PROFILES IN SUSTAINABLE AGRICULTURE

Loon Organics

Minnesota Institute of Sustainable Agriculture

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PREFACE

Today's aspiring farmer is confronted with many sustainable agriculture resources, which generally fall into two categories: inspiring narratives and technical bulletins. This case study seeks to integrate these two types of resources into a technical case study format. It combines a detailed narrative with embedded technical assistance via links to finance, production, and marketing resources. This "one-stop shop" case study format provides beginning and transitioning farmers with both a motivating story and the contextual understanding needed for integrating the nuts and bolts of sustainable farming into a real-life enterprise. This prototype case study is intended for eventual inclusion in a database of case studies that is in development.

Recent trends related to local food and the changing demographics of American farms are creating a whole new enthusiastic generation of aspiring farmers. While this enthusiasm can carry beginning farmers through many an exhausting day in the field, a healthy dose of realism is essential to long-term success. According to Nick Olson, Farm Beginnings Organizer for the Land Stewardship Project, "Beginning vegetable farmers tend to fail for one of two reasons: weed pressure or financial pressure." Although it may seem logical to focus on learning how to grow crops and worry about the rest later, there is a "three-legged stool" of farming: production, marketing, and financial management. As the story of Loon Organics shows, when all three components are addressed from the outset, farming dreams can be realized.

You may have already discovered that "cookie cutter" approaches don't work well in farming; what works on one farm or for one farmer may not work for another. There is no formula or tool for getting you from A to Z, but the case study does step you through what beginning farmers need to think about before starting their own enterprise.

It is recommended you read through the case study once from beginning to end, then use it as a reference document and revisit appropriate sections as needed. Although a PDF version is provided, reading the case study online is optimal due to the number of external resources to which it is linked. The case study has also been laid out with as many internal links as possible to help you navigate the information and find resources that are relevant in multiple locations.

"Beginning vegetable farmers tend to fail for one of two reasons: weed pressure or financial pressure."

Resources are provided as links within the text and in various sidebars called “Educator’s Perspective: Resource Tips” or “Farmer’s Perspective: On the Bookshelf.” Other sidebars called “At A Glance” and “Farmer’s Perspective: Lessons Learned” provide supplemental details and insight.

Farmer’s Perspective: Lessons Learned

Adam and Laura’s Top Ten Pieces of Advice for Start-up Vegetable Growers

1. Work on vegetable farms of different scales, crops, soil types, and marketing outlets.
2. Seek and cultivate relationships with mentors.
3. Start small and increase business gradually. Learning how to have continuous product throughout the season is a genuine challenge.
4. Rent land and borrow equipment until you are confident of your long-term commitment to farming.
5. Support yourself off-farm for the first 4-5 years in order to reinvest all farming profits back into the business, save for future capital purchases, and avoid all debt other than a farm mortgage.
6. Join farmer-based agricultural organizations and engage in farmer-to-farmer learning opportunities such as tours, field days, conferences, and workshops.
7. Enroll in a farm financial planning and analysis course and get a great accountant.
8. Explore and take advantage of traditional farm programs, loans, and small business resources through the USDA, FSA, state agricultural departments, university extension services, and community colleges.
9. No matter what, take at least one day or half a day off each week.
10. Have fun and don’t forget your sense of humor!

ABSTRACT

Loon Organics was established in Minnesota in 2005. It is a certified organic vegetable farm that provides product to consumers through Community Supported Agriculture (CSA) subscriptions, a farmers market, and wholesale outlets. This case study describes how the husband-and-wife team became interested in farming, how they got their training, and how they transitioned from farming on land rented from mentors to buying their own 40-acre farm. Diverse aspects of their operation are described, including business and production planning, infrastructure and equipment, horticultural practices, and marketing models. The finances section is particularly detailed and valuable due to the financial data made available by Loon Organics. The unique challenges of managing an organic CSA operation are highlighted throughout the case study.

INTRODUCTION

Laura Frerichs and Adam Cullip sit side by side in front of their colorful flower garden, swatting away mosquitoes on a warm fall day (Figure 1). Laura calls out a greeting to a customer who has stopped by Loon Organics to pick up her weekly share of vegetables. It is clear that these young entrepreneurs have gotten comfortable in their role as market gardeners over the past five years and that they are already part of the community around their newly purchased land. Laura and Adam's story shows that combining hard work and dedication with excellent recordkeeping, planning, and marketing skills can put beginning farmers on the road to success.

Figure 1: Laura Frerichs and Adam Cullip in front of the flower garden on their recently purchased farm in Hutchinson, Minnesota.

ASSESSING AND PLANNING

Getting Started

Laura and Adam's story begins in 2003. They met while Laura was working a summer job at Gardens of Eagan, a 100-acre organic vegetable farm in Farmington, Minnesota, just south of the Minneapolis-St. Paul metropolitan area. She had recently finished college, and Adam was working toward a master's degree in industrial hygiene. Both were looking for something different than a career spent in a cubicle.

