

# Here Comes GAP Certification!

## *The inside story of a Vermont farmer going for USDA GAP certification.*

*Compiled by Hans Estrin, UVM Extension, with support from Vermont Agency of Agriculture, Food, and Markets, (9/13/10 Draft, 12/9/10 Revised)*



30,000 Heads of Lettuce a Week on Harlow Farm!

### **A Snapshot of Paul and Harlow Farm**

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This is **Paul Harlow's story**, owner and manager of **Harlow Farm** in Westminster, VT as he prepares Harlow Farm and its employees for **USDA GAP** (Good Agricultural Practices) Food Safety Audit and Certification during the summer of 2010.

From one angle, Paul Harlow is a typical Vermont farmer. His farm has been in the family for three generations, since 1918, and during WWII, his grandfather (a Paul as well) was selling produce at the precise location of today's Harlow Farm stand and cafe. Harlow Farm now remains in the family. Paul's brother Dan runs the stand while his sister, Susan helps with marketing and adds value with her preserves sold at the stand. Paul's son Evan works on the Farm



Paul with daughter Hannah

helping to manage things in the field, and keeping the computer running.



Harlow Farm Stand on Rt. 5 Westminster, VT

Like so many other large farms, Paul's 20-plus employees are significantly international, with many returning year after year from Jamaica on the H2A program. Also like many other farmers, Paul is active in the community outside the farm; he serves on the town selectboard and has chaired it for several years.

But clearly Paul and the Harlow Family Farm also deviate from the typical. For over three decades the Harlows have led the organic produce movement in the region.

Paul bought the farm from his parents in 1975, and in his mid-twenties he knew farming was in his blood to stay. He started growing organic vegetables on a quarter acre, before the word "organic" came into popular use. Within a decade NOFA was rooted, and his entire operation was certified Organic.

As a creative and calculated risk taker Paul and his brothers, including Tom, who has since moved out of the area, invested time and resources into making organic produce widely available. In 1985, they helped form Deep Root Organic Cooperative, which significantly increased the quantity and predictability of wholesale organic produce in the New England. Though Paul and Tom have moved on, Deep Root continues to thrive today, aggregating farms and resources to supply organic produce to retail Coops throughout the region.



Field Packing Lettuce

Paul now grows over 40 crops on about 130 acres. With Tom, he started his current company, Westminster Organics, in 2001.



The Harlow Family Farm

Today, with over 20 employees, Westminster Organics grosses around 1 million dollars annually. Paul's main crop, lettuce, accounts for about 30% of sales and 30,000 heads planted each week. Other major crop types include root crops (25%), brassicas (20%), and squash (10% of sales).

Paul has thrift in his bones. By buying, trading and maintaining used equipment, converting the old barn to a packing house with cold storage, and doing his own construction and excavation, he has minimized overhead and remained profitable through a changing climate and market.



Mums at Cafe Loco

Organics accounts include Whole Foods and Red Tomato, Paul aims to feed more folks in his community. He supplies the likely local markets, selling to the area coops, and soon to Hannaford, the local supermarket.

But he also sees value and potential in cultivating future more equitable markets. For years, he has offered produce to nearby schools. In 2009, He partnered with other farmers to launch and run the Windham Farm and Food Network, a local school and institutional wholesale market delivering to local cafeterias in the Windham County Area. And he also works with the Vermont Food Bank gleaning Program to channel a significant amount of fresh Harlow produce into the local meal centers and shelters for those in need.

While cultivating from the seat of his tractor, Paul is continually on the lookout for ways to support, build capacity and strengthen the food system in his community.



Most recently, Paul has focused on diversifying his products and markets. In 200, Paul's brother Dan expanded the farm stand to include more value added products such as flowers and preserves in addition to a local foods café call Café Loco.

He has increased production and distribution of organic pork, chicken and eggs. Although the biggest Westminster



At the Counter in Café Loco

## Vermont's Food Safety Landscape

Food safety regulations have been in place for many decades with regard to dairy, meat, seafood and other perishable products. Only recently has food safety become an issue around fresh produce, after widely-publicized health scares associated with crops like spinach, tomatoes, strawberries and sprouts.

