

Green Grass, Green Jobs

Increasing Livestock Production on
Underutilized Grasslands in NYS



Report and Recommendations
from the Cornell Small Farms Workteam
on Grasslands Utilization

Edited by Daniel Welch, CCE Cayuga Cty

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Work Team Members

- Dr. Michael Baker, Cornell University Department of Animal Science
- Fay Benson, Cornell Cooperative Extension, Cortland County
- Chuck Blood, Farmer
- Mike Dennis, Agri-business and Farmer
- Joanna Green, Cornell Small Farms Program
- Fred Griffen, Farmer
- Jim Grace, Cornell Cooperative Extension, Steuben, Chemung, Schuyler
- Chris Harmon, Center for Agricultural Development and Entrepreneurship
- Karen Hoffman, USDA Natural Resources Conservation Service
- Ken Jaffe, Farmer
- John C. Kiechle, Farmer
- Chanda Lindsay, USDA Natural Resources Conservation Service
- Dr. Michael Thonney, Cornell University Department of Animal Science
- Dan Welch, Cornell Cooperative Extension, Cayuga County

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Executive Summary

There are over 3 million acres of grasslands in New York State that are not currently being used for agricultural production. This presents an opportunity for the state to encourage economic development on these lands that will lead to job creation, enhance regional and local food security, and contribute to sustainable agriculture enterprises. Beef and dairy cattle farms return \$2.40 of every \$1.00 in sales to their local communities in purchases, taxes, and payroll. In addition, promoting agriculture as a viable use for grasslands reduces development pressure and lessens the impact residential development can have on communities.

While there are several alternative options for utilizing grasslands, livestock production is the focus of this report. There is the opportunity to integrate management intensive grazing into at least some portion of any livestock production system. A wide range of livestock operations can be supported on under-utilized grasslands in New York. Some of the potential livestock enterprises could include niche and conventional beef production and marketing, dairy cattle, sheep, goats, and exotic species. Other opportunities for grasslands include pasturing of poultry and hogs. Another use of this land could be the production of stored forages for pasture supplementation and winter feeding. New livestock production operations on these lands build on existing infrastructure and knowledge in Upstate New York.

Several barriers exist to the increases utilization of grasslands for livestock production. One of these barriers is farmers' limited access to these underutilized grasslands and capital to develop agricultural enterprises. In some parts of the state, land has become prohibitively expensive, and in other parts competing uses such as development, conservation programs, energy crops, and minerals prevent establishment of grass-based agriculture. For those interested in starting a grazing dairy, credit may not be available due to the perception that such a dairy farm cannot be profitable. On the other hand, livestock farmers other than dairy farmers face a lack of familiarity of economic benchmarks, which in turn cause some lenders to shy away from extending credit to these businesses. Additionally, there are specific knowledge and production challenges for each type of farm that need to be addressed through research, education, and extension.

The Grasslands Utilization Work Team recommends taking actions in research, education, extension, and policy to realize the potential of our grasslands as a farming resource that will spur rural economic development, grow the regional food supply, and enhance environmental outcomes for all citizens of New York State. As rural demographics shift, farmers need to be prepared to take advantage of land that could potentially be grazed. There is the opportunity for landowner education about grazing leases as well as the potential for other types of farming operations to integrate a grazing enterprise into their current farms.

Introduction to New York's Grasslands

New York State has a long and rich agricultural heritage, dating back to the early settlers who cleared land, built houses and barns, and raised everything from cows and pigs to oats and hay, apples and squash. Over the last few hundred years, NY agriculture has witnessed changing land use patterns, including farm type, number of acres and crops grown.

At the end of World War II, NY agriculture began a period of rapid change. There were 149,490 farms in the state, according to the 1945 U.S. Census of Agriculture, and over 14 million acres were owned by farmers. Of this acreage, almost 7 million acres were used for harvested crops, and an almost equal amount was used for pasture for livestock grazing. However, the end of the war brought new technologies, such as farm tractors, plentiful fossil fuels, and yield-enhancing fertilizers and pesticides. All of these new items were inexpensive, reduced labor needs, and allowed farms to expand and to become more efficient.

From the late 1940's until sometime in the 1980's and 1990's, many farms continued to grow and specialize in certain crops or livestock. The economics of doing so made sense for many of these farms, as the input costs continued to be low and efficiency could be spread across more acres or more animals, or both. However, many farms over the period of 1945 to the present day discontinued farming.

There are various reasons contributing to the decline in the number of farms, including lack of a next generation to take ownership, inability or unwillingness to adopt new technologies efficiently, increasing costs of inputs and decreasing income, among others. According to the 2007 U.S. Census of Agriculture, there are now only 36,352 farms in NY and just over 7 million acres owned by farmers. Only 3.6 million acres are being harvested for crops, with slightly less than 1 million acres used for pasture. Furthermore, much land has been converted to other uses, such as residential and commercial buildings, roadways, or state-owned forests.

As farms have either gone out of business or grown, much land has been left idle or abandoned. Some of this land is poorly drained, too steep, and/or unproductive for crop production. It is estimated that NY has over 3 million acres of land that has been idled. However, much of this idle land could be suitable for grazing livestock or for hay production with the correct management and a low level of inputs. This report examines the opportunities, as well as the barriers, to increasing livestock utilization of much of New York's idle lands.

Executive Summary	3
Introduction to New York’s Grasslands	4
I. Why increased livestock utilization of New York’s grasslands makes sense	7
A. Job creation and economic development	7
B. Regional and local food security	7
C. Economically efficient agriculture	8
D. Ecologically sustainable agriculture	10
E. Livestock health and longevity	11
F. Beautiful working landscapes	12
G. Family-friendly farming	12
II. Livestock production and marketing opportunities	14
A. Beef Cattle	14
B. Sheep and Goats	15
C. Dairy Cattle	16
D. Equine	16
E. Pastured pork	17
F. Poultry	17
G. Exotics	17
H. Stored forages	18
III. Barriers to increased livestock utilization of NYS grasslands	19
A. Limited farmer access to land	19
1. Land cost.	19
2. Landowner resistance	19
3. Competing Land uses	19
4. Lack of facilities	19
B. Lack of agribusiness incentives to promote dairy grazing operations	19
C. Lack of enterprise budgets and economic analysis of non-dairy livestock operations	20
D. Specific production and knowledge challenges involved in livestock system	20
1. Challenges specific to sheep and goats	20
2. Winter feeding and management	20
3. Feed quality	20
4. Balancing dairy diets on pasture	20
5. Environmental regulations	21
E. Lack of information on transitioning from dairy to non-dairy livestock	21
G. Poor coordination between government agencies and educational institutions	21
IV. Recommendations	22
A. Limited farmer access to land	24
B. Lack of agribusiness incentives and capital for grazing operations	22
C. Uncertainty about the economics of non-dairy livestock operations	23
D. Production and knowledge challenges involved in grass-based livestock systems	23
E. Lack of information on transitioning from dairy to non-dairy livestock	24
F. Government Policy	25

V. Inventory of grasslands management resources for NYS landowners & farmers 26

- Cornell University Research and Education 26
- Cornell Cooperative Extension..... 26
- Current grazing courses available to Cornell and SUNY..... 27
- Other SUNY grazing education and resources 27
- Tax incentives 27
- Grants, cost-sharing, equipment-sharing and programs 28
- Grazing Lands Conservation Initiative and Graze-NY Contacts..... 30
- NRCS State-wide Specialists: 31
- Cornell Cooperative Extension County Offices 32

References 36

I. Why increased livestock utilization of New York's grasslands makes sense

A. Job creation and economic development

As overall land use for agriculture has declined in rural New York, the most productive lands remain in agriculture while other idle lands have seen an increase in weeds, brush, or development. The latest numbers show there are about 3 million acres of under-utilized land in the state (National Agricultural Statistics Service, 2005). Productive management of these idle and under-utilized land resources can potentially contribute significantly to the social and economic health of rural areas in the state.

Increasing the utilization of vacant land and the resulting income can have a large impact on rural communities, by creating or retaining jobs in the agribusiness and other sectors. For example, the economic multiplier for cattle and dairy production is 2.4. For every dollar received by livestock farmer, it is turned over 2.4 times in the local community. Based on the average New York farm (United States Department of Agriculture, 2009), if half of these grasslands, or 1.5 million acres of land were returned to production, over 7,500 new farm business would be created, providing employment for 9,000 individuals. More local money in the community means more local non-farm jobs — 1.59 for every farm employee — and more local businesses. For every \$1 in taxes farms pay, only \$0.37 is used by those farms in town services such as highway, fire and emergency medical services, and schools (Farmland Information Center, 2007). This is in contrast to traditional residential developments that often end up costing local communities more than is collected in property taxes, due to the increased demand for town services by more homeowners. Furthermore, communities benefit in many other ways from increased economic vitality such as more volunteerism and charitable giving to local non-profit organizations.

