhode Island (URI) – Historic New England, NOFA-Rhode Island

University of Vermont (UVM) – The Intervale Center, Shelburne Farms, NOFA-Vermont, Vermont Grass Farmers Association (VGFA)

University of Massachusetts (UMass) – CISA (Community Involved in Sustaining Agriculture), NOFA-Massachusetts

University of Maine (UMO) – Maine Organic Farmers and Gardeners Association (MOFGA), Maine Grass Farmers Association (MGFA)

University of New Hampshire (UNH) – NOFA-New Hampshire, Strawberry Bank Museum, D Acres

University of Connecticut (UConn) – Hartford Food Bank

How are our land grant universities in New England, including their agricultural experiment stations and extension services with their heritage and mission in food and agriculture, going to address serious questions of food insecurity and sufficiency within their states and the region? How might they re-tool to increase their capacity to address these questions?

Although deprived of revenue for several decades by their state governments, these land grant colleges of agriculture still retain their identity, honor their important heritage, sponsor some remaining agricultural faculty and farm management staff, maintain much of their infrastructure, and, most importantly, control their lands - the university farms. The land and some infrastructure is there, the memory is there, particularly in the archives. There has been little public attention to these farms for several decades, and rarely have they been the subject of public discourse. They have also experienced a long period of significant underutilization and inattention by the universities themselves, partly through a shift in direction away from agriculture per se, and partly through very tight university budgets. Research agendas have shifted from the farms and into the laboratories. And yet never has the need been greater to conduct research on New England's local food production capacity, both plant and animal, and, as well, to teach these skills, both their science and art, to a new generation of students. Overgrown lands, pastures gone back to scrub

woodlands, corrals and barns, and pastures without animals – this has been the image for some decades, but the tide is now turning. Student-run gardens, organic and otherwise, Cooperative Extension Master Gardener programs, new hoop houses and high tunnels, drip irrigation systems, animals now often out on pasture, are now beginning to make their appearance as we begin to enter a new era of agricultural renaissance and local food in New England.

The university farms, are, as I referred to them in *Pastures of Plenty*, “hidden gems.” Most of these farms are quite close to their land grant campuses, though there are exceptions in Vermont, Massachusetts, and particularly in Maine. What will follow in succeeding chapters is a review and analysis of the current state of each of the university farms along with recommendations for the future.

Land Grant Farms and On-Campus Food Production:

Land grant university farms were used in the past to provide for on-campus food consumption, so the tradition is established, though it has been a half-century or more since the university farms played this role in a significant way. If New England is to become more food sufficient, it is vital that the land grant universities return to using some of their land for food production. First and foremost, this food could be used to supply dining halls and other on-campus eateries and food outlets. But the land grant could also engage in food production for food pantries. This will give the university a political power and, indirectly, an economic power and status it does not now have. Societal needs for this food are growing rapidly and the land grant, quite properly, is in a position to serve. This role should not interfere with the first priority of these agricultural experiment station lands, and that is research, but such food production can be readily integrated into the teaching and extension/outreach missions of the university and should be pursued. In terms of on-campus usage of such food, all six New England land grants are now engaged, or becoming engaged, in a small way. But URI is showing leadership in using their resources to provision food pantries, to the tune of over 100,000 pounds per growing season.

Garrison Keillor has written, with respect to the land grants, “American universities have seen plenty of radicals and revolutionaries come and go over the years, and all of them put together were not nearly so revolutionary as a land grant university itself on an ordinary weekday.” Garrison Keillor, *Homegrown Democrat: A Few Plain Thoughts from the Heart of America* (New York: Viking, 2004), p. 94.

What to Do in Crisis?

Recently, I received an e-mail from the Dean of a Land Grant College of Agriculture who knew of my interest in the university farms. He asked me to call him concerning his university farms. He said they were destitute, facing a badly shrunken budget with little or no money left to take care of the farms.

I reminded him that the land was still there. And that land is wealth. It is good land, good farmland. It has a long history in service of food production for people and animals, and, as well, a long history of teaching, research, and demonstration. What to do under such challenging circumstances? I gave him some suggestions:

First, is the land secure? Secure the land. Understand its status and its degree of protection as university farmland. (I especially refer here to university farmland close to campus – within five or six miles, and less so the outlier farms.)

Second, are budgetary goals realistic? Remember to tell the powers-that-be that truly sustainable agriculture is not capital-intensive. It requires only small amounts of capital. It is high value for the money, “big bang for the buck.” It is thus appealing in difficult financial circumstances. Take full advantage of any resources on the land or available in support of the land, however meager.

Thirdly, is the use of the land within the land grant mission? Remind anyone who will listen that the mission of the College of Agriculture is education and training, practical research, and demonstration/extension. While its mission is not to produce food per se – that’s the role of the farmer – it is the role of the land grant to provide important means of production, i.e., education and training, finding answers to challenges, and modeling for the broader society. And it has been given a critical part of the means – the land – with which to do so.

University Farms: Research Experimentation or Demonstration?

Debate between the role of university farms as sites for experimental research or sites for demonstration goes back to the origins of these farms and the legislation that established them as early as the post-Civil War era. There was a serious need for agricultural experimentation and research on these farms in their earliest days, throughout their history, and continuing at present. And yet there has also been a continuing need for their role as demonstrations to directly assist farmers and the public. And never has this role of demonstration been more important than today, specifically because we’ve lost much of our agrarian culture, the culture of sustainable food production, and the vision that goes with it. In fact, our need for vision in this area is virtually desperate. We must be able to visualize models of sustainable agriculture as models of true sustainability.

It is true that sometimes research and demonstration are at odds, perhaps interfering with one another. Since we are in need of both, we must do our best to see that the two do not compete, or compete as little as possible. Fortunately, this should not be too difficult, given the current underutilization of so much of the open and wooded acreage on these farms. Experimental researchers, demonstrators (including Extension), and teachers must develop ways to work together to avoid conflict.

Particular areas of research and experimental needs on university farms relate to:

- How best to conduct organic agricultural practices (about which we need to know much more)
- How best to conduct grass farming and grazing systems (about which we need to learn from the past while using the technology of the present and future)
- How to effect considerable reductions in fossil fuel energy demand while also learning how to create on-farm energy sources (including particularly biodiesel)
- How to increase on-farm interdependence and mutual service (i.e., plants supporting other plants and animals, animals supporting other animals and plants, and both supporting a diversified on-farm economy and off-farm markets), all within the context of ecological and systems knowledge, and

The Value of “Value-Added”:

Finding ways to add value to raw or unprocessed foods is important to the income of farmers. Although the state of Vermont is the regional leader in artisanal goat, sheep, and cow cheese production, UVM has not chosen to focus on this in its agricultural programs, in spite of the fact that this is likely among the greatest examples of on-farm value-added in all of New England. UVM offers no goat or sheep program of any kind on its campus. UNH also has no goat or sheep presence in its current program but, like Vermont, New Hampshire has much potential in this area, perhaps even greater potential, given its location relative to markets. Another example of value-added potential lies in ice cream and yogurt products, particularly for on-campus and visitor consumption. The old land grant tradition of on-campus dairy bars and their popular ice cream is a successful example. Stonyfield’s offer to UNH to provide processed product from the UNH organic dairy herd is another example of a branded product with university insignia for sale and consumption on campus. Undoubtedly this would be very popular among students and alumni. One example is the large and very popular UConn Dairy Bar. A slightly different version can be seen at the “Vermont-made” Store at UVM’s Davis Center and UVM’s maple syrup (from the UVM Proctor Maple Farm) sold at the UVM Bookstore (and, by tradition, nowhere else). These are all strong traditions. In the non-food area, indirectly related to food, is UNH’s new “U-Doo” soil amendment. This product both comes from food (food waste) and supports production of food on and off campus. And most land grant campuses nation-wide have had a popular tradition of “Dairy Bar” restaurants. UNH’s joint Dairy Bar/AMTRAK train station (which hosts 12 trains per day between Boston and Portland) is a well known example, and one which is somewhat unusual since it serves locally sourced healthy food including soups, salads, sandwiches, as well as the traditional ice cream. A new opportunity in value-added is “mini-dairy” technology for on-farm pasteurization of milk and also milk dispensing machines for retailing. Both new technologies now arriving from Europe can enable dairy farmers to engage in direct marketing and branding their own product.

Why the land grant colleges of agriculture don’t take more interest in value-added local product processing and production remains a mystery. This is a challenge for the Deans who have the power to take leadership in this area. Value-added is ripe for opportunity in teaching, in small-scale research, and, obviously, in demonstration, and, of course, in provisioning the campus communities and dining halls.

- How to develop technology in support of all of these initiatives, especially technology scaled appropriately to smaller scales.

At the same time, we vitally need practical demonstration for those who will grow and raise our food at scales meaningful to and affordable to their realities. What does sustainable agricultural practice look like? What would a sustainable farm look like? What do permacultural techniques look like in practice? Our university farms are needed to help answer these important questions.

The Peoples’ Farms

If New Englanders are going to retrieve their ability to feed themselves, they will need to learn something about land grant university farms, and land grant university farms must, in turn, become what they once were and were originally intended to be – the peoples’ farms. In order for this to happen, the public will have to know where these farms are, what they have done, what they could be doing in the future to secure New England food sufficiency. Each of the states’ land grant universities have at least two or three such farms, sometimes more, and each of these farms - hidden gems with invaluable acreage and a long, rich tradition of teaching agriculture to the citizenry - can be retrieved and put to work for a food secure future for all of us.

Each university farm has a responsibility to train and educate farmers and to carry out research and demonstration of benefit to the farmers in their state. And with each farm, the people of their state come first. Take care of the state, and the nation will take care of itself – a healthy grass roots insures a healthy whole. We must, of course, honor their three-part mission as mandated in their enabling legislation. But we can also enhance this mission to fulfill the need for food sufficiency and security in each of our states.

Tough Tomatoes, Tough Times: A Prescriptive Remedy for University Farms on Tight Budgets

In the late 1960s Jim Hightower, former Texas Agriculture Commissioner, then fresh out of Harvard Graduate School, wrote a dissertation, “Hard Tomatoes, Hard Times”, which evolved into a book of that title. It was one of the earlier attempts to understand the drawbacks of industrial-scale agriculture and to appreciate the values of a more sustainable agriculture. Unfortunately, such “hard produce,” while inexpensive, visually appealing, and long-lasting, is low in nutrition and taste. His title refers to the increased hardening of tomatoes and many other foods as we bred our varieties to withstand long-distance travel and to have a long shelf-life, both keys to profits by agri-business. The other technique for profit, as Michael Pollan tells us, is a high level of processing.

We are again in “tough times” financially, although New England land grants and university farms are no strangers to restrictive budgets at any time. There is nothing new here. And there is a remedy. True sustainable agriculture is, by definition, not capital-intensive. It is economical agriculture. It is agriculture on a budget. It is “every person’s agriculture”-“peoples’ agriculture”- and the land grant colleges can do it on a shoestring, while raising revenue to boot, all within their mission of teaching, research, and extension/demonstration. Many “how to” approaches are suggested not only in this book but in all three books in this series.

The “hard tomatoes” referred to above, tough-skinned and ready for long distance travel, can be replaced by breeds and varieties of all species of plants and animals best adapted to the New England climate, soils, and ecosystems - breeds and varieties that require very low inputs, including animals based on grazing systems that can take care of themselves without significant infrastructure. Goats, chickens, pigs, rabbits, beef cattle on grass (particularly New England breeds like Red Devons) and sheep (particularly Katahdin hair sheep) are all examples. Only limited shelter and very limited veterinary care is necessary. This is low input New England frugality at its best. Likewise we can produce corollary crops like squash, pumpkins and many others. We’ve got the land. We have access to low-cost modern technologies from light-weight New Zealand fencing for intensive rotational grazing to hoop houses and high tunnels for season extension and all-season growing of vegetable crops.

And, importantly, we have access to an important work force who seek opportunity and want to be involved, a workforce that is increasingly excited about farming and gardening. I refer, of course, to our students. The new generation is changing. And they are reading the handwriting on the wall with respect to food insecurity in a shrinking economy, a changing world.

Some Approaches

What might be some approaches for enhancing the practical value of the university farms? It takes people to carry out the task at hand. Of course, there is no money for positions. But most “positions,” other than oversight, are not needed. We have large numbers of young, energetic, spirited students – of course, for what is a university if it isn’t students? And universities are in local communities filled with interesting and smart people, often including many of the university’s own retirees, other retirees who chose the community for their retirement, many employees of the university, and others interested or potentially interested. So, how can we rehabilitate land grant farms and transform them to meet the increasing need for viable, local sustainable agriculture? First, if they can receive some remuneration – food, a rewarding and socially important task, education, perhaps some modest monetary remuneration, some help will come now. More will come as people gain a sense of the threat of hunger and the importance of being involved in the food production process.

Scheduling more undergraduate courses on the farms is possible, especially when the farms are on campus or within a mile or two, and can apply to many different areas of curriculum, especially in all aspects of natural sciences and, as well,

economics. This will build a stronger internal constituency for the farms. Reaching out to like-minded conservation, environmental and sustainability organizations in the community, region and state will also be important.

What to do on the farms, given limited financial means? We need to recognize that sustainable farms are composed of both plants and animals, have high biodiversity, function as integral systems, and rely on breeds and varieties of plants and animals that are best adapted to the local climate, soils, and other ecological realities. This applies to livestock as well as crops, to fruit as to vegetables, some grains, and agroforestry. It applies to very low input systems, to the amending and building of soil through composting, to the selection of animal breeds that can make it on their own, and to animal and crop production that is sturdy, handy, resistant, and accommodating.

Some examples might include:

Goats (which have been called the salvation of sustainable agriculture and which yield both dairy and meat)

Poultry (including chickens for eggs and meat, turkeys, ducks, geese – all hardy breeds adapted to our environment)

Pigs (the “all purpose cleaner-upper”)

Apples (New England grows some of the finest apples in the world. In many places, our land wants to grow apples. Apples can be produced organically and/or with very low spray regimes – hence low input costs – if we ignore cosmetics. Many apples could go into apple sauce, apple cider and juice, cooked apples, and as excellent feed for pigs. Thus, apples can inexpensively support high quality pork production.)

Berries (Rich crops of blueberries and other berries can be produced here.)

Mixed vegetables (particularly squash, greens of many kinds, and root crops, potatoes and beets, all of which can easily be produced in abundance)

All farms claiming to be sustainable should have small numbers of goats, poultry and pigs, ultimate “cleaner-uppers” and inexpensive contributors to soil fertility. Ideally, all should be on pasture. If space permits, beef cattle on pasture would be wise. Red Devons are among the best possible breed considerations. And dairy cows on pasture are basic, Jerseys and Guernseys, perhaps Red Ayrshires, all being desirable for their high quality milk as well as their adaptation to grazing in our region.

By carefully balancing grazing and crop production, New England can produce much food with very little capital investment as long as land and labor are available. And especially if the labor is given (bartered) for educational experience, for food, and for monetary remuneration. “Build it and they will come.”

The Question of Non-Food Agriculture

The primary purpose of agriculture is the production of food. And yet over 75 years of cheap oil has spawned at least three important sectors of agriculture in the Northeast which are not about food, sectors which have represented economically highly important areas of agriculture, particularly in New England: sod/turf grass, ornamental horticulture, and equine studies and practice (i.e., show horses) The economic role played by these three areas should not be underestimated as a revenue stream to farmers, and to local and area economies, and as a place-holder for future food production, keeping farmland and potential farmland open and available (i.e., not paved over for development). Each of these non-food sectors of agriculture are discussed in the individual sections on the six land grant universities and their university farms. New economic and energy realities of a post-petroleum era, including availability and cost of oil, a contracting/shrinking economy, the need for a significant reduction in carbon footprint, the need for local food sufficiency and security, and the need for a developing focus on whole systems farming suggest a limited future for these non-food sectors. But, as a colleague from Maine has expressed to me, there will always be wealthy people interested in supporting these activities and thus always at least a small niche for all of these activities on New England land. And the place-saving role of these thusfar very economically important enterprises, in terms of land, infrastructure, and personnel, is undeniable. They each provide an important base for the transition to local food production.

Re-Train, Re-Tool, Redirect

Movement toward truly sustainable local agriculture and locally secure food production systems is, fortunately, modest in cost. Sustainable agriculture is, by definition, modest in its requirements for capital. It is local, small-scale, decentralized, non-energy intensive, and requires significantly less capital than most other endeavors of land grant colleges of agriculture, particularly when the land is available, as it often is with university farms and woodlands, assets which can and should be used to their full potential. Land is one of the most valuable assets of these colleges.

If we accept that the food source and system providing us over 90% of our daily food is unsustainable and insecure, then it is incumbent upon our land grant colleges of agriculture, our agricultural experiment stations, our extension services, and their agricultural programs, to lead in re-training and re-tooling their personnel and those who will join them. Such re-training, re-tooling, and redirecting is especially critical due to the limited budgets under which the land grant universities must operate.

With the resources of the colleges of agriculture - their heritage and their lands - limited in budgets but nevertheless still rich in resources, there are undoubtedly re-arrangements that can be made to better focus on the realities we face. In the event of a true food shortage and the panic it would induce, the Governor will be calling the Dean of Agriculture asking, "What can you do? How can you help?" The Dean needs to be prepared, and most certainly cannot prepare overnight.

Re-Tooling

An important aspect of adaptation to a new economic and energy reality is the idea of re-tooling and retraining. The land grant universities must re-tool and retrain as must other public institutions. In the areas of agricultural research, teaching and outreach extension, might it be reasonable to make the following assumptions?

People who work with sod are grass people. They focus on lawns and landscapes. They, with some support, can re-tool their work toward pasture grasses and grains. If their very lucrative sod research, teaching, training, and extension of recent decades, serving lawns and golf courses, have a limited future because of a contracting economy, then a re-focus on that which is more necessary becomes more important. And since there is a need for food from pastures (meat and dairy) and from cereal grains (baking bread and pastry, beer production, animal feed), their conversion from sod to pasture grasses and grain production makes sense. Therefore, those working in turf and sod are, at base, grass farmers who could apply their skills to grains and forage plants, both critical for New England dairy industry and baked goods.

Landscape horticulturists, including those working with woody plants, can re-tool to fruit production, an area of agriculture with a formidable past in New England and with continuing potential in the region. Apples obviously, but peaches, pears and plums, including numerous heirloom varieties well adapted to New England, offer potential grounds for work by those whose specialty is woody plants. Likewise, there is need for work with a wide variety of berries, including particularly blueberries as well as new blackberry prospects – all healthy and necessary food. Thus, those who work in landscape horticulture, including in woody plants, are potentially capable in fruit and berry production. New England is a natural producer of apples in many varieties and for many purposes, of blueberries, and many other fruits.

Equine science is a third area which has been lucrative to the land grants in recent decades. Focus has been on show horses and on recreation, as well as attention to the therapeutic riding programs. The latter, therapeutic riding, may have a different future from other areas, but a shrunken economy may limit opportunity for other equine areas. Equine people, people who work with horses, are animal science people and can re-tool to draft horses and to ruminants with food potential (cattle, sheep, goats), and even animals for predator control (donkeys, llamas), in addition to draft horses, all based on grazing. Those working in equine studies could also adapt to other aspects of animal science, including particularly multispecies grazing.

Those engaged in forestry could focus on sustainable woodlot management, agroforestry (i.e., agriculture-forestry integration including), and, importantly, on small-scale sawmill development, not to mention work on heating fuels.

Those working in agricultural, resource, and rural economics and policy could re-focus some of their efforts on small-scale silvopasture local systems, local currencies, decentralization of the economic and political framework, and on collaboration

with local government, fulfilling the needs of local government to itself re-tool for the fulfillment of the vital needs of their citizens.

Each of these five areas share the likelihood of decline in demand as the economy contracts and, as well, potential for conversion to work which is more fundamentally basic to human needs, needs which are rising in such an economy, namely, the production of local food for nutritional value. In this instance, re-tooling rather than retraining appears to be in order.

Poultry, Pigs and Beyond

It makes sense for each of the New England land grant universities to have some involvement with poultry and pigs. Poultry (for both eggs and meat), including turkeys but also ducks and geese, are among the easiest to raise and most efficient of creatures when it comes to energy, nutrition, and basic food source. They are rural, suburban and even urban, and are a proven food source in all economic circumstances. And their waste, if composted properly, has important value for soil fertility. Likewise, pigs rank high in energy efficiency and have historically provided a good return on very little investment. These are “everyman’s creatures,” to use an old phrase, delivering to those with limited means a diversified and nutritious diet. In addition, since the popularity of both pigs and poultry is rising rapidly in households across New England, the land grants can fill an important public service and educational niche by focusing modest resources in this direction. The land grants can also play a special research role in studying a wide variety of heritage breeds to determine which ones work best in New England, with particular attention to what has served New England well at the homestead level in the past.

URI’s Fred Launer, animal scientist, would undoubtedly add high efficiency goats to this list, referring to them as he does, as the “salvation of sustainable agriculture.” Of course goats, for meat and dairy product, require a bit more land and require serious fencing as well. Thus, they fall in a slightly different category but, nevertheless, are an anchor of food sustainability.

The Question of Forestry

When considering university farms, it is natural to ask the question, What about university forests and woodlands? Aside from providing fuel, lumber, paper, and natural capital, forests and woodlands are also an important adjunct of agriculture. However, the two cultures, that of agriculture and that of forestry/natural resources, have been separated for some time. Importantly, the two are beginning to coalesce, as indeed they must under new energy and economic circumstances. This book does not pursue the important role of forestry, and therefore the potential of the university forests and woodlands of the land grant universities – that would be the basis of another book, one which should be written. But any study of regional agriculture may not ignore the supplemental role, as well as acknowledge the central role, of trees, on the New England scene. (Interestingly, in Vermont, maple syrup production is considered an agricultural industry. In the rest of New England, it’s thought of, more or less, as a forest product. It is, of course, both.)

Forests are a vital part of New England’s natural resources in this land that wants to be trees. And forests play an important supporting role when integrated with food production, the central theme of this book, particularly through practices such as agroforestry and silvo-pasture. Wood, as supplier of an important revenue source to the farmer, cannot be ignored. And, indeed, Vermont counts among its university farms the Proctor Maple Farm which is entirely a forest of maple trees, albeit a forest producing food – maple syrup. And obviously, in agroforestry, wood products, including wood as fuel, can help provide an important revenue stream to keep a farmer financially solvent. Likewise, silvo-pasturing, an enterprise which produces both food and fiber simultaneously and interdependently (more with sheep than cattle) is another agricultural enterprise.

Weakness of Research

There is and will continue to be a fundamental inability to scientifically analyze the economic role of home garden production, community garden production, farmers market transactions and CSA activity (including the very existence of CSAs). We have within our society inability to consider real or important that which can’t be quantified or measured; an inability to see the importance of the small or decentralized as important, even when it is common; and an inability to see or measure the importance of that which does not lend itself to quantification.

The Question of Seafood and Aquaculture

This leaves the question of aquaculture, which clearly is a food producer. At the University of Rhode Island one is quickly asked, Do you want to see the aquaculture facilities on the farms, or perhaps the nearby Marine Campus itself? URI is justifiably proud of its involvement in oceans and fisheries, including internationally significant work in aquaculture. The New England coast and its fisheries heritage is, of course, legendary as a food source to the nation as well as the region. The mix of much of aquaculture with sustainable agriculture is a little questionable, however, given the high level of energy needed to conduct aquaculture. Is aquaculture truly sustainable? There are, however, forms of aquaculture that are less energy-intensive and which undoubtedly could serve the interests of regional food sufficiency. Perhaps a way could be found to integrate some aspects of aquaculture with agriculture to serve the interests of both.

Except for Vermont, all New England states are coastal and have an important saltwater heritage, including a heritage of nutritious food production from the sea. This includes both hunting and gathering (i.e., commercial fin fisheries and shellfisheries) and agriculture (i.e., aquaculture, mariculture). And New England coastal land grants are officially sea grant universities as well since they are (or could be) fully invested in this area of food production. The sea is our cultural heritage as well as our food heritage. (We see in the Rhode Island chapter that, at URI, this subject is more central than elsewhere.) And yet, while acknowledging the supplemental nature of this enterprise, it is not the central idea of this book to focus on non land-based food production – that would be the focus of another book. But the role of the sea in helping New Englanders to achieve food sufficiency and security should not be ignored. Recently I witnessed local commercial fishermen at our farmers markets continuing to run out of product long before the market closed – and that is happening all over as fishermen learn both the direct marketing benefits of farmers markets and apply the CSA model to fish. This development is, indeed, a very good thing for the food security of New England and, as well, for the protection of an important New England livelihood.

On the Subject of the “Outlier Farms”

Among the university farms of the New England land grant universities, there are five “outlier” university farms, that is, farms that lie outside of the main campus. These include the University of Maine’s Highmoor Farm (c.100 miles), Aroostook Farm (140 miles) and Blueberry Hill Farm (80 miles); the University of Massachusetts’ Cranberry Research Farm (c.140 miles); and the closer in but still somewhat distant URI Woodvale Farm (40 miles). Outlier farms are often, though not always, too distant from campus to serve a classroom function; but they lend themselves better to the specialized research purposes which they are today fulfilling --mixed vegetables, potatoes, blueberries, cranberries, and childhood and environmental education, respectively. While these farms are too far from the land grants to serve a classroom function, they can still provide educational opportunities for those connected to other institutions in the area. For example, Maine’s Aroostook (potato) Farm and Blueberry Hill Farm could also potentially serve an educational function, especially in biology, for the two state university campuses near to them, UMaine – Presque Isle and UMaine-Machias, respectively. Highmoor could perhaps serve this function for private colleges in its area. The latter farm, Highmoor, is the only one of these distant farms which is biodiverse, supporting a number of different crop plants, including fruit and grain as well as mixed vegetables, and can play a strong role in New England food sufficiency. Woodvale Farm in Rhode Island is a special case because it is not as far

“...[T]he food chain is a key part of the three crises we face: the health-care crisis, the climate change crisis, the energy crisis.”

Michael Pollan (from “As He Sows: An Interview with Michael Pollan” by Bill Lueders, Isthmus: The Daily Page, 9/17/2009 – www.isthmus.com/daily)

“As soon as you allow industry to fund your agricultural research, you’re going to find yourself working on products to sell to farmers rather than processes that farmers can adopt ... [L]et’s say what is most needed are really clever new crop rotations ... or figuring out ways to incorporate livestock. Who’s going to get rich from that research? It’s not intellectual property so it doesn’t get funded. That’s a powerful reason why you need the public sector involved – not exclusively, but substantially – so the research can reflect what farmers need and the public needs, not what the input suppliers need.”

Michael Pollan

This is a rationale for the central importance of the land grant universities and, as Garrison Keillor tells us, “...[T]here is nothing so revolutionary as a land grant university on an ordinary day...” That is, when it is doing its job.

removed from its university campus and because it has no research role at all. While some research could be introduced there, its real potential likely lies in teaching and in adult education. A School for Practical Farming might also be useful at this Rhode Island farm.

Reform in the Land Grants

America's land grant university colleges of agriculture have been sharply criticized since the late 1960s by Wendell Berry, Jim Hightower, and other writers for their philosophical bent toward the larger-scale industrial agricultural model. This is as true for the state Cooperative Extension Services (agricultural and home economics extension in the nation's counties) as well as in the research and academic degree programs at their main campuses. Berry, Hightower, and others have criticized the land grants' predilection for capital-intensive expenditure in place of labor, for large-scale mechanization, for heavy use of chemicals to control disease and insects, heavy use of chemical fertilizer, heavy dependency on irrigation, commodity production over subsistence agriculture, routine use of antibiotics in livestock, animal confinement to the nearly complete elimination of pasture livestock production, near exclusive monoculture over biodiversity, and, in more recent years, growth hormones, genetic engineering, and biotechnology of all kinds. There has been a philosophical model of the factory, a corporate industrial model and, inevitably, large-scale investment in land and machines, with minimal investment in people. This near universal leaning toward the industrial model has meant neglect of small-scale operations, lack of concern over maintaining people on the land and, with some exception, an ignoring of the social and ecological costs of this kind of philosophical value system, costs to the people, the communities, to soil, to ecosystems, and ultimately to the nutritional health of large masses of people off the farm.

It has been said that during America's Great Depression of the 1930s, the American people set out with determination to establish an agricultural system which would produce mass quantities of inexpensive food which maintained good appearance in accordance with cultural norms of what food should look like. Much farther down the scale of priorities was nutrition and taste, while environmental and social effects of food production were off the scale completely. America and American agriculture succeeded dramatically in achieving these goals, leading today to the least expensive food in the world, while also producing, importantly for the nation's balance of trade, a great food surplus for international export. The commodity surplus for export has become an economic dependency, while low cost has meant surplus disposable income for most Americans to direct to other ends. We set out to do this and completed the task, as intended. We should not be surprised, therefore, that nutrition, taste, rural and agricultural ecosystems and rural communities are all damaged and paying a price.

The public land grant universities and their colleges of agriculture symbolize both rejection and change. Without exception, they all share in the accomplishment of producing great quantities of food with good appearance at low cost and, as well, in the ecological and social cost of that production, the latter strengthening the arguments of their critics. But the land grant universities are also developing and nurturing alternative philosophies, those of sustainable agriculture. These philosophies are clearly in the minority but growing and can be seen in all three areas of their academic mission: instruction (i.e., degree programs and courses at both the graduate and undergraduate levels), research, and extension. These alternative value systems extend through the Cooperative Extension Service to the counties where at least some of the County Agricultural Agents/Educators are both taking the sustainability message to farmers and landowners and through which farmers and their organizations are increasingly sending a sustainability message back to the universities.