In general, the illnesses that led to these scares were associated with farms and/or distributors that deal in large volumes of produce for the commodity food system. In other cases, while produce was the carrier for a pathogen, it was never determined where in the food chain the produce became contaminated. Activities such as centralized processing and distribution may have been the culprits rather than farm practices



Baby Spinach from the infamous 2006 recall

In response to concerns about fresh produce food safety, the USDA developed Good Agricultural Practices (GAPs) in 1998. GAPs are a voluntary set of produce safety standards and practices intended to minimize microbial contamination during the growing, harvesting and packing of fresh fruits and vegetables. GAPs, which have been updated in recent years, include guidelines for farm employee hygiene, sanitary facilities, manure management, irrigation and wash water quality, produce storage and handling, pest and wildlife management, product trace-back after shipping, and other activities.

While farmers can self-document their compliance with GAPs, these standards also serve as the basis of an audit-based verification program that some wholesale buyers now require growers to complete. These market demands have effectively turned voluntary standards into mandatory requirements for growers wishing to sell to certain buyers.



With the health and safety of their shoppers in mind, the Hannaford supermarket chain is getting the jump on food safety

Hannaford and Price Chopper supermarket chains, for example, are requiring their growers to begin implementation of GAPs in 2010. While specific requirements vary between companies, their ultimate goal is to provide safer food and food safety information for the benefit of their customers. With large retailers taking the lead, it is likely that before long many, if not most, fruit and vegetable buyers will require growers to complete GAP audits too.

The challenge for small and medium size growers is that GAPs is oriented toward larger farms--and their typical workforce, management capacity, available capital, etc. Thus, GAPs can be problematic for producers who lack the financial and human resources necessary to comply with GAPs. While Vermont has modest funding to help growers

cover the fees associated with an audit, that cost is relatively insignificant compared to the overall cost of record keeping, materials and infrastructure that are often needed to comply with GAP procedures.



Amanda Thurber at Lilac Ridge Farm Stand in W. Brattleboro. Diversity of products and markets is the key for small Vermont produce farms.

In Vermont and many other states small and medium scale vegetable and fruit farms that rely primarily on direct markets far outnumber those that grow primarily for wholesale markets. Of course, many farms utilize a mixture of direct and wholesale markets. Among small farms as well as mid-size farms reconsidering the importance of wholesale markets in light of GAPS, there is strong interest in assuring food safety on fruits and vegetables, but not necessarily through a formal GAPs audit.

better fits their scale and available resources. They want to provide assurance to their customers, protect their markets, and prepare for the eventual implementation of food safety legislation that appears likely to require many if not all fruit and vegetable farms to address food safety risks in some way.

Many growers are interested in an alternative food safety program that

### **How did Harlow Farm approach and gear up to get GAP certified?**

Although the risk of pathogens on small-farm produce seemed minimal, Paul has intuitively thought about the safety of his crops for as long as he has farmed.

“Like many farmers, I have always focused on improving the quality of my crops and soil; to me this has been synonymous with food safety. Healthy harvested crops must move quickly and cleanly to cold storage, and then the cold chain should be maintained.”

Also like many farmers, Paul loathes the idea of the government mandating how he must farm. After Paul caught wind of USDA GAP Certification and food safety regulations coming to Vermont in 2009, he commented several times, and only part in jest that “GAPs is what will finally put me out of business!” This case study will unwrap and examine Paul’s worst fears. It will lay bare the challenges, costs and benefits of this one farm going GAP. Although Harlow farm is unique, the case widely applicable, and we help it will help other farmers and service providers navigate certification and minimize food safety risk within their own landscape.

### **USDA GAP in a Nutshell**

In reality, although certification is by all measures a major undertaking, the bark of USDA GAP may be worse than its bite. For starters, you only need 80% compliance within each of the following five farm-based major categories:

1. General section
2. Farm Review
3. Field Harvesting
4. Packing House
5. Storage and Transport

Each of these major categories is comprised of about 15-30 criteria, with each criteria assigned points based on its importance (Appendix 1 or <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5075122> ). Farms may elect to “fail”

certain criteria and still pass the related section, and the entire audit. For example, Paul’s wooden storage bins need repair and will cost about \$60,000 to replace with plastic. Without bottomless pockets, he may elect to fail this criteria (Appendix 1 Section 4-9) and only lose 5 points out of 250. In fact, Paul could lose up to 50 points in this section and still pass! (Appendix 2-GAPS Work Sheet illustrates this concept and allows farmers to play out different points scenarios)



Although USDA GAP certification adheres to myriad uniform standards that are often a poor fit for small diversified farms, the process does have a human face. In Vermont, there is currently one chief auditor, who needs to interpret the criteria in the spirit of minimizing risk, and arbitrate point awards. This human face is essential, because each farm is unique, and there is much room for interpretation of standards. Interpretation will often work in favor of the farmers efforts, yet it is double edged, because points may be lost where least expected. Therefore farms should play it safe, and aim to pass 90% or more of the criteria.