B. Regional and local food security

Food security considers all the factors within a region or community's food system that influence the availability, cost, and quality of food. Community food security supports local or regional foods that have a stable supply and sustainable production. Local food production reduces the number of "food miles" that food travels before reaching the consumer. This supports local farmers and farm economy and, thus, the local community. There is not enough land available in New York State to meet the dietary needs of every resident in the state. However, by making use of land suited for pasture and forage production to support diets with a moderate amount of meat and dairy products, it would be possible to feed more people with food produced in New York (Peters, Wilkins, and Fick, 2009).

Ruminant animals, such as cattle and sheep, eat grasses and other plants that cannot be digested by humans and many other animals, thus having the potential for producing food and fiber with little expenditure of fossil fuel energy. On properly managed grazing

land (including pasture land and hay land) only 1 calorie of fossil-fuel energy is needed to produce up to 2 calories of food and fiber energy. Many crops require from 5 to 10 calories of fossil-fuel energy for every calorie of food or fiber produced. Improving the efficiency of grazing land production can increase landowners' income and reduce dependency on fossil fuels in food production to improve environmental quality.

There is increased consumer demand for locally-raised foods, including both dairy and meat products. Many consumers are interested in purchasing products that come from animals raised on pasture. The benefits of grass-fed animal products include increased levels of conjugated linoleic acid (CLA), Omega-3 fatty acids, and Vitamins A and E compared to conventionally fed livestock (Dhiman, et al., 1999, French, et al., 2000). All of these nutrients play a vital role in human health, and have been found to be lacking in our modern diets. Consumers are interested in affecting their overall health by consuming more of these nutrients, as research has shown anti-carcinogenic, anti-atherosclerotic, and body fat mass decreases as benefits of doing so (Daley, et al., 2004).

C. Economically efficient agriculture

Management Intensive Grazing consists of dividing pastures into smaller sections or paddocks. Livestock are moved as frequently as twice a day to once every five days. Paddocks are then rested, allowing time for re-growth before the animals are turned in again.

Livestock systems that make effective use of grazing can be very economical. The need for expensive animal housing can be greatly reduced or eliminated. Labor requirements are reduced compared to confinement systems, since the animals do most of the work involved in harvesting the crop and spreading the manure. The start-up costs for grazing systems are minimal, offering many opportunities for the increasing numbers of beginning farmers across the state.

For beef farmers, numerous studies have shown pasture-based systems to be more efficient and more profitable than confinement systems. In one classic study, the annual cost to maintain a cow and her calf was found to be \$40 in a pasture system, compared to \$82 and \$101 in semi-confinement and permanent confinement system (Perry, Peterson et al. 1974). More recently, beef calves supplemented on pasture were found to be more profitable by \$103 per head compared to calves fed in a drylot system (Mathis, Cox et al. 2008).

The advantages of grazing are well understood by most beef farmers in NY, who already make significant use of pasture. However there is some room for improvement in grazing management on most beef farms, which would further reduce costs and improve profitability of these operations. Increasing the level of management can increase both the quality and quantity of the forage grown compared to continuous stocking. This leads to increased animal performance through better daily gains and more grazing animal days per acre (Emmick, Fox, and Seany, 1990).

Beef producers in Manitoba, Canada who changed to rotational grazing from some previous management system (primarily continuous grazing) observed numerous improvements for both livestock and forage productivity (Chorney and Josephson, 1999):

- When comparing their current system to their previous system, 80% of respondents reported weight gain was greater, 91% reported pasture forage production was greater, 88% reported pasture forage quality was better, and 53% of respondents reported overwintering costs were lower for 1999 compared to the last year of their previous system.
- This increased livestock and forage productivity has enabled farmers to observe positive economic changes under their current pasture management system, with 88% reporting that net farm income for the livestock enterprise was greater than it had been.

One management practice employed by graziers is “out-wintering” of beef and even dairy animals. This eliminates or reduces the need for animal housing and significantly reduces capital costs. The key factors that make out-wintering feasible are feeding additional energy to the animals and having a place where they can find shelter from strong, cold winds. Many farmers have successfully used woods, three-sided open shelter structures, or stacks of bales as windbreaks. However, many farmers find that most animals prefer to be outside most of the time in the winter when given the choice of a barn as an alternative.

Within the dairy industry, the economic advantages of grazing have been recognized as quickly as with other livestock. These advantages are no less significant and measurable than in beef production. A recent extension bulletin from Cornell University clearly shows the cost of production to be less for dairy herds that practice rotational grazing compared to non-grazing dairy farms of a similar herd size.

The 2006 Cornell Dairy Farm Business Summary (DFBS) showed graziers to be more profitable than comparable farms that did not utilize intensive grazing (Conneman, et al., 2007). An average net farm income per cow of \$383 was measured for grazing farms compared to only \$114/cow for similar sized non-grazing farms (Conneman, et al., 2007). This is in spite of lower milk production per cow on grazing dairies. It should be noted that \$14.13 was the average price of milk per hundredweight in 2006. The return on assets is 64% higher for grazing compared to non-grazing dairies, reflecting the generally lower capital investments required in grazing systems.

Because the cattle harvest the grass, expenses are lower for fuel, machinery and repairs. Less investment in machinery and buildings is required for grazing farms than confinement farms. One study showed that it is possible to start-up a grass based dairy with as little as \$50,000 compared to over \$300,000 for a similar-sized conventional confinement dairy.

An on-farm study in Minnesota found that dairy heifers raised on pasture for the summer cost \$0.93 per day while heifers raised in a confinement barn cost \$1.32 per

day (Rudstrom, 2003). A landowner can have heifers delivered to his farm in the spring and send them back in the fall. The main labor requirement is to rotate animals through paddocks and feed grain and forage if needed. Forage could be harvested from excess acres in the spring or heifer numbers reduced as the pasture yield decreases (Rudstrom, 2003).

In a Cornell Cooperative Extension study, heifers that had been recently bred were separated into two groups. One group stayed on the farm and was raised in a freestall, and the other group was raised on pasture, by a contract heifer raiser, from early May to late fall. The study indicated that raising bred heifers in a management intensive grazing system had beneficial impacts beyond their time on pasture (Bartlett & Grace 2008). Heifers raised on pasture in this study had better reproductive performance, having lower calving difficulty scores, and a shorter calving interval (Bartlett & Grace 2008). A cow that is not pregnant costs, on average \$2.00/day to maintain. Based on the improved breeding performance of the cows that spent some time on pasture there is a minimum savings of \$80.00 compared to the group that was raised in the freestall.

D. Ecologically sustainable agriculture

Grass-based livestock farming systems can provide multiple environmental benefits, including protecting water quality by minimizing soil erosion rates, improving soil health and productivity, and enhancing biodiversity. This is true whether the land is being used for grazing or mechanical harvesting of hay, although each method has slightly different impacts.

Modern grazing land management is one of the most important ways that farmers and ranchers can reduce soil erosion and subsequent water pollution. Water quality is dependent upon both surface water that runs over land and into creeks, streams, or rivers, and ground water that leaches through the soil profile and into underground aquifers. Surface water is the one which garners the most attention from government agencies and communities, as impacts of land use can be clearly seen in the turbidity of surface water.

Surface water that runs overland can carry exposed soil, manure and nutrients. Grassland minimizes exposed soils, so nutrients and soil are retained in place, providing there is good management. A densely covered field of grasses and legumes allows for excellent water and nutrient infiltration and uptake by plants.

Consideration of site-specific conditions is important in planning the conversion to either grazing or haying of previously idled land to minimize soil and nutrient runoff. When idled land is first converted into grasslands, there may be less vegetative cover at the soil surface due to dominant weed species shading out new growth. This can be problematic if grazing animals are placed on this land, allowed to eat, trample, and waste the plants that are growing, or are not moved to different pastures in a timely manner. Manure may accumulate and run off the land during heavy rains, as there would be little vegetation remaining to hold the nutrients. If the land is being converted

to hay ground, and fertilizer is spread at a heavy rate, there is also a chance of increased runoff due to exposed soil during establishment of the new crop.