There remains on the land a cadre of farmers engaged in diversified sustainable agriculture who do not trust the land grants and their personnel and will have nothing to do with them. Land grants have, in their eyes, gained a reputation, a reputation earned through past land grant alliance with forces antithetical to small farms, ecological agriculture, or any questioning of the industrial model. Because of these perhaps deserved antithetical attitudes, combined with severe budget cutting, Cooperative Extension remains small and, in some areas, seems to be in search of a mission. Some of Cooperative Extension's work is being supplanted by farm organizations associated with the new social movements in agriculture, agrarian movements that have clearly rejected the industrial model and largely exist as non-public and non-profit membership organizations.

Alternative or sustainable agriculture requires all the support it can get, and is increasingly getting that support through consumers themselves and through associations or organizations that have developed around a number of sustainable agriculture movements: certified organic, biodynamic, community and congregation-supported agriculture (CSA), farmers mar-

kets and growers associations, starter farmer/beginner farmer movements, womens' agricultural networks (WAgNs), food cooperatives, graziers' associations, seed sowers' associations, and numerous other such groups. To some degree, these groups are supplanting the traditional role of Cooperative Extension. Alexis deTocqueville's characterization of Americans as joiners, as people choosing to associate with one another in organized ways, is particularly true in sustainable agriculture today. It is undoubtedly because extension and the land grants have been poorly equipped, for philosophical as much as for any other reasons, to answer to the needs of small-scale farmers and organic and biodynamic growers, or to an agriculture based on biodiversity and ecological principles, on new farmer entry by people of non-farm background, on urban and suburban food production, or on direct marketing needs and systems. Those involved in sustainable agriculture have been abandoned by institutions which have lost faith in them. Likewise, the alliance of these institutions with corporate institutions not trusted by farmers, an alliance which has brought down on them the criticism of Berry, Hightower and others over the decades, has not helped to connect them to the alternative and sustainability market which would otherwise be theirs.

The land grant universities have been particularly bound by institutional straightjackets, both in terms of budgets and tradition. If they are to serve, to make a real contribution to a society experiencing new realities, they must break out of that straightjacket in all three of their missions: teaching, research, and extension. They must come to understand and accept that the past, at least the recent past, is not necessarily prologue. Significant elements of the more distant past, including the past of the land grants themselves, a past much less dependent on fossil fuels, may indeed be prologue. Adaptation to low capital intensity, to experiential learning, and to ecological over industrial principles, at a scale appropriate to the realities of the region, are all critical for these universities to emerge from that straightjacket.

Times, however, are indeed changing. We now witness a rejuvenation of activity at the university farms, virtually all in the direction of small-scale, local, ecological, grass-based and far more biodiverse as well as economically diverse systems. The land grants are hearing the call and beginning to respond, as can be seen on the university farms themselves.

Let us now turn to the six New England land grants and their "hidden gems" - their university farms.

With reference to his own state's land grant university and its college of agriculture, Wendell Berry has said,

"Rather than trying to be nationally or globally prominent as a great research institution, if the University of Kentucky would meet its local responsibilities and really meet the needs of the land and the people of this state, it would be a city on a hill.

"Everybody would come here to find out what they're doing and how they're doing it and what the results are."

— Wendell Berry, 2010



Three Philosophical Mantras

Recent Past: Get Big or Get Out!

Today: Anything from Anywhere at Any Time!

Tomorrow: Who's Your Farmer?

Russell Libby, MOFGA



CHAPTER FIVE:

Maine and the UMO University Farms

Maine is the largest of the New England states. It thus has the greatest mass of land available for production agriculture and, as well, some of the least costly land for those types of farming which are dependent on larger acreages. Maine also has the longest distance to market, especially for lower value crops lacking a value-added component. And it suffers the greatest energy costs given its geography. The University of Maine and its farms are located in relatively remote north central Maine, in a rural agricultural region where land is relatively inexpensive, where an agrarian culture survives, and where markets are distant.

The University of Maine at Orono is thus the most geographically isolated of all the New England land grants, and a number of its university farms are quite distant from campus and therefore particularly isolated. With this isolation comes challenges but also opportunities, the latter being an opportunity to work in larger-scale agriculture than other New England schools, to have access to less costly land, and to engage in areas such as grain production which is less common than at other New England land grants. Maine also has the advantage of collaboration with two important symbols of sustainable agriculture in the New England region, the nearby Maine Organic Farmers and Gardeners Association (MOFGA) and the much newer Maine Grass Farmers Association (MGFA). The Vermont Grass Farmers Association (VGFA) spurred the development of the newer Maine Grass Farmers Association (MGFA) (just as, in reverse, Maine's MOFGA influenced the development and evolution of its Vermont corollary, NOFA-Vermont, a case of give and take).

The University of Maine's efforts in sustainable agriculture, and the integration of those efforts with MOFGA, were extensively described in my 2005 publication - see Chapter Six of *The Wisdom of Small Farms and Local Food: Aldo Leopold's Land Ethic and Sustainable Agriculture* (NHAES Publication#2260). The treatment herein will be limited to UMO's university farms.

UMO has two different categories of university farms: the nearby farms and the outlier farms. Maine is the only New England state with extensive university farms far removed from campus and thus more favorable to the work of on-site faculty research than to the work of students and on-campus teaching faculty.

The nearby farms available to all in the university are primarily Rogers Farm and Witter Farm.

A Tale of Two Farms

Rogers Farm:

The Rogers Forage and Crop Research Farm is 5 miles from campus. According to the UMO Rogers Farm brochure (dated 1998 and still in use), Rogers Farm was acquired as a forage source for the dairy herd and has developed into a research facility for forage crops and small grains, field corn, oats, wheat, barley, and soybeans. The farm encompasses 125 acres in nearby Stillwater, Maine. There are labs, a storage building, and a now vacant residence for the farm manager. Rogers Farm today is the home of Cooperative Extension's Master Gardeners Program and the student-run Black Bear Food Guild, the latter being a three-acre organic vegetable garden providing food to CSA subscribers and area farmers markets.

The farm's acres are about 60% open and 40% wooded. Twelve acres are certified organic, including the three-acre student farm, Master Gardeners plots, and some research plots. There's some corn and hay forage, winter varieties of grains, triticale, spelt, and wheat. There's IPM (Integrated Pest Management), garden space with strawberries, blueberries, and raspberries. There are solar-operated hoop houses. There are also canola, small grains, potatoes, and corn on large fields. And there are sorghum/sudan grass plots supporting the joint UMO/UNH Organic Dairy Research Project. The woodland

portion, 40% of the land, is not in use. Rogers Farm in particular has high potential for experimentation on on-farm energy potential in the interests of farmer self-sufficiency and independence. Rogers Farm could be thought of as an example of sustainability at work, a farm of hope and possibility.

On a beautiful sunny and unseasonably warm morning in November, I arrived at Rogers Farm. (I had been misdirected a number of times – a story in itself, as it seems that no one I encountered at UMO was at all aware of this longstanding and very established university farm so close to campus – such is the ignorance in matters agricultural in the general population, including the staff of the University’s Visitor Center.) What I saw at Rogers Farm on that mild sunny morning was, metaphorically speaking, “morning in America” – a story of rejuvenation and hope. I saw a large number of plant research plots, mainly food plots, many varieties, all active and well tended. I also saw the plots being used to sustain the much talked about UMO/UNH joint research study on supporting the needs of the growing organic dairy industry in the two states. (UMO provides the agronomic expertise – the organic forage for the cows – while UNH provides the organic cows – see the section on UNH farms.) I saw energy crops (canola) and experimentation which can lead to on-farm energy independence on New England farms as well as a local source of energy independence in the New England region. I saw a very active Black Bear Guild student-run certified organic mixed vegetable farm, providing food for both CSA members and farmers markets as well as an important teaching experience for students. I saw the UMO Master Gardeners Program plots associated with Maine Cooperative Extension. I saw numerous buildings in good repair (except for the original farmhouse in need of renovation, something quite doable since it will provide a revenue stream from rental income, ideally from the farm manager, when renovated and made more livable). And I noted the presence of considerable farm woodland acreage, some of which can be converted to additional tillable acreage, perhaps to grow food for dining hall and other on-campus consumption, all of this on fine sandy loam soil with good production prospect. I also saw the neat delineation of organically certified and non-organic land, each separated from one another by a state highway. In all, Rogers Farm is a story of hope, of success, of fertility in the broadest sense.

Are Sheep Profitable?
The question, “Are sheep profitable in Maine?” which appears in a 1914 Maine Agricultural Experiment Station publication is not a relevant question to this study. Nor are countless similar questions asked about other livestock and crops in farm production. What is relevant is the question “Can sheep provide nutrient for the human diet in Maine?” once we make the assumption that the present food system, i.e., our dependence on food from away, is an unsustainable system resulting in food insecurity.

Witter Farm:

Witter Farm, about a mile from campus, is the traditional animal science farm at UMO, the animal corollary of Rogers as a plant science farm. According to the official UMO Witter Farm brochure (1998 and still in use), after a period of decline and disrepair, the Witter Farm was renovated and reopened in 1998. The farm encompasses 360 acres (of which 250 acres are tillable). It has a 35-cow tie-stall dairy, a livestock barn, a horse barn, classroom/lab space, and a farm manager’s residence. Until recently it has had a herd of registered Holsteins, Black Angus and Belted Galloways for beef, Suffolk sheep, and university-owned horses. Witter contains an active composting program and a relief milker training program. This farm has been the most heavily used and the most actively integrated into the university’s teaching mission, and it is far better known to the university community than is Rogers Farm.

Witter Farm produces mixed grass/legume forage on 23 soil types. It has outstanding livestock grazing potential should the university decide to move in that direction. Once home to Jerseys, Guernseys, Brown Swiss, and Holstein cattle, the farm now has only Holsteins, all for dairy. There were both beef cattle and sheep on the farm until the summer of 2008.

Severe labor shortages have plagued the farm, hastening the demise of the herds and programs. Cows were replaced by horses, and now all privately owned horses are gone as well. Large laboratories replaced milking and dairy processing – the university is no longer processing milk, and therefore losing out on the benefits of value-added. The dairy herd is down from 120 to 55 animals, with only 35-40 milkers. In spite of good pasture availability, there is no grazing – it’s been over five years since cows were out on pasture. Heavy reliance on part-time student labor insures no grazing. Horses are pastured, but pastures are not maintained. It’s felt that the farm might survive because of its nearness to campus, but otherwise a sense of gloom prevails.

Summer Farm School

What are some solutions to the decline of Witter Farm and others like it? One could be that the New England land grants might institute a required summer session or re-organize themselves so as to sponsor a full summer semester for agriculture majors to insure that there are students and faculty using the university farms throughout the growing season. This session or semester might also be widely available to the general public as a summer “farm school.” And there could exist a Master’s degree or other type of summer-based certification program as well, perhaps even as a two-summer requirement. This would have the added advantage of insuring that summer interns and other personnel remain on the farms all summer.

history. Is this the goal? – a symbol of decline at Witter? Might not the people of Maine deserve something better at their land grant? And are they willing to support something better in the interests of their own food security?

Witter is a classic example of a farm in need of a renewed mission. Wherever I went at the New England land grants, I witnessed (as I have for many years at UNH) a decline in numbers of agricultural faculty conducting research on these farms. And this is related, of course, to the decline in usage of the farms, and particularly so at Witter. But Witter and other such farms, especially those close by, must be able to rely on broader usage than just expensively funded (and often

UMO has the opportunity to collaborate with local historical properties which share an interest in agriculture. On a scale smaller than that of the URI-Historic New England collaboration (see URI Farms chapter), the University of Maine could collaborate with the extensive heirloom gardens and the sustainable agriculture interests of the Henry Knox Museum and House in Thomaston, an interesting opportunity for UMO with a most enthusiastic non-profit involved in both historic preservation and, potentially, experimental gardens and orchards reflecting Henry Knox’s own 18th- and 19th - century interest in these matters. A further collaborative opportunity may be available in Midcoast Maine at mid-19th century Historic New England properties in Wiscasset, particularly Castle Tucker.

On the afternoon of the same day as my Rogers Farm visit, under an increasingly threatening sky, perhaps symbolic, I visited this even-closer-to-campus and better-known Witter Farm, today UMO’s only Animal Science Farm. I was escorted by faculty and farm management staff who showed the depletion that had occurred. Sheep gone. Beef cattle gone. Pigs and poultry not to be found. Nor goats. A dairy herd much diminished (which may not be all that bad, bringing the smaller dairy herd a bit more into keeping with Maine’s small-scale realities). Privately boarded horses gone, with a few university-owned horses still present. Empty stalls. Empty barns. Deteriorating buildings. Badly over-grazed horse pasture. No intensive rotational grazing (in spite of Maine’s very positive prospects and Witter Farm’s own prospects for this type of grazing). After being informed of the rate of decline of animals and activities just in the past two years, I quickly calculated that, at that pace of decline, in just a few years there would be no remaining animals, no programs, no people, neither workers nor students, on this site, just neglected, deteriorating buildings. And this on a farm which is close in, easily accessible to many students, rather well known, and with a rich agricultural

federally directed) scientific research in the conventional sense. They must also become important teaching tools, food producers for on-campus consumption, centers for value-added farm products, and host to numerous kinds of student, community, and citizens’ activities. Certainly the potential is there. Bring on the goats with their milk, cheese and meat! Bring on the poultry (including turkeys) with their meat and eggs! Bring on the pigs, nature’s cleaner-uppers! And the easy-to-raise and so important beef cows on pasture. And where is UMO’s Dairy Bar with its own UMO ice cream, cheese, and eggs? I couldn’t find it. Bring in the animals and operations, and the researchers and political support will come.

The irony in this story of decline at Witter Farm is the operation’s stubborn embrace of expensive energy-intensive animal confinement systems which rely on purchases of feed-grain concentrates rather than the grazing resources at hand. If the farm relied more on the grass its own land produces, and moved away from expensive confinement practices, it might not be in such a state of decline. In addition, the farm has given up on beef cattle despite rapidly rising demand for grass-fed pasture beef and has neglected to promote goats, pigs and chickens, all three of which are rich producers and models of efficiency in hard times. Maine could learn from Rhode Island that goats are the key to sustainable agriculture!

On a positive note, it should be stated that some renovations were recently completed at Witter Farm, including repairs of serious drainage problems, the installation of a new system of gates surrounding animal turn-out areas, and the replacement of the horse barn roof, as well as the updating of safety features. These actions suggest there may be hope yet for the future role of Witter Farm in UMO agricultural plans.

A source of excitement for students and staff associated with both Witter and Rogers' Farms appears to be the UMO-UNH joint research project on on-farm nutrients in organic dairy production which, aside from being organic, everyone feels is scaled right for Maine. That is a story in itself and suggests that, in many areas at the land grants, we have moved away from the comfortable and realistic scale of the regional society we serve.

Smith Farm:

Finally, at UMO there is also the less well known Smith Farm, land which is in use for forage production only, and perhaps for not that much longer, given the decline of the dairy and other livestock at Witter.

A "can't do" attitude, together with a glum acceptance of tight and disappearing budgets, is evident at all the New England land grants. It is too much in evidence at Maine. But the UMO undergraduate major in Sustainable Agriculture, described in detail in NHAES Publication #2260, is a "can do" example at Maine. Now 20 years old, the major is increasing in enrollment, having doubled in the last two years. Still based in plant and soil science, it is in need of an animal science component.

The Outlier Farms

Highmoor Farm:

UMO's outlier farms are three: Highmoor at Monmouth, Maine, 278 acres and 2 hours from campus; Aroostook Farm at Presque Isle, 425 acres and 2.5 hours from campus; and Blueberry Hill Farm at Jonesboro, 60 acres and about 1.5 hours from campus. Highmoor Farm, though not near campus, is accessible to many more Mainers than are the other two farms.

Highmoor Farm is to UMO what Cold Spring Farm is to UMass: a center for heightened potential in apple production. Orchard production is high on the list of priorities at Highmoor. There are now 17 acres in orchards. There are also 5 acres of vegetables and small fruits, with much unused open and wooded acreage available for future use. There's a sizable historic farm house and barns with offices to support the work of specialists in tree fruit, small fruit, and vegetables. Work is ongoing on small fruit and vegetable varietal trials, apple cultivars, and vegetables (green peppers, snap beans, onions, sweet corn and strawberries). There's also a breeding orchard for American chestnut trees and the Maine Compost School, both on this farm.

Researchers at Highmoor Farm look at ways to eliminate insect damage, increase soil quality, test varieties for northern climates and hardiness (15 varieties of sweet corn, 8 varieties of asparagus, 13 varieties of tomatoes, 12 varieties of cantaloupe, 10 varieties of hot peppers), experiment with crop rotations, and even provide thousands of pounds of fresh vegeta-

"That Sweet Agricultural Valley"

Highmoor Farm currently conducts a considerable amount of valuable research and holds much future potential. As UMO's David Smith tells us,

"Orchard and apple work, in particular, was carried out only with difficulty in Orono. Students stole the experimental fruit, the soil was not good for this sort of work, and the commercial apple growers were generally located in other parts of the state. Station personnel hoped to be able to purchase a farm. The favored location was in that sweet agricultural valley lying between the Kennebec and Androscoggin Rivers around the town of Monmouth ... Here the first school of higher education devoted to agriculture in the United States, the Gardiner Lyceum, had been located. Here, in fact, both (Ezekiel) Holmes and William Drew, the great Maine agriculturalist newspaper editors and owners, had not only had their farms but published their newspapers. Here also was the major portion of the state's great orchards."

David C. Smith, The Maine Agricultural Experiment Station: A Bountiful Alliance of Science and Husbandry, 1980

Maine Comes Early on the Scene - 1855

“The Oxford Democrat, a leading weekly and one with a strong farm interest, called for an experimental farm. Its columns said that this farm should provide for experiments on manures and how to apply them, on the best methods of cultivation, on crop rotation, on seed selection, and on animal breeding. Also needed ... was a description of ways of propagating various fruits adapted for the Maine climate, as well as the best methods of preserving and marketing products. The newspaper concentrated on information about fertilizers, however ... (B) etter breeding of animals was also an issue.”

The Oxford Democrat, February 9, 1855

“In addressing the Maine Board of Agriculture at Newport, 1877, C. F. Allen, President of Maine State College, remarked that “The Maine State College should have connected with it an experimental station, WELL SUSTAINED (emphasis mine), where an accurate test of fertilizers of all sorts, as well as methods of cultivating plants, of breeding animals, and of feeding stock could be made.”

Agriculture of Maine, 1877

Both quotes as reported in The Maine Agricultural Experiment Station: A Bountiful Alliance of Science and Husbandry by David C. Smith (Orono, Maine: UMO, 1980). Indicative of the agrarian nature of the times, early bulletins of Maine’s Agricultural Experiment Station were all printed in the local newspaper editions of the Bangor Whig and Courier.

If Maine is to meet its stated goal of 80% food sufficiency by 2020, the University of Maine, its Agricultural Experiment Station, its Cooperative Extension Service and its many university farms will need to get very busy very soon.

bles to a nearby food bank. Highmoor features ongoing collaborative work with MOFGA on asparagus and has established hoop houses, high tunnels, and high-gro tunnels (including the largest tunnels on the market) for season extension. There is potential here for research in “tunnel technology” which would yield useful results for many Mainers given the profitability of season extension. Collaboration with Maine’s Eliot Coleman, the national guru of season extension and all-season gardening, would be likely richly rewarded and is part of the farm’s considerable potential. The reality in Highmoor’s future is undoubtedly an ability to serve Maine’s trend toward more diversified smaller farms, and not only Eliot Coleman but Eric Sideman and others associated with MOFGA could be of great assistance. (See NHAES Publications 2260 and 2340.) Highmoor’s future also lies in pomology and particularly in the integration of fruit and berries with vegetables so that each element serves the other. At least a small quantity of diverse small livestock would also be helpful and would support work on apple-swine linkages (i.e., pig grazing in apple orchards, as is being done at Michigan State University and at Agriculture Canada’s Experimental Farm in Kentville, Nova Scotia). Highmoor is today a regional research farm, receiving research funds and inquiries from all over New England and taking the lead in providing research for vegetable and fruit farmers.

Blueberry Hill Farm:

Blueberry Hill Farm, like UMass’s Cranberry Research Farm, has a specialized mission of serving one particular industry, blueberries. Both of these farms are oriented toward commodity and export production. Emphasis now is needed on integrating blueberry production as an important supplement in small-scale farming and as an important supplemental revenue source. Hence, Blueberry Hill Farm could be prepared to assist Maine farmers at this lesser commercial level of production. With 60 acres devoted to commercial cultivated blueberry production and a separate five acres devoted to Maine’s wild blueberry industry, the only missing element is attention to the organic blueberry sector as Maine and the nation desperately need research in organic blueberry production. Recently discovered and significant health and nutritional benefits of blueberries, in particular related to anti-oxidants, make blueberry production and research in Maine that much more important.

Aroostook Farm:

Aroostook Farm, the most remote of all of New England’s university farms, also has a specialized mission, that of potato research in support of one of New England’s few examples of industrial agriculture. With rising and uncertain fuel costs and an uncertain economy, one would not expect an increased intimacy between the Orono campus and southern Maine. But those same geographical circumstances argue for a revised mission in support of Aroostook County agriculture, not simply in potatoes, but also perhaps in beef cattle (which is growing in the county) and in diverse animal production. There could well be some integration with a wider variety of plant products, particularly grains, supplementing important advances in

small-scale wheat and small grains production for flour which is now occurring in southern Aroostook County. A further role for Aroostook Farm lies with field crops useful in potato rotations, particularly those crops which increase crop rotational activity and lengthen the potato rotations, especially oats, barley, wheat, canola, and soybeans. Canola and other exports to Quebec for oil might be increased, the resultant byproduct meal being useful for animal feed. Research on carbon credits and rotation also holds promise for the future, as does research on potato storage at the new research storage facility on site, and measures to get potatoes onto three year rotations. Broccoli is also being studied as a rotational crop, in addition to grains and some sugar beets. And there is potential for malting in Canada for Aroostook-grown barley. Two other areas for consideration include provision of grains for Maine beer micro-breweries: the demand for local grains is high, the supply nearly non-existent. And there is opportunity to serve the very under-served organic potato sector to give Maine regional leadership in that area. Organic potatoes, being of greater value, can better justify longer-distance transport from Aroostook to farmers markets and other direct-marketing venues in southern Maine and elsewhere in New England.

With four major research projects by UMO on-campus faculty at Aroostook, there is still room for development of the conventional Agricultural Experiment Station (AES) research model, but little teaching opportunity at such a distance from campus. Aroostook remains “king of the outliers”!

The Lure of the “Petting Zoo”

At UMO, lack of farmland is not a problem. Farms are plentiful. The problem is lack of faculty. This shortage will not be remedied any time soon. The answer, therefore, is to seriously involve students and others, including enthusiastic members of the public and non-profit organizations. This solution favors, of course, those university farms most directly accessible to students and others on or near campus. And it favors a model, such as that created by Fred Launer at URI, which appeals to and excites numbers of undergraduate students. Lure the students out to the farm. Then reward them for being there by giving them interesting things to do related to animal care and interaction. Ideally, general education courses can be designed to make use of these farms, effectively leading more undergraduate students to work at the farms. “Petting zoos” might also be an apt use for some highly accessible university farmland. Some agriculture faculty joke about and belittle the idea of a “petting zoo,” but they can be effective. Never underestimate the power of a so-called “petting zoo” to open people’s hearts and minds, whether children or adults. Perhaps we need more such “petting zoos” on university farms. Who knows where they could lead? Who knows how many new farmers, future university farm staff, and future teachers of agriculture they might inspire?

According to Russell Libby, long-time executive director of MOFGA (see AES Publication #2340), Maine today is roughly only 18% food self-sufficient, in spite of the state’s large size and small population. That is, a mere 18% of the food consumed in Maine is produced in Maine. MOFGA and the Maine Department of Agriculture have endorsed an ambitious goal of 80% food self-sufficiency by 2020. But this is on paper only. There’s been no formal acceptance of such a goal by state government or the university, and no action taken, no policy implemented. The 80% figure comes from the work of Professor Mark Lapping of the University of Southern Maine and represents the Nordic standard which Maine copied. (The Swedes aimed and largely succeeded at developing a food policy that would reach 80% self-sufficiency on a caloric basis. That was a goal generated, in large part, by the need to retain their political neutrality during the Cold War, according to Professor Lapping.) While the local foods movement is vigorous in Maine, and includes large farmers markets at Brunswick, Portland, and Orono, plus many smaller farmers markets across the state, a CSA movement that serves 2% of all Mainers, and thriving farmstands and on-farm stores, there is tension in the state: the movement is seen as a threat to Maine’s potato exports. Maine would be well-served, Libby contends, by further development of food policy councils, including Multi-Town Food Councils. These would be even more effective than single Town Agricultural Commissions and Councils. UMO could help to facilitate these needed developments.

The Story of an Agricultural Experiment Station

“The essence of agricultural experimentation is farms where long-term scientific experiments may be run. The standard for such locations was set nearly one hundred and fifty years ago at Rothamsted in England...The initial soil and fertilizer experiments begun at their Broadbalk Field in particular are still carried on; they are the longest continuing scientific experiments in the world ... As I write I am looking at the Station’s copy of ... The Book of the Rothamsted Experiments, a volume now battered, but widely read at the station before 1920. The Rothamsted ideas – long continuing experiments on soil and plant chemistry and nutrition – were the stuff of life in the early experiment stations.

When the Maine Agricultural Experiment Station was created in 1885, much of the driving force behind it was a perceived need to understand a rapidly changing agricultural situation in the United States.” (And today, once again, we have a rapidly changing agricultural and food situation in the United States.) “Today (1980), when one thinks of Maine farms, one thinks of potatoes, broilers and perhaps apples. When the experiment station began, wheat, oats and hay were the prime crops. Potatoes came next, still under debate as a primary crop, and apples, ice and timber were exported. Most Maine farmers were relatively self-sufficient ... Protein, population dynamics (whether in insects or humans) and energy are the threads that run through predictions of the future ... More work on forage and protein, and the development of better integrated farm systems seem to be the prime necessities ... and a long-term goal is to cut back sharply the unnecessary use of pesticides.

When the station was founded, the critical areas were declining population, crop and resource competition, and a need to understand basic processes. As the station staff faces the future, population is still a problem, but now it is concerned with increase and with changing characteristics. Basic research in protein looms very large. A new problem is energy – but the resolution of that difficulty will invade all other areas of research.

Most of the citizens of the state have never heard of the station and have no idea of its work. Lack of publicity is often a testimonial to work done well at an inexpensive rate. In this case it is absolutely true. The past without the station would have been at many times desolate; the future without it would be unthinkable.”

David C. Smith, Maine Agricultural Experiment Station



"Food is a community responsibility."

*From "Recommendations for a New
Hampshire Food Policy"*

*(New Hampshire Cooperative Extension,
1979)*





Wake up, New Hampshire! If we really believe in “Live Free or Die,” we’d better change some of our behaviors that are preventing us from living free.

CHAPTER SIX:

New Hampshire and UNH University Farms

Of the three northern New England states, New Hampshire, hampered by loss of much farmland to residential and commercial development, nevertheless has the greatest market potential based on both nearness to major markets and greater ability to pay for high quality fresh farm products. And the state’s land grant university is located in the middle of a high growth, high income region on the Portland-Boston corridor. It has fast direct transportation linkage to the greatest markets in the New England region and the value of its own extensive farmland is greatly enhanced by this geographical proximity. Land costs in the area are high and the farm population small, the agrarian culture all but gone, but its market location, good soils and the mildest climate in northern New England provide distinct compensation for adverse challenges.

Being based in Durham for many years, I think of UNH’s university farms as “hidden gems” and I referred to them as such in *Pastures of Plenty*. Gems, absolutely, and well hidden from the eyes of the public and even the university community. All of UNH’s farms are within a six-mile radius of the UNH campus – a unique value providing a base for intense student and faculty usage, adding to the importance of protecting UNH’s close-in farm land.

UNH Farms:

The University of New Hampshire has perhaps the highest potential for the effective use of university farms of any land grant university in New England. This stems from three factors:

- the magnitude of university-owned acreage available (1100 acres – half farmland and half woodland)
- the nearness of and accessibility to campus of all university farmland – within a radius of six miles
- the broader context: New Hampshire’s highly developed seacoast has a shortage of local farms and open space, a rising demand for local food, and an ability to pay.

One could add to this list nearness to the farm- and local-food-starved Boston and Portland metropolitan areas as well, and focused advocacy movements for both open space preservation and local food across the entire region.

Together these realities enhance the prospect of UNH farms and the agricultural programs already existing or to be developed on those farms. And yet, even here at UNH, we witness under-utilization of these university farmlands.

UNH owns seven farms and has other field land not designated as farms which traditionally support the Animal Science and Plant Biology programs. UNH also leases nearby farmland from private landowners in the area, mainly to grow forage for the two dairy cattle herds. The farms are:

Woodman Farm – on campus – contains 155 acres, with 20 acres used for horticultural research, the principle purpose of the farm.

Kingman Farm – just 3 miles from campus – contains 300 acres – traditionally an agronomy research farm – now devotes 30 acres to horticultural research, 50 acres to crops (forage for dairy cows), a small orchard, a growing compost operation (the product of which is marketed as “U-Doo”), and sizable woodland.

