

## **Integrating Livestock Production into a Vegetable Cropping System: Pros and Cons, Dos and Don'ts**

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Crops and livestock have historically been integrated in New England farming systems with only the last 50 years showing a trend towards specialization in either single crops, diversified vegetables or livestock. In many cases, this specialization also developed into consolidation of commodity production. For example, in Maine, we see potato production focused in Aroostook County and dairy production in Central Maine. With this consolidation, there is a reliance on commercial fertilizer in Aroostook County for fertility in potato rotations and a concentration of manure nutrients in Central Maine where the largest source of soil fertility is actually being imported through purchased grain to feed dairy cows and young stock. Most of these nutrients into livestock operations are coming from the Midwest and can potentially lead to excesses that cause environmental concerns with non-point source pollution.

Recently, there has been increased discussion of diversification and re-integration of crop and livestock operations. There are two scales of integration that are often discussed; (1) within farm integration where a crop or dairy operation diversifies and adds another enterprise and (2) among farm integration or “coupled” farms where two or more operations share land, manure nutrients, forage and grain crops grown in rotations. These coupled operations allow individual specialization, but allow sharing of nutrient and land resources, hopefully benefiting both operations.

When evaluating the benefits of integrated systems, it is obvious that organic vegetable producers would benefit from the improved flow of nutrients from manure produced from a livestock enterprise. This is especially true when one considers areas that are deficient in soil phosphorus as feeding forages and grains through ruminants will improve phosphorus availability. Nitrogen from manure is also fairly rapid in plant availability during the growing season. This is of course dependent on the type of manure and bedding content, with poultry manure (cage layer) containing very little carbon and high nitrogen availability, to beef, sheep or horse manure which contains high amounts of carbonaceous material such as sawdust or shavings that may “tie up” nitrogen when applied to the soil.

So more specifically, what are the benefits of including livestock into your vegetable operations?

- 1) A source of nutrients that can be used for direct application and/or composting. By combining livestock and vegetable production, your whole farm nutrient balance of imports and exports becomes more even.

- 2) Along with nutrients, manure and compost applications tend to improve soil organic matter, biological activity and potential disease suppression. This improved “soil health” will manifest itself quickly and include improved soil nutrient cycling, improved soil structure, better water holding capacity in droughty soils and improved drainage in heavy soils.
- 3) Livestock operations improve the potential for profit in lands that are in a “sod” rotation. Sod crops help to build soil structure (grass roots) and soil drainage (legumes/alfalfa). Sod crops high in legume content will also provide a source of nitrogen when those fields are returned into the row crop rotation.
- 4) Livestock provide a use for crop residue and waste or cull vegetable crops. This can help to reduce disease prevalence while providing a “cheap” source of feed for livestock. Cows turned into a field of pumpkins in November provide great feed for the cows and help vegetable producers clean up a field!
- 5) Grain crops used by vegetable operators as cover crops can fit well into livestock rotations. Winter grain crops provide fall nutrient catch, weed control in both fall and spring, and can be undersown with clover or other legumes to provide nitrogen in subsequent rotations and a sod crop establishment with minimum tillage.
- 6) Adding livestock products to your marketing can help improve cash flow in the winter and add a new aspect to CSA operations.
- 7) While not always discussed, successful “coupled” animal/vegetable operations can also help to build community with a farm region. Coupled operations also tend to share machinery resources and labor resources during busy periods.

While there are many positives to integrating livestock and vegetable operations, there are also some risks and issues. Most involve the use and handling of livestock wastes and effluent from feeding operations. Organic operations have specific guidelines for the use of manure and manure composts. Un-composted manure is permitted under organic rules if it is applied 120 days prior to harvest of crops where the edible portion has direct contact with the soil or soil particles, or at least 90 days prior for crops where the edible portion does not have direct contact with the soil or soil particles. Livestock manure may be used on crops that are not for human consumption without waiting periods before harvest. Manure tea and liquid manure have the same restrictions. Composting eliminates these “waiting” periods, but involves time and temperature monitoring for pathogen reduction.

Additionally, new USDA guidelines for GAP (Good Agricultural Practices) certification tend to discourage the use of manure or adjacency with livestock operations. Since many new markets are now demanding GAP certification, many vegetable producers may be hesitant to integrate. While GAP guidelines discourage integration, it does not eliminate the potential. GAP certification and the audit process is a point system. Involving manure and animals into your operation means that while you lose points in that section, your operation needs to be “tighter” in other portions of the audit to pass. Please be aware that having your dog run through your fields, processing area or storage will also cause you to lose points under GAP!

Below is a list of links to information regarding food safety and the use on manure in vegetable operations. There are also links to learn more about the GAP audit and certification process.

Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables  
<http://www.cfsan.fda.gov/~dms/prodguid.html>

Food Safety Begins on the Farm [http://wcmorris.com/gap/files/cornell\\_guide.pdf](http://wcmorris.com/gap/files/cornell_guide.pdf)

National GAPS Educational Materials at Cornell  
<http://www.gaps.cornell.edu/educationalmaterials.html>

USDA Good Agricultural Practices & Good Handling Practices  
Audit Verification Checklist  
<http://www.ams.usda.gov/fv/fsis/GAP%20&%20GHP%20Checklist%20May%202007.pdf>