As with nutrient runoff, soil erosion can be reduced with good grassland management through grazing or haying. The benefits of a dense stand of plants described above are equally applicable to the issue of soil erosion. Heavy rains are not as likely to cause soil particles to be washed away as when the soil is exposed with few plants to hold it in place (USDA-NRCS, 2003). Grasses and forage legumes are perennial crops, and do not require annual plowing as many other crops do. Unless idled land is plowed, soil erosion rates remain low as it is transitioned to productive grassland.

Soil health and productivity can also be increased on idled land when brought into production through appropriate management. Increased infiltration rates, higher levels of organic matter, greater carbon sequestration, and larger soil macro-invertebrate populations are usually found in well managed grasslands (USDA-NRCS, 2003). Compared to converting idled land for annual crops, maintaining these lands as grasslands also minimizes the potential for soil compaction, although haying equipment will create compaction faster than will grazing.

Wildlife habitats for many species are improved by grassland livestock production. Over the last few decades, certain grassland nesting birds have been in population decline due to the expansion of forested and brush-covered land, fragmentation of open farmlands, and increasing development in rural areas. Recent research in New York has shown that grassland nesting birds that are either threatened species or species of concern, such as Grasshopper Sparrow, Vesper Sparrow, and Horned Lark, benefit from grazing systems compared to either haying or annual crops (Ochterski, 2005). Other wildlife species that benefit from grasslands include white-tailed deer, turkeys, and aquatic species such as trout from improvements in water quality.

Carbon sequestration of grasslands has received increased attention in the last few years. For example, grazing land soils in the Great Plains contain over 40 tons of carbon per acre, while cultivated soils contain only about 26 tons. The grasses, legumes, and shrubs on grazing lands remove carbon dioxide from the air through photosynthesis and add this to the soil as leaves and shoots die back or store it in the soil when roots die and decompose. This process promotes the long-term sequestration of carbon as soil organic matter. (USDA-NRCS, 2003)

E. Livestock health and longevity

Grass-based farming systems have important health benefits for ruminant livestock (cattle, sheep, and goats), which evolved on a diet of forages. Improved herd health is one of the primary reasons that graziers are more profitable. Dairy cows on pasture have fewer health problems and lower veterinary and medicine costs, compared to confinement cows. These health benefits are primarily due to cows not standing on concrete, lower rates of mastitis, and better rumen buffering, resulting in a lower

incidence of acidosis (Emmick, 2000). As a result of healthier cows, the cull rate for grazing herds is less than for confinement herds, and longevity is increased. This allows many dairies to sell young stock as an additional source of income, as they do not need to replace mature animals as often.

It is important to note that for lambs on pasture, there can be increased health, parasite, and predator problems compared to confined lambs. Parasite control can be challenging even with good management, although strategic deworming and monitoring for signs of stress can help to reduce the incidence of infection. The use of beef cows with calves, livestock guard dogs, donkeys, or llamas for predator control can deter predation, especially in conjunction with effective electric fencing systems.

Once weaned, beef calves are typically sold and grouped with calves from other farms exposing them to unfamiliar bacteria and viruses that can lead to bovine respiratory disease (BRD). If more space is given to calves during the co-mingling process the incidence of BRD is lower. Weaning on a pasture as compared to a small dry lot results in a lower incidence of BRD and subsequent feedlot growth and carcass quality is improved (Gerrish, 1998).

F. Beautiful working landscapes

Farms contribute to the scenic, rural landscape that defines Upstate New York and make it an attractive place to live and relax. This landscape provides several benefits to communities, the tourist industry, and all New Yorkers. Throughout New York State, the scenery sought by tourists is provided by farms. Many farmers, with permission, allow access to their land for snowmobile trails, hunting, and fishing. For rural communities, well-maintained working farms add to a strong sense of place and identity and provide a link to the rural heritage and culture of New York. As the underutilized grasslands in the state revert to forest and brush, the benefits of a working landscape and open spaces are lost.

G. Family-friendly farming

Most of the work involved in grass-based agriculture is “family-friendly” and children are much more readily engaged in farming activities alongside their parents. A frequently heard comment at pasture walks and workshops is that the children can help move cows to and from pastures, move temporary fence, and benefit from direct involvement in the farm management and other activities. Many farmers who make intensive use of grazing also report that their children view farming as a viable career choice.

The need for large and potentially dangerous tractors, heavy equipment and machinery is reduced on grazing farms, as the animals do much of the harvesting. In many areas, if hay is to be harvested from the land, it can be done on a custom basis, rather than owning equipment. This keeps debt loads low, and reduces the chance of children becoming injured by playing on or near equipment.

Each year, graziers that participate in the Dairy Farm Business Summary are asked about their quality of life and their satisfaction after switching their dairy herd to grazing from confinement. On a scale of 1 to 5, with 5 being the highest, the average satisfaction rating was 4.4 in 2006. 24 out of 29 producers indicated that their lifestyle has improved since implementing intensive grazing on their farm (Conneman, et al., 2007).

On many dairy farms, there are reduced labor requirements when the animals are grazing, resulting in more leisure and family time. In most cases the amount of labor is reduced through less time spent in the barn, spreading manure, and planting and harvesting crops. However, some graziers also report that while the amount of labor does not decrease significantly, the type of work is more pleasurable and less stressful.

II. Livestock production and marketing opportunities

The success or failure of any farming system depends a great deal on the manager. Raising animals on pasture can be friendlier to animals and the environment if managed correctly. However, poor management of pastures will lead to poor animal performance and environmental damage. There is the opportunity to integrate management intensive grazing into at least some portion of any livestock production system in New York State. This section will present opportunities specific to several common farm enterprises.

Grass grows well throughout New York State due to the rainfall and soil resources of the region. Grass-based agriculture is becoming more popular as a way to help dairy farms lower farm expenses, as a source of high quality summer feed for dairy herds, for finishing beef cattle and for increasing the numbers of sheep and goat enterprises. Additional acreage is used to produce grass for hay and silage (Beetz, 2004). Managed grasslands also serve land conservation purposes, such as flood and erosion control, carbon sequestration and the preservation of natural habitat for birds. "Grass-fed" farming practices are being used as a marketing tool to sell meats and other products.

A. Beef Cattle

Conventional Beef Markets

According to the National Cattlemen's Beef Association, roughly 85 percent of beef is sold on the conventional market. This means that the beef is produced and sold on an un-differentiated market as opposed to specialty or niche marketed beef. Other than standard agricultural practices, there are no set guidelines for conventionally marketed beef. In New York State, most beef farmers utilize grazing in their production system. Well managed pasture and stored foraged typically provides 90 to 95% of the nutrient requirements of a cow/calf operation.

There are many opportunities to optimize land use and reduce the requirement for stored forages in a conventionally managed beef operation. Introducing and/or intensifying a rotational pasture system will increase the production of the existing land base. Extending the pasture season through good pasture management and incorporation of different forage species into the pasture mix can reduce the amount of stored forage required, thus reducing the cost of production.

After weaning, calves are typically fed a forage diet supplemented with 15 to 30% grain to support the desired growth rate. After a 60 to 120 day period the cattle are then transitioned to an 80 to 100% concentrate diet until they are ready for harvest. One opportunity is to increase the duration of forage feeding post-weaning to reduce the time cattle spend in the concentrate finishing period. This would provide a product acceptable to the conventional market, potentially reduce the cost of production and avoid the 10 to 20% discount incurred for cattle finished entirely on forage that are sold on conventional markets.

Niche Beef Markets

Consumer interest in pasture- finished beef is on the rise. Typical consumers include individuals, restaurants, and institutions. These consumers are interested in one or all of the following niche market criteria for beef: local, natural, or no added hormone products, organic, healthy, humane, minimizing the carbon footprint and low environmental impact (Fanatico, 2006). Consumers in these niche markets are not only looking for specific criteria, but they are willing to pay premium prices for beef that has been raised according to their specifications. The specific management practices for pasture-finishing cattle vary depending on the niche being targeted, but pasture is obviously a critical factor.

Since this trend toward increasing consumer interest in pasture-finished beef and related niche markets is relatively new, there is opportunity for additional research into the market characteristics and trends. Where are the large markets? What is the current demand? How large could the market become? How can markets be optimized for these types of production? What are the bottlenecks?