Bartlett-Dudley Farm – the farthest out at six miles from campus – contains 100 acres with 65 acres in field and 35 acres in scrub woodland – farm use is crop production and the farm abuts Burley-Demeritt Farm.

Burley-Demeritt Farm – also six miles from campus – contains 120 acres, with 65 acres in field, the rest in woodland – farm use is for crops and pastures. This is likely today the best known of the UNH farms, as the home of the UNH Organic Dairy and its 90 Jerseys. The farm also contains the historically significant mid-19th-century Demeritt family farmhouse which, if renovated, might house the farm staff, students or faculty researchers, or visiting scholars. In addition to the organic milking herd, there are dairy heifers and a miniature swine colony used for medical research, the latter of which may

soon be moved to make way for value-added dairy product from the farm.

Thompson Farm (also called Highland House Farm after its famous homestead) – about four miles from campus, contains 150-200 acres (exact acreage unknown). About 34 of these acres are used for crop production, and assorted farm buildings are on site. The university's two-year school, the Thompson School of Applied Science, operated a sustainable, student-run teaching farm on-site in the 1970s and 1980s.

Fairchild Dairy Research Center – on campus – contains 60 acres and is a conventional confinement dairy with over 200 Holsteins and associated forage crops.

Moore Fields – about one mile from campus – contains 77 acres, all used for forage crop production.

The university also leases about 30 acres of private land near the Dairy Research Center adjacent to campus and an additional 12 acres about 4 miles away, all for cattle forage. The university continues to search for more leasable acreage.

With so much land at its fingertips, UNH has significant potential for expansion of agriculture and food production. How will the university develop that potential?

The Organic Dairy:

UNH is home to the nation's first organic dairy at a land grant university. This organic dairy remains one of only two land grant organic dairies in the U.S. It is ironic that New Hampshire, home to far fewer organic dairies than its neighbors, Maine and Vermont, should become the first to establish an organic dairy research farm at its university. Neither UMO nor UVM have come even close to trying. On the other hand, New Hampshire is host to the world's largest user of organic milk, Stonyfield, and its dynamic "CE-Yo" Gary Hirschberg, a frequent visitor to UNH for almost four decades. Some funding assistance provided by Stonyfield and others, coupled with the fact that New Hampshire does not host a large-scale conventional dairy industry which might feel threatened by organic dairy production, has allowed UNH, even on a very limited budget, to pursue its interests in organic dairy. And one of its major university farms, Burley-Demeritt, and the excellent pastures on its over 200 acres (which includes the adjacent Bartlett-Dudley Farm) has played no small role in this process. Likewise, playing no small role is the indefatigable and highly regarded Professor Chuck Schwab - a principal player until his recent retirement. Both certified organic and pasture-based approaches are key to understanding what UNH has accomplished against substantial odds. And the work of UNH's endowed Office of Sustainability, under the leadership and initiative of Dr. Tom Kelly, who has chosen to devote significant time, effort, and resources to sustainable agriculture and food systems in general and to the organic dairy in particular, is also critical to that understanding.

Scale has been central to the success of this organic land grant dairy, the nation's first. The university intentionally scaled the dairy to a size in keeping with New England realities for organic dairies, and therefore to readily identify with individual

Sustainable Agriculture in Higher Education

Detailed descriptions of the Sustainable Agriculture program models for the Universities of Vermont, Maine, Wisconsin, and Iowa State (all of which now have over two decades of experience) are presented in NHAES Publication # 2260, The Wisdom of Small Farms and Local Food. They made the effort early, and today the rest of us at the land grants can do even better.

It has been my experience that many of the best sustainable agriculture farmers, particularly in New England, come from liberal arts backgrounds, not necessarily backgrounds in science or agriculture. As most of the graduates of such programs who go into farming do so on small to medium-sized farms in the state and region of their alma mater, I suggest that the Bachelor of Arts (B.A.) degree has a particularly attractive value. The M.A. also has great value since many of the students who will want to enroll in this area already have an undergraduate degree. Also, the M.A. is simpler to establish since it does not need to concern itself with university general education requirements.

I believe it is very important to maximize the place of internships and all other on-farm experience early in the program, especially in the first and second undergraduate years, and in the first graduate year, including but not limited to the first two summers. This field experience will ensure that students will be far better informed as they engage in the academic side of their studies.

The program might start with determining how to model the program after existing sustainable farms, and to choosing a few such farms as models, answering the question, "What makes these farms sustainable?" It starts with soil and the care and amendment of soil. It must include animal and plant agriculture integrated as much as possible with one another. And there will be need for a basic course in principles of ecological and sustainable agricultural production, and a basic course in direct marketing.

New Hampshire Births the GREEN PASTURES MOVEMENT - 1947

“The people of New England were united this past summer in pushing a Green Pastures program for all New England...The Green Pastures program was an organized approach of many agencies to focus attention on production of pasture feed on livestock farms. The effort was directed to pasture feed since such feed is especially important now in view of high grain prices and measurably affects the success or failure of many herd owners...The New England efforts grew out of a ‘Green Pastures Contest’ staged the previous year in New Hampshire...

“The Federal Reserve Bank of Boston described the Green Pastures Program of New England as ‘one of the outstandingly successful agricultural programs of the decade.’

“Charles M. Dale, Governor of New Hampshire, offered the wager of a new hat with any New England Governor who thought that his state could produce a pasture greener and better than New Hampshire’s finest.

“The three top pastures in each State were considered in this New England contest. The eighteen owners of these pastures were awarded free trips to the Eastern States Exposition and were given engraved plaques. County agents have not found locally any group of dairymen more responsive to suggestions for forage improvement than participants in Green Pastures.

“People of New England are becoming Green pastures conscious.”

From The Green Pastures of New England by Ralph W. Donaldson, Extension Service, UMass-Amherst, 1949

farmers rather than with an anonymous industry. Scale is a theme in the new documentary film *Milk in the Land: Ballad of an American Drink*, which, while focusing on the history of the industrialized approach to milk production, reconsiders the possibilities of small-scale dairy farming as “both sound business practice and a meaningful approach to the production of food” (according to Dr. Abigail Carroll of Boston University in her review of that film in the *Journal of American Culture*, Spring, 2009). URI and UMass no longer have dairies, and Maine’s dairy is becoming borderline, while UVM has recently moved the dairy research herd off campus. UNH, with its investment in two university dairies, would be well advised to practice an approach to serving those small-scale dairies, as it has begun to do with its small-scale milking parlor and small-scale barn at Burley-Demeritt Farm. Small-scale dairy farming in New England is “both sound business practice and a meaningful approach to the production of food.” It is a viable business plan, especially if pasture-based.

The UNH Organic Dairy holds great promise for the biodiversity that can be achieved by multispecies grazing approaches which are described in *Pastures of Plenty*. The dairy holds this promise precisely because it is pasture and grazing-based. Poultry (both chickens and turkeys, even ducks and geese), sheep, pigs and perhaps goats, can all be readily integrated in intensive rotational grazing plans, and pigs and goats can assist in creating new pasture from scrub woodland. Such multispecies grazing can well come into use at Kingman Farm and even on-campus as well, where it holds the attraction of large numbers of students (witness Peckham Farm at URI). Cynics may deride the creation of what they call a “petting zoo” characterized by a visible variety of animals, because of that wide variety of animals which can be seen, but they fail to understand and seriously underestimate the attraction value of such a mix of farm animals to bring students in and to create public interest as well. The opportunity for undergraduate students in particular to benefit from such a development is enormous and should not be underestimated. Can such a “petting zoo” be an entrée into serious biodiverse sustainable agriculture?

Grass-based dairy is the key to economic success for organic dairies in the Northeast. As is widely known, the cost of certified organic grain is beyond the affordability of most New England farmers. It is beyond UNH’s affordability as well, which means that the UNH Organic Dairy must, of necessity, be grass-based

with serious grazing on pasture and production of certified organic forages from university farmland. This is the only path which makes good sense economically. So the decision to go organic is also the decision to go with a bedded-pack, open-stall barn for the herd, rather than the more conventional tie-stall arrangement on concrete. This measure is necessary for credibility in the organic community and is, as well, a question of economics. And, in accepting the multitude of organic rules, and in accepting a research and market base dependent on organic, there is a commitment to the hiring of personnel with organic experience (which is difficult to achieve in the United States), or at least to hire those who truly believe in and want to learn organic agricultural procedure (and, as well, the homeopathic techniques which supplant and replace antibiotics in herd health and herd management). All of this constitutes a formidable commitment, and UNH has made that commit-

Whole Systems Research on an Organic Dairy

In addition to their now-completed UNH-UMO organic forage study involving the UNH organic herd, UNH Provost John Aber and his Co-Principal Investigators have launched a new research project on “A Closed System Energy Independent Organic Dairy for the Northeastern U.S.” Because of the interest and excitement surrounding this unique research, the project abstract is provided here in its entirety:

“Dairy dominates animal agriculture in the Northeastern U.S., but rising energy, feed and capital investment costs combined with a shrinking profit margin threaten regional sustainability of the industry. Organic dairy agroecosystems provide a potentially viable strategy for maintaining dairy agriculture in the face of existing risks, vulnerabilities and uncertainties, including those associated with a “post-oil” economy. However, transitioning from conventional to energy efficient agroecological practices can also be an expensive, management-intensive and risky process for operating dairies with marginal revenues.

“The vision for the project begun with this proposal is to use the newly established, commercial scale, operating organic dairy at UNH as a test bed to design “A Closed System Energy Independent Organic Dairy for the Northeastern U.S.” The fundamental approach to be taken draws heavily on the ecosystem-level research of two of the principal investigators carried out at the Hubbard Brook Experimental Forest, and through the National Science Foundation’s Long-Term Ecological Research (LTER) Program.

“We propose to measure all of the material and energy flows occurring across the annual production cycle at the UNH Organic Dairy, including both geophysical and human activities. This will include, for example, nutrient inputs through precipitation, and feed and fertilizer imports, and losses in product shipment as well as surface water run-off and ground water leaching. Energy inputs include solar and wind, as well as fuel oil and electricity. Energy capture through photosynthesis and biomass production will be measured and followed through the pasture/ dairy system, as well as in woodlands on the property.

“The proposed work is seen as the first stage in a nine-year project that will use the data acquired in the first three years (Phase 1) to redesign and implement changes in farm operations to decrease nutrient losses and fossil fuel requirements (Phase 2), which will be refined and presented as best management practices (Phase 3).

“Open communication and transparency have been an integral part of the UNH Organic Dairy project from the beginning. UNH has established a set of stakeholder advisory groups which provide direct links and two-way communication between this research enterprise and potential users of the program’s outcomes. Emerging results of the research proposed here will be made available quickly and directly to the Organic Dairy community.”

ment; indeed, it is the first and one of the very few land grants in the nation to do so.

The UNH Organic Dairy has more likelihood of success if the university employs farm management staff and administrators:

- who are properly knowledgeable about and philosophically supportive of organic practice and the values behind it;
- who are seriously committed to intensive rotational grazing and knowledgeable enough to make it work, hour by hour, day by day;

Rothamsted

UNH Professor Steve Froking is researching the English experimental research farm, Rothamsted, which has continuous data from 1840 to the present. This is the same experimental farm that the earliest UNH and New England land grant university agricultural researchers were working on in the first decades of their research activity in the 1870s and 1880s!

- who are experienced in and knowledgeable about organic requirements, seriously committed to insuring they are honored, and who understand the consequences of failure to observe all of those requirements (i.e., a three year loss of certification which would seriously affect ongoing research, deny contract recipients their supply of organic milk, upset major university donors, and bring negative notoriety to the university's reputation – UNH being much in the spotlight today as the first institution to make this organic commitment);
- who are committed to the pasture plants and soils, and who know and understand them; and
- who are committed to the maintenance of herd health through naturopathic measures and without any benefit of antibiotics, and who understand the animal health benefits of good grazing practice.

There are two notable ongoing research projects at the Burley-Demeritt Farm/UNH Organic Dairy. The first, "Reducing Off-Farm Grain Inputs on Northeast Organic Dairy Farms," is notable for its collaboration with the University of Maine farms. Dependent on both the agronomic capacity of UMO and the organic dairy herd of UNH, this project was initiated by the University of Maine which soon realized the project could not be conducted without an organic dairy herd, something not possible for UMO working alone. The research is a model, first and foremost, of the level of intense collaboration which all six New England land grants and their farms could benefit from. The project has been the talk of many on both campuses and has inspired a new and hopeful spirit of excitement among farm staff, students, and faculty researchers. This project has been managed by Maine's Rick Kersbergen.

Another more recent project, the "UNH Organic Dairy Farm Agroecosystem Study," is a unique merger at UNH between natural resources (including water resources) and agriculture. Natural Resources and Ecosystems Science professors are organizing a whole systems study of energy and carbon movements on the university's functioning organic dairy farm. This project represents a true test of ecological and sustainable agriculture and should reveal in practice what the words "ecological" and "sustainable" truly mean in a farm setting. The project is also an important model for study by sustainable agriculture as well as environmental science and environmental conservation students at UNH. Interestingly, the Principal Investigator (PI) for this project is distinguished ecosystems scientist Prof. John Aber who also serves as the Provost of the University of New Hampshire, raising Burley-Demeritt Farm as a research site to an unusually high level of recognition at UNH and among the six land grants. Co-PIs are Professors Bill McDowell in Water Resources/Environmental Science and Matt Davis in Earth Systems Science, illustrating the interdisciplinary breadth of this effort.

Empty of Answers

New Hampshire Public Radio recently produced an hour-long discussion program on the growing plight of New Hampshire dairy farmers who are facing some of the lowest prices for their milk that they've ever experienced compared to their cost of production. It was striking how few answers to the problem were presented, how little sense of opportunity there appeared to be, perhaps reflecting attitudes of the broader society. There was no answer to the question of what to do or what direction to take, and it was patently clear that the state can do little if anything to help. This program aired the same week that four dairy farmers went out of business in the state, decreasing the number of dairy farms state-wide from 131 to 127. There was no discussion of the farmers getting out from under the control of bigger market forces, whether national or global. There was no mention of grass-based systems, grazing and forage; no recognition of on-farm value-added opportunities (cheese, yogurt, ice cream, or liquid milk processed on-farm with local branding); nothing on local markets, local customer base, local loyalty, or any form of direct marketing; no attention to moving away from confinement and high energy input dairy; nothing on lower-input breeds (with less milk production per cow but with lower input costs as well); little on raw milk sales; and overall nothing on keeping scale small and independent. This in a state known for its libertarianism and traditional sense of Yankee frugality and independence – where did that Yankee wisdom go?

Farmer Lougee's Answers

A new publication, Sustaining Agriculture in the Granite State: A Citizens Guide to Restoring Our Local Foods, Farms and Independence, has recently been completed by UNH graduate student Jeremy Lougee. The work describes in detail the changing climate for agriculture and the advent of an agricultural renaissance in New Hampshire. It is in this climate that UNH is developing its new agricultural sustainability initiatives, all within a spirit of food sufficiency and independence. The publication is available from UNH Printing Services.

The UNH Organic Dairy may realize further success by utilizing existing infrastructure on the farm, a small building which currently houses swine for medical research. It would be much more logical to utilize this space to add value to the dairy through on-farm milk pasteurization with utilization by the university community and direct sale to the public, as well as small-scale cheese production. The latter would attract student and public interest and possibly even provide some revenue for the dairy. Such organic cheese production could complement efforts at the main campus dairy to produce grass-based but non-organically certified cheese, as described later in this chapter.

The UNH Campus Community Organic Farm also has organic certification rules to which it must adhere. The ever-increasing UNH farm acreage which is now being designated organic also must be protected from violation or contamination which would compromise its certification and, therefore, the certification of its animal forage or other product. (For a detailed discussion of the new and unique UNH Organic Dairy, the nation's first organic dairy at a land grant university anywhere in the United States – and still only one of two, the University of Minnesota being the other - see *Pastures of Plenty*, NHAES Publication #2340, 2008.)

In 1958, over half a century ago, and not long before grazing at all New England land grant universities virtually ceased, UNH agronomist Ford S. Prince, assisted by George Frick of the USDA and other UNH faculty members, published a comprehensive text, *Grassland Farming in the Humid Northeast*. Written at the end of the grazing era, this remarkable book, written in Durham, encapsulates the best of grazing knowledge, method, and practice known to that time, and provides a foundation for those toiling in the pastures of the modern grazing movement of today.

So, there is a whole management system in place based on organic certification and grass-based practice for UNH farms which sets them somewhat apart from their peers at the other New England land grants.

Creating a Sustainable Agriculture Program and Curricula at UNH:

UNH has been slow to develop sustainable agriculture curricula at its College of Agriculture. In 1990 when I suggested to the Dean that we move in this direction, he noted that both of our neighbors, UMO and UVM, had already done so. The Dean expressed that, with Maine and Vermont doing this, there wasn't likely a need for us at UNH to become involved. Nearly two decades later, under the leadership of Dean Tom Brady and Associate Dean for Agriculture Jon Wraith, we are finally moving in that direction. And it's a win-win for everyone, not only because there is a need among our farmers and in our food system for research and development in small-scale sustainable agriculture for local food markets, but because it's a logical thing to do when budgets are tight and when both the land itself and student interest are present. (For the history and evolution of the UMO and UVM efforts, see *The Wisdom of Small Farms and Local Food*, NHAES Publication #2260.) The goals of such a program, whether degree or certificate, undergraduate or Master's level, is to train new farmers operating at the small-scale level who wish to direct-market their product in the local area and to embrace low energy-input, low capital-intensive systems that are ecologically based rather than industrially and commodity-driven. The most basic need in those areas of New England which have lost most of their agrarian culture is farmers; there is, in fact, even a greater need than for farm land. It is only natural that a land grant agriculture college with a fundamental mission in agricultural education would address that basic need.

How does one design an academic and education program in sustainable agriculture for a college or university? The answer lies in the question, How does one design a sustainable farm? What would such a farm look like? With an answer to that question, we have the road map for how to design an educational program to support such a farm.

A farm which is sustainable would be a farm which:

- seriously minimizes dependence on off-farm energy inputs, particularly oil and natural gas
- is governed by ecological rather than market principles
- works with nature, not against nature, accepting nature as guide
- is highly biodiverse in both its plant and animal components and products

- fully integrates plants and animals with one another
- capitalizes on each aspect's ability to serve the other aspects (as, for example, plant components serving animal components, and vice versa, or one species of plant or animal serving other species of plant or animal)
- provides highly economically diverse output so as not to concentrate economic dependency on any one farm product
- produces no farm waste
- uses farm production (including what is commonly called waste) to produce compost and amend the soil
- takes advantage of value-added opportunities, direct markets its product so as to have some control over the price received, and operates within its means

This description of the sustainable farm provides a guide to the necessary components of a sustainable agriculture program.

EcoGastronomy

In addition to its first-in-the-nation organic dairy, UNH is leading the way in another exciting first: its new degree program in EcoGastronomy.

In summer, 2009, fourteen European students from Carlo Petrini's School of Gastronomic Sciences in Bra, Italy, began work at UNH. They devoted twelve weeks to the study of American foodways. In particular, they investigated sustainable agriculture in New England and UNH's role in that emerging "Slow Food" and local agriculture system. A like number of UNH students spent the Fall semester in Italy, as per the requirements of the new UNH/School of Gastronomic Sciences exchange contract with Carlo Petrini. The UNH students are mastering "slow food" and other European philosophies toward food production, preparation, and nutrition. The program has a tripartite approach that focuses on sustainable agriculture, human nutrition, and food systems, with emphasis on local, small-scale, artisanal and ecological approaches to food. The International Slow Food Movement, founded in Italy by Carlo Petrini (UNH '05 Honorary) and now world-wide, inspires this UNH effort which will undoubtedly ground future efforts of UNH's agriculture programs and utilization of its farms. This sets UNH apart from its New England peers and positions UNH philosophically for leadership in sustainability in the region.

The UNH Dual Major in EcoGastronomy (coupled with any other major of the student's choice) is the first of its kind in the nation. It focuses on the connections between sustainable agriculture, nutrition and health. But the starting point is, of course, sustainable agriculture. It starts with the soil, the plants, the animals, while recognizing that most peoples' only connection to agriculture is the food they eat. The program is premised on Wendell Berry's famous remark, "Eating is an agricultural act", while recognizing the eagerness of students to understand and connect with the local, regional and global food system. From farm to fork to nutrition and health – it all connects. UNH thus builds another support for its agricultural renaissance.

Green Pastures Scorecard for 1948:

- A. Amount and Seasonal Distribution of Grazing 50 pts.**
 - 1. Earliness of pasturing 8 pts.**
 - 2. Utilization in flush period 5 pts.**
 - 3. Adequate July grazing 10 pts.**
 - 4. Enough August grazing..... 15 pts.**
 - 5. Supply of fall grazing 12 pts.**
- B. Management..... 50 pts.**
 - 1. Grain-milk ratio on pasture 15 pts.**
 - 2. Management of pasture areas... 10 pts.**
 - 3. Early cutting to improve hay and to increase grazing 10 pts.**
 - 4. Quality of pasture herbage..... 10 pts.**
 - 5. Convenience of pasture layout ... 5 pts.**
- C. Pasture for Young Stock**
 - 1. Up to 15 pts. maximum may be deducted from total score if young stock pasturage is inadequate.**

The Green Pastures of New England, 1949

Two Farms for the Future at UNH:

There are a few measures UNH could profitably take to significantly progress in its widely recognized mission of sustainability. Expanding pasture grazing following management intensive rotational techniques and multispecies practice is one of those measures.

Another measure involves farmland on the main campus, highly visible and accessible to all in the UNH community. The area of pastures, fields and woodlands surrounding the UNH conventional dairy and Fairchild Dairy Research Center at the west end of the main campus can readily support the long-held idea of Stonyfield's Gary Hirschberg to establish a Rural Farm Education Center to teach the principles of agricultural sustainability and ecological practice to students and the public alike. The model established by Fred Launer at URI's Peckham Farm would serve well to start this project off on a modest but valuable scale. The core could be a wide variety of heritage breeds (chickens, turkeys, ducks, geese, pigs, goats and sheep, possibly a few all-purpose cows if space permits). The nearby Moore Fields to the south and adjacent Woodman Farm to the north could provide infrastructural support, as needed. This education/demonstration and teaching project could provide knowledge on biodiversity, a key to sustainability, as it would focus on integration of the species with one another, with the pastures, and with the plants and soils. Many techniques introduced by the Virginia grass farmer and biodiversity expert Joel Salatin can be tested. Education could also extend to the value of heritage breeds, their low input costs, their sturdiness, their grazing ability, their ability to

Student Inventory and Analysis

UNH Environmental Conservation students, under the guidance of several faculty, have recently produced two important detailed inventories and analyses of significant local farms: "An Inventory of Natural, Agricultural and Cultural Resources on the UNH Burley-Demeritt Farm in Lee, New Hampshire" (2008), and, similarly, "An Inventory of Natural, Agricultural and Cultural Resources on the Tuckaway and Sheltering Rock Farms, Lee, New Hampshire" (2009). These detailed studies encompass an on-campus university farm, the latter a close-by private and protected farm with much university use. The university will likely have long-term dependence on this farm for teaching and research. This effort is nearly identical to important student-conducted and faculty-guided farmland efforts over a decade earlier at UVM, likewise emanating from environmental and natural resources students and faculty.

Reviving Ayrshires, A Tradition at UNH

Ayrshire cows have a long history at UNH from earlier times to the 1970s. They are sturdy highly sustainable animals that can take care of themselves in the New England environment, are good grazers, and, according to successful Vermont dairy farmers of my acquaintance, as fine a breed as any for quality cheese production. This breed has been so much a part of UNH's past, a fixture on UNH pastures. The university could do well bringing them back.

Focus in the future might be conversion of Fairchild Dairy to grass-based and grazing Ayrshires, down-sized to 30-40 animals, and set up as a value-added herd for cheese production. The CREAM program, involving perhaps 10-15 animals, could be maintained as a valuable teaching and experiential tool for the students. Pasture is available and can be made more available to practice intensive rotational grazing. And a small-scale cheese operation could be started. The new dairy, a farm for the future, would be characterized as non-organic, grass and grazing-based, non-confinement, value-added, dependent on direct rather than bulk or commodity marketing, centered around cheese production, and dependent on Ayrshires, as recommended by Jasper Hill Farm, the very finest artisanal cheese producer in New England, and, indeed, as suggested by UNH's very own heritage and tradition.

"'Live free or die' is hardly the mantra of a state 95% dependent on outside sources for its most basic need -- food."

Jeremy Lougee, Sustaining Agriculture in the Granite State, 2009

Local farming is the second pillar of organic ... Without principles, organic farming has no future. ... There are over 160,000 certified organic farms in the European Union, 18,000 in Germany alone.

Dr. Gerold Rahmann, director of organic dairy research in Germany, on a recent visit to UNH

The University Press of New England has published an unusual book on one university's drive to attain serious sustainability. The Sustainable Learning Community: One University's Journey to the Future, edited by John Aber, Tom Kelly, and Bruce Mallory, describes in detail UNH's efforts in food and agriculture, as well as energy, building design, transportation, and other subjects. The book addresses the organic dairy, the EcoGastronomy program, and a host of other sustainable agriculture activities ongoing at UNH.

take care of themselves in adaptation to New England climate and soils. The cynic might dismiss such an idea but would be vastly underestimating the attraction of such a project to the undergraduate students on campus who will compete with one another for enrollment in the courses developed around this project, and who will compete as well to intern and volunteer to work at this easily accessible and exciting facility. URI's experience has proven that. As long as labor has access (and it does), labor will be there to care for the animals. Over time, pastures can be developed for them. With diverse livestock as the centerpiece, the Rural Farm Education Center can branch out to crops and gardening and to many other aspects of both rural life and sustainability, agricultural and otherwise. The Rural Farm Education Center would quickly become a draw for both students and the public and would become a much discussed and popular centerpiece for the university's Sustainable Agriculture degree program, its EcoGastronomy degree program, new research on multispecies grazing using intensive rotational methods, possibly research on new grazing technologies (similar to UMass), and as a way for the university to encourage public interest in and donations to the university's agricultural program. It can also play a critical role in both the inspiration and the training of new farmers. A somewhat broader picture of what could be at "Fairchild Farm," based on Ayrshires and value-added, could also host a Rural Farm Education Center.

Food Sufficiency Calculations

"One of the calculations that I always find to be troubling is the way people measure our food self-sufficiency. How much food we need, how much food we can produce, and how much farmland should be set aside ... Assuming a healthy diet requires 2000 calories per day and New Hampshire's current population of 1,300,000, we would need 2,600,000,000 calories per day to feed our state... Now take our current cropland (c. 129,000 acres) and multiply this by the average calories produced on an acre of cropland (6,000 per day x 120 days per year - the growing season). Therefore, we can produce a total of 92,880,000,000 calories per year from our cropland. Additionally, we can harness protein from our pastures (c. 65,000 acres) in the form of meat. An acre of pasture provides 1,200 calories per day (180 days/year). Therefore, we should be able to produce 14,040,000,000 calories of meat from our pastures each year. Adding crop and pasture calories together, we should expect to produce approximately 106,920,000,000 calories per year. As a state, we require 949,000,000,000 calories per year, which means that we are capable of producing only 11.3% of our dietary needs. Steve Taylor, former Commissioner of Agriculture, believes that our actual production is only half that, maybe 3-4%. It is even more worrisome that less than 10% of our current farmland is protected from future development."

Jeremy Lougee, University of New Hampshire

"Sustaining Agriculture in the Granite State" (UNH, 2009)

A UNH staff member suggested the value of developing an on-campus employee-student CSA which grows food on the Campus Community Organic Farm and delivers the food to all offices and dorms.

Fairchild Farm: A Picture of What Could Be:

UNH's traditional or conventional dairy is today called the Fairchild Dairy Research Center, named after former College of Life Sciences and Agriculture Dean, former Interim UNH President, and, most importantly, former dairy scientist and dairyman, Tom Fairchild. This on-campus facility has been for many years the dairy farm for the UNH College of Agriculture and the Department of Animal Science, the home of the university's dairy science and dairy management degree programs, and the home of Project CREAM, offspring of the similar UVM CREAM teaching program.

Times have changed. Needs have changed with them. Conventional confinement dairy has declined throughout New England, spurred, among other reasons, by low milk prices which are well below the cost of production. High and ever rising energy costs, nutrient disposal issues, and water quality contamination are among other factors reducing the presence of conventional confinement dairy and its familiar black-and-white Holstein herds on the New England landscape. And yet we are today in the midst of an agricultural renaissance in the region, driven by a powerful "Eat Local" social movement that cries out for both more local food production from the farms that remain and the birth of new farms on the New England scene. In the face of low milk prices, high energy costs, and nutrient waste contamination of local streams and the Great Bay Estuary, UNH is bleeding money in maintaining this dairy and its large Holstein herd.

The UNH conventional (Holstein) dairy on campus represents, it could be argued, a 20th-century attempt to answer a 21st-century challenge, and may no longer fit the mold of current culture and demands. As conventional dairy shrinks in New England, it has increasingly become a poor match for UNH. Its high energy demand, big carbon footprint, continuing pollution challenges, failure to use a whole farm ecosystem approach, poor economics, and even the nature of tie-stall animal confinement (which is conventional but increasingly questionable to many in the public), make it at odds both with the ongoing sustainability efforts at UNH and with the simple twenty-first century realities.