Finally, besides helping to minimize pathogen risk, GAPs may provide additional indirect benefits. Some certified farmers maintain, for example, that the added cleanliness and communication have made for a more efficient and positive work environment, adding up to more fun and significant cost savings. Furthermore, as more distributors like Red Tomato and retailers like Hannaford start requiring GAPs, Farms that are already certified will no doubt find markets opening up around them.

In Fact, Hannaford Supermarkets want all their local growers GAP certified now, but recognize that it will take time. Thus, in the 2010 season, they have mandated that growers certify just one crop for the General Questions and Parts 1(Farm Review) and 2 (Field Harvest and Packing). This, they argue, will push farmers to write a food safety plans and get familiar with the process without having to take on too much at once.

So although no one is yet forcing Paul Harlow to get GAP certified, Hannaford is offering a baby step, and the major distributors to which he sells are already requiring food safety audits for

certain specialty products like Romaine hearts that Paul packs. Paul sees the writing on the wall and wants to prepare for market change, and the looming consumer demand for safe food certification.

Again, Paul is not alone. Although only five Vermont farms were GAP certified in 2009, about 25 more are in the pipeline for 2010. In fact, the State has hired another full-time employee to help support state GAP auditor Steve Parise, and they are still inundated.

### **Harlow Farm Gears up for GAPs**

As Paul initially looked into the criteria behind GAP, he saw many of them as “onerous government mandated regulations that don’t seem to apply to small diversified operations”. For Paul, the most senseless and acrid of these criteria focused on control of animals around crops.

When asked, Paul gets right to the heart of his looming fear, “There hasn’t been much of a rodent problem since my cat’s been around. Now I’ll probably have to shoot my cat and shoot my dog and go spend money on rodent traps and bird deterrents. It really rubs hard against the basic organic farming principle of building natural predators on your farm”. Although it is too soon to tell, Paul also predicts that much of the detailed record keeping may be a waste of time and money.

On the positive side, Paul knows that the increased standards for operation cleanliness and personal hygiene will further minimize food safety risk and improve the overall work atmosphere and productivity. And there is good news for the pets—Harlow farm can spare their lives and still easily pass the GAP Audit.

So despite some deep reservations, Paul Harlow, the-ever-open-minded-risk-taker, placed his bets, did not sell his farm, and committed to getting Westminster Organics GAP certified, starting in 2010, on the Hannaford’s time-line.

Paul’s delegation skills got him off to a good start. When he learned that one person had to direct the farm’s food safety practice, for example, he mused for a day or two and then promptly hired Bruce Macintosh as a general manager. Although Bruce is learning to farm on the job, he brings lots of management experience and is good with people. Paul recognized that tight management was going to be key to success with GAPs, and so he got serious.

Paul also welcomed process support of UVM Extension. He recognized he would need help and Extension saw an opportunity to complete a case study of Harlow Farm while building knowledge and tools to help other Vermont farmers navigate the changing food safety landscape.

In gearing up for GAPs, Paul Harlow followed this process:

- **Hosted an initial farm “walk-through”** with UVM Extension’s vegetable specialist Vern Grubinger and local foods coordinator Hans Estrin (3/19/10). During this walk-through some of the major questions and concerns were addressed to help prepare for a “Mock Audit” in a month. For example, Paul re-engineered a portion of his farm to minimize livestock run-off (details below), hired Bruce as general manager and thoroughly cleaned and organized the packing house.
- **Hosted an on-site “Mock Audit”** with Steve Parise (State Auditor), Ginger Nickerson (Extension’s GAPS support specialist), Bruce Micintosh (new Harlow Farm General Manager) and Vern Grubinger and Hans Estrin (4/24/10). *This meeting helped Harlow Farm take stock of their challenges while serving as a training for UVM Extension.*
- **With UVM Extension, drafted of GAP Audit worksheet** to help predict farm-specific GAP scores and costs (4/9/10—Appendix 1 and 2). *These documents including Appendix 3 below) were produced by Hans Estrin in consult with Paul. Again they had the double purpose of helping Harlow Farm and training UVM Extension to help other farmers.*
- **With UVM Extension, drafted the Harlow Farm Food Safety Plan** (4/8/10—Appendix 3). This document was document was produced by Hans and Paul based on the a Food Safety template provided by Hannaford Supermarkets.
- **Completed an Action Time-line** (4/9/10--Below)
- For 2010 and 2011, **assessed Harlow Farm’s issues and costs related to meeting specific criteria within the GAP audit** (6/1/10- This study and Tables 1 -3). These issues, costs and product links were compiled by Hans Estrin in consultation with Paul Harlow, Steve Parise, Vern Grubinger and Ginger Nickerson. Although we have done our best to accurately estimate needs and costs, it is important to realize that a farm is ever changing, and the auditor must arbitrate based in the moment and based on observation. So this assessment should be treated as suggestion not prophecy. There is also no one right way to prepare for the USDA GAP audit. In this report, to keep it simple, we have outlined two ways, higher budget and lower budget. Both budgets, we hope, will support Harlow Farm in becoming GAP Certified. As the budget decreases, the potential risk of audit failure increases.
- Passed Initial Gap Audit Certifying Kale on September 10, 2010.