Additionally, since any niche production system involves new management strategies, there is the opportunity to provide improved technical assistance and support networks. Farmers require reliable and accurate information and assistance with all aspects of their farms – from intensive rotational grazing production methods to appropriately pricing and marketing their specialty products.

B. Sheep and Goats

Sheep and goats are grazers and browsers that make productive use of pastures and forages grown on marginal land in New York. In fact, they can be used to renovate pastures and hay fields that have been abandoned; putting land back into production that otherwise would not provide an economic return to the owner. Grazing is the traditional basis for sheep and goat farming.

The major strategy for grazing sheep and goats should be management intensive; moving the herd or flock from paddock to paddock every few days and controlling excessive forage growth by harvesting for hay or by using cattle. Sheep and goat farmers have close access to the most significant market in the United States. The New Holland, PA terminal market is the strongest of its type for sheep and goats and sets the basis for selling to more local markets. Continued, ready access to these markets needs to be ensured.

Although there is concern about the ability of localized slaughter plants to remain in business, they are more numerous in New York than in other parts of the United States. This provides the opportunity for farmers to market lambs, sheep, and goats directly to consumers, restaurants, and grocery stores. Each farmer, however, must assess the cash costs, and additional labor and management required for direct consumer marketing compared with terminal marketing or marketing on-the-rail to a slaughter plant. Technical assistance and information to help farmers market their product is an ongoing need.

Because there is little opportunity to purchase sheep or goats in the spring and then graze them through the summer and sell them in the fall, methods for preserving forage and using other ingredients for winter feed need consideration. As part of a whole farm plan, farmers need technical assistance on breeding systems, kidding and lambing systems, health management, parasite control, predator control, and animal handling options.

C. Dairy Cattle

There are numerous production systems associated with dairy cattle. Dairy production systems are less driven by consumer demand than by farmer preference and economic situation. For the right manager, dairy grazing makes sense.

There are many variations on grass based dairies. A grazing dairy can be organic; entirely grass and forage based, or utilize supplements and grains. A well managed grass based dairy provides the opportunity for a farmer to reduce feed and other input costs as well as to decrease labor requirements and minimize environmental impact. There is the opportunity for education and technical assistance to both optimize pasture production as well as appropriately manage the economics of a grazing operation.

Another option for dairy is to custom graze heifers from confinement farms. An on-farm study in Minnesota found that heifers raised on pasture for the summer had a cost of \$0.93 per day while heifers raised in a confinement barn had costs of \$1.32 per day (Rudstrom, 2003). A landowner can have heifers delivered to his farm in the spring and send them back in the fall. The main labor need would be to rotate paddocks and feed grain and forage if needed. Forage could be harvested from excess acres or heifer numbers reduced as the pasture yield decreases.

Another way to introduce grazing into a dairy management system is for a conventionally managed dairy farm to graze their heifers and/or dry cows (Fanatico and Rinehart, 2009). There is great opportunity for education and technical assistance to best integrate intensively managed rotational grazing into a farm's production system.

D. Equine

The equine industry varies widely from backyard horses to multi-million dollar boarding facilities. Researchers found that a majority of equine pastures in the Northeast are currently undermanaged and that horse owners have limited knowledge of agricultural Best Management Practices (Williams and Greene).

Equine grazing poses its own set of management challenges, but can be a viable option to save on feed costs and provide the animals with additional exercise. Since horses are notoriously tough on pastures there is a tremendous opportunity to provide education and technical assistance to horse owners about intensively managed rotational grazing for horses. The University of Vermont and Rutgers University equine extension specialists noted the need for 1) increased educational programming and

farm visits; 2) research and demonstration sites for pasture management topics specific to equines; 3) support for industry pasture management services; and 4) research into forage species best suited to balance equine grazing and pasture ground cover.

E. Pastured pork

Today's independent hog farmers have to choose between production systems that lead in different directions. One is toward confinement feeding of hogs and contracting with vertical integrators. The hog industry is approximately 87% vertical at the farmer/packer interface. The other direction is toward production of a smaller number of hogs and marketing them, through various methods, as part of a whole-farm operation (Gegner, 2004). Pasture raised pigs occupy a growing niche market.

Pigs can eat a wide range of feeds, such as pasture grasses and other fibrous materials, as well as forage based energy and protein sources. According to ATTRA's "Hog Production Alternatives" publication, "fibrous feeds traditionally have not been used for non-ruminants due to their documented depression of diet digestibility in pigs and poultry. However, some types of fiber and fiber sources do not exert such negative effects on nutritional digestibility in older growing pigs and sows. Dietary fiber can actually have a positive effect on gut health, welfare, and reproductive performance of pigs. Nutritionists are currently working to gain a better understanding of the role of dietary fiber from forages in swine diets (Gegner, 2004)."

There are many different opportunities to raise pastured hogs utilizing management intensive grazing- from farrowing on pasture, to farrowing and finishing on pasture. Some farmers attempt to take advantage of a majority of required nutrients from pastures while others prefer to utilize a greater percentage of concentrated feeds. Regardless, there is opportunity for education and technical assistance for proper swine management on pasture.

F. Poultry

Alternative poultry production is growing, due to a consumer demand for specialty products from cage free and free range birds. Alternative poultry enterprises may be large-scale, but are typically smaller scale and integrated into a diversified farm. The following are all options for pastured poultry enterprises: egg sales, sale of spent laying hens, sale of broilers, sale of chicks, feather sales and manure sales.

It is important to note that chickens obtain limited nutrients from forages, as they cannot digest large quantities of fiber. However, they do obtain nutrients from seeds, worms and insects (Fanatico, 2006).

G. Exotics

There are numerous opportunities for exotic livestock production enterprises on pastures. Some alternatives include: Llamas or alpacas, bison, deer and exotic birds. As with any species, each carries with it a specific set of nutritional needs, behavioral considerations and pasture infrastructure requirements.

H. Stored forages

Northeast livestock farmers must be able to manage a profitable business that is also sustainable in terms of environmental stewardship. Forage-Livestock Systems utilizing both grasses and legumes for stored feed, as well as for grazing, can have a positive impact on sustainable agriculture in New York. “Forage crops are one of the few resources that can be converted to food while sustaining and restoring our soil, water and atmosphere. With much of our land resources in the Northeast best suited to growing perennial forage crops, we have the opportunity to produce the needed milk and protein for mankind from livestock, while maintaining a sustainable forage crop based ecosystem” (Cherney, 2008).

III. Barriers to increased livestock utilization of NYS grasslands

A. Limited farmer access to land

1. **Land cost.** Access via purchase or lease is prohibitive in some areas of the state.
2. **Landowner resistance.** Many landowners are willing to have hay cut, but not willing to have livestock on their land. Reasons include perceived liability, smell, and limiting access to land for recreation (snowmobiling, hiking).
3. **Competing Land uses**
 - a. Development.
 - b. Gas leases.
 - c. Biofuels.
 - d. Government programs, such as the Conservation Reserve Program and the New York City Department of Environmental Protection Watershed Program.
 - e. Recreational uses, for example, hunting.
 - f. Row crops, including corn and soybeans.
4. **Lack of facilities.** Much of the idle land either has no or very poor fencing and may be limited in access to water. Lack of fencing can be a deterrent to grazing production systems, although portable electric fence designed to confine and protect small ruminants can be used successfully to graze idle land.
5. **Availability and productive capacity of idled land.** Idle land is perceived as not available to dairy farmers for additional stored forage production or expanded grazing. Further, yields from idle land are perceived to be inadequate in both quality and quantity for the production of stored feeds for winter.

B. Lack of agribusiness incentives to promote dairy grazing operations

Many agribusinesses with an established presence on NY dairy farms stand to lose some portion of their business when farms convert from confinement to grazing. Many actively discourage grazing and may spread misinformation to farmers about the economic and technical feasibility of grazing.

Dairy farmers seeking to change from full-year confinement to a grazing system often are challenged to find financing for costs associated with the change. Many lenders do not view grazing as a profitable long-term alternative, as they are not familiar with the practice nor aware of economic studies documenting profitability.

They prefer to finance larger capital projects such as herd expansion or equipment for field crops where there is both collateral and an assumption of a reasonable return on investment.