Toward New Hampshire's Agricultural Future: The Role of the NH Agricultural Experiment Station

The NH Agricultural Experiment Station (NHAES) is now over a century old. Its past history has been well documented by Professor Walt Collins in his 1990 report, "A History of the New Hampshire Agricultural Experiment Station, 1887-1987." As with all stations, the work of the NHAES has changed over the years to reflect changing directions of agriculture in this state. It is logical to assume, therefore, that the New Hampshire Station will come to reflect the new agriculture developing in the state (and developing even more rapidly in the three surrounding states).

The public commonly perceives New Hampshire agriculture as dying or without a future. It is true that a certain kind of agriculture, commodity agriculture oriented to the production of mass market commercial quantities of agricultural export products, is in serious decline. This is the agriculture that grew strongly in the late 19th and early 20th centuries and was visible to all. By the mid-20th century, it began a clear decline, a decline initiated by high labor costs, then by high land costs, and eventually by low market prices. It was simply unable to compete in this arena, and only remnants of this form of agriculture remain in the state (with a somewhat greater amount still remaining in Maine and Vermont, both of the latter under siege, particularly by low commodity prices below the cost of production). With the decline in commodity agriculture, there has been a corresponding loss in support infrastructure and, as well, a decline in both Agricultural Experiment Station and Cooperative Extension programs and budgets.

The general public, when faced with the question of New Hampshire's agricultural future, might ask, "What future?" And yet, at the small-scale farm level, agriculture in New Hampshire (and in all of New England) is growing. And the need to serve this traditional (and still) underserved area of agriculture is also growing. Virtually all the research questions that one might posit to the NHAES, therefore, to provide this service, are like a major characteristic of this agriculture itself: low capital, low input, and thus suitable to today's budget realities. To adjust to these new directions, NHAES might benefit by focusing on this agricultural sector, now still in its youthful stage, and define its role and mission at least in part by the research questions which this agricultural sector posits.

Radical in the Lunch Line

We in New Hampshire proudly lay claim to New Orleans' and now Baltimore's Tony Geraci, the man whom the Washington Post calls a "radical in the lunch line." Tony cut his teeth as Food Service Director of New Hampshire's ConVal School District and lived in Peterborough where he is already a legend. Tony was also an active and important collaborator with the UNH Office of Sustainability and a member of the New Hampshire Committee for a Food-Secure Future. If there is anyone who can bring about a national revolution in school lunches and make a complete connection between those institutional lunches and local farms, school gardens, and K-12 student involvement in the in-school production and preparation of food, it is, indeed, the current Food Service Director of Baltimore City Schools and founder of that city's 33-acre Great Kids Farm, Tony Geraci, a "chef on a mission"!

This site, which can be maintained as a dairy, provides opportunity for innovative contemporary approaches, including biodiversity, work with other cow breeds, introduction of goats, and value-added (i.e., cheese, butter, ice cream, yogurt and pasteurized liquid milk) for on-campus demand and as an important teaching tool. And all of these approaches can be carried out on grass, limiting expensive feed inputs and the pollution challenges associated with confinement agriculture. In discussing the possibilities with my friends at Jasper Hill Farm, one of the most stunning success stories of local dairy production in all of New England, I began to envision a small herd of Ayrshires (perhaps 30 milkers), possibly in conjunction with dairy goats and a value-added cheese operation to train students and the public in local cheese production. Full development of adjacent grazing lands and the nearly adjacent and larger Moore Fields, might well be the ticket to make this happen (as a companion, of course, to the now well-established UNH Organic Dairy and its Jersey herd a few miles away at Burley-Demeritt Farm). The new operation could continue to honor the memory of UNH's modern dairy pioneer, Tom Fairchild, and the overall facility could well don the name Fairchild Farm.

These approaches are particularly appropriate in this economic climate. Value-added can require low energy input and therefore cost less; grass production provides nutrient while eliminating the waste problem (there need be no waste – the whey can be either composted or fed to pigs for an ancillary teaching, research and revenue opportunity; and proximity to campus reduces transportation costs, making the farm easily accessible to students and faculty alike for teaching as well as research purposes. The new dairy approach can be a visible part of UNH's agricultural and food future and an important service model for the people of New Hampshire and the region, a model that is appropriately scaled to be meaningful to the farmers and public whom it serves.

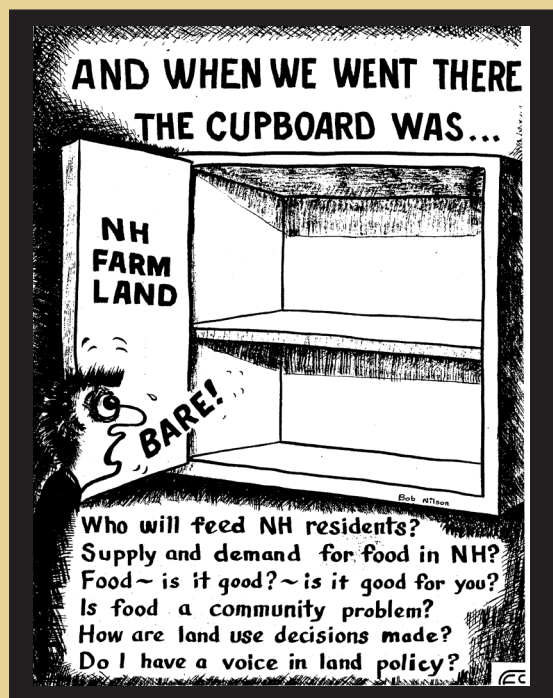
A further measure UNH could take involves enhanced usage of the largely unused Bartlett-Dudley Farm in nearby Lee. The much under-utilized Bartlett-Dudley Farm (whose existence is hardly known to most at the university) could take a lead from Watson Farm in Rhode Island and produce high-quality protein, specifically beef, by grazing Red Devons. This heritage breed is ideal because it is particularly well adapted to New England soils and climate and requires very low input. What is more, the animals largely take care of themselves: they have a notoriously low requirement for any form of veterinary care, as long as they are on pasture, and they even give birth unassisted. Twenty-five years of experience at Watson Farm in Rhode Island, plus the long-term experiences of Trauger Groh in New Hampshire, Sarah and Doug Flack in Vermont, and Ridge Shinn in Massachusetts, all reliably suggest that UNH would have a success story at Bartlett-Dudley. The farm could become a case study for management intensive rotational grazing in New Hampshire. Poultry could also be introduced. (In nature, birds follow ruminants on grasslands, as witness the great herds of grazing animals on the Serengeti in Africa and the large flocks of birds with them.) And a long-term research program could be established which would be of considerable importance to New England food production and security. UNH has done productive beef cattle work in the past and can do so again. Bartlett-Dudley pastures (which today are more scrub woodland than pasture) deserve renovation and recovery, a useful pasture product in itself for education and research. There is a long history of grazing at this Lee farm – it appears to be time for a return to that grazing.

"Between Guernseys and Ayrshires, you have New Hampshire's heritage!"

Barrington, N.H. Farmer Joseph Marquette

“And When We Went There, the Cupboard Was Bare”

In 1979, UNH produced a study of New Hampshire farmland and food production bearing the above title. The study raised and attempted to answer many questions and featured a cover which included a number of those questions: “Who will feed NH residents?” “Supply and demand for food in NH?” “Food: Is it good? Is it good for you?” “Is food a community problem?” “How are land use decisions made?” “Do I have a voice in land policy?” On the cover was a dramatic depiction of an empty cupboard. The study was ignored, shelved, gathering dust for over a quarter century, and through another era of cheap oil. Times are now changing. The report has just been dusted off. That cover is depicted here.



Conclusion:

Given the first in the nation land grant university organic dairy;

Given the Campus Community Organic Farm and the plan to designate most of the university's extensive farm acreage to organic certification;

Given the commitment to produce extensive soil-amending compost (U-Doo) from Dining Halls' food waste;

Given the launch of the unique new degree program in EcoGastronomy inspired by UNH Honorary Alum Carlo Petrini and the International Slow Food Movement and operating with a formal contract for student exchange with Italy's School of Gastronomic Sciences; and

Given the formidable work and sizable commitment of the UNH Office of Sustainability to sustainable agriculture and food systems (which is summarized in detail in the new University Press of New England book, *The Sustainable Learning Community*),

It can be argued that UNH is ready to let go of the past and give birth to a world that has been seeking to be born. It is a world of systems thinking, grounded in ecological thought and practice, a world which recognizes that sustainability, as UNH Commencement Speaker Gary Hirschberg of Stonyfield Farms put it, is a conversion experience. This admission is no small matter, for it depicts a much more radical condition than most people accept when they all too frequently use the word "sustainability" in a shallow, cosmetic sense. Such a conversion represents a desire and a willingness to change past behavior, to cease making the same tired old mistakes over and over. One can catch glimpses of this willingness to change at other New England land grants, but nowhere has it been made more explicit than at UNH. And, while progress in this direction - in energy, in transportation, in building design and construction - is happening, it is food and agriculture which is riding the crest of the wave. And the university farms - the College of Life Sciences and Agriculture's greatest physical asset - have a prominent role to play in what is being called a renaissance of agriculture at UNH, as we witness such a renaissance in local agriculture across the region.

In summary, there is no New England land grant university with greater agricultural potential than the University of New Hampshire. With UNH's 1100 acres of university farms and woodlands within six miles of campus and a setting in an area of significant interest in and demand for local food, from Portland to Boston, with high quality established pastures, an organic dairy as well as a conventional dairy, a long distinguished history of agricultural research, teaching and extension and a nationally prominent Sustainability Office which places great emphasis on food and agriculture, UNH likely sits on the highest potential for that agricultural renaissance of any of New England's six land grant universities. The key to maintaining that potential is to protect the close-in farmland in this generally non-farm region and not convert it to non-farm uses. To change such close-in land from farm to non-farm use would be to fail to understand the importance of such farmland to the central mission and the future needs of the university and the state. Today the key is for UNH to honor its very high claims for leadership in sustainability, its place as the model "sustainable university", and to take full advantage of its golden opportunity in food and in all matters agricultural.



“The process of rebuilding local food networks will be one of the key tasks in rebuilding working communities generally... We don’t need ethanol. We need carrots, and cheese, and wheat. And beer. And Ron Krupp.”

*Vermonters Bill McKibben, from the Foreword to Ron Krupp’s *Lifting the Yoke**



CHAPTER SEVEN:

Vermont and UVM University Farms

Vermont by all measures is the region's and perhaps the nation's leader in the local food/local farms movement, adding to the potential of what UVM might accomplish. The University of Vermont and its farms are located in northwest Vermont within the city limits of the state's largest city and yet in a fertile agrarian location of rich farmland and strong farm markets, within a state which prizes farms and farmers.

Vermont is perhaps the most agricultural and, importantly, the most philosophically agrarian of the New England states. And yet UVM is land-constrained when it comes to its university farms, particularly due to its location inside the city limits of the state's largest city, Burlington. The near-campus farm environment comprises two complexes: the Horticulture Research Farm or Hort Farm, some 4-5 miles away in South Burlington, and the Spear Street Farms, somewhat closer to campus and including the Paul Miller Dairy Research Farm, the East and West Wheelock Farms, and multiple individual plots of farm fields along Spear Street interspersed with private property.

The Horticultural Research Farm, which also houses the Common Ground Student Farm, contains sandy soils which limit the types of agronomic research that can be conducted. These soils, which are well drained and dry out readily, require irrigation for many types of agriculture and are not very typical of Vermont soils, meaning that much research conducted on them has limited ability to serve Vermont farmers. These soils do, however, provide a rather unique research opportunity.

The Spear Street Farms, although closer to campus, were limited until recently by their need to service the requirements of a large dairy herd, as the university cannot afford the fast rising price of purchased grain and forage and thus needs every square inch of these multi-unit farm fields to produce forage for the herd. This circumstance cannot be improved upon unless the size of the herd is reduced or grazing land is located elsewhere with grazing then replacing confinement as a management practice. (It was recently announced that the research dairy herd would be moving to a private site off campus.)

Two additional university farms, Proctor Maple Research Farm (16 miles from campus) and the UVM Morgan Horse Farm (32 miles from campus) are outlier farms. They are now fully utilized by their specific mission as sugar bush and horse-breeding management sites, respectively, but some land at Morgan could be made available for grazing, for horses or other livestock.

Thus, UVM, unlike other New England universities, faces limitation and constraint with respect to dependency on its already fully utilized university farms. Nevertheless, UVM has good ideas and even good plans for farm development, especially for the valuable Hort Research Farm.

UVM Hort Farm:

The UVM Horticultural Research Center (Hort Farm) is a 97-acre property located in South Burlington about 4-5 miles from campus. It is not easily accessible by public transit, and heavy vehicle traffic makes biking difficult.

The Hort Farm has 69 acres of tillable land (including 39 acres of cornfield dedicated to forage production for the UVM dairy cow herds), and 30 acres of woodland. Cold hardiness trials for tree fruits, strawberries, and blueberries were conducted here in the farm's earlier years (1950s to early 1990s), but these have been discontinued with the farm's decline and semi-abandonment. The farm has been in decline for decades due to tight budgets but is now beginning to turn around.

The Hort Farm is a working classroom for plant technology. It hosts apple variety research, one of the largest collections in the Northeast of flowering crabapples (20 different kinds), lilacs, 700 kinds of ornamental trees and shrubs, a juniper collection, and the 3-acre student-run Common Ground Educational Farm. The Common Ground Farm, UVM's answer to UMO's Black Bear Guild Farm and UNH's Campus Community Organic Garden, provides students with hands-on education in growing vegetables, small fruits, herbs, and flowers. Half of the farm's produce goes to emergency food shelters in the

Greater Burlington area. The Common Ground Farm has great potential to significantly increase student involvement at the farm.

The farm's sandy, loamy soils work well for production if irrigation is provided. Drip irrigation is present but maintenance is needed. The site is good for nutrient research, but the soils are rather atypical of the state and region, so the effectiveness of work done here is limited. The teaching of production agriculture no longer takes place at this site. A full-time staff of three in the mid-1990s has declined to a 40% manager and one hired student. The Hort Farm was almost sold in the early 1990s, and a citizens' group, Friends of the Horticulture Farm, was organized to protect it. The friends have been hiring interns in summer to protect the orchards (which are certified organic) and also the collections in the absence of a stronger university presence. The proceeds of popular apple sales to the public go into the farm budget and some of the apples are marketed on campus at the Vermont Products Store in the new Davis Student Center. There is potential at the farm for biodiesel research and production.

Spear Street Farms:

The Spear Street Farms are dominated by the Paul Miller Research Complex, essentially UVM's Animal Science Farm. Miller contains 342 acres of land, including arenas, barns and labs. The site hosts both equine studies, including a therapeutic riding program, and dairy cows, both for research and for teaching through the CREAM program. While dairy cows, horses, sheep, and swine are present, the operation is predominantly dairy. As at UNH, UVM has both a research dairy herd and a student-run CREAM (Cooperative Real Education in Animal Management) herd. (The CREAM idea was born at UVM and carried to UNH.) UVM also has an equine equivalent to CREAM called EQUUS. There are 12-14 acres in rotational pasture for 20 horses. Projects at this farm include pasture management and composting. Grazing paddocks for horses exist, but intensive rotational grazing is not practiced. The CREAM herd has 15 Jerseys and 17 Holsteins, while the milking (research) herd (now off-campus) has 120 Holsteins. All are fed on purchased grain, and the manure is sold. The Wheelock Farm, part of the Spear Street Farms, has 200 tillable acres, all dedicated to forage for the dairy herd. Although neither set of farms is very far from campus, student access is difficult, at best.

The "Outlier Farms":

UVM's "Outlier Farms" are two-fold: the Morgan Horse Farm in Weybridge (32 miles away) and the Proctor Maple Research Center in Underhill Center (about 16 miles from campus). Due to distance, students and classes have very limited access, and these farms operate rather independently of campus. They are both specialized in their missions and offer no diversity. Morgan Horse is focused on breed research as a way of protecting and promoting this historic Vermont horse breed. The farm is also a tourist attraction with an admission fee, and, as well, a museum dedicated to the Morgan Horse. There is under-used land and potential for other forms of agricultural activity at the farm, including grazing, although its distance from campus reduces its utilitarian and academic value.

Proctor Maple Farm is a research center focused on maple syrup production and the sugar maple as a species. Sugaring demonstrations, meetings, and other events focus on educating maple syrup producers and consumers. There is also internationally renowned environmental monitoring (air quality) research taking place at this site. Proctor Maple Research Center has 180 acres of maple woodland (sugarbush) and is wholly dedicated to specialized field research aimed at keeping the sugar maple tree a healthy resource. In addition to 2100 tapped sugar maples, there is a Christmas tree plantation. It could be argued that Proctor represents a forest product rather than an agricultural product, but UVM considers maple syrup and sugar a farm product – hence, the inclusion of Proctor as a university farm.

Vermont is #1 of all U.S. states in terms of direct sales from farms to consumers. According to Allen Matthews of the UVM Center for Sustainable Agriculture, "...2002 data show Vermont produced a maximum of 38% of its own food [but exported most of this, so that] actual local food usage is some incalculable lower number ... A large percentage of Vermont's production is from just one commodity, dairy ... Vermont ranks #36 of the 50 states in its ability to feed itself, i.e., agricultural diversity in Vermont is unusually low compared to other states."

Needed in Vermont according to a recent presentation to the Burlington Food Council:

- **1,415 acres of additional vegetable production would be needed to meet demand for local consumption.**
- **28,440 additional acres for corn silage and hay would be needed to meet beef and pork demand.**
- **1.25-1.4 million additional broiler chickens would be needed to meet regional demand.**
- **5,102 acres of hard wheat would be needed if demand is to be met.**

The state has surplus in apples and milking cows: 1,110 acres of apple orchard beyond what is needed to satisfy local demand, and 78,934 additional cows beyond what is needed to meet local demand.

Answering these needs would suggest a substantial shift in direction for UVM agricultural research!

According to Heather Darby, UVM Extension's field crops specialist, "wheat is poised for a comeback, driven by demand from artisan bakers and the localvore movement." Darby is reintroducing heritage wheat varieties that were grown in Vermont in the 1800s. She is involved in the testing of nineteen varieties of wheat, largely from North Dakota and Washington State, but including three varieties of heirloom wheat originating in Charlotte, Vermont, in the mid-19th century. This argues for UVM attention in its agricultural research to a return to wheat and other grains.

The Environmental Program's Study of University Farms:

The students of the UVM Environmental Program have taken an interest in the university farms. In the Spring of 1998, five UVM undergraduates working under the direction of Professor Rick Paradis of the UVM Environmental Program conducted a study of UVM lands which resulted in a 57-page publication, *Planning for the University Farms and Forests: Analysis and Recommendations for the Best Use of Farm and Forest Land in the College of Agriculture and Life Sciences at UVM*. This is among the few course-generated reports on the status of a land grant university's farms and forests to be published in New England. Ten years later, the university produced its own detailed report on this subject, in some respects an echo of the earlier student study. Driving the Environmental Program's study in the 1990s was recognition of increasing development pressure on land in and around the Burlington area and the possible spillover threat to university lands. The students were especially concerned about the future of the Spear Street Farms and the Hort Farm and felt it important that the university encourage stewardship of Vermont's heritage by serving as a model steward of its lands and facilities.

What did the students find? After analyzing the resources and infrastructure of the Hort Farm, studying the farm's history, and analyzing its research and teaching usages, particularly with respect to apples, they concluded that, in a state with more than 80 commercial apple growers producing more than 1.2 billion bushels of apples on nearly 4000 acres of land, the UVM Hort Farm is valuable to Vermont. The students also found the rather uncommon fine, sandy loam of this tract ideal for horticulture farming and research. Being atypical of Vermont, such soil would be difficult to find on another parcel. Among student recommendations for the farm are research in organic and/or ecologically sound apple production; contracting out its apple research associated with pesticide use to an off-site location; fostering community involvement on the farm through the design of an arboretum at the farm; and greater more diversified undergraduate curricular involvement engaging more UVM departments. These three measures would enhance the constituency in support of the farm. Students also found that, in this area of South Burlington overrun

with development, the value of the Lake Champlain views, the open space, the cultural symbolism of the agricultural heritage, and the need for a community gathering place all support the land stewardship model in which the university should be invested.

The Spear Street Farms, including the Miller Dairy Farm, East Wheelock Farm, West Wheelock Farm, and assorted plots and patches along Spear Street south of campus, were the topic of intense student interest in the late 90s. The Miller Dairy Farm is the core of this complex. In the past two decades there has been a major decline in funded research at the Miller Farm. And yet, dairy being as central as it is to Vermont's economy and culture, the farm is a powerful symbol to Vermonters. And, as Vermont dairy moves toward smaller-scale organic systems, UVM has a real chance to show leadership in this area. As the student authors report, the farm also represents a unique opportunity to demonstrate the workings of an urban farm. And the latter is in keeping with the urban-agrarian directions of both Burlington and South Burlington. The farm is also

highly visible to motorists on I-89 and familiar to many Vermonters, further enhancing its symbolic value. The farm is one mile from campus and is the only UVM farm with walking access. Animal Science and other departments use the farm for class and lab work as well as research.

The UVM farms are relatively recent, mid-20th century acquisitions by the university, as all of UVM's original farmland has been converted into campus facilities. Unlike many other university farms in New England, these farms are both free of deed restrictions and close to campus, creating a temptation either to dispose of them to cover budget shortfalls or use them for other non-agricultural university purposes. It is out of fear of their loss that the UVM Environmental Program students conducted their work. In this spirit the Environmental Program students developed their list of recommendations as guidance to the university. Urging the university to maintain its dedication to the betterment of agricultural practices as a land grant institution, the students wrote, "If UVM rejects this challenge and leaves the Spear Street Complex..., it will send a message to the community that agricultural production is not sustainable in close proximity to the consumers of its products." That is the last message the university would want to be seen as sending to the community.

Who Is To Be Served?

More recently, there has been controversy at UVM around the question: "Should the university farms primarily serve the research interests of Vermont's large-scale industrial dairy sector, or should the university, as a public land grant institution, mainly serve Vermont realities on the land, the smaller-scale and more diversified (and increasingly certified organic) Vermont family dairy farm?" In other words, should UVM focus on and serve the past, based on high energy inputs and commodity export markets, or should UVM focus on and serve the future, based on low energy input, relocalization, and ecosystemic approaches?

In early 2008 UVM released a Farms Reorganization Plan which covered all but the outlier farms. That plan, written along the lines of continuing past emphases on service to large-scale research for larger-scale industrial farms, brought controversy from small-scale farmers, from the media, from various environmental and farm organizations and, not the least, from the Vermont legislature. The plan was sent back for revision and a new plan, known as Version 6.3, emerged later in the year. This plan answered the criticism and focused much more directly on the needs of

Vermont as Model

"The Green Mountain State serves as a model for other regions of the country since it has, per capita, the largest small farm initiative in the country and the greatest per capita purchasing of local food from direct market outlets, including farmers markets, farmstands and Community Supported Agriculture (CSA) operations...Vermont is just totally irrelevant by any statistical measure when it comes to agribusiness and the food industry. But it is precisely because of its size and scale and the sensibility that is taking hold here that Vermont has the potential to be in the forefront of a movement away from corporate domination of food production and distribution, and toward a greater reliance on locally produced food...Vermont produces less than it consumes in almost every category, except dairy; the supplies of local meat, poultry, eggs, grains, beans, fruits and vegetables are all less than amounts consumed. Research from the Vermont Sustainable Agriculture Council shows that the state could potentially produce 38% of its food needs. Thirty-one states have more potential than Vermont to feed themselves, with Minnesota ranking #1 at 88%. Vermont leads all New England states except Maine... Vermont, like much of the Northeast and other parts of the country, is dependent on outside food sources. I've often heard the figure of 90-95% dependency used."

Ron Krupp, Lifting the Yoke: Local Solutions to America's Farm and Food Crisis

Efforts are afoot to establish a UVM Food Systems Leadership and Policy Institute – this could involve expansion of the Center for Rural Studies and integration of the Center for Sustainable Agriculture. This also includes a new Ph.D degree program in Food Systems Policy. Six undergraduate minors and certificate programs are now available.

Vermont's small and mid-sized farms and opened the door to more ecological approaches to food production in the state. That revision is the plan now in force.

With respect to university farms, UVM's initial answer in early 2008 to the question of the university farms' future was the industrial path as delineated by the UVM Farms Reorganization Committee. The legislature and various citizens' groups responded by cautioning that the question should be answered in another way: the smaller-scale path, as per the UVM Farms Reorganization Plan, September, 2008. A critic of that early 2008 report would likely feel the need for a greater emphasis on research of a nature and scale to serve the needs of the farmers and citizenry of Vermont. Indeed, this is what the legislature found. I would add the need to include in the future plan:

- energy research to generate biofuel energy for on-farm production and on-farm needs
- food production for the campus community, as per earlier UVM practices and traditions
- an ability to demonstrate and model food sufficiency and farm sustainability in Vermont at the small-scale level of production
- some attention to the future course and welfare of the Proctor Maple and Morgan Horse Farms (which are ignored in the report)
- attention to the bioresearch site on Spear Street, university farmland which appears to be absent from the report
- inclusion of opportunity for long-term (i.e., ten years or longer) field trials at the Horticulture Farm.

Given the revised report in 2008, UVM is to be applauded for its plan to develop a summer teaching program at the Horticulture Research Farm, reducing that farm's current underutilization and generating a new revenue flow to the College of Agriculture and Life Sciences. Focused attention on the CSA model within the courses at Hort Farm and a CSA Summer Internship are progressive elements of change for the Hort Farm.

The Farms Reorganization Plan's treatment of the Miller Farm raises the question, "Does animal concentration and confinement, and thus nutrient concentration, have a future, considering high energy costs and energy shortages?" The revised plan of 2008 concludes that UVM's current university farm system is not sustainable economically or environmentally – the farm infrastructure has been neglected for over 20 years and is beyond the point where repair or renovation is a financially responsible option. It is to the credit of the College of Life Sciences and Agriculture that they are struggling through the development of a detailed plan for their two near-campus university farms at a time when so many land grants continue to ignore (and most certainly to under-utilize) their university farms. A detailed Master Plan should be developed for all the university farms in New England, and UVM is currently showing the way.

UVM Farms Reorganization Plan

The tenets of UVM's Revised 2008 Farms Reorganization Plan are to:

- Maximize opportunities for student instruction and involvement in activities that provide skills, knowledge, and approaches our students will use throughout their lives. This will include a suite of farm-based courses to be offered both during the academic year and in the summer months
- Provide quality research facilities to assist the competitiveness of our faculty for externally-funded research related to healthy foods, agricultural profitability, community sustainability, and environmental stewardship
- Pursue research in animal health and animal nutrition that provides strategies for Vermont's farmers to realize greater economic success
- Pursue research in high-value specialty crops which provide a competitive advantage for the Vermont agricultural community
- Commit to the environmental and fiscal sustainability of the UVM farm operations

Student Wisdom from UVM

Being fearful of the future for this farm, the students asked in their 1998 report that:

- (1) The Miller Farm convey UVM's long-term commitment to agriculture through the retention of these lands and the expansion of their current use**
- (2) The university explore techniques by which the development rights of these lands can be secured, thereby ensuring the preservation of the farmland along Spear Street**
- (3) The mission of the Miller Farm be clearly defined as the pursuit of education for UVM students and the greater Vermont community**
- (4) The CREAM herd be expanded to better serve the increasing enrollment of the College of Agriculture and Life Sciences**
- (5) The university explore possible locations for a research-exclusive dairy farm operation**
- (6) The Miller Farm diversify its livestock – diversification will develop new constituencies and new markets for the farm**
- (7) Opportunities for new constituencies be explored. Relocation of the research herd will lessen the need for forage production, allowing the farm to explore diversified methods of organic and ecologically sound crop and vegetable production that reduces or eliminates the use of pesticides**
- (8) The Miller Farm secure its present land holdings for forage production, by formalizing its “gentlemen’s agreements” with neighboring landowners**
- (9) UVM take a stance on the automobile dependency of its students, extending bus service to the farm**
- (10) The 1994 Historic Preservation student proposal for the rehabilitation of the “White House” (the original farmhouse) be pursued**
- (11) Innovation be considered essential to addressing the agricultural issues being faced by modern farmers in Vermont, as well as nationally**
- (12) The land remain in agricultural use and not be converted to non-agricultural use; it is essential that the university recognize that the cultural and educational values of the Miller farmlands supercede the value of any development.**

In their report, the students also addressed the “Outlier Farms,” Proctor Maple and Morgan Horse. Noting the 45-minute drive to Proctor Maple and the even longer drive to Morgan Horse, the students had fewer concerns about these farms, but among their recommendations were increased connection between these farms and core UVM programs, as well as the development of a local area constituency to better insure protection and maintenance of these farms.

- Commit to renewable energy systems that are environmentally and economically sound
- Partner with local farmers, state agencies, dairy industry consortia, and local research institutions, to maximize basic and applied research productivity without duplication of facilities or animal stock
- Pursue value-added product development and marketing strategies that provide economic opportunities for Vermont's agricultural community
- Partner with Vermont's private sector and state agencies in a variety of student-operated enterprises in areas such as compost production, marketing and sale; renewable energy generation and sale; farm operation and management, animal health management, value-added product development, marketing and sales, and environmental stewardship through balance of farm nutrient export and import.