## Harlow Farm GAP Certification

### *Action Timeline*

Test irrigation water and retests spring water	By April 13
Paul H reviews Farm Food Safety plan and decides to proceed or not with GAP	April 2010
Paul H schedules GAP Audit for end of 2010 harvest season	May 2010
Paul H Submits Hannaford Growers paperwork	April 2010
Complete trial record keeping and cleaning trial for Mock Audit including packing house	May-July 2010
Buffer livestock for Mock Audit	By late April 2010
On-site Mock Audit for General and Parts 1,2 of GAP for Summer Squash, walk-through packing house	April 26, 2010 10:30-12:00
Continue GAP practices/record keeping for General, Parts 1,2 for Summer Squash	Summer, 2010
Estimate needs and costs for GAP part 3	Summer, 2010
Complete partial GAP Audit	September 10, 2010
Prepare for GAP Part 3—Packing House Audit	Winter/Spring 2011
Complete entire GAP Audit	Summer/ Fall, 2011

## Summary of Costs, Issues, and Recommendations

### **YEAR 2010—The First Step**

Because of the wash-free field packing, Paul and Bruce decided to certify Kale for the first step in 2010, and passed GAP'S general section and parts 1 and 2 on September 10th. The total cost of GAP Certification for year 1 (capital improvements and all labor) is estimated at just over \$5,000 (around 0.5% of gross sales) (See Table 1). Annual labor is estimated at about half of that total (\$2,600). Summarized below are the significant issues that Paul Harlow will address to become GAP Certified over the next two years, including reference to related criteria in the GAP Audit Checklist ([http://www.uvm.edu/vtvegandberry/GAPS/USDAAuditChecklist\\_Nov09.pdf](http://www.uvm.edu/vtvegandberry/GAPS/USDAAuditChecklist_Nov09.pdf)). (Also see Table 2 and 3 low and high cost estimates)

This 1,000 gallon cistern and pressure tank supply water at Harlow Farm



**Water—Potable water must be available for workers and for washing produce and bins (G-3 and 2-15).** Harlow Farm’s water is spring fed, running with gravity into a 1,000 gallon white plastic cistern shown on the left. The blue steel tank pressurizes the water which is then piped to throughout to packing house and to the farm house. This spring water tastes great and has never made anyone sick but it tests positive for a minor amount coliform bacteria.

This likely indicates that a small amount of soil is getting into the spring. Because of the coliform, however, this spring water is not considered “potable”.



This \$1,200 (installed) UV filter kills soil bacteria, making spring water potable

The least expensive and environmentally benign method of sterilization is to install a UV filter (above right) to kill bacteria upstream of the cistern intake. This system was installed in mid-June 2010 for a cost of about \$1200.



Wind-row of composting manure next to crop land.

**Manure and Crop Buffers--Strom flow off manure piles should not run-off into crops (1-10, 1-17).** Harlow Farm piles and composts manure in several areas on-site. In some of the locations (one shown on left) there are currently not adequate buffers to prevent run-off from composting manure into crops. For this summer, the crop being certified (kale) will not be within range of run-off. But manure run-off and safe storage will need to be addressed next year, in order for Paul to certify all his crops.