C. Lack of enterprise budgets and economic analysis of non-dairy livestock operations

Currently non-dairy livestock enterprises do not make up a large share of the receipts from New York animal agriculture. As such, compared to dairy there is a lack of experience with non-dairy livestock operations and virtually no economic analysis of the profit potential of these enterprises. Therefore most Extension educators, agriculture service providers, veterinarians, and bankers lack knowledge about the economics of non-dairy livestock systems. Without these data, farmers, bankers and service providers lack the tools necessary to support and encourage livestock production.

D. Specific production and knowledge challenges involved in livestock systems

1. **Challenges specific to sheep and goats.** Among the management issues with solutions that may not be widely known 1) predators; 2) internal parasitism, 3) neonatal mortality, 4) labor and stress associated with the kidding and lambing season.
2. **Winter feeding and management.** Costs associated with feeding and managing livestock during the winter period account for 60% to 70% of annual expenses involved in raising livestock. For dairy operations this has typically meant keeping cattle in a barn. Because livestock operations usually do not have the equipment, buildings or labor to handle bedding and manure, a significant number of sheep, goats, and beef cattle are housed outdoors. In addition, poorly managed indoor facilities create unhealthy conditions for livestock. To minimize reliance on stored feeds there is growing interest in extending the grazing season, but – except for sheep– there is a lack of information on this topic at this time.
3. **Feed quality.** Producing high quality stored forages for winter feeding is always a challenge given high rainfall levels in the northeastern US. This is particularly difficult for forage finishing systems that require very high quality feed to promote animal performance during the winter. Most non-dairy livestock operations cannot justify the equipment and structures necessary to feed ensiled feeds.
4. **Balancing dairy diets on pasture.** Because dairy operations are fully invested through capital and knowledge in the traditional crop and feeding systems it is difficult to switch to a more pasture based production system. Based upon observations on NY farms, many feed company nutritionists undervalue pasture contributions to the diet. When they do not have experience with pasture-based herds, they can and do make a number of common mistakes, leading to losses in

milk production. It becomes a “self-fulfilling prophecy” of poor returns from grazing.

5. **Environmental regulations.** Known as Confined Animal Feeding Operations (CAFO), farms with more than 300 cattle have limited out-wintering options. Even farms of less than 300 animal units (known as Animal Feeding Operations, AFO) are at risk if environmental issues arise. Research is needed to identify management practices that will meet the Clean Water Standards guiding CAFO and AFO regulations, especially when winter-housing livestock.
6. **Availability and productive capacity of idled land.** Idled land is perceived as not available to dairy farmers for additional stored forage production or expanded grazing. Further, yields from idled land are considered to be inadequate in both quality and quantity for the production of stored feeds for winter.

E. Lack of information on transitioning from dairy to non-dairy livestock

With the shift in demographics of dairy farming, it might seem logical that these former dairy farms would transition to beef, sheep, or goat production. The success of farmers making this transition, however, has been low. Nutrition, cash flow, diversity in products and markets, limited markets, focus on profitability vs. production are all hurdles that would-be livestock farmers face. Information on successful transitions is lacking.

F. Marketing

Marketing is a critical challenge not only to grass-based livestock farmers, but all farmers of meat products in New York. Some of the barriers that have been identified in this area are: 1) lack of appropriate slaughter facilities for direct-marketing; 2) difficulty in consolidating small lots of cattle and small ruminants for markets; and 3) lack of an efficient system for linking cow-calf farmers, grazers of feeder cattle, and cattle finisher (both grass fed and conventional). The challenge of processing capacity is being addressed through the work of the Cornell Small Farms Program Work Team on Livestock Processing.

G. Poor coordination between government agencies and educational institutions

There are multiple government agencies, non-profit organizations, and educational institutions that farmers can look to for assistance with grazing management. Often these organizations do not coordinate their efforts in grazing, leading to frustration on the part of farmers. If any coordination occurs, it is at a local level, and may be based on personal relationships. This type of joint effort may not be sustained based on staff turn-over or a shift in organizational priorities. Also, the level of coordination and service regarding grazing varies across the state.

IV. Recommendations

New York State has extensive grassland resources, but much of it is currently fallow or underutilized. Taking actions to realize the potential of our grasslands as a grazing resource will enhance economic development, growth of the regional food supply, and reap environmental benefits. We recommend the following actions that will increase the use and productivity of these grasslands.

A. Limited farmer access to land

1. Much of the unused grassland is owned by non-farmers. Strategies should be identified to overcome these barriers to productive use.
2. Design a survey to determine landowner interest and resistance to leasing land for livestock production. Identify competing interests for use of the land. A companion survey for farmers should also be developed to assess their level of interests and any barriers to leasing land.
3. Create tools and programs for landowner outreach and education based on survey results. These programs are likely to include:
 - a. Seminars about the benefits of leasing land, both personally and for the community including legal, lease and insurance issues, and the basics on grazing systems.
 - b. Educating farmers on developing relationships with landowners. This could be accomplished through working with the NY Beginning Farmer Project. Another area to address is the infrastructure concerns on leased land, specifically fencing.
4. Document outcomes for projects that connect farmers with landowners for the purpose of expanding leasing opportunities for both parties.
5. Create a database of grazing land costs across the state based on recent transactions.

B. Lack of agribusiness incentives and capital for grazing operations

1. Actions should be undertaken to assess the availability of funding (loans, grants) from banks and government sources for livestock and dairy grazing-based enterprises, and to expand the availability of funding.
2. A survey of funding availability across the state for livestock and dairy grazing should be undertaken, gathering data from banks, farmers, and agencies.
3. If the lack of capital availability is confirmed, action should be taken to make funding available. One potential option would be to increase low interest loans available from state and federal sources for grazing operations.
4. Educate bankers and other agribusiness professionals about the business potential of livestock and dairy grazing. The opportunity for the establishment of new farms that will be customers of agri-business should be stressed.
5. Develop educational materials for beginning and established farmers on how to access capital. Potential topics for this type of outreach would

include: when do I need capital?; what should I bring to the bank?; and existing government loan programs.

C. Uncertainty about the economics of non-dairy livestock operations

1. An enterprise analysis of livestock operations in New York State, similar to the Dairy Farm Business Summary, should be undertaken to determine profitability, income and expenses, and balance sheet specifics.
2. This information should be disseminated widely through professional conferences and education materials to extension personnel, agency staff, and agribusiness professionals.

D. Production and knowledge challenges involved in grass-based livestock systems

1. To increase the utilization of grasslands in New York State for livestock enterprises we recommend the following general education, research, and extension/outreach initiatives:
 - a. Grazing should be emphasized in the curriculum for all animal science students, including those specializing in dairy, at Cornell and the SUNY Colleges of Agriculture and Technology.
 - b. To support graziers in New York State, there should be a group of educators and agency staff available statewide who are knowledgeable about livestock production and dairy grazing systems, including economic and technical information. This could be done by:
 1. Providing professional development training for Cornell Cooperative Extension, United States Department of Agriculture, and Soil and Water Conservation District staff to increase livestock production and dairy grazing expertise.
 2. Developing and delivering a livestock and dairy grazing short course for educators and service providers.
 - c. Develop a network of mentors experienced with livestock and dairy grazing systems, willing to share their expertise and experience with other farmers.
 - d. CCE should consider establishing a certificate and/or more formalized educational program for grass-based farmers. One example of such a program is the Wisconsin School for Beginning Dairy Farmers which has a heavy emphasis on grazing.
 - e. Extension should engage in a systematic effort to create and distribute factsheets targeted to farmers on grazing topics that are applicable to all livestock species, including dairy.
2. The following research and outreach efforts should be undertaken to address *specific* production, knowledge, and marketing challenges in livestock grazing systems
 - a. **Winter feeding and management.** Research winter feeding strategies appropriate to optimize yield, quality and profitability,

- and share the results with farmers. This should include out wintering of all species, and winter grass finishing of beef cattle.
- b. **Feed quality.** Conduct workshops and provide information to farmers on best practices for producing high quality hay. Specifically, this should address the needs of farmers with smaller machinery and without storage facilities for ensiled forages.
 - c. **Environmental regulations.** Research is needed on the design of various grazing wintering systems to minimize negative impacts, especially for out-wintering facilities to minimize environmental impact, optimize production, and maximize profit. In addition a comparison of grazing to confinement systems regarding nutrient loss and soil erosion should be conducted. The costs and benefits of using public money to support grazing vs. supporting manure management in confinement operations should be analyzed.
 - d. **Balancing dairy diets on pasture.** To improve the capacity of industry nutritionists to correctly formulate grazing rations, there should be sessions on livestock production and grazing nutrition at industry professional development conferences.
 - e. **Availability and productive capacity of idled land.** Another area for research is strategies and best practices for converting idle land to productive, profitable pasture. Lessons learned from this research should be provided to extension educators and agency staff for widest possible dissemination.
 - f. **Animal genetics.** Development and selection of breeding stock that is well adapted to grass-based agriculture in our region, and research on genetic testing to assist in breeding and selection of beef breeding stock for tenderness.
 - g. **Direct marketing.** CCE and/or other organizations should match chefs and other food service professionals to farmers raising livestock by grazing.
 - h. **Small lots of animals.** Strategies should be identified to consolidate small lots of cattle and small ruminants for market.