The near-term university farm investment plan issued in conjunction with the Revised 2008 Reorganization Plan is to:

- Deconstruct the current dairy barn facilities on Spear Street
- Upgrade the Horticultural Farm and support buildings to facilitate research and teaching programs in Specialty Crop, New Farmer, Organic, and Biomass
- Construct a modern large animal facility for teaching and research that enables expansion of student experiential learning opportunities – this new animal barn complex will house approximately 60 cows in milk production, 20 dry cows, and 50 juvenile “replacement” animals
- Construct and/or renovate on-farm classroom facilities at both the UVM Horticulture Farm and Miller Complex to serve the suite of additional course offerings
- Establish a dairy innovation pilot plant for dairy product development and testing
- Construct a methane digester research unit whose purpose is to optimize manure utilization and efficient energy generation on a scale appropriate for the typical Vermont dairy farm of 60-100 cows – this facility is intended as a series of “plug-in” modules that will be sequentially replaced with new experimental prototype units
- Conduct “proving ground” assessments of economically effective solar and other renewable energy technologies in collaboration with private sector partners.

The new plan, released in September, 2008, clearly shows progress toward a model which is of more direct application to Vermont’s farmers than had earlier plans. The funds do not yet exist, however, for that capital investment, and may not exist for four or five years, suggesting that farm management should focus primarily on less expensive land and animal management rather than on building construction. Some Animal Science faculty have continued to call for the controversial doubling of the dairy herd even in the face of a \$60,000 per year bleeding and in spite of a \$500,000 subsidy. The Dean refers to the economic situation as “gruesome.” (Some of those Animal Science faculty have left for more fertile climes in industrial agriculture and to universities with much larger herds.) The Dean is looking to develop a research consortium with industry which would entail moving the research (milking) herd to an off-campus site, a goal that was achieved in late 2009. This is not only in keeping with the revised plan, but also in keeping with what the students want, as presented in their aforementioned and detailed 1998 report on the Miller Dairy Center and other university farms. This also paves the way for a more sustainable and ecological, possibly even organic, agriculture at not only the Miller Dairy Center but all that university farmland which is currently and rather frantically growing forage for the large milking herd. It also means that UVM could compete with UNH in the organic dairy area and, at the same time, serve a rapidly growing organic dairy sector in Vermont, a sector which is today grossly underserved. It might also open the path to a goat dairy supporting an important and growing value-added artisanal goat and sheep cheese sector in Vermont.

Version 6.3, the revised plan of September, 2008, remains the de facto policy for UVM university farms. It calls for

- support for student-operated enterprises (which are especially valuable if they can be run through the summer)
- a Summer Equine Institute (which would be ideally based on grazing, perhaps following the Rutgers University rotational grazing model)
- promotion of on-farm research, on-farm value-added, and high value UVM farm-branded products
- serious efforts to re-connect with the Vermont agricultural community (“reconnection” because, sadly, the former connection has been broken)
- required summer courses at the Hort Farm (and the key here is “required,” so as to insure a minimum enrollment base)
- “beefing up” Hort Farm facilities (even a cosmetic “beefing up” is valuable to improve appearances)
- establishing a certificate program for non-degree students
- charging student use fees for certificate students (but not for degree candidates, for this is their campus and UVM needs to encourage and maximize their use of the campus, including the farms)

- relocating the Center for Sustainable Agriculture to one of the university farms, which would yield benefit to both the Center and the host farm
- collaborating with the new Slow Foods Venture Center and the new Center for an Agricultural Economy at Hardwick, Vermont
- involving farm management staff in instruction as much as possible – farm staff have much practical experience which is of interest and value to the students.

I suggest the following additions to the list of what Version 6.3 of the Farm Reorganization Plan calls for:

- involving Vermont farmers Jack Lazor of Butterworks Farm, Pete Johnson of Pete's Greens, Mateo and Andy Kehler of Jasper Hill Farm, among others, in order to garner valuable input for the farm program – these are among Vermont's best and most successful farmers
- similarly involving Vern Grubinger of SARE and Vermont Extension from southern Vermont, and Professors Emeriti Bill Murphy and Fred Magdoff, both of whom are in Burlington near the farms and who have a great deal to offer
- developing easy public transportation to the farms so as to set the stage for a much more intimate student involvement not only through class field trips but individual and group assignments as well
- developing stronger and more formal collaboration with Vermont's two immediate neighbors and peers among the land grants, Durham (UNH) and Amherst (UMass), for both have much to offer
- developing new summer certificate opportunities for adult learners
- focusing on the education and training of new farmers, including those, both younger and older, who have no farm experience whatsoever
- focusing on beef cattle as well as sheep, goats, pigs and poultry – diversity is critical, and it is the interrelationship of these animals with plants and soil that is important
- prioritizing multispecies grazing and management intensive grazing in the university programs – this is Vermont's future for food production
- focusing on bedded pack, hoop barn, and high tunnel construction systems, along with minimalization of structures – both are good for the budget and a vibrant part of true sustainability.

While UVM has the smallest farmland acreage of New England land grants, it is complemented by a variety of local resources. UVM has easy access to two other outstanding and nearby farms and farm complexes. The Intervale, composed of multiple farms on public land and managed by a private non-profit organization, is close and accessible to the UVM campus by foot, bike or bus. And Shelburne Farms in South Burlington is within five miles, although a bit less accessible. (See Chapter 4 for detail.) Both of these rich agricultural resources could, with planning, support UVM agricultural research, teaching, and demonstration. Long-term formal arrangements could be investigated, alleviating pressure on the more limited university acreage which should be otherwise fully utilized. Finally, the City of Burlington provides a large number of urban community gardens and a very strong constituency for ecological agriculture offering UVM a brighter prospect than might otherwise be the case.

Conclusion:


As we saw in Chapter 4, Vermont is the region's leader in local food and local farming. In particular, the city of Burlington, the home of the University of Vermont, is a leader within the state. It is natural that some of this leadership position would become visible in the programming of the university's agricultural college and its use of university farmland. We are beginning to now witness just that scenario.

MAP OF THE INTERVALE



The Intervale Center is a 501(c)(3) nonprofit that strengthens community food systems. It is dedicated to preserving a great agricultural resource for the Burlington community, working with farmers to increase market access and viability, support short food chains that lower our carbon footprint and promote land use that protects Vermont's water quality. Together, our programs and services build a community food system for the people of Vermont: a food system that honors producers and values local food and local landscapes.



A watercolor illustration of two wooden baskets filled with bright red apples. The baskets are made of light-colored wood with visible grain. The apples are rendered with soft, blended colors, showing highlights and shadows that give them a realistic, slightly soft appearance. The background is a mix of warm, earthy tones like yellow, green, and brown, suggesting an outdoor setting. The overall style is soft and painterly.

“There needs to be a category of faculty who are willing to work on a farm. If the farms are a lab, we’ll need senior staff and faculty to run these labs. We need research at the farm system level.”

UMASS Ag Scientist



CHAPTER EIGHT:

Massachusetts and UMass University Farms

Centrally located Massachusetts has both the best markets and the most fertile farmland in all New England. The University of Massachusetts and its farms are located right on that most fertile farmland, in a place of continuing agrarian tradition among a sizable remaining farm population with moderately good farm market potential. And yet perhaps the greatest value represented by the Commonwealth is its legacy of progressive agriculture.

Massachusetts, with that legacy of progressive agriculture, has made important contributions toward attaining sustainability. Massachusetts is the state which has given us the idea of town conservation commissions (1960s), town agricultural commissions (1990s), much progressive agricultural and conservation land protection legislation, NOFA-Massachusetts, and the distinguished periodical, "The Natural Farmer." The Commonwealth also contains the finest, most fertile soils in all of New England, those of the Connecticut Valley, and the Commonwealth's cities, suburbs, and towns constitute one of the greatest markets in all of New England for local, grass-based, and organic foods. However, UMass has fallen short of this legacy. UMass struggles to maintain some semblance of agricultural involvement. Massachusetts Cooperative Extension is largely gone, a likely result of the loss of the agrarian culture - the culture of agriculture - all across the Commonwealth. And UMass has the most fractured of the region's agricultural programs, fractured in both the physical sense - its components spread over a large, sprawling campus with little rationale, suggesting discontinuity and division in the programs themselves - and in the financial sense, as the victim of probably the most severe budget cuts of all the New England schools. Like UVM, however, UMass enjoys the benefit of a location very supportive of the new ethic of sustainable agriculture arising in the country: it is located in the heart of the most fertile agricultural area in all of New England and has a staff of competent people, under the able example of Prof. Steve Herbert. For the sake of the state's own food sufficiency and food security, one must hope that Massachusetts understands the necessity of a strong and functioning land grant college of agriculture. After all, the Bay State has more mouths to feed than any other New England state.

The Farms

UMass has several farms that are close to campus and several that are outlying. They are:

- UMass Livestock and Crop Farm (Animal Research and Education Center) at South Deerfield, sited on a picturesque shore of the Connecticut River 9 miles from campus and extending for 358 acres along the river. This site has been proposed as a much needed New England Regional Grazing Research Center
- UMass Hadley Farm Center, 131 acres only 1.5 miles from campus
- UMass Cold Spring Orchard, another scenic site of 215 acres about 10 miles from campus;
- UMass Joseph Troll Turf Facility, 20 acres at South Deerfield 9 miles from campus
- UMass Cranberry Research Station, 11 acres at East Wareham near Cape Cod, at 140 miles, far removed from campus.

UMass Livestock and Crop Farm:

Although UMass's Animal Research and Education Farm at South Deerfield is not as conveniently located as Hadley Farm, it offers important future potential as a center for integrated sustainable agriculture research. This particularly scenic site, managed by Professor Steve Herbert, currently hosts alpaca, sheep, and a herd of Belted Galloway beef cattle. The cattle are not used for research or production, but rather for educational purposes. The farm trains farmers and students in pasture management, the only university farm in New England thus far to do so, and this training forms the basis for possible conversion to a regional research center explicitly for this purpose. There is also substantial woodland offering silvo-pasture

grazing research opportunity and, as well, extensive under-utilized hill pastures and river-front pastures.

The work at South Deerfield extends to both vegetables and grains. Vegetable research projects include work on sweet corn, butternut squash, cucumbers, and pumpkins. Work is also done on Central American exotic vegetables (chipilin and taioba) for production in Massachusetts. In addition, asparagus, corn, soybeans, potatoes, and various ethnic crops have their place at this farm, as does a student-run organic farm. Work conducted in the area of grains focuses on wheat, triticale, and barley, all produced for processing as flour.

Finally, the farm supports innovative research in biofuels. Important biofuels research is being conducted on switchgrass, crambe, and sunflower, for the express purpose of developing on-farm energy independence, something also unique to UMass farms. (Switchgrass is a perennial which takes only two years to get established and survives for about fifteen years with little or no fertilization. One acre can produce 400 gallons or more of biofuel per year. A switchgrass pellet burner costing \$12,000 can produce 500,000 Btus, enough to run a farm and home for a year.)

Recent major investments have been made in physical infrastructure: a new hay barn, new mechanical equipment buildings, and new fencing around the farm. Interestingly, thanks to the skills and passions of Steve Herbert, there is a pasture fencing demonstration project featuring many different kinds of fences, including “tumble wheel,” exotic fencing from New Zealand, a nation which is a world leader in pasture management and practice.

UMass Hadley Farm:

The Hadley Farm, perhaps the best known of all UMass farms to students and to the general public, houses the large UMass Equine Program and also contains resident sheep, pigs, and goats. It is designed to serve over 400 undergraduates in animal sciences, almost all in equine studies, and it provides outreach assistance to horse owners throughout the state. Advantages of this farm include nearness to campus and an abundance of flat riverine land (although the land was stripped of its rich topsoil many years before university acquisition).

Hadley Farm, an important animal science facility, contains substantial infrastructure for its equine activity, which includes both exhibition and therapeutic riding. The farm has abundant fields, although its pasture fields are in need of renovation. Hadley faces the basic challenge of how to make show horses and equine research sustainable in a contracting economy. The farm can also support sheep, llamas, alpacas, and goats (particularly Boer goats for meat and Dorset sheep, also for meat). Movement toward sheep and goats might be a major step in the direction of sustainability for this farm, as would on-farm production of hay (which is now trucked in from South Deerfield’s UMass farm at great cost), and pasture recovery and renovation.

Hadley Farm’s principal asset is its abundance of flat tillable land close to campus and easily accessible to campus transportation systems. The farm’s principal weakness, its depleted and largely removed topsoils, even provides a fine challenge for faculty and students as it offers the opportunity for pasture re-building and renovation. And the necessary soil amendments to do the job - food waste from the very close UMass core campus (as well as food waste from several other nearby college campuses and other institutions) are both convenient and cheap. UNH’s U-Doo composting program which composts campus food waste stands as a promising model for UMass. (If UNH serves over 70,000 meals per week, which it does, I cannot begin to imagine how many meals UMass Dining Halls and other on-campus eateries must serve each week. This is a tremendous compost resource!)

“Heat in Stables Would Not Pay”

With respect to the construction of stables, “Steam heat was introduced in one of these for the purpose of determining whether artificial warming of a cow stable is, from a financial point of view, advisable. Experiments conducted in these stables showed that the cows in the warm stable produced considerable more milk than those in the one without artificial heat, but the percentage of fat was lower so that the butter production was not appreciably increased, and the conclusion was that heat in stables would not pay.” (The Handbook of Amherst by Frederick H. Hitchcock, 1894)

At today’s and tomorrow’s energy prices, and at the low prices for milk paid to the farmer, such heating would not likely pay today either.

UMass Cold Spring Orchard:

The Cold Spring Orchard Research and Education Center at Belchertown is the primary location for tree and small fruit research at the university and also features a hands-on laboratory for many courses and for Extension work, in spite of its distance from campus. UMass considers Cold Spring Orchard the premier pomology facility in all of New England. (Given the rate of orchard loss at all the New England land grants, they could be right. UNH, however, is still trying!) The colorful brochure developed for this farm is entitled “Cold Spring Orchard – The Orchard with a Difference.” Not only is Cold Spring a research facility for fruit but a place where one can visit, buy fruit, and enjoy a spectacular mountain view. Over 100 varieties of apples are grown here, including heirloom Baldwins and Golden Russets as well as the latest new varieties like Gingergold and Akane. The orchard is a site for substantial Integrated Pest Management (IPM) research as well as non-chemical methods of pest control. And all profits from retail sales of apples and other fruit (peaches, nectarines, pears, blueberries, plus sunflowers, pumpkins and gourds), supports UMass’s research program at the orchard. Many locally made fruit jams and jellies and, in season, fresh apple cider, round out the sales program. The orchard includes a hillside of peaches (an operation that could well be expanded). Grapes and a wine-making project are also here. The orchard sells to UMass Dining Halls, Whole Foods Market, area farmstands, and at the orchard itself. Farm workers are paid through these sales, and there is some conflict today between production for sale (which appears to be very successful) and research. However, the sales do support research, filling a revenue gap which the state can’t fill. The farm staff here prefers to think of the orchard as a demonstration farm featuring research rather than a research farm per se, an approach which eliminates the conflict.

The Massachusetts Fruit Growers Association is very much connected to and supportive of this farm, and the Orchard Director answers to both UMass and to the fruit growers association. Small fruit interest is increasing in Massachusetts, as is interest in apple cider. The latter circumstance means that apples with cosmetic diseases (blemishes) and hail dings maintain their high value.

Central Massachusetts is McIntosh apple country, and UMass Dining Commons takes over 100 bushels per week of this variety in the harvest season (about \$10,000 worth of apples). Interestingly, many varieties of apples go unpicked because the Cold Spring Orchard lacks personnel with the skilled knowledge of when to pick them. UMass is, however, encouraging growers to plant heirloom varieties, and new varieties come in every week, August to November. Many are cooking apples, but it’s a double plus if it’s an heirloom variety and tastes good.

Pears and plums, as well as peaches, are produced in some quantity, and peach quality here is said to be far higher than elsewhere. Grape production is increasing for table grapes, juice, and wine. This area, central Massachusetts, can grow non-viniferous grapes, while coastal Massachusetts can grow viniferous wine grapes similar to European wines. Since the UMass Cranberry Experimental Farm is on the coast, this opens the additional possibility of viniferous grape and wine experimentation, as well as beach plum trials, at that farm.

Cold Spring also has woodland and hayfields available for research but, above all, Cold Spring is a serious orchard operation with involvement in multi-state regional projects and some collaboration with the University of Maine’s Highmoor Farm. The orchard also hosts significant tree pruning teaching and demonstration, cider demonstrations, super spindly (i.e., fast-growing) tree demonstration, and work on blackberry production similar to UConn’s and UNH’s work in this area. The orchard also demonstrates the economic advantage of “pick your own” operations in an era of high labor costs although, as employment slackens, and as more people become underemployed if not unemployed, more labor will be hired on the farms.

New England is one of the world’s most ideal regions for apple production. It has been said that New England hillsides and soils want to grow apples. Apple and other fruit production can and should constitute a major element in future New England food security. It is up to UMass and the other New England land grants to take this seriously and to return to significant fruit (especially apple) experimentation and demonstration (particularly with organic, low-spray and low energy-intensive practices), and to rejuvenate their orchards and establish new ones at their university farms. Better education of the public on acceptance of apples with superficial blemishes, and reminders of the high nutritional values of apples, will open the door to greater production and use. A drive for such public education will be reflected at the university.

Joseph Troll Turf Research Farm:

The Troll Turf Research Facility has 20 acres along the Connecticut River immediately adjacent to the aforementioned UMass Livestock and Crop Farm at South Deerfield. The farm is irrigated and its work focuses on golf courses and lawn turf, with experimentation on different varieties of turf grasses and on biological control of insects and weeds, among other areas. It is similar to the older turf facilities on URI farms.

Cranberry Experiment Station:

The Cranberry Experiment Station, a university farm consisting of 11 acres at East Wareham, hosts research on entomology, plant pathology, weed science, plant nutrition, and related subjects of benefit to commercial cranberry growers. This is a specialized facility, not unlike UMaine's distant outlying blueberry research farm and, of all the UMass farms, is least used by the campus, students, or extension service, largely because of its long distance from campus.

Massachusetts Agricultural Experiment Station:

All the farms, of course, are research units of the Massachusetts Agricultural Experiment Station, established in 1882 (albeit significant agricultural research was performed at Amherst throughout the 1870s). They perform educational and extension service as well. For four decades in its early history, the Station was under the able leadership of William Penn Brooks, who also served as President of the University, and introduced important crop plants from Japan into the U.S., notably Japanese millet and green soybeans.

Early investigations at the UMass Station include:

- "The causes, prevention and remedies of the diseases of domestic animals, plants and trees
- The history and habits of insects destructive to vegetation, and the means of abating them
- The manufacture and composition of both foreign and domestic fertilizers, their several values, and their adaptability to different crops and soils
- The values, under all conditions, as food, for all farm animals, for various purposes, of the several forage, grain and root crops
- The comparative value of green and dry forage, and the cost of producing and preserving it in the best condition
- The adulteration of any articles of food intended for use of men or animals
- And in any other subjects which may be deemed advantageous to the agriculture and horticulture of the Commonwealth."

History tells us, "The work of the Station is of three distinct classes: control work, dissemination of information, and investigation. The farmers owe to the Station: better knowledge of methods of feeding stock; more definite information as to the nature and special adaptation of feedstuffs; better knowledge of the methods of feeding the crops of the field, garden and orchard; and more accurate information as to the nature of manure and fertilizers ..." (*The Handbook of Amherst* by Frederick H. Hitchcock, 1894)

Pasture Research

Prof. Steve Herbert is a pillar of sustainable agriculture at UMass, involved, as he has been over many years, in grazing and pasture plant research, new pasture fencing technologies, biodiesel and other on-farm energy production, and related areas. He sees pastures as solar-powered feeding sites. He is proud of the diverse mixture of forages in UMass pastures which feature 28 different pasture blends. He knows the importance of different maturities for timing of animals on pasture,

Green Gold: An Appreciation

In 1943, J. G. Archibald argued that, for the New England farmer, grass is much more than grass, it is “green gold,” a reference to the high value of grass in production agriculture and agroecosystems:

“[Green gold] concerns one of the most commonplace and humble of our possessions; so humble and so commonplace that the great majority of people take it for granted without even giving it a second thought, and yet so vital to our very existence that, if its harvest were to fail for a single season, famine would depopulate the world. Yes, you guessed it: the subject is grass, plain, ordinary everyday grass ... [G]rass has had a constant influence on the destiny of man all through recorded history ... Grass, or perhaps more correctly, access to grass, has oftener than not been basic to this great human drama that we call history.”

He writes “[T]he farmers of the Northeastern states could be much more self-sufficient with regard to feed supplies than they are, if they would pay more attention to their grasslands than they have in the past. This region, with an average annual rainfall of 40-45 inches, well distributed over the entire year, is a natural grass and hay country; 25% of the arable land is in plowable pasture, another 33% is in hay.”

Grass, he writes, is this “very real ‘green gold’ of the region.”

He notes that “Hay is so much more important in Northeastern agriculture than anywhere else in the country,” and cites the 1940 Census of Agriculture for arable land devoted to hay crops:

U.S. – 13%

North Atlantic – 34%

New England – 49%

New Hampshire and Maine – about 55%

Vermont – 59%

He writes that “[P]oultrymen are just beginning to realize the importance of good range for their birds and of grass silage for winter feeding. Someone else will say you can’t make milk without grain. I will agree that you can’t make as much, but if most of your milk check goes to the feed dealer, what better off are you?”

Archibald concludes, “Our Northeastern farmers have on the whole not even made a start at capitalizing on the potentialities of this ‘green gold’ which is their natural heritage.”

J. G. Archibald, Massachusetts Agricultural Experiment Station, 1943

This article appeared some fifteen years before the advent of the zero-grazing movement, a movement to eliminate the practice of grazing from agriculture and the demise of grass and grazing research and teaching at UMass and the other New England land grants. New Englanders did not hear very well what Prof. Archibald had to say.

extending the growing season, and the big picture of pasture health and quality. And wide soil adaptability provides roughage, cold tolerance, and higher yield. UMass’s 2007 Agronomy Research Report is a celebration of the work of Steve Herbert and his several colleagues.

Perhaps most intriguing in this agronomic report on sustainability and food sufficiency, in addition to attention to summer forages, sweet corn needs, and switchgrass for bioenergy, is the plan for a regional Pasture Research Center. This plan is based on the addition to the Livestock and Crop Farm pastures at South Deerfield of what is now a 65-acre potato field and presently unused upper pastures, and an invitation to other New England states and New York to collaborate on these pastures for grazing research. I suggest Red Devons and other Devons for beef production as a wise choice. Devons are the quintessential all-purpose New England breed. They produce meat, milk, and serve as beasts of burden, and have the lowest of maintenance costs. This breed is both perfectly adapted to the New England environment and would be an important symbol. Old Sturbridge Village, Plimouth Plantation (both model Massachusetts institutions), and the National

Devon Cattle Association, as well as the Rare Breeds Conservancy, would be most pleased with this choice, and UMass would get much positive publicity. Sara Flack in Vermont and Trauger Groh in New Hampshire, both much experienced with Devons on pasture, could help, as would nationally respected Devon breeder Ridge Shinn of Hardwick, Massachusetts, and Don and Heather Minto at Historic New England's Watson Farm in Rhode Island. All of these farmers are involved in local Devon beef production.

Finally, given Steve Herbert's interest and proficiency in pasture fencing technology of various types, the Pasture Research Center could become a center for pasture fencing technology and design as well as a conduit for advanced thinking from New Zealand and other parts of the world on such fencing and related technologies.

Steve Herbert's dream of a regional Pasture Research Center at UMass could fulfill many important regional needs. *Pastures of Plenty* made the case for pastures and grass farming as at the core of New England food sufficiency. UMass and its New England neighbors could go far in bringing such regional grass farming to reality through work on this site.

Experimentation vs. Demonstration

There is some feeling in UMass administration that university farms should not be used as demonstration sites but should be reserved for experimentation. Their purpose is seen as research and experimentation. And yet demonstration is clearly one part of the land grant university's three-part mission and is a legitimate purpose for university farms. Of course, the two purposes, research and demonstration, can be at odds with each other, and, therefore, a decision must be made when the two purposes conflict. Our society needs both the answers to important research questions and the inspiration offered by demonstration.

Sustainable Agriculture at UMass

Might a university sustainable agriculture program reveal the unsustainability of some of the university's work? The presence on campus of a true sustainable agriculture program, generally dominated by teaching with some research and extension, would quite possibly reveal the lack of sustainability inherent in much agricultural and other practice at the university. Since we live in a petroleum-based and, therefore, unsustainable society, and since land grant universities are public institutions which reflect the thinking and practice of the society, it is only natural that land grant colleges of agriculture are and have been for a half century engaged in obviously unsustainable practices. The dichotomy in values between the established practice of this university and the requirements of sustainability will have to be mediated over time. This mediation, this need for the inclusion of values of sustainability in practices advocated by the university, is increasingly assisted by economic realities, sustainable agriculture being much less energy-intensive and thus more economically realistic.

The Matter of Horses

Like sod and ornamental horticulture in the plant domain, equine studies have been an important money-maker for the New England land grant colleges. And riding, including therapeutic riding, has been popular. But can we assume in current economic realities that this situation will continue? Equine in particular, because of its high maintenance cost, could become more a liability than an asset. It must be said at this point that equine, like sod and ornamentals, has provided a rationale for keeping farmland open and in production (equine for hay crops as feed as well as space for horses). Without these programs through the past three decades, it is quite possible that much more university farm acreage would have been lost – in effect, these enterprises have served as a place-holder. But now we are transitioning into a new world marked by a shrunken economy and a need for local production. Hadley Farm is centrally positioned to play a key role in this transition.

There is some need for research on draft horses (perhaps Hanoverians at UMass) for police and other special purposes, and possibly research for therapeutic riding. Horses, therefore, can continue to play a role at Hadley Farm. But the prospects for pasture plant and soil recovery and allied research for grazing-based equine management and for much more highly diversified livestock research and teaching should not be ignored. Potentials are particularly good for Boer goats and Dorset sheep, both for meat production, and for the integration of poultry and pigs into the mix. Research on all of these subjects, especially when integrated, speaks to farm and food sustainability for the future. Intensive rotational grazing, multi-species grazing, and high levels of energy and ecological integration for maximum service can also be profitably practiced

Center for Pasture-Fencing Technology

There is so much enthusiasm at UMass for light-weight movable pasture fencing, and such a great need in the New England region, that the questions arise, Could UMass, under the leadership of Prof. Herbert, develop into a Center for New Pasture Fencing Technology? And could the university farm at South Deerfield become the premier test site for such technology?

here, whether at Hadley or South Deerfield or both. And what Fred Launer has developed on a small scale on the teaching side at URI (see next chapter) could well be carried out on a larger scale at Hadley in particular, given the close access to a very large cadre of undergraduate students with easy access. This can involve students as both learners and as interns or apprentices.

Sweet Corn

Another pillar of sustainability at UMass is Prof. Ruth Hazzard who, additionally, is a key figure in the Amherst Town Agricultural Commission. Prof. Hazzard's activity includes her long-established research on the ecological role of corn in central New England farming. She studies prospects for "corn heat," namely, for shelled corn as greenhouse heat, and ways to provide cost share to growers to install a corn furnace to heat greenhouses, thus aiding corn growers by developing a shelled corn industry. The significance of this work for sustainability is obvious: greenhouses without fossil fuel dependency are a vehicle of serious

season extension and therefore can increase New England winter vegetable production. (See www.umassvegetable.org for further information on this topic.) The goal here is nothing less than to build a new economy. This kind of work can lead to the creation of a new economy involving significant expansion of greenhouse production even beyond season extension.

Beyond Ruth Hazzard's agronomy and energy research on corn, she studies the market to insure financial health for her sustainable agriculture work. Included in that work are local food purchasing commitments of UMass Dining Commons; the student-run Earth Foods Café in the Student Union; use of university farms for growing food for the campus; a little farmers market in the campus center; moving more under-utilized land into use on university farms; involving more undergraduates in study on the university farms (noting that many students are passionate about being involved on the farm and in the practice of sustainability); and the overall linkage of UMass work in fertility, weed management, and in less fossil fuel dependency, while increasing overall productivity. Prof. Hazzard is also interested in promoting serious collaboration among the six New England land grants. And she envisions expansion of all our university farms into Research and Education Farms, making them more than just research farms. This is an idea worthy of further consideration.

A New England Regional Pasture Research Center

UMass' Animal Research and Education Farm, with its pastures containing 28 blends of grass and legumes, with samples taken before and after grazing, with integrated crop-livestock studies, with a systems approach to nitrogen (N) management on farms, and with good water and electricity infrastructure throughout, is a prime candidate for a badly needed New England Regional Pasture Research Center, as proposed by Prof. Herbert and the university. Whether or not this will come to pass depends on the continued persistence of UMass and the successful acquisition of outside assistance. As with many other aspects of sustainable agriculture, capital needs for serious pasture research are not high, an inviting circumstance in a capital-strapped economy. There is some interest at UMass (and at other New England land grants) in new energy generated from wood to replace fossil fuels. That can only be done at high capital cost and at some threat to the viability of the forests. Would it not be smarter to benefit from the energy that can be saved by pastures and by grass-based agriculture?