Possible solutions include:

- Sub-contract all manure composting off-site (Paul estimates a \$10,000 cost increase)
- Relocating all composting operations areas that pose no run-off threat (cost of within farm transport significantly less—Paul guesses a couple thousand dollars)
- Planting a buffer of sweet corn to absorb all runoff from lee-rows (cost of potential crop loss currently unknown)



These laying hens are up-hill and 40 feet across a gravel drive from an entrance to the packing house

**Packing House Buffer—  
Livestock field runoff should not contaminate the side entrance of the packing house (1-8).**

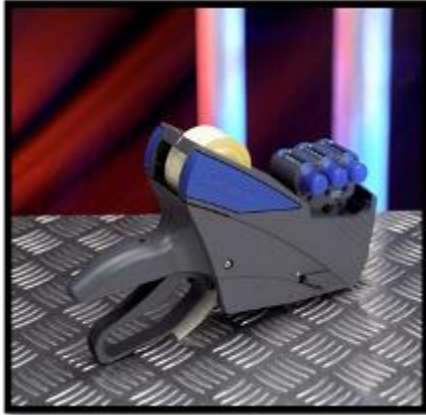
Currently, pigs and chickens graze in the field adjacent and uphill from the packing house (shown left). Paul needs to ensure that storm flow does not run of livestock fields and into the packing house side entrance (photo). With an excavator, Paul amplified and existing berm in the farm road, added gravel, and increased the sod buffer between pasture and the road. The in-house

cost of this procedure was \$500.

**Packing Crates—Packing crates must be cleaned before use and stored under cover (2-6).** Currently, plastic packing crates are cleaned before each use but are often stored outside on the washing/loading dock over which sparrows are nesting. The most cost effective solution is to build a modest shed roof over the loading deck, under which to store crates. A roll-down tarp would ensure that crates stay clean and dry when being stored (Estimated cost: \$500 for minimal roof and trap walls). Sanitizing the crates 3 times/season will cost about \$36 for 3 hours labor.



Washing produce on the dock with stacked plastic crates against the outside wall



Part of a simple solution to tracking product

**Traceability**—All produce units leaving Harlow Farm must be traceable by date, farm Name and Harvest location(1-26, 2-21). Harlow boxes are already labeled with the farm name. Paul plans to use a \$100 pricing gun to label all cases with a harvest date (<http://www.pricinggunsworld.com>) . Pre-existing accounting software (Quickbooks) invoice will record harvest field location of all shipping units. Total cost of a traceability program will include the \$100 pricing gun and the minimal time required to stamp each box and to enter a harvest field code for each invoice item.

**Record Keeping**—Many of the GAPS criteria require documentation, which means regular communication and record keeping (see Appendix 5—Harlow GAPS Checklist). Initial estimates (20 minutes a day for 240 days/year at \$20/hr) suggest that it will cost Harlow Farm about \$1,500 year in labor to keep records for GAP certification. This estimate can only be tested with direct experience, and does not include gap related management issues that are sure to surface regularly.

**Other Minor Expenses**—Training new workers, more frequent bath and lunchroom cleaning, pre-harvest checks, sterilizing harvest equipment, and performing a mock recall are predicted to cost around \$700 in labor. Here again, experience is needed to accurately assess costs.

Table 1—Cost Estimate for Partial USDA GAP certification at Harlow Farm in Westminster, VT (year

Criteria	NEED	Description	Labor need	Initial Investment	Annual Cost	First Year Total
<b>GENERAL SECTION</b>						
	General Record Keeping	GAPS Manager record time	.3hr/day x 240 days x \$20/hr	\$ -	\$ 1,400	\$ 1,400
G-1	Traceability Program	Pricing gun and labels	15 min/day x 280 days	\$ 100	\$ 700	\$ 800
G-2	Mock Recall	NA	ONE TIME 3HR @ \$20/HR	\$ 60		\$ 60
G-3	Potable water for Workers	UV Filtration into Cistem		\$ 1,200		\$ 1,200
G-5	Sanitation Training	NA	30 MIN/EMPLOYEE *\$20/HR	\$ 200		\$ 200
G-9	Clean Restrooms		R		\$ 280	\$ 280
<b>PART 1--Farm Review</b>						
1.8	No animal run-off into crops	buffer livestock/excavation/gravel	NA	\$ 500		\$ 500
1.12	Fields checked for animal sign	NA	.02HR/DAY x 240 DAYS X \$10		\$ 48	\$ 48
<b>PART 2--Field Harvest and Packing</b>						
2.1	Pre-Harvest Assessment/Area	NA	.17 HR/WK X 32WKS X\$20		\$ 109	\$ 109
2.6	Harvest containers cleaned	Build Tarp Container Cover and Sanitize 3 X YR	HOURS/SEASON X\$10/HR	\$ 500	\$ 30	\$ 530
2.7	Hand harvest tools (knives, etc)	NA	.08 HR/WK X 40WKS X\$10 TO MAINTAIN BUCKET		\$ 35	\$ 35
<b>TOTAL COST</b>				<b>\$ 2,560</b>	<b>\$2,602</b>	<b>\$ 5,162</b>