E. Lack of information on transitioning from dairy to non-dairy livestock

1. Providing farmers information on nutrition, cash flow, diversity in products and markets, limited markets, and profitability vs. production through factsheets, the internet, and educational workshops.
2. Develop case studies of farmers who have successfully made this transition. One particular focus of these efforts should be farmers who are custom raising dairy heifers on pasture.

F. Government policy

1. Taxes: The Grasslands Utilization Work Team supports agricultural tax policies that are structured to increase the amount of grassland in profitable, productive agricultural enterprises.
 - a. We recommend a thorough examination of the impact of taxes on the utilization of grasslands in New York State. This should include a comparison of New York with other jurisdictions.
 - b. We recommend that the principles of the School Property Tax Credit should be applied to all grazing land. This law shares the cost of school support statewide rather than placing the burden only on rural communities, and is a statement that agriculture is a priority of New York as a whole. Currently this credit is available only to farmers with 2/3 of income from farming.
2. The Grasslands Utilization Work Team supports all efforts to encourage purchase by state and local government entities (schools, colleges, hospitals, food for the aged, food pantries) of locally produced meats, as a way to increase the profitable and sustainable use of the state's grasslands. Further, funding should be made available to expand existing programs, such as SUNY purchase of ground beef.

V. Inventory of grasslands management resources for NYS landowners & farmers

Cornell University Research and Education

Cornell University is the land-grant University of New York State, and as such has a three-part mission: teaching, research, and extension. Cornell has four colleges that are operated by the university as part of the State University of New York system. The state supported colleges are the: College of Agriculture and Life Sciences, College of Human Ecology, School of Industrial and Labor Relations, and College of Veterinary Medicine.

Education on grazing at Cornell is primarily conducted through the Department of Animal Science in the College of Agriculture and Life Sciences. The Department of Animal Science offers an undergraduate course on beef cattle, and one on sheep. There are several course offerings on dairy production, management, and nutrition.

Research by faculty in the College of Agriculture and Life Sciences at Cornell is conducted through the Cornell University Agriculture Experiment Station (CUAES). CAUES coordinates state-wide research in five areas: agriculture and food systems, quality of life, youth development, community and economic vitality, and natural resources and the environment. Current research projects involving sheep include breeding and selection for seasonality and – for both sheep and beef cattle – fermentable fiber composition of diets. Staff in the Cornell Small Farms program have conducted research on utilizing forage brassicas for grazing dairy cattle.

Cornell Cooperative Extension

Cornell Cooperative Extension is the primary outreach organization for the College of Agriculture and Life Sciences, and the College of Human Ecology at Cornell University. There are 56 extension offices; one in every county of New York and in New York City. Extension educators in each of these offices develop educational programming with the support of campus-based faculty. There are also several extension programs that are centered at Cornell University. Many of the faculty in the College of Agriculture and Life Sciences have extension responsibilities including applied research.

Programming in each county extension association is determined by local need, and some offices offer grazing education and resources to farmers in their area. The Cornell Small Farms Program has a website that offers resources on production, management, and marketing for small farms in New York. Also, the Small Farms Program coordinates the NY Beginning Farmer Project and the New York Organic Dairy Initiative. The Beef Cattle Extension program at Cornell works with extension educators and farmers to ensure a sustainable and viable beef industry in New York State. The Cornell Sheep Program has an extensive web site, hosts field days for farmers, and develops educational materials for productive and profitable sheep enterprises. Similarly, Cornell has an extension program in goats and swine.

Current grazing courses available to Cornell and SUNY

There are no courses specifically on grazing at Cornell or at the State University of New York Colleges of Agriculture and Technology.

Other SUNY grazing education and resources

The State University of New York system includes three undergraduate colleges that offer degree programs in agriculture. Each of these schools has expert agriculture faculty, and farms that support their educational mission. The College of Technology at Alfred State offers degree programs in animal science and plant science. Alfred State is in the process of developing the Center for Organic and Sustainable Agripreneurship, which will be a resource for Western New York on sustainable agriculture. At Alfred State, speakers are brought in to address the dairy science class each year for 2 to 3 class periods. They discuss grazing management, ranging from fencing, to water, to grasses to grow and pasture rotation. Usually one speaker talks on the economics of grazing compared to confinement dairying.

The College of Agriculture and Technology at Cobleskill has degree programs in dairy production and management, livestock production and management, agricultural business, crop science, and agricultural engineering technology. Grazing is presented in several of the livestock production courses. Additionally, SUNY Cobleskill has an inspected meat processing facility.

The College of Agriculture and Technology at Morrisville accepts students in the following degree programs: dairy production and management, agricultural business, and agricultural engineering technology. SUNY Morrisville operates Nelson Farms, an organization that provides value-added processing, distribution, and product development for farmers. One class period is spent on grazing in the dairy science curriculum.

Tax incentives

New York offers tax incentives for farmers on income tax, sales tax, and property tax. One such benefit is the farmers' school tax credit toward New York State income tax. A farm is eligible for a credit of 100% of the school tax paid on 350 acres plus any acres that are enrolled in the Conservation Reserve Program, and a credit of 50% on any additional acres beyond the 350 acre base. Two-thirds of excess federal gross income (all sources of federal income above \$30,000) must be from farming in the past three years to qualify for the credit. Additionally, farmers with modified adjusted gross income between \$200,000 and \$300,000 are subject to a phase-out, and no credit is available for income above \$300,000.

Farmers are exempt from New York State Sales Tax on purchases of personal tangible property used predominantly in farm production. This includes building materials, production equipment and supplies, animals, feed, hardware, motor vehicles, fuel for agricultural equipment, gas/propane, electricity, and refrigeration. The sales tax exemption applies to labor and services used for repairing and maintaining property

used in the farm operation. In addition, farmers can apply for refunds of sales tax paid on utilities, fuel oil, and motor fuel.

In New York State, farms are eligible to be assessed at their agricultural value, instead of the market value of the property. The agricultural value is determined by the state, based on the soil groups encompassed by the farm. In most cases this results in a lower property tax bill. To qualify for an agricultural assessment the farm must have at least seven acres in production of crops, livestock, or livestock products that are intended for sale. The farm operation has to generate \$10,000 in sales, averaged over two years. A farm that is less than seven acres is eligible if the operation has a minimum of \$50,000 in sales. In addition, the farm has to be operated by the same person for at least two years. There is a penalty for land that is converted from agricultural use to a built structure.

Grants, cost-sharing, equipment-sharing and programs

Grants and cost-sharing programs for grazing programs are available through the *United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS)*, and county Soil and Water Conservation Districts (SWCD). The funding provided through the NRCS is authorized by the 2008 Farm Bill, and is administered by the New York state NRCS office. Farmers interact directly with NRCS technical staff located at USDA Service Centers throughout the state. USDA is still in the process of implementing rules for programs authorized by the 2008 Farm Bill. Therefore, funding levels and exact eligibility requirements are subject to change, and farmers should contact their local NRCS office for the most up-to-date information.

One such program available through the Natural Resource Conservation Service is the Environmental Quality Incentives Program (EQIP). EQIP is voluntary conservation program for farmers and ranchers promoting environmental quality along with agricultural production. The program offers financial and technical help to assist eligible participants to implement practices on agricultural land. In past years, EQIP has cost-shared between 50 and 75 percent of the costs of certain conservation practices. Additionally, incentive payments may be available for management practices that contribute to conservation for three years. Limited resource farmers may be eligible for cost-sharing up to 90 percent.

Another program that may assist graziers is the Wildlife Habitat Incentives Program (WHIP). WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Through WHIP, USDA's Natural Resources Conservation Service provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from 5 to 10 years from the date the agreement is signed.