Beef cattle research and production is perhaps the most important of future grass-based endeavors that could be carried out on this university farm, which could in turn become a centerpiece for a regional pasture research center. The university is planning to introduce a Holstein-Devon Cross on a 65-acre plot on-site. The herd will be finished on grass, and then compared to Angus cattle finished on grain. (Red Devons might even work better, as is being demonstrated in Rhode Island.) Given Massachusetts' emerging leadership in grass-based beef cattle production, UMass might be well advised to involve itself in the developing work of Ridge Shinn and his colleagues at nearby Hardwick, Massachusetts: a collaboration could

be of great benefit to the state and to future New England protein production and food security. Red Devon is an ideal beef breed for New England conditions and has exceptionally low input cost relative to output produced. Once the cattle are on the field and the 65 acres have been put into active pasture, I suggest that this farm be re-named the New England Pasture Research Center. UMass has the makings for this now, and even more so if the upper pasture were put into grazing, if collaboration were begun with Hardwick, and if a modest pasture fencing technology were launched. Once established, the UMass Pasture Research Center can invite the other five New England land grants to join UMass on joint research on this site, with beef cattle and perhaps sheep serving as a centerpiece for multispecies grazing. New England would become that much more food secure.

“There needs to be a category of faculty who are willing to work on-farm. If the farms are a lab, we’ll need senior staff and faculty to run these “labs.” We need an integrated plan for the university farms and research at the farm system level, not the NIH or NAS research levels – the two are totally different. We have the animals, skills, and land but not the purpose of agriculture which is to produce food. The three are compatible but need support as a unit. If we want to retain agriculture, we’ll have to have an intellectual shift”.

UMass Ag Scientist

Adjacent to the UMass Animal Research and Education Center at South Deerfield is the Troll Farm, the first turf (sod) teaching facility in the U.S. (URI has the nation’s first turf research farm.) With 17 acres devoted to turf, UMass has a strong reputation in this area similar to its southern New England neighbors. The Joseph Troll Turf Research and Education Center has had a distinguished history. As with equine and ornamental plants, it gets credit for keeping open space open and agriculture/horticulture a working proposition in the Bay State. But, like ornamentals and equine, it now has a more questionable future in an era of high and volatile fuel cost and a changing economy. Turf is grass. Grass is pasture. Grass is grain. There are enough connections here to begin to see the roll-out of a future pathway for turf, as the focus shifts increasingly to basic food production. Integration with a New England Regional Pasture Research Center might be appropriate.

Some Views from UMass Plant and Animal Sciences

UMass’s Chair of the Department of Plant, Soil and Insects echoes what most chairs of plant science departments would likely relate: it’s the turf industry and ornamental plants that fund us. If that stops, we’re nowhere. Vegetables and fruit cannot provide enough money. The state would have to do it, and likely would not. The present circumstance of turf and ornamental’s funding sources clearly is not sustainable, but we are perhaps not yet hungry enough or insecure enough to develop the new funding mechanisms we’ll need to support local food production programs. You might say that, at the moment, we’re between a rock and a hard place.

Discussions with the UMass Animal Science Chair reveal the central place of his department’s biomedical thrust which clearly outcompetes the more traditional agricultural orientation – true elsewhere as well. The department’s farms are extremely underutilized and the structures are modified for veterinary science purposes (which signifies where the department is going). Animal-plant integration, research/teaching integration, land/buildings integration, and overall unity rather than division are what is needed. But what we get from the division we now have is territoriality, sometimes fierce territoriality, a destructive force. Students are seeking animal husbandry skills and teaching of these skills needs to be integrated into the farming system. We will need interdisciplinary departments to do this. And further integration opportunity is offered by the need for work on water pollution and watershed, as well as other environmental and natural resources work.

UMass Ag Science


So, having met with the department chairs of plant and soil science and animal science and noticed the distinct focus on the turf and ornamental aspects of plants and soil and the biomedical focus of animal science, both to the detriment of agriculture, what was my impression? My impression was that hands are tied in Plant and Soil Science as there is little support

“Our problem is not with energy or a lack thereof. It’s with culture. We have a culture based on consumption which does not work. Futility, a sense of inability to truly change, is the driving force. But it’s futile to depend on producing garbage and selling it.”

from the fruit industry and virtually none from vegetables (or, for that matter, grains). The reality of Animal Science is that it has become almost totally a veterinary and an equine department, and therefore no longer agricultural in the food sense. The latter's support is largely governed by funds from NIH, and none of these are in support of agriculture. Traditionally, these two departments are mainstay agricultural departments, and yet perhaps only 10%-15% of the departments' total work today is agricultural. I also have the impression that the department chairs, both of whom appear to this author to have a sensitive and true understanding of what lies ahead in terms of food sustainability, exert thoughtful and wise leadership. And I believe that both recognize that vital and necessary changes could happen in the direction of integrated and sustainable agriculture and local food production if a new joint program could be established with participation by multiple departments and programs, including natural resources and environmental sciences. Funding support would have to come, presumably, from the state, likely as a shift of support from other programs, as new money is not likely to be found. The bottom line remains: if we are to separate fossil fuel from agriculture, as it appears we must, we have a steep uphill climb to perform that necessary task.

The merging of key agricultural units (departments and programs) within the mission of local and regional food production is the key to truly sustainable agriculture at UMass. A strong voice for sustainable agriculture at UMass is the popular teacher, Prof. John Gerber. And the philosophical thrust of Professor Gerber's work is interdisciplinary, calling for a merger of currently separate disciplines and the units in which they are housed. A popular Professor of Sustainable Agriculture, John Gerber's work is one example of a successful merging of interdisciplinary thought. His classes teach this integration. Indeed, the overall Sustainable Agriculture degree program housed in Plant, Soils and Insects represents such integration and interdisciplinarity. The Sustainable Agriculture Program at UMass is not a major but a Concentration within the Plant, Soils and Insects major. Prof. Gerber and the program place a major emphasis on using area farms and learning innovation from area farmers who are seen as ahead of university researchers. (This is ironic since land grants were designed to be the agricultural leaders.) The program also actively promotes the idea that the large university dining services at UMass should purchase a substantial percentage of its food from the local farms of this richly fertile agricultural valley. And as at other land grant universities, Plant Science faculty tend to develop and support sustainable agriculture programs while Animal Science faculty are noticeably absent from the programs – this is a very clear reality. In keeping with more recent trends, UMass offers two distinct thrusts in this Concentration: crop production and food systems. Cultural sensitivity and community organizing are both explicit elements. As it develops, UMass Sustainable Agriculture can obviously become a base of support for the reinvigoration of the university farms and give them a prominent teaching role. A merger of the clearly agricultural elements of these two core departments, Plant and Animal Science, in one campus location, with some faculty contribution coming from other departments, from the Sustainable Agriculture teaching program, and including centralized housing on campus, would likely be a good first step if UMass is to get back to the business of assisting food production in the Commonwealth.

UMass clearly has highly competent leadership in all the right areas necessary to support a credible program in Sustainable Agriculture, utilizing a base in an exceptional quality and placement of university farmland in support of that program. And there is some degree of immunity from the chronic and steep budget reductions which UMass has faced in recent years, given the land resource and the creative and wise personnel who are already on board. Will UMass be able to maximize its opportunity?



Years thousand since, God gave command
(As we in Scripture find)
That Earth and Trees and Plants should bring
Forth fruit each in his kind.
The Wilderness remembers this
The wild and howling land
Answers the toiling labor of
The wildest Indian's hand.

*Roger Williams, Founder of Rhode Island and Providence
Plantations*



CHAPTER NINE:

Rhode Island and URI University Farms

Diminutive Rhode Island, with a rich agricultural history and nearness to Boston, Connecticut and New York City markets, is a state with serious economic challenges. These very challenges in the past few years have called forth a remarkable response from the people of this small state who are perhaps more concerned than most about putting food - good food - into the mouths of people in these difficult economic times. The local food and local farms movement contains an image of necessity, not just choice, in the Ocean State today. The University of Rhode Island and its farms enjoy the most moderate climate and longest growing season in the region, are highly accessible to excellent markets, and located in an area of good soils which is regaining its agrarian heritage.

Little Rhody or Big Rhody?

Rhode Island is such a small and highly urbanized state that most people would immediately dismiss notions of serious agricultural possibility in this place and at its land grant university in Kingston. In fact, URI's historic College of Agriculture became the first in New England to drop the word "agriculture" from its name even though it was the first college at that land grant university, as elsewhere, and URI did that decades ago. But Rhode Island, with its dense population, has lots of people and thus many mouths to feed. Perhaps we need to think "food" rather than "agriculture" in our conversations about sustainability, particularly in such places as Rhode Island with its large market demand, a market demand which is the envy of many places in northern and even western New England. Rhode Island's prospect for local agriculture and, therefore, local food, is, indeed, bright. While Rhode Island may have limited available farmland, this is in part compensated for by the advantage of a mild climate and longer growing season, at least in comparison to other New England states. The state also has relatively good soils for various till crops and pasture products. The long history of Rhode Island agriculture, epitomized today in Historic New England's 300-year-old producing farms, the Casey Farm at Saundertown and the Watson Farm near Jamestown, presents an example of long-term Rhode Island food productivity. The Rhode Island Red among livestock and flint corn among crops provide historic symbols of that productivity.

Rhode Island, that smallest of states, is sometimes referred to as "Little Rhody." My first visit to a University of Rhode Island farm, namely Peckham Farm, the university's Animal Science farm, convinced me that "Big Rhody" would also be an appropriate nickname. What I witnessed at Peckham Farm was a big idea: biodiversity. Indeed, no other university land grant in New England appears yet capable of such a substantial commitment to this important ecological and sustainable practice at the farm level. The farm is now home to sheep (for both wool and meat), dairy heifers, pigs, goats, chickens (Rhode Island Reds, the state's famous heritage breed which is also designated as the Rhode Island state bird and used for both eggs and broilers), donkeys and llamas for predator protection. Beef cattle are on the way. Only turkeys and rabbits were missing from the mix. This is big thinking indeed, a higher form of sustainability, especially with the planned advent of intensive rotational grazing. It is a most progressive example of ecological agriculture. Few land grant universities anywhere are capable of this kind of integrated ecological thought, thought that considers numbers of heritage breeds, low energy and other input costs, and how best to create interdependency and thus maximize natural capital through the rearing and maintenance of all of these species and breeds together. Bravo for URI for showing the rest of us the way!

And just what is going on here at Peckham Farm? Two very popular undergraduate courses fulfilling general education credits, and thus attracting a wide-range of non-majors (some of whom may well become animal science/agriculture majors because of this experience) are being taught using these animals and their integration with one another into a sustainable agroecosystem. And, although established for teaching purposes, this array of animals and their interrelationship may well spawn future research. It certainly provides demonstration and a model for extension purposes and values, and a true launch of what must be done to accomplish sustainability. A big idea for "Little Rhody"!

For one of America's smallest states and smallest land grant colleges of agriculture, there is surprisingly much to say about Rhode Island, its geographic location, its history of agriculture, about URI, and about its university farms. Rhode Island is highly urbanized, dominated by its capital city, Providence, and other old industrial cities; is very near to Connecticut and Massachusetts population centers; and has easy access to metropolitan Boston. These proximities speak to demand for food, great nearby demand with willingness and ability to pay. It speaks, therefore, to local markets, the starting point on any agricultural discussion on Rhode Island. Little Rhody is also known as the Ocean State for good reason: with ocean and estuaries, there are fish and shellfish, crabs and lobsters – more food for local consumption and opportunities for integration between agriculture, aquaculture, and fisheries. And, of course, there is a long established heritage of agriculture and food production in the state from Colonial times to the present. (In fact, the official name of this state, the State of Rhode Island and Providence Plantations, belies the centrality of agriculture in the founding and the history of the state.) And, albeit small in scale, there is an historic land grant agriculture college with its agricultural experiment station, its extension service, and its university farms (even if it has dropped "agriculture" from the College's name). So URI is a presence on the agricultural scene.

URI Ag History

In 1897, URI instituted a six-week summer course in poultry husbandry, the first of its kind in the nation. This is precisely what we need today, from URI and all other land grant colleges. We are told that this 1897 program satisfied a real need and was "vigorously practical." Part of the purpose was to utilize the university's physical plant in the summer (also a challenge today). Enrollment in the program was 8 in the first year and 22 in the second year. A summer short course in horticulture soon followed, and both courses became very popular!

There are many mouths to feed in Rhode Island – those with the means for payment and those without. And with the highest unemployment rates in New England, Rhode Island faces a true food production and distribution challenge. On the down side, urbanization and suburbanization have taken their toll in this small state. Much agricultural land has been lost and, most significantly, most of the agrarian culture of Rhode Island is absent in modern times. The loss of the word "agriculture" from URI's colleges is symptomatic of that decline.

The university farms, labs, libraries and other support infrastructure remain, however, as do a small cadre of dedicated teachers and researchers in agricultural fields, and much can be redeemed. And supplementing the valuable university farms is the prospect of a serious collaborative relationship with an important regional non-profit organization, Historic New England, with its nearby and sustainably progressive working farms upon which much teaching, research, and demonstration could be conducted.

University Farms:

URI's university farms, with one important and exciting exception, are all in Kingston, very close by and accessible to the university campus. URI has, at or very near the campus:

Peckham Farm (400 acres), East Farm (87 acres), Skogley Farm and Turfgrass Research Center (10 acres), and Gardner Agronomy Farm (30 acres)

About 40 miles away from campus, URI maintains and operates the true gem of the university farm system, perhaps for all of New England, the Woodvale Farm, a rambling 2300 acres of farmland, pasture, ponds, and woodland that is an historic former fishing haunt of President Dwight Eisenhower. This property is also known as the W. Alton Jones Campus of URI.

URI Woodvale Farm housed a major game bird hunting and fishing camp operation to which their owner, businessman W. Alton Jones, lured President Dwight Eisenhower for no less than four visits while President.

Peckham Farm:

The working philosophy of URI's Peckham Farm today, a philosophy of biodiversity, efficiency and integration, is largely the philosophy of URI animal scientist Prof. Fred Launer, URI's "Teacher of the Year" in 2008. Rhode Island's 19th-century state senator, Nathaniel Peckham, for whom this farm was named, would without doubt agree on that philosophy: he and Fred Launer appear to be like-minded, both of them appreciating biodiverse and hands-on agriculture of great integrity. Senator Peckham lived in an era when values and circumstances supported biodiversity and hands-on approaches. Prof. Launer lives in an era that resists such approaches, giving him a good opportunity to show us a more progressive way to the future. Senator Peckham, I suspect, would be very proud of today's developments at Peckham Farm and the education it provides. (Rhode Islanders have another reason to be grateful for the work of Nathaniel Peckham. In 1870 he fought courageously to ensure that public money marked for agriculture was spent on agriculture and not deflected to other purposes. He was successful in his efforts.)

The State of Maine has a promotional motto, "The Way Life Should Be." Whenever I visit Peckham Farm at URI, that's exactly what I think: the way life should be. Although modest and small-scale, everything seems right about Peckham: the diversity and integration of farm animals, the fine rotated pasture paddocks, the general scale. In fact, in 2002, Peckham Farm was used as a demonstration of integrated farming technique.

What Fred Launer and Peckham Farm teach is the efficient use of animals for sustainability. Three different kinds of farm animals (goats, pigs, and poultry) stand out for high levels of efficiency, and yet they seem to receive little attention at the New England land grants. Attention goes to dairy and some attention to beef cattle and sheep. This is all well and good but, because of extraordinarily high levels of efficiency, certain other animals should be present for research and teaching on all land grant campuses if we are to achieve food and farm security in the region: goats, pigs, and poultry, which includes turkeys, geese, and ducks, as well as chickens.

"Goats are the salvation of sustainable agriculture", says Fred Launer. Goats may well be the saviors of sustainable agriculture. With very low input cost, they provide meat and dairy (including particularly valuable cheese for which there is good market demand), and serve as converters of land from scrub woodland to pastures. They are early-stage pasture renovators, par excellence. Peckham Farm favors Boer goats for meat. (Interestingly, UNH will soon introduce meat goats for the first time – albeit initially to clear land, converting woodland into pasture. Meat will be a byproduct of this effort.)

Chickens (Rhode Island Reds, of course), turkeys (Narragansetts, among other breeds), geese, and ducks, are highly efficient converters of insects, grass, and miscellaneous grains into high value protein in the form of both eggs and meat. I refer here to the grazing role of poultry, and to the especially great abilities of turkeys to graze on pasture.

And everyone knows of the superb cleaner-upper and all purpose role of the pig – the creature that can exist largely on the waste of other operations. Whether they fulfill the common role of all-purpose food waste and scrap consumption or a more specialized role of apple drop clean-up in the orchards or whey waste consumption from cheese-making (can one even toss in acorns in New England oak woodlands?), pigs can be produced in New England in a quantity to meet the region's high demand for pork.

We can no longer afford to ignore our most efficient and therefore most productive animals in our local food stream. And we can no longer ignore the value of biodiversity and economic diversity they bring to us.

Why are so many throughout Rhode Island and southern New England agriculture circles, particularly in livestock, talking about URI's Fred Launer? The answer is simple: In his effective teaching of large numbers of undergraduates who are general education, not agriculture students, Fred Launer is employing nothing more than common sense but doing so when few others anywhere are doing so. A quick look at his work at URI's Peckham Farm, a conversation with Rhode Island farmers and farm groups and a chat with URI students, will reveal a deep respect and admiration for this man of agriculture who is such a good practitioner of the common sense that too many of the rest of us have lost in modern life. Our forbears before the era of cheap oil had that common sense, that deep sense of survival and sustainability – it is what enabled them to be sustainable, to survive, and, therefore, it is what enabled us to be here. It is precisely what we will need for our own survival. And it is what people like Fred Launer of Rhode Island and, in a way, his corollaries, Matt Williams of Maine and Bill Murphy of Vermont (the latter two of whom I wrote about in two earlier volumes in this series) model for us, teach us.

Because of the popularity of and student interest in what is going on at Peckham Farm, enrollment in animal science courses at URI has shot up, and there is a growing research interest in animal agriculture in Rhode Island. Creative ideas there include:

- the teaching of two new courses explicitly based on the great diversity of livestock on the farm
- the provision of general education Animal and Veterinary courses for non-majors
- the collection of a lab fee from all of the students providing good revenue to the farm
- the requirement that all enrolled students work as interns on the farm
- the hiring of just a few paid student workers to supplement unpaid lab interns
- the commitment to start intensive rotational grazing next year, a program which will undoubtedly be popular, attracting more new students as they engage in moving animals from paddock to paddock, pasture to pasture.

If any university farm in New England can do a great job of teaching the principles and practices of raising and maintaining important farm animals, and doing so through grass farming, that is, intensive rotational grazing, it is Peckham Farm. In addition to goats, chickens, and pigs, Peckham Farm hosts sheep and cattle. Dorset sheep graze the pastures and provide meat and wool, while other breeds of sheep on nearby farms yield milk for cheese-making. Pastured Dexter beef cows, with Devons coming, provide meat. A few dairy cows are also being milked. And donkeys and llamas are present for predator control. The farm is a very short drive or bike-ride and is also walkable from the URI campus. It is today serving important teaching needs in the undergraduate agricultural and particularly general education curriculum. And Fred Launer is showing the way – even to the tune of insuring farm fertility through composting the waste from two large gambling casinos in nearby Connecticut. (I wonder if UConn has thought of that!)

East Farm:

Equally close to the main URI campus is the historic 87-acre plant science/pomology farm known as East Farm. What is my take on East Farm? Seriously under-utilized today but roaring with potential. East Farm was known for fruit, potatoes, and poultry, and was essentially a plant science farm. But agriculture at East Farm took a hit in the early 1970s, and the combination of turf science and aquaculture took over some of the farm, with the rest of the acreage abandoned. Extension's Master Gardeners program with their associated gardens is also housed here. East Farm today hosts undergraduate research (Partnership on Coastal Environment and Partnership on Energy programs); freshwater aquaculture for salmon and trout; a fisheries center for the commercial fisheries organizations on campus (Sea Grant Fisheries Outreach Group); and some ornamental horticulture plots and activity.

East Farm today is a far cry from what it was in the past, beginning with its establishment in 1928. Pomology staff planted orchards of cherries, plums, peaches, and pears. Red raspberries were added, and by 1930 poultry arrived. Egg-laying contests were popular. Significant research was carried out on poultry disease. A stone fruit orchard was established, the Nicholls Memorial Crab Apple Plantation, and, as well, a pinetum. A five-acre arboretum of deciduous trees was added, a short-term organic vegetable gardening project was established, along with a new apple orchard, grape vines, beds of

URI's farms stand out from all other university farms in at least one way: they produce a substantial quantity of food for the Rhode Island Community Food Bank. According to URI Associate Dean Rick Rhodes, "Undergraduate students [supported by the Alan Shawn Feinstein Service Learning program] and volunteers [e.g., 4-H'ers, Master Gardeners, community folk] harvest under the guidance of Cooperative Extension staff. Our food bank coordinator [who is our vegetable Cooperative Extension staffer] provides primary oversight of the operation. She's paid from our Cooperative Extension budget. Our food bank coordinator also works closely with URI farm staff [funded by a combination of state and land grants funds] to have specific work done [e.g., plowing, etc.]. The RI Community Food Bank provides some modest funding for additional student support on the project. Last, area farmers and seed stores donate seed from which the vegetables grow. The Rhode Island Community Food Bank is the sole resource for the distribution of the produce."

Dean Rhodes reported in April of 2009 that URI provided the RI Community Food Bank 100,800 pounds of produce in the previous growing season. Of that total, 95,000 pounds was squash. The rest included carrots, cabbage, cauliflower, and broccoli.

woody ornamentals, two green houses for seed work and Master Gardener activity, and a few blocks of blueberries.

The farm's emphasis on agriculture for food production ended in the 1960s when ornamental horticulture took over. From the 1970s turf developed, followed by aquacultural and fisheries usages. The blueberry research program was terminated. Fruit and vegetables finally disappeared in the 1980s but are now beginning a comeback. The URI poultry operation there was terminated in the 1980s. Sustainable landscaping has become of interest and fish farming replaced poultry. The farm has 24 acres of fields and 60 acres of woodlands. The stony loam soil of this farm is very appropriate for orchards. Orchards could once again become a major feature of the farm. There's significant potential for cherries and apples as well as the return of blueberries, the latter a fruit ascending in importance and popularity for health reasons. There's also the potential for the production of forage crops for livestock.

As can be seen, East Farm has been a diversified, mainly plant science, farm whose usage has both changed dramatically and deteriorated from its agriculture purposes. But the good land nearby remains. A 2003 URI release remarks "...It remains to be seen whether new generations of faculty, students and volunteers can put this land to more uses that will perpetuate the tradition of outreach service, research and education that are keys to the mission of East Farm." There is certainly sufficient space at East Farm to both maintain current activity in aquaculture and fisheries and, as well, serve Rhode Island's and the region's agricultural renaissance. Professor Brian Maynard and his colleagues are working hard to get East Farm back on track.

Interestingly, East Farm is contiguous with a large tract of conserved land, its 87 acres being part of 400-500 acres of "Greenland" (conservation lands). An additional adjacent 500-600 acres of university farmlands is leased to turf farms.

Skogley Farm:

The ten acres of the on-campus Skogley Farm Turf Grass Research Center constitute some of the oldest turf farmland in the U.S. This farm is completely committed to its current mission of turf grass production for research. It has potential for research on grains, among other crops, on this highly tillable soil.

Gardner Agronomy Farm and Crop Science Center:

The Gardner Agronomy Farm, also on campus, contains 30 acres of mixed vegetable crops currently produced for Rhode Island food banks. (According to the College Dean, 100,800 pounds of produce were produced for R.I.'s Food Banks last year.) Such highly tillable, fertile soil right on campus could obviously sustain many food production usages in support of sustainable agriculture, including grain to support the increasing demand for locally grown, high-quality grain for micro-breweries and bakeries, as well as poultry feed.

A True Irony

Brown University was the first recipient of Rhode Island's land grant university monies in the 1860s-1870s but failed to fulfill its obligation to establish an agriculture college and failed to educate the sons of farmers in agriculture, thus losing the money to the establishment of Rhode Island's new land grant school, Rhode Island Agricultural College (now URI).

Today, as with other land grants, URI is moving ever farther away from its land grant agricultural mission, to the disappointment of the state's farmers. At the same time, in a supreme act of irony, Brown University is playing a central role in demanding more and more local food from Rhode Island farmers and boosting the economic prospects of Rhode Island's farms and farmers. URI has, to date, been significantly less involved in this work. It has some catching up to do.

Breeding of heritage species of animals and heirloom varieties of plants provides both historical value, tying back to earlier New England history, and, as well, important insights into modern sustainability by demonstrating breeds that are classically adapted to low-input sustainable agriculture.

Woodvale Farm:

Although not close to campus, the university's Woodvale Farm in western Rhode Island (W. Alton Jones Campus) offers considerable potential to the university and the people of the state, if for no other reason than its sheer size. The land now hosts a Youth Science Center, an Environmental Education Center, an adult retreat center, a conference center, and a support center for faculty and student research. The on-site Woodvale Farm was once a "Poor Farm", a place of refuge for indigent people. URI is keeping the fields open, bringing in a full collection of animals from local farms for summer youth education purposes, and returning the animals to their home farms in winter. There's a green house with hydroponics exhibits, and there's a great deal of on-site potential for the practice of agro-forestry (i.e., the integration of woodland management with cropping and livestock production on pasture, which, in tandem, require a sizable piece of land). Potentials for Woodvale Farm are virtually unlimited including maximum opportunity for biodiversity of plants and animals, both to serve this very rural area of the state and all of southern New England by providing ideas for serious food production. It constitutes a prime educational, research, and demonstration tool for URI if the 40 miles of separation between the farm and campus can be overcome.

Rhode Island flint corn and delicious Jonnycake are synonymous. URI's Agricultural Experiment Station is perpetuating its seed source for small Rhode Island growers. URI Cooperative Extension reports that "flint corn has an unquestionable reputation for making fine jonnycakes ..." Prescott Farm in Middletown, Rhode Island, produces it commercially, as do Old Sturbridge Village and Plimouth Plantation in Massachusetts as well as other Colonial heritage museums in New England. Whitecap flint corn dates from the pre-European Indian population and was introduced to the Massachusetts Bay colonists in 1620, soon becoming the main food crop of the colonists. It thus offers heritage and agri-tourism as well as limited food value in a specialty niche.

A Word on Marine:

As befits the Ocean State and the distinguished reputation of the University of Rhode Island in oceanography and marine biology, much emphasis at URI is placed on significant aquacultural facilities and research as an extension of the university's involvement in local food, farms, and agriculture. There is, of course, a question as to how food production from the sea and aquatic environments - freshwater, estuarine, and marine - should be measured against the possibilities of the traditional university farms, especially since so much aquaculture is energy intensive. However, current Rhode Island food producing aquaculture is limited to less energy-intensive bivalves (clams and oysters, specifically) so work in those areas should be recognized as more sustainable. (Of course, most fisheries research is focused on hunting and gathering rather than on agriculture, per se.)

Some URI Agricultural Experiment Station funds go into aquaculture support (as also at UNH), mainly for the purchase of soybeans to replace animal protein in fish diets and thus reduce costs. Additionally, the marine aquaculture project contributes nutrient to the compost supply for the farms. This is achieved through the necessary drying of cages covered with built-up underwater marine organisms. The organisms fall off when they dry, yielding valuable compost. However, there is little, if any, conscious integration of aquaculture and agriculture for mutual benefit. And aquaculture in general, which is very energy intensive, has not had good energy audits performed, raising questions as to where it might fit in a sustainable agriculture program. Those questions may not be appropriate in the context of this investigation which focuses on agriculture, but they deserve attention in future work.

A Valuable Collaboration:

The historical usage of New England land grant university farms bears many similarities from one land grant to another, as these farms have served the agricultural research missions of their states and universities. Their geographical diversity, however, is more marked, and this may be especially true in terms of their future potential. Each has its own set of advantages and disadvantages, assets and liabilities.

URI's university farms, and especially URI's agricultural research, teaching, and extension/demonstration programs, can benefit uniquely from a distinct advantage in URI's own backyard: Casey Farm at Saunderstown and, just across the water on Jamestown Island, Watson Farm. These unique farms are properties of the distinguished Boston-based historical preser-

vation society known today as Historic New England. As its name indicates, Historic New England's work centers on the preservation of historic structures throughout New England. It is unusual for this or similar organizations to hold responsibility for historic but working farms. What is more, these are farms committed to production agriculture through highly sustainable ecological practices. The best of sustainable agriculture practice may be seen on these farms. These two Rhode Island farms are leading with the agricultural practices of tomorrow, practices of sustainability that include intensive rotational grazing of livestock and small-scale integrated plant-animal agriculture at Watson Farm, as well as Community Supported Agriculture (CSA) and farmers market sales of mixed vegetable and animal products at Casey Farm. Both farms have significant investment in important and efficient heirloom varieties of plants and heritage breeds of animals. Both of these farms have strong educational missions, as does URI, and both have much to teach and demonstrate for the people of Rhode Island. These two Rhode Island farms have been able to model such methods and, given their location just minutes away from URI, the farms can potentially support significant research, teaching, and demonstration in sustainable agriculture, research, teaching and demonstration in sustainable agriculture that cannot at present be as readily carried out at the university farms.

Conclusion:

Given Rhode Island's diminutive geographical size, its urban-industrial and suburban nature, and the decline in agriculture and food production which it has experienced in the 20th century, little is expected from "Little Rhody". Residents of larger states often assume that little can come from their smaller brethren. How surprising to learn otherwise from a state which, as its farmers markets and CSAs indicate, as its embrace of local food and farming demonstrates, is marching headlong into a new age of agricultural renaissance and has lessons to teach to the larger and more rural New England states. In an era where small is increasingly beautiful, Rhode Island, which has been operating at a small scale from necessity for a very long time, may be today better positioned for leadership than we might imagine.