Although Laura and Adam did not set out to be farmers, their college degrees laid a good foundation for learning how to grow food and connect with people through Community Supported Agriculture (CSA). Laura has a bachelor's degree in anthropology, a holistic discipline that she thinks translates well to organic farming. Adam holds a bachelor's degree in biology with a minor in environmental studies.

Educator's Perspective: Resource Tip

Community Supported Agriculture

CSA is a model for agricultural production that has become more prominent in the U.S. since first introduced in the 1980s. The USDA[1] definition highlights the sharing of risks and benefits between consumers and producers. A summary of how CSAs work is available at Local Harvest. An ATTRA[2] publication provides more in-depth information on history, trends, research results, and examples.

[1]U.S. Department of Agriculture

[2]ATTRA, formerly known as the "Appropriate Technology Transfer for Rural Areas" project, is now the home of the National Sustainable Agriculture Information Service.

Hands-on Experience

Having caught the farming bug in the summer of '03, Adam and Laura set out to gain more hands-on experience. Much of their knowledge came from working at Gardens of Eagan over the next few years. They learned about all aspects of large-scale organic vegetable production, including soil health, fertility, pest management, and cover crops. They also saw all phases of production, from seeding to post-harvest handling. As Table 1 shows, they also worked at other types of farms in different locations in order to acquire a variety of skills and perspectives.

Figure 2: Adam and Laura took up Gardens of Eagan on the offer to rent land, where they are shown walking in August 2005.

Farmer's Perspective: Lessons Learned

If We Knew Then What We Know Now…

Adam and Laura place a high value on the training they received by working on a variety of farms. It allowed them to see different crops and scales of farming and to combine favorite practices into their own operation. If they could change one thing about the course of their farm career, however, it would be to spend even more time working on other farms before starting their own. Although they are glad they didn't pass up the opportunity to start farming on rented land (Figure 2), they feel 4-5 years of working on vegetable farms would have made their first seasons in business much easier.

Table 1. Summary of farming experience

Time Frame	Farm Name, Type, Size,[1] and Location	Position(s)	Skills
2003 (summer)	Gardens of Eagan Organic vegetables Large (100 acres)[2] Minnesota	Intern (Laura)	Greenhouse techniques, transplanting, cultivating, harvesting, and retail sales at roadside stand
2004 (winter)	Flying Disc Ranch Eco-dynamic fruit California	Laborer (Laura)	Managing citrus trees and date palms, retail sales at farmers market
2004-2006 (summers)	Gardens of Eagan Organic vegetables Large (100 acres)[2] Minnesota	Sales (Laura)	Retail sales at roadside stand
		Harvester (1 yr) + Equipment Operator (2 yrs) (Adam)	Machine repair, tractor tillage, mechanical cultivation, harvesting, fertilizing, and cover cropping
2004 (summer)	Riverbend Farm Organic vegetables Mid-sized (80 acres)[3] Minnesota	Harvester (Laura)	Growing specialty vegetable crops, marketing to restaurants and smaller wholesale accounts, cover cropping, beneficial insects, varietals, and managing a farm crew
2004 (summer)	Natural Harvest CSA[4] Organic vegetables Small (5 acres) Minnesota	Laborers (Laura and Adam)	Production, harvesting, packing, and management for a 140-member CSA
2005 (winter)	Fazenda Demetria Biodynamic vegetables Brazil	Garden Managers (Laura and Adam)	Managing biodynamic vegetable, herb, and flower gardens

[1] if available
[2] about 65 acres in production/cover crops
[3] about 40 acres in production/cover crops
[4] no longer in operation

Educator's Perspective: Resource Tip

Hands-on Learning

The Land Stewardship Project's Farm Beginnings is a farmer-led educational training and support program designed to help people who want to evaluate and plan their farm enterprise.[1]

The Beginning Farmers Web site from Michigan State University (MSU) provides a list of resources under Employment/Internships and Training Programs.[1]

MISA[2] maintains a list of internship opportunities with farms and related organizations in Minnesota and beyond.

ATTRA has a directory of on-the-job learning opportunities in sustainable and organic agriculture in the U.S. and Canada. Farmers and interns/apprentices can connect by searching for opportunities by state.

The MOSES[3] Farmer-to-Farmer Mentoring Program pairs experienced organic farmers with transitioning organic farmers to promote the successful adoption of organic methods through one-on-one interaction.

Some training programs are designed to serve as "incubator programs" and may be targeted to specific audiences. The Minnesota Food Association, for example, provides small learning plots through its Immigrant Agriculture Training Program at Wilder Forest.

[1]The Farm Beginnings courses led by LSP are offered in the Upper Midwest. Links to Farm Beginnings programs in other regions are on the MSU Beginning Farmers Training Programs page.