New York is one of sixteen states in which farmers are eligible for the Agricultural Management Assistance (AMA) Program. AMA assists farmers to manage risk and voluntarily address issues such as water management, water quality, and erosion

control by incorporating conservation practices into their farming operations. Eligible land includes cropland, rangeland, grassland, pastureland, non-industrial forestland, and other private land that produces crops or livestock where risk may be mitigated through operation diversification or change in resource conservation practices.

Soil and Water Conservation Districts (SWCDs) are subordinate county agencies that coordinate conservation of soil and water resources within that county. SWCDs in New York were created for some of the following purposes: preserve soil and water resources, prevent soil erosion, control and abate nonpoint sources of pollution, and assist in the drainage and irrigation of agricultural lands. Each SWCD has a local board of directors that oversees its operation. Programs and funding opportunities vary depending on the county, so the best information can be obtained through the county SWCD office.

The New York State Department of Environmental Conservation offers the Landowner Incentive Program for Grassland Protection and Management (LIP) grant program. LIP is administered by the New York State Department of Environmental Conservation (DEC) and funded in part by the U.S. Fish and Wildlife Service (USFWS). This project provides technical advice and financial incentives for the protection of at-risk wildlife and habitats, specifically grassland birds and their habitat. DEC and Audubon New York provide technical assistance in the form of a Site-Management Plan to eligible private landowners that are selected to receive a grant. Selected landowners must manage their land to benefit grassland birds. For financial assistance, an applicant must be a private landowner and must own at least ten acres of contiguous grassland (or shrubland the landowner is willing to convert to grassland) located within one of the Grassland Focus Areas.

Grazing Lands Conservation Initiative and Graze-NY Contacts

Grazing Lands Conservation Initiative and Graze New York Program

Northern New York (*14 counties of: Clinton, Essex, Franklin, Fulton, Jefferson, Hamilton, Herkimer, Lewis, Oswego, St. Lawrence, Saratoga, Warren, and Washington*)

Adirondack North Country Association (ANCA)
Phone: 518-891-6200

Central New York (*11 counties of Broome, Cayuga, Chemung, Chenango, Cortland, Madison, Oneida, Onondaga, Schuyler, Seneca, Tioga, and Tompkins*) –

Broome County SWCD
Phone: 607-724-9268

Cayuga County SWCD
Phone: 315-252-4171

Chenango County SWCD
Phone: 607-334-8634 ext. 108

Cortland County SWCD
Phone: 607-753-0851

Madison County SWCD
Phone: 315-824-9849

Oneida County SWCD
Phone: 315-736-3334

Onondaga County SWCD
Phone: 315-677-3851

Schuyler County SWCD (also covering Chemung County)
Phone: 607-535-9650

Seneca County (located in Cayuga SWCD)
Phone: 315-252-4171

Tompkins County SWCD (also covering Tioga County)
Phone: 607-257-2340

Western New York (14 counties of Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Steuben, Wayne, Wyoming, and Yates)

Seneca Trail Resource Conservation and Development (Allegany, Cattaraugus, Chautauqua, Livingston and Wyoming Counties & Seneca Nation of Indians)
Phone: 716-699-8923

Finger Lakes Resource Conservation and Development (Steuben County)
Phone: 607-776-7398 ext. 5 or email:

Eastern New York (6 counties of Albany, Columbia, Greene, Montgomery, Rensselaer, and Schenectady) -

Cornell Cooperative Extension of Greene County and Hudson Mohawk Resource Conservation and Development
Phone: 518-828-4385 ext.105 (RC&D)

NRCS State-wide Specialists:

Karen Hoffman, Animal Science/Nutrition
Phone: 607-334-4632, ext. 116

Counties not listed: contact your local USDA-Natural Resources Conservation Service or county Soil and Water Conservation District offices for more information.

Cornell Cooperative Extension County Offices

Albany County

PO Box 497 Voorheesville, NY 12186 518-765-3516

Allegany County

5435A County Rd 48 Belmont, NY 14813 585-268-7644

Broome County

840 Upper Front Street Binghamton, NY 13905 607-772-8953

Cattaraugus County

28 Parkside Drive Ellicottville, NY 14731 585-268-7644

Cayuga County

248 Grant Avenue, Suite 1 Auburn, NY 13021 315-255-1183

Chautauqua County

3542 Turner Road Suite 1 Jamestown, NY 716-664-9502

Chemung County

425 Pennsylvania Avenue Elmira, NY 14904 607-734-4453

Chenango County

99 North Broad Street Norwich, NY 13815 607-334-5841

Clinton County

6064 Route 22, Suite 5 Plattsburgh, NY 12901 518-561-7450

Columbia County

479 Rte. 66 Hudson, NY 12534 518-828-3346

Cortland County

60 Central Avenue Cortland, NY 13045 607-753-5077

Delaware County

CCE-Delaware PO Box 184, State Rt. 10 Hamden, NY 13782 607-865-6531

Dutchess County

2715 Route 44, Suite 1 Millbrook, NY 12545 845-483-9588

Erie County

21 South Grove St. East Aurora, NY 14052-2398 716-652-5400

Essex County

PO Box #388 Westport, NY 12993-0388 518-962-4810

Franklin County

355 West Main Street Malone, NY 12953 518-483-7403

Fulton County

The Johnstown Hotel 55 East Main Street, suite 210 Johnstown, NY 12095
518-762-3909

Genesee County

420 East Main Street Batavia, NY 14020 585-343-3040

Greene County

CCE Agroforestry Center 6055 Route 23 Acra, NY 12405 518-622-9820

Hamilton County

Piseco Common School, Room 20 P.O. Box 7 Piseco, NY 12139 518-548-6191
or 888-548-6191