"Whatever can be done to render agricultural labor more interesting, attractive and remunerative, and thus stay the tide of emigration from the soil, will be an essential service to the state."

Excerpted from a Rhode Island Joint Legislative Committee, 1868, determining the location of Rhode Island's new land grant college of agriculture, quoted in Herman F. Eschenbacher, *The University of Rhode Island* (New York: Appleton-Century-Crofts, 1967)

This sentiment was expressed to slow the tide of emigration from New England farms. Today's challenge is to feed the people here and now off the remaining agricultural soils.

Casey and Watson

Casey and Watson Farms are only 8 minutes and 15 minutes, respectively, from the URI Campus – this means that a valuable intensive relationship for faculty and students is possible.

Casey and Watson Farms are hotbeds of state-of-the-art, cutting edge, progressive thinking in sustainable agriculture, far more than URI could become on its own campus and on its own farms at this time. Sustainable practices include small-scale modern technologies like increasingly sophisticated season extension for vegetables and light-weight New Zealand electric fencing for management-intensive grazing.

Casey and Watson Farms are icons of historical sustainability and New England frugality for over two centuries – there are tremendous lessons to be learned here, not the least that sustainability is nothing new.



A Sign of the Times

A new image is appearing in New England farmers markets. One increasingly sees small-scale farmer-vendors with small quantities of produce for sale, but mixed with potted plants, bread and other baked goods, sewn goods and alteration services, the spinning and selling of wool, and even, at the morning markets, artisanal breakfast food such as cream cheese-filled French toast! This great diversity of small-scale production is undoubtedly a sign of these trying economic times.



Given new energy and economic realities, local trumps distant – in every aspect of life.

CHAPTER TEN: Connecticut and UConn University Farms

Connecticut, among the wealthiest of states but with serious pockets of poverty and rising hunger, shares with Rhode Island the benefit of the mildest climate and longest growing season in the region. And the substantial infrastructure present at UConn is a reflection of the state's wealth and willingness to tax to provide services. Connecticut, so near to New York, also shares in the fast-growing market demand from the New York metropolitan area for fresh local food. The University of Connecticut and its farms are located in a still rural region in a largely suburban state accessible to large nearby markets.

The University of Connecticut is likely the most well-endowed and the most capital-invested of the six land grant colleges of agriculture in New England. UConn has substantial farmland assets and infrastructure very close to the main campus. Because of this, it is perhaps the New England land grant with the highest immediate potential to bring about an agricultural renaissance in the region, provided it marries this fortunate capital endowment to a goal of true agricultural sustainability.

In 2006, UConn produced a Comprehensive Land Use Task Force Report detailing the university farms, each of which is under the jurisdiction of the Department of Plant Science, Animal Science, or Pathobiology/Veterinary Sciences. Additionally, there are five forestry tracts near campus totaling 1,140 acres, collectively referred to as the University of Connecticut Forest and administered by the UConn Department of Natural Resources, Management and Engineering. The specificity of this Land Use Report indicates the sophisticated level of inventory analysis UConn has applied to its university farms.

Plant Science Farms:

The Department of Plant Science farms constitute five distinct areas all within four miles of the campus. Their acreage totals 208, with 61% tilled field and pasture and 39% wooded. The Plant Science Research and Education Facility contains 153 acres including three buildings serving research, teaching and extension, as well as the oldest continuously operating National Weather Service Cooperative Weather Station in Connecticut (since 1888).

The Hicks-Burr Nursery is a 5-acre teaching nursery, one of only a few teaching nurseries in the country associated with a university.

In the area is a six-acre certified Landscape Technician Testing Site and a ten-acre Plant Science Conifer Collection, the latter being an unusual germ plasm source and study area for dwarf conifers, the largest witches broom collection of dwarf conifers in America. There is also a 33.5-acre Plant Science Orchard, formerly used for Integrated Pest Management (IPM) apple research and still used for supplemental corn silage production for university livestock.

Research and Extension efforts are currently supported by these farms in the areas of turfgrass pathology, ornamental horticulture, and constructed soils. Topics of instruction include ecology, entomology, floriculture, forages, soils, sustainable agriculture, vegetables, weed ecology and control, and woody and herbaceous ornamentals.

There is also a 40-acre Plant Science Pomology Research Facility in nearby Spring Hill and the 90-acre Lee vegetable farm in North Coventry, both under-utilized and largely non-operational. Additionally, there is a greenhouse range consisting of three greenhouses and encompassing another three acres of land used for flower and turfgrass field trials.

Over time these farms have served the original departmental programs of Agronomy and Horticulture with major strengths in crop production and pomology. Conversion to ornamental horticulture, soil science, landscape design and architecture, and

Often, academics lack currency in the larger society because they don't get out into society or invite society in. The connection between academics and citizen scientists needs to be strengthened.

plant breeding followed in conjunction with the broader direction of the state and region. Integrated pest management and turfgrass science are later additions, replacing agronomy and much of pomology. As elsewhere, plant nutrition, traditional plant breeding and variety testing, and crop and pasture management have given way to molecular plant biology and biotechnology.

Animal Science Farms:

The farms of the Departments of Animal Science and of Farm Services are treated as one unit.

The Campus Farm, as it is called, is on the main campus. It is managed by both departments and is composed of seven units: Ash Farm, Mick Farm, Mansfield Supply, Cemetery, Kes-sels, Horsebarn Hill, Valentine Meadow, and various permanent pastures and paddocks totaling 224.7 acres. Campus Farm includes 30% permanent pasture, 33.5% hay and pasture land, and 36.5% tillable land. It also contains trails, wetlands, and streams in an area of high recreational value. The farm with its seven units supports dairy cattle, beef cattle, sheep and horses through forage production, nutrient management, and pasture grazing. The Campus Farm also features a poultry unit, a dairy center, a cattle resource unit, general livestock units, and horse stables supporting the teaching of 36 undergraduate courses that require dairy cattle, pigs, sheep, beef cattle, horses, and poultry. Horses, sheep, and beef cattle are all pastured on this farm. UConn reports increased student enrollments in courses requiring the use of these animals and their lands.

Spring Manor Farm, very close to campus, comprises 221 acres made up of three units: Pink Ravine, Depot, and the Spring Manor Farm. It is composed of 49% tillable land, 31% permanent pasture, 13.5% hay/pasture, and 6.5% forest. Horses are grazed at Pink Ravine for the equine program, while a variety of livestock are grazed, forage produced, and nutrient managed at the Depot and Spring Manor areas. Over 40 courses are supported by pasture and forage grown on this land.

Lee Farm is the farthest from campus, at six miles. A former university vegetable farm, it is today 86 acres, of which 26% is tillable and 74% is in forest. It features forage production and nutrient management as well as some forestry and air quality research.

Additionally, UConn has animal disease and veterinary medicine programs necessitating additional farmland at Spring Hill Farm, a 45-acre farm with six buildings. The buildings focus on large animal disease research (swine and cattle as well as poultry) while the land produces forage crops and provides for some pasturing.

UConn also maintains County Extension Centers and 4-H Camps throughout the state. These total an additional 732 acres, including the 120-acre Auer Farm devoted to agricultural education in Bloomfield.

The animal farms are supplemented by relatively substantial animal science infrastructure, in addition to an on-farm teaching and lab building containing the famous UConn Dairy Bar, still a significant purveyor of UConn agricultural products, including ice cream, cheese, eggs and other products. There are more than usually well developed and well equipped meat science and food products labs; equine facilities; a livestock show arena; and a well equipped dairy center with a herd of 100 milking Holsteins and Jerseys (including a dairy cow surgical unit and recovery room, classrooms, and even on-site dorm rooms for dairy students). There is also a cattle resource unit; a livestock unit for 60 beef cows, 80 sheep and 100 pigs; a poultry unit for 3000 chickens; a new poultry resource unit (2005) for breeding and genetics; an agricultural biotechnology laboratory; and a computer laboratory reserved for agriculture. This assortment is by far the highest level of infra-structural development, as well as the most diversified, to be found at any of the New England land grants.

Elements of University Farms

Three part mission: teaching, research, extension

Student-run sub-farm

Food production for campus

Energy research and production for on-farm energy needs

Experimental demonstration farm (sustainability or self-sufficiency farm model)

Private lawns, front and back yards, lands around schools and churches and public buildings, can all be used for food production.

UConn also sells sizable quantities of livestock, wool blankets from the sheep herd (the “Connecticut Blanket”), and the aforementioned retail food products. Finally, the university monitors its on-farm inventory with an exceptionally detailed degree of record keeping that meticulously tracks its resources and its management practices.

UConn’s Plant Science Farms: Analysis and Commentary

An analysis of UConn’s Plant Science Farms would show:

A growing focus on energy production on the farms, with willow and switchgrass plots now being established for biofuels. As well, a growing focus on poplar and a biotech effort (Agri-Vita -GMO) focused on corn stover (the residue left in the field after corn harvest) for biofuel (and corn itself for fuel). A special emphasis is being placed on fast-growing willows as an energy crop, particularly because they can be grown on contaminated ground that can’t produce food crops.

A growing student interest in the ROOTS program, which supports on-campus production of vegetables for farmers markets, for the dining halls (which are independent rather than contracted out for food service). In addition, a growing student interest among UConn’s 18,000 students to learn more about fruit and vegetable production in an environment which is losing university farmland to turf and landscape horticulture, and losing fruit and vegetable staff as well.

A growing recognition of new opportunities for niche crops such as black currant production (in which Connecticut is first in the nation in production of this nutritious food crop), a chance for research on invasive species, and a demise of interest in genetic engineering (GE) research plots in aspen, wheatgrass, and tobacco.

An eclipse of turf over fruit and vegetable work on these farms, even though turf work is highly energy-intensive and vulnerable to energy price and shortage concerns, with golf course turf work being particularly high on energy and labor input. Such a conversion from fruit and vegetables to turf is not in any way indicative of sustainability. The 40-acre former orchard, which produced apples, pears, grapes, blueberries, blackberries, and some vegetables for research and teaching, has given way to a turf and landscape horticulture farm, forcing us to ask the question, what will our real needs for sustainability require of us in the future? Likewise, a former active forage-producing acreage for livestock feed now has a turfgrass focus. UConn is now conducting “precision fertilization” on turf in order to save on fertilizer costs, an acknowledgement of the cost-burden of turf when it comes to energy.

UConn’s Animal Science Farms: Analysis and Commentary

An overall picture of UConn’s Animal Science Farms would show:

- A growing interest in grazing, including horses, beef cattle (Angus and Hereford breeds), dairy cattle (Holsteins and Jerseys), and sheep (Southdowns for merino wool for the Connecticut Woolgrowers Association), although the sheep are not yet intensively rotationally grazed. Poultry (Leghorn chickens) are not yet involved in the grazing program, although they are cage-free and dependent on forage (mostly corn). There has been no predator control and few predator problems.
- Considerable animal variety on the farms, providing real potential for a program in multispecies rotational grazing, both simultaneous and consecutive. Beef cattle, dairy cattle, chickens, pigs, horses (two separate herds), and sheep add up to much more variety than is to be found at any of the other New England land grants. Like UNH’s new Organic

A Niche for the Affluent

There will always be some affluent people who will sustain some ornamental horticulture, turf grass and equine activity. There will always be a niche for these things no matter what the economy.

Food, which before had been taken as a matter of course, is in reality the foundation of all life, all knowledge, all progress.

Dairy, the UConn beef cattle barns are now using bedded pack systems, a step toward ecological management and sustainability, a new technique for New England land grants.

- Heavier than usual emphasis on horses, both for show and to sustain the UConn polo team. Two separate university horse herds remind one of the two separate dairy cow herds at UNH, suggesting an exceptionally serious intent. There are no draft horses in the mix and no ongoing work on work horses, although UConn would be a natural location for such research and teaching.
- A particular concern over the lack of competence and understanding of animal welfare accreditors (AAALAC) when it comes to farm animals, a concern certainly present elsewhere in the Northeast land grant colleges but not always expressed.

Conclusion:

A number of opportunities present themselves at UConn farms.

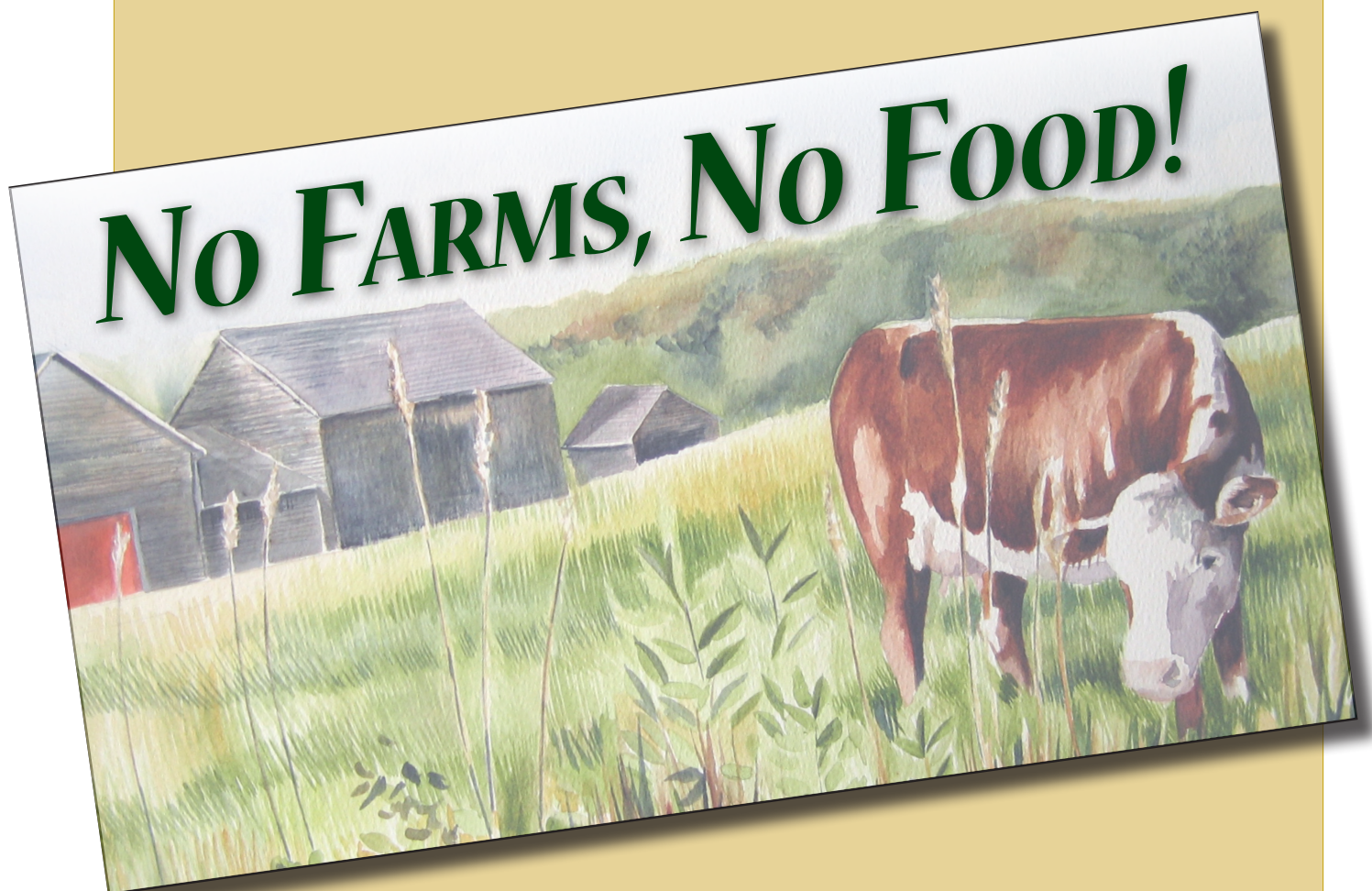
In the area of plant sciences, focus on turf grass and ornamental horticulture has reduced emphasis on vegetables, fruit, and forage. This is in spite of much student interest in fruits and vegetables; in spite of promising market opportunities through campus dining halls for those fruits and vegetables (and the fact that UConn's dining halls are independent and not contracted out, thus being free to purchase the food); and in spite of the inherent energy intensity, lack of sustainability, and changing economic circumstances associated with continued emphasis on turf and ornamental horticulture. The future in turf and ornamental horticulture appears to be somewhat limited while the demand for edible local food is growing. And growing student interest in fruits and vegetables should be nurtured, in addition to serving the local food industry for Connecticut consumption. Present circumstances also point to a resurrection of pomology and of fruit studies in general. Such studies can serve to support Connecticut's numerous heirloom apple varieties while boosting the state's unique-in-New-England role for peach and pear production. Black currants (a possible new industry), blackberries, blueberries, and grapes could all be expanded. A further example of an opportunity seized is the effort of UConn farms in biofuels energy production through the growth of willow, poplar, and switchgrass, either now in production or scheduled for start-up.

In the area of animal sciences, grazing interest is reasonably strong with rising interest in management intensive grazing that could expand to sheep. UConn's diversity of farm animals, unusual for the New England land grants, suggests strong potential for multispecies grazing research, either simultaneously or in tandem. In following the advice of John Seymour, as described elsewhere in this volume, UConn has an excellent prospect at its on-campus Jacobson Barn to provide leadership in establishing a small model sustainable farm or sustainable small-holding right on campus and very visible to the whole campus community. And UConn's preeminence in horses speaks to future work on an important element of sustainable agriculture, draft horses, for which the Editors of *Draft Horse Journal* can recommend areas of needed research. Work on cage-free poultry and research on bedded pack barns for beef cows, and hopefully for dairy cows in the future, are clear evidence of movement toward farm sustainability at this very well endowed New England agriculture college. With greater resources at its command, UConn stands somewhat apart from its New England land grant neighbors and could make a name for itself in service to New England food security and sufficiency, if it chose to do so.

Most New England land grant universities have equine programs with major focus on show horses and some growing focus on therapeutic riding (and UConn features polo as a sport). None of the schools actively engages in research or teaching focused on horses as beasts of burden, specifically draft horses for logging or agriculture, or horses for transportation (though UMass does lean toward the Hanoverian breed, which are work horses). In 1920 the Amish in the United States, given a choice between the internal combustion engine and the horse, made their decision and established a culture and society based on horses – for both farming and transportation. Does this suggest anything for us in an energy-constricted world? Do horses have a role to play in sustainable agriculture or in a post-petroleum era?

We must increase the capacity to produce local food as quickly as possible.

As the bumper sticker says,



"If we really want to heal the land, atmosphere, and our bodies on a massive scale – not to mention getting the petroleum out of agriculture – the fastest way to accomplish that is to increase demand for 100% grass-finished beef and milk in this country."

Joel Salatin, 2007 (Everything I Want to Do is Illegal)





Local farming's most important contribution is security.

CONCLUSION:

The Food Renaissance in New England Has Begun

“Coulda Done, Shoulda Done, Mighta Done, but Didn’t Do”, as oil analyst Matthew Simmons says. This phrase carries with it a clear note of regret. It reflects the regret our society may well face over its lack of planning or preparation for the realities, economic and otherwise, of a post-petroleum world. We are not prepared. By our refusal to choose, we considerably narrow our choices. A relatively soft landing thus becomes, of necessity, a harder landing. In lacking the will to change, we permit change, perhaps harsh change, to force itself upon us. Some have had the will, and they will be among the better prepared. Most have lacked the will, and will be significantly less prepared. As petroleum (that is, cheap oil) becomes less and less available, all aspects of our daily lives will, of necessity, change. The post-petroleum world will be a very different world, indeed.

Honoring Yankee Frugality

New England has long been proud of its Yankee frugality. In these times of economic challenge on every front, this may be time to resurrect Yankee frugality, to apply Yankee wisdom to scarce resources. We may choose to look beyond New England for some inspiration. I suggest two recent winners of the Nobel Peace Prize as a possible source of that inspiration: forester, land conservationist, and tree planter Wangari Maathai of Kenya, educated in Kansas; and economist of micro-enterprise Mohammed Yunus of Bangladesh, educated in Tennessee. These leaders’ efforts resonate with environmental work that has taken and is taking place in the U.S. Wangari Maathai and her organization have inspired people around the world to choose independence and a better life by taking organized action to plant trees. This is not unlike earlier heroic efforts in New Hampshire, Vermont, and Maine to restore the great forests of northern New England. And Mohammed Yunus’ impact in helping people organize to conduct micro-credit to make possible small-scale independent and local farming has been felt for a quarter century in Connecticut and western Massachusetts where the late Chuck Matthei pioneered Equity Trust, and additionally Vermont National Bank’s efforts in the Socially Responsible Banking (SRB) program of today’s Chittenden Bank. Smaller efforts have been launched by John Piotti’s Coastal Enterprise organization and others in Maine.

These Nobel Laureates, citizens of Kenya and Bangladesh, are reminding New Englanders of their roots, of the philosophy and practice that has enabled New Englanders to endure challenges and survive on the land for nearly four centuries. New Englanders working together in developing farmers markets, CSAs, and new local economies with, as James Howard Kunstler has wisely predicted, agriculture and food at the very center, will enable not only survival but a healthy quality of life for ourselves and succeeding generations. Maathai and Yunus, who both embraced American values of independence at formative stages in their lives, are among those who can show us the way.

Relocalization

Relocalization is the order of the day. Drawing our necessities (and much else) from as nearby as possible will be necessary, as distance will be money in the new economic and energy order. The greater the distance, the greater the cost to move either goods or people. A contracting economy will yield a contracting society. The effect of this contraction will result in less human mobility (and, indeed, in lesser speed, in recognition of the laws of physics). And the effect of contraction will particularly impact goods which are heavy, bulky, or capable of spoilage, including food, and especially perishable food in need of either freezing or refrigeration. Hence, the impact of new energy and economic realities on agriculture and the food system will be especially profound. This circumstance all but dictates substantial increase in local food production, whether from small farms, cropland and pasture, or from food-producing gardens in every local place. Circumstance will dictate need for a highly decentralized system of food production, the very opposite of what we’ve practiced for well over half a century.

Environmental Ignorance

Indicative of the low level of environmental understanding at which we find ourselves as we enter the post-carbon era of peaking oil and necessary reduction in carbon emissions, is the recent news story, which we are expected to take seriously, that a large bottled water company in Maine is “going green”, the advertising announced, because it’s adopting a B-5 biodiesel fuel policy for its delivery trucks. Five percent biodiesel is minuscule and hardly worth recognition. Far more important is the blind acceptance of selling water (with its huge profit margin), transporting this heavy commodity long distances from its source (often overseas), and wasting enormous quantities of energy to do so. For this company and other retailers to become “green,” they would have to cease. To think that such advertising could be successful (and it likely is) is a sign of our ignorance and/or our unwillingness to believe what must be done.

By way of its impact through employment and jobs, business and commerce, the new energy and economic reality is already giving us two resources previously in scarce supply: time and space. The loss of full-time employment without job replacement opportunity, the reduction of full-time employment to part-time employment (creating under-employment), and the periodic “furloughing” of workers for various periods have yielded increased time for many Americans. (As of November, 2009, the U.S. government claimed that unemployment and under-employment combined was at nearly 18%. Some believe the figure could be as high as 22%.) Time created by these various realities can lead to opportunity for work in local food production, processing, and distribution, and, in turn, the fulfillment of community necessities. A world where labor is cheap and capital (i.e., energy) is expensive is a very different world, a world not seen, perhaps, in a hundred years. But our forbears knew this kind of world, and it appears that we may come to know it as well.

The other unexpected resource is space, particularly built space, a result in part of our long period of over-building. This space is both residential (vacated and foreclosed homes and unsold housing stock) and commercial (from individual unrentable downtown storefronts to empty big box stores to whole malls). Some of the built space will likely be stripped for salvage and then demolished.

But some of it will find new uses. One of the more imaginative ideas is for year-round farmers markets, as well as other food distribution and even food processing purposes. Thus, the local food/local farming movement, with its values of nutrition, fresh food, community, land preservation combined with its ability to keep money in the local economy and create local jobs, will provide an answer to the question of how to use surplus space. For without at least some decent amount of local food, we cannot, in New England or in any other region, achieve food sufficiency nor food security. Yes, this book is about making choices. But it is also about yielding to the requirements of necessity. All of us across the New England region will need to pull together to fulfill the renaissance of food and farming which has begun in our midst. We will need to do so for purposes of health (of the land, the soil, the plants, the animals, and ourselves), and also because realities are beginning to dictate that, indeed, we must do these things – our choice in the matter is limited.

“Everything else is going down”

In conversation about the present state of the local and national economy, a Rhode Island farmer was heard discussing the incredible boom in the sales of locally grown food. He noted that, aside from the terrific growth in demand for local food from local farms, “Everything else is going down.” Those concerned about economic growth and economic development take note: Local food and farming is the new economic development. The State of Rhode Island Agriculture Division Chief says that small farms and farmers markets are the “shining star of the economy.” Most else today is failing. “We must shorten the distance between the farm gate and the dinner plate.” This statement is now more than merely part of a local food movement buzz – it has become a necessity in the local economy.

Serious efforts are now being made to assess New England’s local food insecurity and to determine how that insecurity might be addressed. Brian Donahue, Professor of American and Environmental Studies at Brandeis and author of *Reclaiming the Commons: Community Farms and Forests in New England*, makes the sensible point that fifteen million New Englanders will not be able to fully feed themselves from New England lands and waters. While the word “sufficiency” as used in this volume may imply full self-sufficiency to some, that is not its meaning and that is not the question. The question is how far can we go in feeding ourselves. Today’s mere 5% in New Hampshire, 10% in Massachusetts, and perhaps 20% in Vermont and Maine can most certainly be significantly increased, but by how much? Can we double or even triple our local production? Perhaps even do better?

Donahue rightly states that we must determine which food products to raise here, based partly on knowledge of what we were growing a century ago when we were already urban and industrial. Cheryl Wixson is doing research on food sufficiency in Maine for MOFGA, looking at the top twenty Maine foods which would have the greatest chance of success if produced in much greater quantity in-state for Maine palates. Donahue notes that our food production peaked just after 1900 when farmland was already in decline and the forest returning. He remarks that the “sensible regional food system was destroyed by the 20th-century rise of cheap oil” and that “Industrial agriculture brings not only grain and meat but milk, fruits and vegetables from distant feedlots and fields, by methods that are at best unpalatable” (and, I might add, always dependent on unlimited cheap oil). Pursuing a post-oil future, Donahue is inspired by what we are now doing in the local food/local farms movement but wonders about animal products and grain. He sees the New England future as dependent on grass farming and a return to pasture grazing. He writes “We can produce all our own milk, butter and cheese in New England again, sustainably, with only a modest reduction in forest – if we can master productive intensive rotational grazing.” I would add food dependence on our near agricultural neighbors, New York, Pennsylvania, and the neighboring Canadian provinces, to insure a greater degree of regionally local supply so as to avoid dependence on places more distant. Donahue further argues that “it makes good sense to import grain, along with vegetable oil, and the bulk of our meat,” for “Grain ships at very low cost, so we don’t need to grow much here. Given our large urban population and limited acreage, sustainable farming and eating in New England will always require sustainable farming in the Midwest.” This certainly takes some pressure off New England, but it is good to know we do have a prospect in our region for some specialized grain production, for artisanal bread and other baked goods, for micro-brewed beer, and even for some animal feed. Needed research continues in this area.

A Tale of Two Hardwicks

There are two towns named Hardwick in New England that are each developing as seats of an agricultural revolution. I refer to the Hardwicks of Massachusetts and Vermont. Hardwick, Massachusetts, was settled in 1737. Hardwick, Vermont, was named for Hardwick, Massachusetts, and settled in 1780. Today, the two Hardwicks are the seat of revolution in the renaissance of agriculture and local food now sweeping New England.

Hardwick, Massachusetts, is an important center for grass farming, specifically management intensive grazing of beef cattle, particularly Devons which are a quintessential New England breed, probably the most efficient breed of cow in all the region. Producing quality grass-fed beef on very little energy input, and only minimal veterinary service, Devons are being bred in Hardwick. Thanks to the diligent work of the energetic Ridge Shinn, champion of Devons,

Resisting the New

We must not resist the new. Too often we are engaged in resisting the new with respect to letting go of no longer appropriate ways of doing things such as confinement dairies, tie-stall barns, ruminant animals fed on grain, animal confinement, preventing animals from being what they are. We now know better.



What we need to insure food sufficiency in New England is “right to farm” policy implementation which removes or significantly reduces obstacles to local food production and a healthy local food economy. Right to farm includes the right to feed one’s own community and the right to be fed by one’s own community. That being said, the road map to how we live locally will be worked out through actions, not ideas. Ideas and policy principles will follow actions.



“My vision of a low cost grazing system puts the cows on grass in mid or late April, and carries on until Christmas or beyond, depending on snow cover and forage species available to be grazed. Through the winter, bale grazing can keep costs low by minimizing bedding and manure spreading costs. It is possible to overwinter a cow for under \$200 per head.”

John Duynisveld, “Pasturing in Tough Times: Tips for Getting the Most from Your Grazing Season (Atlantic Beef, Vol. 19, No. 2, Summer, 2008, p.21.

If the Nova Scotians and New Brunswickers can do it, surely we New Englanders can! Extending the grazing season is the easiest way to get bang for your buck in pasture management.