## Full-GAP Compliance in the Future—Time to get Serious!

Although currently Hannaford is helping its growers by only requiring one crop to pass the first three sections of GAPs in 2010, Paul aims to certify his whole operation in the next year or two. To be prepared, he wants his significant crops to pass all on-farms sections of USDA GAPs shown below (See Appendix 1):

1. General section
2. Farm Review
3. Field Harvesting
4. Packing House
5. Storage and Transport



Headquarters of Harlow Farm at Westminster Station, VT

In short, the entire operations needs to be certified—all major crops—from the field to the packing house, into storage and out on the truck. Although this is a major undertaking, Paul hopes that a year of practice with one crop will position him for the next big step.

Below is a summary of major issues and potential cost posed by the full audit in 2011. Each issue is reference with its related criterion. Table 2 (below outlines the High and low budget approaches to GAPS compliance).

**Field Sanitation Units**—Nearly all Paul Harlow's fields are within a  $\frac{1}{4}$  of a restroom and therefore field sanitation units (portable toilets) will not be required for workers (2-2, 2-3). There are a couple outlying leased fields, however, that may rarely require the work crew to take a hand washing station as well as provide potential transport to a toilet facility. Hand washing stations range from 5-gallon



bucket/foot pump system for \$80 unit <http://www.riverconnection.com/>, to the all-in one plastic unit for \$600 (<http://www.allsafetyproducts.biz/product/ASP-PSW1-1000GG>).

**Manure Storage**—To certify all crops in all fields (1-10, 1-17), as described above, on-site manure storage will need to change in 2011. As described above, the cost of this change could range from a couple to ten or more thousand dollars to modify the on-site process or purchase composed material

**Wooden bins**-must be clean and in good repair, not contributing foreign material to the stored root crops (2-8, 4-9)—Paul owns 300-400 oak pallet bins. Although functional, many of them are damaged in some way and in need of repair. For whole-sale replacement with plastic bins, Paul could buy 336 bins delivered in 3-trailerloads for \$165/bin, or \$56,600 total



An oak bin in need of repair...or...

(<http://www.duboisag.com/>) . Currently, this cost would require 10-year payback of \$5,700 or 0.6% of his gross sales. Given that each of the above criterion are worth only 5 points, Paul is likely to opt out of buying new bins and still pass the audit. His current plan, in fact is to buy a couple plastic bins to check them out



... a lighter durable plastic bin for \$200



Ice maker compressor and hydrocooler (orange box behind) under a shed roof at Harlow Farm

**Crop Cooling** —Currently, Paul employs a one-pallet hydro-cooler to quickly reduce the temperature of lettuce packed in the field. To comply with the GAP audit, this system must be in good repair and its recirculated water treated to reduce microbial contamination (3-5, 3-6) .

At a minimum, both the hydro-cooler and the ice maker will need repair of cracked surfaces that could harbor bacteria, costing as little as \$200 in labor and materials for an in-house repair.



Inner walls of the hydrocooler need patching and smoothing

More importantly, the chlorine concentration and pH of the re-circulated water must be monitored and adjusted. A combined system to continuously control chlorine and pH levels will cost over

\$2,000 (HANNA PCA 320-1). The cost of bleach reagent is minimal.

Hand-held monitors are less expensive (\$100-\$300), but will require hourly testing and manual adjustment of sanitizing water in mixing tanks. In sum, maintaining the hydrocooler will likely cost a few thousand dollars up front and continued monitoring and upkeep of the system.

Ideally, Paul should upgrade to a newer, more efficient vacuum cooling system. The primary advantages of vacuum cooling systems are that they save energy, water and chemicals, while maintaining postharvest quality of the produce, eliminating risk of wash-water contamination and bleach discharge.

These vacuum cooling benefits, however, come with a large price. A comparable sized unit will cost over \$60,000 (<http://www.agrefrigeration.com/>).

Although pricy, a 10-year annualized cost of \$6,000, amounts to less than 1% of gross sales and will improve the safety and quality of Paul's most important lettuce crop. Furthermore, cost-share monies from public or private sources may allow Paul to upgrade with a more manageable capital outlay, although such sources have yet to be identified.



A typical 1-pallet vacuum cooling system quickly draws heat out of leafy produce tissue by forcing evaporation under vacuum pressure.