Herkimer County

5657 St. Rt. 5 E. Herkimer, NY 13350 518-622-9820

Jefferson County

203 North Hamilton Street Watertown, NY 13601 315-788-8450

Lewis County

PO Box 72 Outer Stowe St. Lowville, NY 13367 315-376-5270

Livingston County

158 South Main Street Mt. Morris, NY 14510 716-658-3250

Madison County

PO Box 1209 Morrisville NY 13408-1209 315-684-3001

Monroe County

249 Highland Avenue Rochester, NY 14620 716-461-1000

Montgomery County

55 East Main Street The Johnstown Hotel, Suite 210 Johnstown, NY 12095
518-762-3909

Niagara County

4487 Lake Avenue Lockport, NY 14094-1139 716-433-2651

Oneida County

121 Second St. Oriskany, NY 13424-9799 315-736-3394 x129

Onondaga County

The Atrium, 2 Clinton Square Syracuse, NY 13202 315-424-9485

Ontario County

480 North Main St Canandaigua, NY 14424 585-394-0377 x30

Orange County

Lucy Joyce Community Campus 1 Ashley Avenue Middletown, NY 10940
845-344-1234

Orleans County

20 South Main St. Albion, NY 14411-0150 585-798-4265

Oswego County

3288 Main Street Mexico, NY 13114 315-963-7286

Otsego County

123 Lake Street Cooperstown, NY 13326 607-547-2536

Putnam County

Terravest Corporate Park 1 Geneva Rd. Brewster, NY 10509 845-278-6738

Rensselaer County

61 State St Troy, NY 12180 518-272-4210

Rockland County

10 Patriot Hill Dr Stony Point, NY 10980 rockland@cornell.edu 845-429-7085

St. Lawrence County

CCE-St. Lawrence 1894 State Highway 68 Canton, NY 13617-1448
315-379-9192

Saratoga County

50 West High Street Ballston Spa, NY 12020 518-885-8995

Schenectady County

PO Box 497 Voorheesville, NY 12186

Schoharie County

173 South Grand Street Cobleskill, New York 12043 518-234-4303

Schuyler County

Rural-Urban Center 208 Broadway Montour Falls, NY 14865 607-535-7161

Seneca County

PO Box 748 Waterloo, NY 13165 315-539-9252

Steuben County

3 East Pulteney Square Bath, NY 14810 607-664-2316

Suffolk County

423 Griffing Ave Riverhead, NY 11901 631-727-7850

Sullivan County

69 Ferndale-Loomis Road Liberty, NY 12754 845-292-6180

Tioga County

56 Main Street Owego, NY 13827 607-687-4020

Tompkins County

615 Willow Ave Ithaca, NY 14850 607-272-2292

Ulster County

10 Westbrook Lane Kingston, NY 12401-2928 845-340-3990

Washington County

415 Lower Main St Hudson Falls, NY 12839 518-746-2560

Wayne County

1581 Rte 88N Newark, NY 14513 315-331-8415

Westchester County

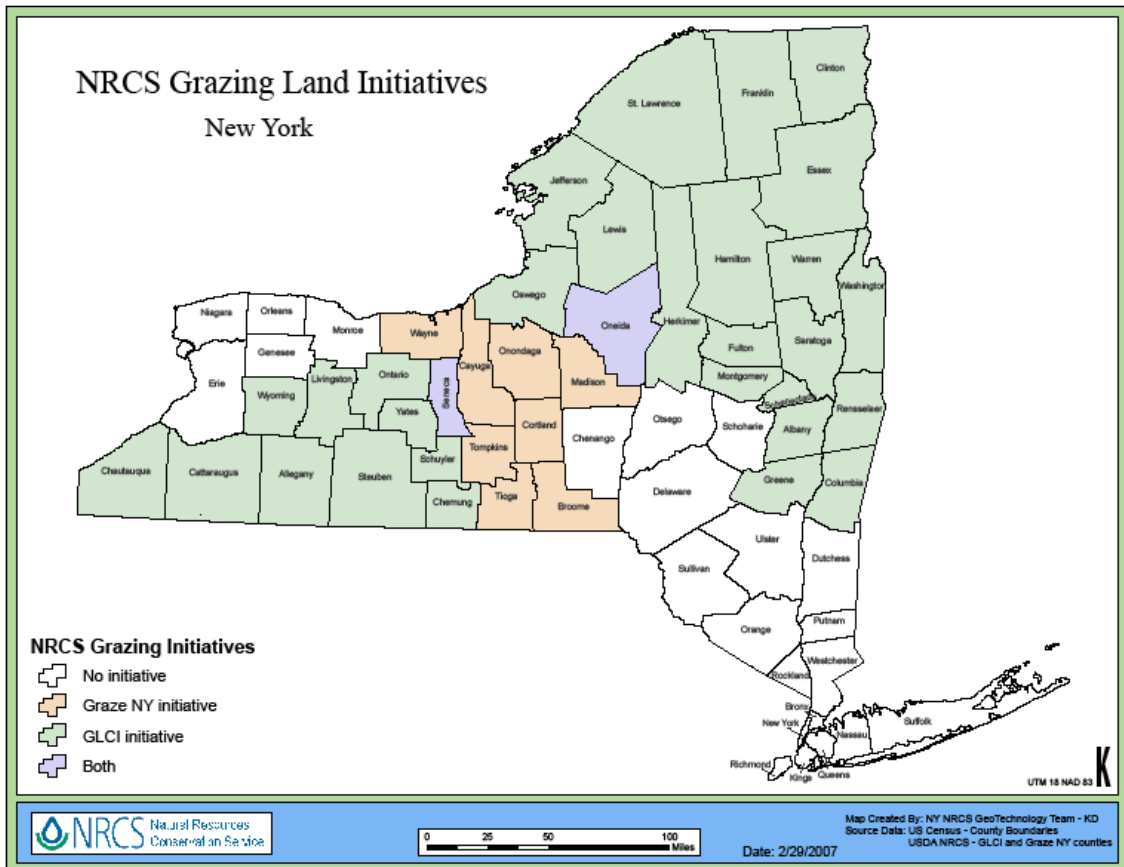
26 Legion Dr. Valhalla, NY 10595 914-285-4620

Wyoming County

401 North Main Street Warsaw, NY 14569 585-786-2251

Yates County

417 Liberty Street Penn Yan NY 14527 315-536-5123



References

- Bartlett, K. and J. Grace. (2008). *The benefits of grazing.....beyond grass!*. Bath, NY: Cornell Cooperative Extension of Steuben County.
- Cherney, J.H. (2008). Forage-livestock systems at Cornell: Looking towards the future. Web-site Retrieved April 28, 2010 from <http://www.forages.org/forage.asp>
- Chorney, B and Josephson, R. (1999). *A Survey of Pasture Management Practices on the Canadian Prairies With Emphasis on Rotational Grazing and Managed Riparian Areas*. Winnipeg, Manitoba: University of Manitoba, Faculty of Agricultural and Food Sciences, Department of Agricultural Economics and Farm Management.
- Conneman, G. J. Grace, J. Karszes, J. Degni, D. Munsee, L. Putnam, et al. (2007). *Dairy farm business summary: Intensive grazing farms New York 2006* (E.B. 2007-13). Ithaca, NY: Cornell University, Department of Applied Economics and Management.
- Daley, C.A., A. Abbott, P. Doyle, G. Nader, and S. Larson. (2004) *A literature review of the value-added nutrients found in grass-fed beef products*. Chico, California: California State University Chico. Retrieved April, 15, 2010 from <http://www.csuchico.edu/agr/grassfedbeef/health-benefits/index.html>
- Dhiman, T.R., G.R. Anand, L.D. Satter, and M.W. Pariza. (1999). Conjugated linoleic acid content of milk from cows fed different diets *Journal of Dairy Science*, 82, 2146-2156.
- Emmick, D. L., D.G. Fox, and R. Seany, (1990, June). *The effects of grazing systems on forage and cattle productivity*. Proceedings of the American Forage and Grasslands Council, Blacksburg, VA.
- Fanatico, A. (2006). *Alternative poultry production systems and outdoor access*. Retrieved April 26, 2010, from ATTRA - National Sustainable Agriculture Information Service Web site: <http://attra.ncat.org/attra-pub/poultryoverview.html>
- Fanatico, A. and Rinehart, L. (2009). *Raising dairy heifers on pasture*. Retrieved April 26, 2010, from ATTRA - National Sustainable Agriculture Information Service Web site: <http://attra.ncat.org/attra-pub/dairyheifer.html>
- Farmland Information Center. (2007). *Factsheet: Cost of Community Services*. Retrieved April 15, 2010, from http://www.farmlandinfo.org/documents/27757/COCS_09-2007.pdf
- French, P., C. Stanton, F. Lawless, E. G. O'Riordan, F. J. Monahan, P. J. Caffrey, et al. (2000). Fatty acid composition, including conjugated linoleic acid, of

- intramuscular fat from steers offered grazed grass, grass silage, or concentrate-based diets [Electronic version]. *Journal of Animal Science*, 78, 2849-2855.
- Gegner, L. (2004). *Hog production alternatives*. Retrieved April 26, 2010, from ATTRA - National Sustainable Agriculture Information Service Web site:
<http://attra.ncat.org/attra-pub/PDF/hog.pdf>
- Gerrish, J. (1998). *Weaning on pasture for low-stress beef production*. Forage Systems Update 7(4). Columbia, MO: University of Missouri. Retrieved April 15, 2010 from <http://aes.missouri.edu/fsrc/news/archives/nl98v7n4b.stm>
- Mathis, C. P., S. H. Cox, et al. (2008). Comparison of low-input pasture to high-input drylot backgrounding on performance and profitability of beef calves through harvest. *Professional Animal Scientist*, 24, 169-174.
- National Agricultural Statistics Service. (2005). *NY Rural Landowner Survey*. Retrieved from April 15, 2010 from http://www.agmkt.state.ny.us/rl_survey.pdf
- Ochterski, J. (2005). *Grassland Birds Regional Pasture Use Inventory*., Montour Falls, NY: Cornell Cooperative Extension of Schuyler County.
- Perry, T. W., R. C. Peterson, et al. (1974). A comparison of drylot and conventional cow herd management systems *Journal of Animal Science*, 38, 249-255.
- Peters, C.J., J.L. Wilkins, and G.W. Fick. (2008). Land and diet: What's the most land efficient diet for New York State?. *Rural New York Minute (Issue 19)*. Ithaca, NY: Cornell University, Community and Rural Development Institute.
- Rudstrom, M. (2003). *Pasture Versus Feedlot Growing Dairy Heifers: Summary of results for 2000, 2001 and 2002*.. Morris, MN: University of Minnesota, West Central Research & Outreach Center.
- U.S. Department of Agriculture (2009). *2007 USDA census of agriculture*. Retrieved August 26, 2009 from http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/index.asp.
- USDA-NRCS. (2003). *National Range and Pasture Handbook*. Grazing Lands Technology Institute.
- Williams, C. and Greene, B. (n.d.) *Opportunities for multistate research and educational programs to address equine industry grazing priority needs in the NE Region*. , New Brunswick, New Jersey: Rutgers University, and Burlington, Vermont: University of Vermont.