A basic lesson in sustainable agriculture: One size does not fit all. Local circumstances - ecological, geographical, social - rule.

this breed will soon be flowing from Hardwick across the region. Potential for protein production for New Englanders' diet is enormous, since Devons convert New England grazing soils and our great cool season pasture grasses into meat protein in the harsh New England climate and on the stony New England slopes.

In the more northerly and younger Hardwick, that of Vermont, one finds the extraordinary Center for an Agricultural Economy, an impressive integration and collaboration of food and farming which paints a picture of what New England will need in order to insure a food secure future. Recognized and respected by both the University of Vermont and the State of Vermont, the action that the entrepreneurial folks of Hardwick have taken provides a strong model for others, fulfilling a mission of engaging agricultural leaders in the emerging 21st-century food system. This system will need to build capacity and inspire the public to support and implement that new system. In little Hardwick, this involves the integration of community gardens, multiple farms, an eco-industrial park, a seed company, a large composting project, several investment firms channeling local investment in land and infrastructure, a soy processing plant, a natural coatings (varnish) plant, and an award-winning restaurant and café. The key word is integration: each of these entities operates in support of the others.

The Center's vision "supports the desire of rural communities to rebuild that economic and ecological health through strong, secure and revitalized agricultural systems to meet both their own food needs locally as well as to determine and build the best opportunities for value-added agricultural exports." The Center has signed a Joint Memorandum of Understanding with UVM for research and education.

American author Bill McKibben gives us his impression of the Hardwick agricultural renaissance: "After spending a day in Hardwick, I feel a great burst of pleasure and possibility. Deep and transformative things are happening here. Hardwick has all the pieces of a healthy food system connected and ready to fall into place, and is as far ahead in sustainable agriculture as any place in the country."

The Center for an Agricultural Economy in and around Hardwick in the Northeast Kingdom of Vermont is an extraordinary non-profit organization of farmers, food processors, restaurateurs, investors, and business folk--entrepreneurs all--who have joined together in a common vision to develop a local regional food and agriculturally based economy. Initially, it was the vision of four or five investors well grounded in the agriculture of the area. Described as a 21st-century food system for Hardwick and surrounding communities, it is an attempt to encompass the entirety of the food system and to serve local needs while halting (or at least significantly slowing) the bleeding of wealth from the area. It is an attempt to focus capital investment into value added, insuring a good return on investment. Operating from good agricultural soils and a regional agrarian heritage (if a heritage somewhat reduced in the past few decades), it is a project which takes full advantage of modern technology to produce a food product all year round, well beyond the limitations of a short growing season. Defining a radius of twenty miles as its definition of local, executive director Monty Fischer (whom we proudly claim as a UNH Soils alum) also refers to the project as a "dating service," since it connects people, establishes networks, and has a serious commitment to the value of bringing people together, of building community. (And a few of the people it brought together in this rural Vermont area are now married to one another, hence Monty Fischer's description of the Center as a "dating service.")

Many readily transferable concepts and practices will apply in other parts of New England, as modified for each and every place. The challenge of the Center for an Agricultural Economy: can it become a model for the successful establishment of regional food hubs, hubs throughout Vermont and across the New England region?

Signs Today

A walk through UNH's university farms today reveals a noticeably different and more hopeful picture than was the case even two growing seasons ago. There is a sense that the underutilization and, in some cases, abandonment of land and facili-

"To continue to support policies, institutions, a way of farming and living that destroys land, communities and people, when we know it is wrong, is madness."

"There is nothing sustainable about the way we live, the way we work, the way we farm, or the way we treat the earth."

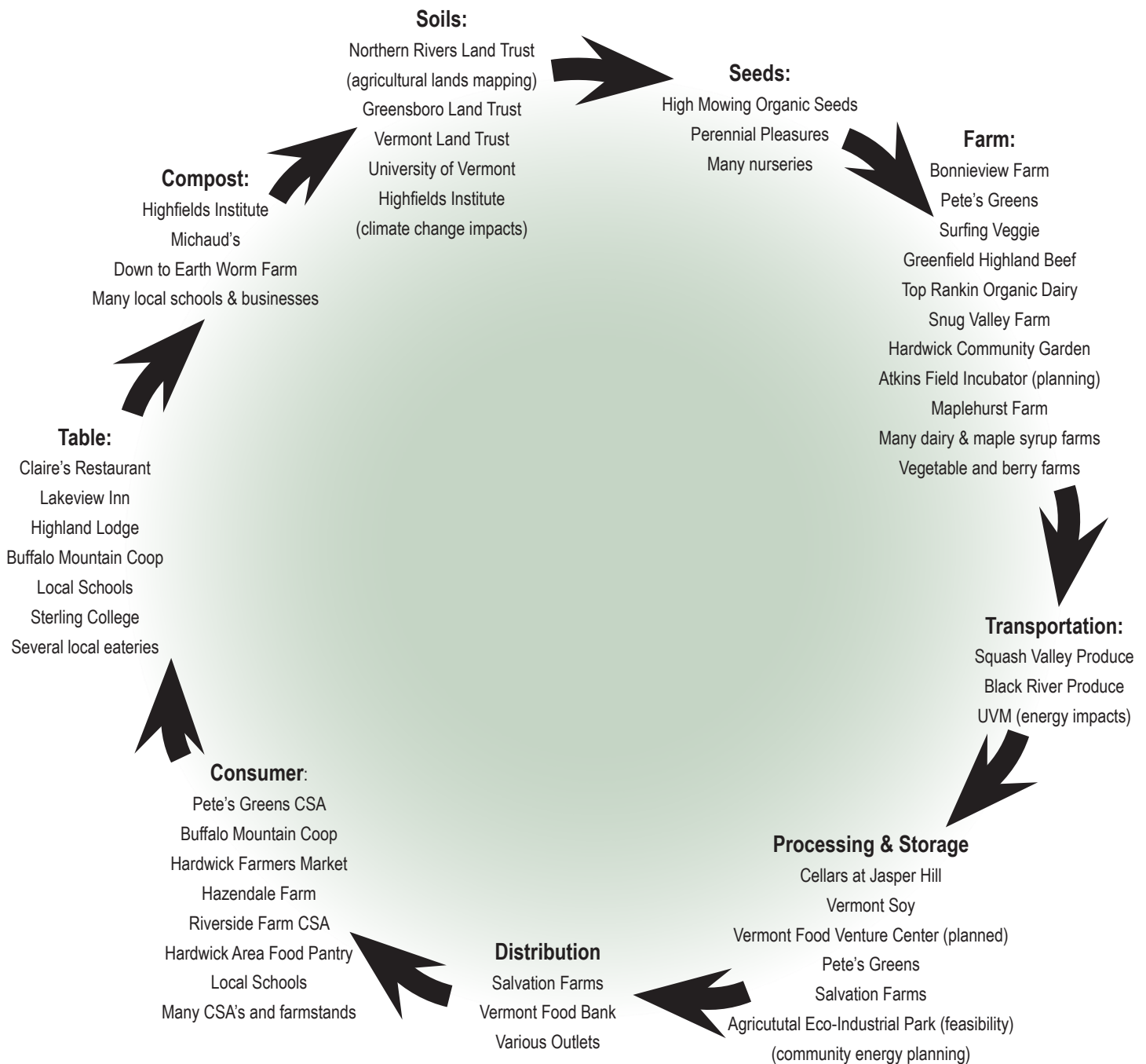
"We lack what Fred Kirschenmann calls 'a big hairy audacious idea'. And lacking a grand idea, we aggrandize the trivial. It's all about sustainability. For me, sustainability remains a vision worthy to serve, a big hairy audacious idea."

Prof. John Gerber

UMass Agriculture Faculty

HARDWICK AREA LOCAL FOOD HUB DIAGRAM

The Center for an Agricultural Economy in Hardwick and surrounding communities is a Vermont regional food hub whose purpose is to ensure that consumers have access to healthy, secure, and affordable locally-grown food, and farmers and agricultural entrepreneurs have reliable and efficient access to local and regional markets. The not-for-profit Center works to fill gaps identified in the regional food system and makes community connections so that food pantries, schools, restaurants, and social service agencies are able to count on a year-round supply of local food. The measurable outcomes of this food system include a stronger local economy, improved public health, retention of agricultural lands, and decreased fuel consumption.



ties visible as recently as just a few years back, has bottomed out. Signs of activity suggest that a new path to the future has been found. More and more diversified plots of land in production, season extension infrastructure (hoop houses, high tunnels, re-may covers) and even new animal care facilities, including a very impressive new barn at the Organic Dairy, suggests that a new direction into the future has been found. Much of this infrastructure has now been refurbished – there is, for instance, even new office and workspace on-site. And this, even or in spite of a decline in the national economy. This new approach is reflected today at the many other university farms across New England as well.

Likewise, statistics indicate the growth in numbers of new farms in places as developed as Rhode Island and southern New Hampshire, with on-farm and near-farm product sales booming. There is rapid growth in winter as well as summer farmers markets with winter farmers markets going in Seacoast New Hampshire from non-existent in 2007-2008 to every four weeks in 2008-2009, to every two weeks in 2009-2010, There is talk of every week in 2010-2011. The Winter Farmers Market in Pawtucket, Rhode Island records as many as 2000 customers on a typical Saturday morning. Similar Winter Markets in Dover, New Hampshire attract 1600 to 2300 in a single morning. That is remarkable growth, reflecting both substantial customer demand and ability of the farmers to provide. Not only are farmers seeing increased local demand for their product, so too are fishermen. They have been selling serious poundage of finfish, northern shrimp, and even lobsters. They are utilizing CSA and farmers market techniques, thus converting this important local food from the low-price commodity market to high-price direct sales. Town Agricultural Commissions are continuing to grow in number and, as well, spreading out from their native Massachusetts. And energy awareness, including the oil-food link, is rising, though not as rapidly as it might be. Finally, gardens - home, community, and school - are growing fast, as is home production of chickens and eggs. There is even growth in home production of other small livestock; pigs and goats are making their entre into the New England scene for the first time in a significant way for meat (and land-clearing) as well as for dairy product. Raw milk sales are also rising, to the economic fortune of some struggling dairies. Finally, the value-added message is finally taking hold, shoring up the local farm economy in an important way.

While we have a lot of choices to make and changes to embrace, progress has been and is being made. The food renaissance in New England has indeed begun.

The Maritimes

To achieve mutual benefit in local food sufficiency, it behooves Maritime Canadians and New Englanders to determine how they can best collaborate with one another. They need to identify how they might best supply one another with needed food product, including organic and grass-based product; how they might benefit from each other's market need; how they can supply needed infrastructure and services; and how they can best exchange ideas mutually.

Stop the Bleeding

In a time of negative growth, with unemployment and loss of wealth, we cannot afford to continue bleeding our wealth, our resources, and our jobs both overseas and out of area. And yet we do this every day in our food purchases, in our fuel purchases for vehicles, and in our energy purchases for home heating and electricity. Before we do anything else, we must stop the bleeding! The easiest and most direct ways relate to local production of food as much as possible; serious gardening, both personal and institutional; public transit, bicycles, walking, and generally traveling less; and weatherization of all buildings, residential and commercial.

Research Foundations

Scientific and behavioral research into waste reduction, of energy, food, and materials (which could also be called research into frugality), particularly in reducing food waste from its present 33% to a goal of perhaps 10%, and economic and behavioral research into getting the public to accept an increase in money expended on food from the present 9.5% of income to perhaps 18%-20% of income, are important foundations for all other research into sustainable agriculture.

There is a difference between learning how to farm and learning how to read labels on chemical containers. A successful local agriculture, organic or otherwise, grass-based or otherwise, requires the skill of knowing how to farm.



EPILOGUE

Letter from a New Hampshire Farmer, February 17, 2010

The following letter from a Barrington, New Hampshire farmer, addressed to the House Committee on Environment and Agriculture, New Hampshire House of Representatives, Concord, illustrates the spirit and fervor of the rising renaissance of agriculture in New Hampshire and New England:

“New Hampshire agriculture is alive and well. It is vibrant and exciting. It is profitable and rewarding. In the wake of this return to food, other beauties are revealing themselves. Community is abounding. Recently a first-time customer to a Seacoast Eat Local Winter Farmers’ Market wrote her gratitude in an email relating how she had walked around the booths three times and all she could see were smiles--smiles on the customers, smiles on the vendors. A dear friend of mine has come to refer to the markets as “going to church.” It is her community, her support, her passion. At the markets are endless possibilities for friendship and acquaintance. As timeless as the fall of empire is the resilience of community and the unifying nature of good food and honest work--the rebellious crunch of a parsnip in February, the appetizing aroma of a roasting duck with good organic potatoes, the velvety gulp of fresh milk from a farm just down the road.

“The return to food on a local scale is a return to good economy. It is money that goes from the New Hampshire locavore to Yellow House Farm for a heritage Ancona stewing fowl, who then spends it at New Roots Farm for heritage Berkshire sausage, who then crosses the aisle to buy some good shallots from Meadow’s Mirth Farm, who then slips down the row for a quart of Brown Swiss cream from Brookford Farm. Local food is tens of thousands of dollars swirling around the room with every intention of staying in New Hampshire--worked for from NH soil, earned at NH markets, spent among NH farmers. Local food is honest pricing for an honest product. Good, clean fair price is paid for good, clean, natural product. It is not sold by gimmick. There are no fake farm logos to mask the factory reality of production. Hundreds have become thousands. They come seeking honesty, and they leave feeling satisfied.

“They tell us the same feedback that we speak to each other at our after-market socials. We are amazed that the vast majority of our food comes from here, and the little that we do not grow comes from the local co-op--organic and with modest packaging--simple, healthful food. We pay more; we eat less. We are feeling better, more sound, more satisfied, less hungry, less craving.

“New Hampshire soil is worked with the hand, with the small tractor, with the draft animal. It is not monoculture. It is not agriculture of one, two, or three large farms in strong monopoly. Our topography will not allow it. We are a state of nooks and crannies, of valleys and hillsides, of mountains and marsh hay. Our future is a New Hampshire of small farms, many in a town, dozens in a county. Our markets are not dominated by the powerful few but peopled by the myriad. If this be so, then this is what we need:

1. We need a return to strong farming. I intend thereby not a system of simple producers of industrial hybrids on a local scale but of farmers who relearn the arts of breeding and selection. We need livestock and poultry farmers who breed their own purebred stock and who cooperate with fellow farmers for the establishment of productive lines particularly adapted to New Hampshire’s climate. I speak here for dairy, beef, chevon, pork, rabbit, mutton, chicken, duck, turkey, goose. We need purebred, and thus genetically stable, farm animals that are selected with each generation for disease resistance as is demanded by our particular climate and our particular disease potential. We must select for vigor and stamina that they might live well in the climate change that will be New Hampshire’s climate change, for all climate change will not be alike. New Hampshire in climate change will not be Iowa in climate change, and there will be no mistaking it. We need purebred farm animals that with each generation are more productive on the forage that New Hampshire has to offer. We need farm animals that like grass and lots of it. We need animals that can utilize forest forage and thrive.

2. We need produce farmers that relearn the art of selecting for seed. We need them to find crops that thrive here year after year from seed that is the signature and fruit of their farms that in twenty years speaks of twenty years of New Hampshire climate history. We need New Hampshire produce that is so outstandingly selected for New Hampshire's particular climate that it will grow and produce nowhere as well as it does here.
3. We need fruit in abundance that adapts well to heat and cold and wet. In so many ways, this resource we have already, we just need to plant more of it and tend it better, favor it and buy it.
4. We need the grain farmers who are, at the very time of this writing, striving to find that which is best suited to our needs, that which thrives on the parsimonious nature of New Hampshire soil and still brings forth bounty. We need barley and oats, buckwheat and rye, and the promise of a wheat that will be New Hampshire's wheat.
5. We need to reestablish or, perhaps, invent for the first time strong lines of communication and commitment between New Hampshire farmers, our New Hampshire Legislators, and the University of New Hampshire that is a Land Grant university.
6. We need a New Hampshire Department of Agriculture who recognizes New Hampshire farmers as the core of New Hampshire's food supply, who works closely with them and understands itself as existing to serve the needs of New Hampshire's farms, not a distant regulator planning behind closed doors, but a vibrant servant responding to the needs of those whose mission seeks to establish, safeguard, and promote New Hampshire's food supply.
7. We need to extend and deepen dialogue with New Hampshire locavores to help better understand their hopes and to help them better understand the nature of New Hampshire's food. We need eaters who see the natural beauty of a blemished apple and who do not succumb to the poisoned mask of the perfect fruit.
8. We need not to be contaminated from GMO drift that alters the work of the sustainability for which we labor. We need careful checks on the importation of plant material, that it does not spread blight and infect with the diseases that are the signature of another region, unnatural in our own. We need to be supremely cautious with plant importations that might harbor insect pests whose adaptability to our climate renders them plague.

"All of this is set to occur. We farmers are in constant communication. We work hard, and ask each other constantly about how we might add to the quality and stability of our work. Our customers are arriving from all sides of the state and their questions are ever more savvy, more informed. The tide that is beginning is marked by the nature of what is mainstream; it is not cliquish, it is not eccentric. Our farmers, like our customers, represent diverse beliefs and diverse political convictions. It never ceases to amaze me that the simple gift of clean, intentional, local food has helped us reach across the aisle more effectively than any catch-phrase or futuristic promise of blessing or woe--food, that which sustains our life."

"We are at the start of a mode that will, I am sure, become a wave of moves to solidify, strengthen, promote, and protect the delicate intricacy that is the resurgence of New Hampshire agriculture."

Joseph Marquette

Yellow House Farm

Barrington, New Hampshire

Appendix

Resources for Aspiring Farmers

Education, Training & Employment Opportunities
in Sustainable Agriculture



Sustainable Agriculture in Higher Education:

The USDA maintains a nationwide database of university-based educational and training opportunities in sustainable agriculture. Search the database at:

www.nal.usda.gov/afsic/pubs/edtr/EDTR2009.shtml

UNH Academic Programs

UNH College of Life Sciences and Agriculture (COLSA)

Undergraduate and graduate programs
www.colsa.unh.edu

UNH Thompson School of Applied Science

2-year degree programs in Applied Animal Science & Horticulture Technology
www.thompsonschooll.unh.edu

UNH Dual Major in EcoGastronomy

www.unh.edu/ecogastronomy



Farming Internships & Apprenticeships

ATTRA - Sustainable Farming Internships & Apprenticeships. A directory of on-the-job learning opportunities in sustainable and organic agriculture in the U.S. and Canada. <http://attra.ncat.org/attra-pub/internships/>

MOFGA Farm Apprenticeship Program connects people wanting to learn organic farming with experienced farmers willing to share their expertise. Opportunities are available on more than 80 farms throughout Maine. www.mofga.org/Programs/FarmApprenticeships/tabid/502/Default.aspx

NOFA-VT Apprentice & Willing Worker Program helps to connect farms and individuals interested in working on a farm. Search their online directory of work opportunities in Vermont. nofavt.org/programs/apprentice-willing-worker

Northeast Workers on Organic Farms (NEWOOF) is a regional farm apprenticeship placement service, sponsored by the New England Small Farm Institute. www.smallfarm.org/main/for_new_farmers/north_east_workers_on_organic_farms/

UNH Horticulture Internships. For information, contact cathy.neal@unh.edu

World Wide Opportunities on Organic Farms (WWOOF) is a network that links people who want to volunteer on organic farms with farmers who are looking for volunteer help. www.woof.org



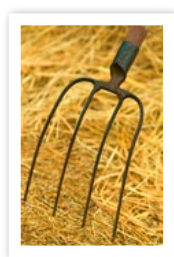
Other places to look for agricultural job announcements:

- **Backdoor Jobs**, www.backdoorjobs.com/farming.html
- **The Greenhorns Blog**, thegreenhorns.wordpress.com
- **NOFA Interstate Farmer to Farmer Exchange**, www.nofa.org/exchange
- **Northeast Farm & Food Network**, www.nefood.org Join the NEFOOD listserv!
- **Sustainable Food Jobs**, sustainablefoodjobs.wordpress.com/

www.sustainableunh.unh.edu
discoversustainability.org



Practical Farmer Training Programs



Angelic Organics Learning Center - Farming Training
(IL) www.learnrowconnect.org/farmer

Farm Life Ecology: A Summer Field and Table Intensive at Green Mountain College (VT)
www.greenmtn.edu/farm_intensive.aspx

The Farm School - Practical Farm Training Program at Maggie's Farm (Athol, MA) www.farmschool.org/prog_practicalfarm.html

MOFGA Journeyperson Farm Training Program (Unity, ME)
www.mofga.org/Programs/Journeypersons/tabid/228/Default.aspx

New Entry Sustainable Farming Project (Lowell, MA)
www.nesfp.org

Organic Growers School (NC) www.organicgrowersschool.org

UC Santa Cruz Apprenticeship in Ecological Horticulture (CA)
casfs.ucsc.edu/training/index.html

UVM Summer University at the Horticulture Farm and Farmward Bound: Preparation for Farm Operation Leadership (VT)
www.learn.uvm.edu/igs/food_systems

Resources for New Farmers

Great Bay Agricultural Resources Network (G-BARN)
gbarn.pbworks.com/

The Greenhorns Guide for Beginning Farmers www.thegreenhorns.net/reading.html

Land for Good
www.landforgood.org/

National Young Farmers Coalition
www.youngfarmers.org

New England Landlink
www.smallfarm.org/main/for_new_farmers/new_england_landlink/

New England Small Farm Institute
www.smallfarm.org

Young Farmers Conference at Stone Barns Center for Food & Agriculture (Pocantico Hills, NY)
www.stonebarnscenter.org

Additional Educational Resources for Farmers & Gardeners

NH	D Acres Organic Farm & Educational Homestead (Dorchester, NH)	www.dacres.org
NH	New England Vegetable and Fruit Conference (Manchester, NH)	www.newenglandvfc.org
NH	NH Department of Agriculture, Markets & Food	www.agriculture.nh.gov
NH	NH Farm & Forest Expo (Manchester, NH)	www.nhfarmandforestexpo.org
NH	NH Master Gardener Program	extension.unh.edu/agric/agmastgd.htm
NH	Northeast Organic Farming Association (NOFA)-NH	www.nofanh.org
NH	UNH Cooperative Extension	extension.unh.edu/events/
NH	UNH Food & Society Initiative, University Office of Sustainability	www.sustainableunh.unh.edu/fas
NH	Yellow House Farm Chicken School (Barrington, NH)	www.yellowhousefarmnh.com
MA	New Entry Sustainable Farming Project - Livestock Field Schools	nesfp.nutrition.tufts.edu/resources/
MA	NOFA Annual Summer Conference (Amherst, MA) <i>NOFA Chapters in each state also offer conferences & workshops</i>	www.nofa.org
ME	MOFGA Common Ground Fair (Unity, ME) MOFGA Farming Training Project Workshops (various ME locations)	www.mofga.org
VT	Fair Winds Farm Draft Horse Workshops (Brattleboro, VT)	www.fairwindsfarm.com



A review of

Pastures of Plenty: The Future of Food, Agriculture and Environmental Conservation in New England

by **John E. Carroll**

New Hampshire Agriculture Experiment Station Publication # 2340 (2008)

Illustrations and book design by Karen Busch Holman

Reviewed by Larry Lack

John Carroll's lively, optimistic, wide ranging and comprehensive look at the future of agriculture in northern New England (Maine, Massachusetts, New Hampshire and Vermont) makes a convincing case that this region, now largely dependent on food shipped in from far away, can--and soon will--produce much more of the food that is consumed here.

This colorful and attractive publication differs significantly in format from that of most USDA research reports. Clearly a labor of love, *Pastures of Plenty* draws its inspiration from a host of alternative food, agriculture and conservation writers and visionaries, perhaps most of all from Aldo Leopold, whose understanding of the importance of land and exposition of a "land ethic" helped launch what eventually evolved into the modern conservation and environmental movements.

Carroll's homage to Leopold, though, is just the starting point for this eclectic compendium.

The central focus of *Pastures of Plenty* is on the potential for a revival of grazing (specifically, intensive, rotational grazing on pasture) as the cornerstone of a new, more efficient, sustainable and productive agriculture for our region. But Carroll's book makes its case by presenting the ideas and actions of alternative food and agriculture advocates and reinterpreting them in the context of present day northern New England.

Included among those whose writings and programs Carroll cites and discusses are Joel Salatin, Fred Kirschenmann, Masanobo Fukuoka, Andre Voisin, Sir Albert Howard, Wes Jackson, Borealis Bread's Jim Amaral, New Hampshire's Trauger Groh (one of the founders of Community Supported Agriculture), Vermont's Bill Murphy ("It's a lot better to just let the livestock go to the feed and spread their manure themselves") and a score of other food and ag luminaries whose thoughts are skillfully blended in support of Carroll's thesis that northern New England is ideally situated, ripe and ready for the emergence of a new agriculture that is diverse, ethical, environmentally sound, local, mainly organic and marketed directly to a savvy new generation of eaters who increasingly care about how their food affects both them and their communities.

Pastures of Plenty includes useful background on the history of New England agriculture--how mixed farms and livestock grazing were replaced by industrial mono-cropping and confinement production of livestock--and includes chapters on grazing and grasses, the soils of northern New England, the key role Carroll sees for dairying in this part of the world, breeds of cattle and other animals suited to northern New England, direct marketing and "relationship agriculture", and the role land grant universities hopefully will play in encouraging the reorganization of agriculture and the revival of family farming in our region.

Strikingly illustrated with Karen Busch Holman's evocative and lively watercolors of farm scenes and animals, Carroll's text has the feeling of a heartfelt celebration of farming that, while obviously drawing much from conservation biology and the agri-sciences, is also fed by insights gleaned from literary and even musical sources including Wordsworth, Wendell Berry, Garrison Keillor, Beethoven (specifically his "Pastorale" Symphony) and Alan Jay Lerner's lyrics for a song by Kurt Weill.

In addition to the threads of alternative agriculture and food philosophy that Carroll weaves together from his wildly inclusive kaleidoscope of sources, *Pastures of Plenty* assembles and presents important new information about our region's soils. It includes five pages of detailed maps based on the soil studies of New Hampshire soil scientist Sidney Pilgrim and his colleagues in the Natural Resource Conservation Service. These maps, one of each of the four states of northern New England and one of the entire four state region, indicate by green shading which soils have "High Potential for Grassland Agriculture".

Nearly a quarter of New Hampshire's area is shaded green, indicating soils that have this potential, as is roughly half of Maine and, surprisingly, roughly half of Massachusetts as well. Vermont, where pastures and dairying still anchor a viable statewide family farm based economy, leads the region for soils that are suitable for pasture grass production: green shading covers fully 90 per cent of that state's area.

These impressive maps are supplemented by Sidney Pilgrim's notes on the identity and characteristics of the various grazing-appropriate soils found in various parts of the four northern New England states, after which Carroll points out that *Pastures of Plenty* presents "what is likely the first effort, at least in modern times, to map the (soils) of central and northern New England for the purpose of identifying...the best and highest potential grazing soils in the region."

Carroll shares some relevant information about himself, mentioning his New York City upbringing as the son of an accountant for the International Harvester Company. "It is truly ironic", he says, "that my own career and work is critical of the large scale industrial model of agriculture"—that system that the Farmall tractor (and the other products of his father's employer) made possible.

In his prologue Carroll mentions how a "prescient" 1979 New Hampshire study of food security, "*Who Will Feed New Hampshire's Residents Five, Ten, Fifteen Years From Now?*" gathered dust on university shelves through nearly thirty years of American consumer and academic apathy, a result, he says, of "cheap food, fueled by cheap energy (and) full supermarket shelves at the lowest food prices in the world."

There are some weaknesses, I think, in Dr. Carroll's thesis about the imminent renaissance of a pasture-based eco-agriculture. His approach in *Pastures of Plenty* is so inclusive and enthusiastic that sometimes he seems intent on including almost too many streams of evidence and support. A bit of editorial tweaking and a solid index of his varied sources might be able to corral his wide-ranging vision without reducing the impact of this book's important message.

Professor Carroll's optimism about the future of food and agriculture in our region is infectious and well justified in this unique report, and he can't be blamed if his most likely readers are likely to be those who already agree, or are predisposed to agree, with what he has to say. He may, however, want to consider a few questions. For one, it may be useful to ask whether his predictions about a future for farms and food that's focused on grazing and dairying may be challenged by current diet trends and a younger generation who are eating less meat and dairy and turning in substantial numbers to vegetarian and vegan fare.

And, perhaps more important, if, as Carroll believes, more young people will be drawn to more holistic, ethical and sustainable ways of farming, how will they get access to the land they'll need? As Carroll is no doubt aware, secure access to productive land can be a serious barrier to farm entry for young people who aren't lucky enough to inherit farmland from their folks.

Perhaps this question needs more answers before the prediction from urban planning critic James Howard Kunstler that appears at the close of *Pastures of Plenty* (and is repeated in large letters on its back cover) can come to full fruition. "Agriculture", Kunstler tells us, "is going to come back to the center of American life in a way that we couldn't imagine."

This caveat aside, *Pastures of Plenty* certainly gives readers many reasons for imagining the dimensions and encouraging the emergence of a new New England agriculture, one that can and--as this book helps us understand--*must* be planted on the sure foundations of our region's fertile soils and the productive farms and pastures these soils, if they are cared for carefully, can sustain.

-- L.L.



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**IT HAS BEEN SAID THAT NEW ENGLAND
SOIL WANTS TO BE APPLES.**