It is impossible to keep a carrot washer dirt free, but screens and catchers should be non-porous and easy to wash with high-pressure spray

**Food Contact Surfaces**—All food contact surfaces should be smooth, non-porous and in good repair. (3-8). Most food contact surfaces at in the Harlow packing house are either wire-screen or nylon conveyor belt. There are also a few plywood catchers. To conform, these porous wooden catchers in the packing line must be replaced at a cost of couple hundred for an in-house job, to thousands of dollars for custom stainless steel. More regular pressure washing will also become standard procedure.

**Product Flow Lines**...Are protected from sources of contamination (3-9). The ceiling of the old timber-frame barn packing house at Harlow Farm is a porous dust-collector with exposed pipes and wires that is hard to

clean (photo). It is up to the auditor to decide if regular cleaning is enough to pass this criterion. If not, Paul may elect to lose the 10 points it is worth. The alternative would be to re-surface or

hang ceilings over product flow lines. The cost of these alternatives has not been investigated here.

**Light Covers**—All light bulbs must be covered to protect produce from broken glass (3-24)—Paul has over 30 lights in the entire packing house. At \$5 per light cover, it will cost about \$150 to protect produce from breaking bulbs. (Lunet light cover at [www.fireflyenergygroup.com](http://www.fireflyenergygroup.com)). The added benefit of these light covers will be to reduce bulb glare and improve light quality in the barn.



One of 32 lights in the Harlow packing house. if this breaks, glass could fall into produce.



These in expensive clip-on light covers can solve the problem.



This wireless temperature logger allows for continuous cooler temp monitoring on your PC.

**General House Cleaning**—Additional cleaning of about 4 person hours/week X 40 weeks is estimated—this amounts to \$1,500-\$2,000 annually.

**Temperature monitoring**—Records of walk-in cooler temperatures must be kept. This will require purchasing data logger and probes for around \$350 (<http://www.instrumart.com>).

**Lettuce Harvest Technique**—Efforts should be made to remove excess dirt or mud from the product being harvested (Criteria 2-16, and 3-2). Paul's current three-person lettuce harvesting technique is very efficient. Heads are cut by a cutter, placed on the ground for a moment until they are packed directly into crates by two packers. Crates are then transported directly to the hydrocooler and then to cold storage. Lettuce is generally not washed. This technique may need to be reexamined in light of GAPS. The replacement of this technique with one less efficient could cost tens of thousands of dollars in labor. (Estimate from Paul)

**Enclosed Packing House**—Packing house should be enclosed (criterion 3-20). Although bays can be open during operation, solid doors should close at the end of the day.



Open bay doors at Harlow Farm packing house. These currently have insulated covers that can be installed in the colder weather, but they are not easy to close.

Professionally installed garage doors for the packing house's four large bays could cost over \$10,000. In-house doors may be installed for thousands of dollars. This criterion, however, is only worth 5 points and could be "ignored" within a passing grade.

### **USDA GAP Compliance Summary**

At the end of the day, Paul, and many other farmers in similar positions, will need to decide if GAP certification is worth the effort. That decision depends on at least four factors Cost, Management, Commitment and Regulation.

**Cost.** In Paul's case the GAP price tag is high but likely manageable. The capital investment of full compliance could range from \$6,000 to \$130,000 (depending on compliance level-see Table 2 for details). When this investment is annualized over a decade **and** combined with GAP operating costs, we estimate **compliance will cost Harlow Farm between \$10,000 and \$32,000**

**annually.** This accounts for approximately 1-3 % of the farms total produce sales of one million dollars. Between cost shares and a minor pricing increase, Harlow Farm can afford it.

**Commitment.** If Paul wants to get out of farming in the next few years, Gap certification would likely not be worth the hassle. Change is stressful, and takes both an economic and mental push. We have annualized the investments over a decade. It is over that same decade that a farmer's commitment should be annualized.

**Management.** Someone needs to be in charge of each farms food safety program, and that person must take time each day to keep records, manage employees, track shipments, and keep order within the operation. In Paul's case, he wanted to focus on farming, and knew this was not the job for him. Given this clarity, and a general need for a field and operations manager, Paul hired Bruce to as an on-the ground manager. We predict Bruce will spend at least 30 minutes each day focused on GAP specific record keeping and employee management. Smaller farms may spend less time, but the need for consistency and attention is the same.

**Regulation.** Food safety regulation is a moving target and even experts know not what the future holds. Within one or two years, the USDA and/or FDA may end up revising and mandating food safety compliance from farms above a certain size. The legislative wheels are already turning at the federal level, with food safety bills under consideration. Mandate can also take the form of ground swell. Once supermarkets start advertising food safety certification of their produce in 2011, what will local consumers demand in the smaller markets? This uncertainty is unnerving and may push a farmer to get certified in order to play it safe. Certification is realistically a 2-year process, so it may be prudent to prepare for its future need rather than be left in the dust.



**How important will compliance with food safety regulations or market requirements be to your farm, or to farms you work with?**

Finally, the decision to “rock the boat” and get GAP certified is entirely personal. Each farmer must gather as much information and experience as possible, base their decision of fact and gut, and go with it in good faith.

**Table 2: Low – Cost Estimate for USDA GAP Compliance for Harlow Farm in Westminister Vermont.**

LOW COST ESTIMATES						
NEED	GAP Checklist Reference	Initial Investment	Annualized investment (10 yr)	Annual (Labor. Etc)	Annual Cost over 10 years	
Potable Water	G-3, 2-15	\$ 1,200	\$ 120		\$ 120	
Field Sanitation Units		\$ 90	\$ 9		\$ 9	
Manure Storage	1-10,1-17			\$ 2,000	\$ 2,000	
Packing house Buffer	1-8	\$ 500	\$ 50		\$ 50	
Packing Crate Storage	2-6	\$ 500	\$ 50	\$ 40	\$ 90	
Traceability	1-26, 2-21, 3-34,4-31	\$ 100	\$ 50	\$ 750	\$ 800	
Record Keeping			\$ -	\$ 1,500	\$ 1,500	
Employee training	G-5		\$ -	\$ 700	\$ 700	
Storage Bins (no action)	2-8, 4-9		\$ -	\$ -	\$ -	
Crop Cooling	3-5, 3-6	\$ 2,500	\$ 250	\$ 750	\$ 1,000	
Food Contact Surfaces	3-8	\$ 300	\$ 30		\$ 30	
Light Covers	3-24	\$ 200	\$ 20		\$ 20	
House Keeping	3-21, 22,23		\$ -	\$ 1,500	\$ 1,500	
Temperature monitoring	4-19	\$ 350	\$ 35		\$ 35	
Lettuce Harvest Technique	2-16		\$ -	\$ 3,000	\$ 3,000	
Enclosed packing House (no action)	3-20		\$ -		\$ -	
<b>LOW COST --TOTAL ESTIMATE</b>		<b>\$ 5,740</b>	<b>\$ 574</b>	<b>\$ 10,240</b>	<b>\$ 10,814</b>	

**Table 3: High – Cost Estimate for USDA GAP Compliance for Harlow Farm in Westminster Vermont.**

<b>HIGH--COST ESTIMATE</b>					
<b>NEED</b>	<b>GAP Checklist Reference</b>	<b>Initial Investment</b>	<b>Annualized investment (10 yr)</b>	<b>Annual (Labor. Etc)</b>	<b>Total Annual Cost</b>
Potable Water	G-3, 2-15	\$ 1,200	\$ 120		\$ 120
Field Sanitation Units		\$ 600	\$ 60		\$ 60
Manure Storage	1-10,1-17			\$ 10,000	\$ 10,000
Packing house Buffer	1-8	\$ 500	\$ 50		\$ 50
Packing Crate Storage	2-6	\$ 1,500	\$ 150	\$ 40	\$ 190
Traceability	1-26, 2-21, 3-34,4-31	\$ 100	\$ 50	\$ 750	\$ 800
Record Keeping			\$ -	\$ 2,000	\$ 2,000
Employee training	G-5		\$ -	\$ 700	\$ 700
Storage Bins (no action)	2-8, 4-9	\$ 55,600	\$ 5,560	\$ -	\$ 5,560
Crop Cooling	3-5, 3-6	\$ 60,000	\$ 6,000	\$ 750	\$ 6,750
Food Contact Surfaces	3-8	\$ 1,000	\$ 100		\$ 100
Light Covers	3-24	\$ 200	\$ 20		\$ 20
House Keeping	3-21, 22,23		\$ -	\$ 1,500	\$ 1,500
Temperature monitoring	4-19	\$ 350	\$ 35		\$ 35
Lettuce Harvest Technique	2-16		\$ -	\$ 3,000	\$ 3,000
Enclosed packing House (no action)	3-20	\$ 12,000	\$ 1,200		\$ 1,200
<b>HIGH COST --TOTAL ESTIMATE</b>		<b>\$ 133,050</b>	<b>\$ 13,305</b>	<b>\$ 18,740</b>	<b>\$ 32,045</b>