[2]Minnesota Institute for Sustainable Agriculture

[3]Midwest Organic and Sustainable Education Service

Setting Up Shop

In 2005, Gardens of Eagan owners Martin and Atina Diffley offered to rent the fledgling farmers two acres of land (Figure 3). Adam and Laura went into business as Loon Organics. The rented land, combined with an opportunity to borrow equipment from their mentors and to continue working part-time for the Diffleys, provided several advantages. It was a low-risk financial situation, allowing them to make mistakes, get feedback from established farmers, earn off-farm income, and find out if full-time farming was a good choice for them. Laura described their mentorship in the first of a series of articles about their first season, now archived at the New Farm Web site.

Figure 3: Adam and Laura standing in front of the green beans on their rented land during their first year in business, August 2005.

Gardens of Eagan and Loon Organics maintained a written agreement each year. It outlined rental fees for greenhouses, equipment, and farmland. It also included expectations that the Diffleys had for Laura and Adam, such as achieving and maintaining organic certification, carrying liability insurance, and keeping weeds under control. Rent was $200 per acre for the certified organic acreage. Gardens of Eagan charged less than the going rate for organic farmland rental because Laura and Adam were beginners with low capital access.

Educator's Perspective: Resource Tip

Leases and Contracts

Whether it's an opportunity to rent land or the need to understand rules and regulations, farmers often find themselves in need of legal documents or services.

Free rental agreement lease forms are available from Iowa State University.

The Farmers' Legal Action Group is a nonprofit law center dedicated to providing legal services to family farmers and their rural communities in order to help keep family farmers on the land.

Educator's Perspective: Resource Tip

Organic Certification

For Laura and Adam, growing vegetables organically was a commitment from the outset, as indicated by the name of their new enterprise (Figure 4). While farmers can use organic growing methods without getting certified, certification was an important part of the agreement between Loon Organics and its mentor farm, Gardens of Eagan. The following resources provide good baseline information on organic certification:

What is Organic Farming?

Minnesota Guide to Organic Certification

Organic Certification of Vegetable Operations

MOSES Organic Certification Guidebook[1]

Minnesota Department of Agriculture Organic Division

University of Minnesota Southwest Research and Outreach Center

eXtension

ATTRA Organic Farming

[1]MOSES also has a Farmer Transition hotline at 1-888-551-GROW (4769) for questions about soil building, weed and pest control, livestock, and certification paperwork.

Adam and Laura initially focused on wholesale markets but quickly transitioned to a predominantly direct-marketing strategy, as described in a New Farm article written by Laura at the end of their first season. Their decision to emphasize CSA and other direct sales is explained further under Marketing Models. An important part of the mentoring relationship with the Diffleys was the purchase of certain crops from Gardens of Eagan so that Adam and Laura could offer customers a more complete CSA box each week. The purchase of product for re-sale is described further under Finances.

Figure 4: Adam and Laura agreed to achieve organic certification as part of their agreement with Gardens of Eagan.

Land Acquisition

Laura and Adam started looking for their own land soon after they established Loon Organics. Their search was to take until 2008, when they found a 40-acre certified organic CSA farm for sale outside of Hutchinson, Minnesota, 70 miles west of Minneapolis-St. Paul. Although they had initially focused on southeastern Minnesota, they found themselves squeezed between development pressure by the Twin Cities to the north and Rochester to the south.

Educator's Perspective: Resource Tip

Finding Land

Some organizations have clearinghouses or "matchmaking" programs designed to help aspiring farmers locate suitable land.

MOSES: Land Link-Up

Center for Rural Affairs: Land Link

Land Stewardship Project: Seeking Farmers-Seeking Land Clearinghouse

Iowa State University Extension Beginning Farmer Center: Farm On Program

Programs in other states or regions may be found through the National Farm Transition Network.

Adam and Laura looked at approximately ten farms before finding the one they purchased, and they drove by many more. They found that "drive-bys" were efficient because it was often quickly apparent that the farm layout and the amount of tillable land made a farm not worth pursuing. They used Multiple Listing Service (MLS) listings, called local realtors, and made inquiries through organic farmer networks. Although they expected to find a farm through word of mouth, they saw their farm listed on MLS.

Laura and Adam considered anything from 10 to 80 acres. Their preferred size was 40 acres, but they found it a difficult parcel size to find in their price range. Besides the obvious need to find a farm that fit their budget, they wanted to avoid parcels with dilapidated structures that would divert their cash flow from the farming operation. Laura and Adam sought the advice of veteran organic farmers, who emphasized paying attention to soils, drainage, the degree of protection from neighboring conventional farms, and protection from flooding. Their top priority was finding good soil for growing vegetables, and they hoped to find land that hadn't been sprayed.

They couldn't quite believe their luck at finding an existing organic CSA vegetable operation (Figure 5). As discussed further under Finances, a USDA Farm Service Agency (FSA) loan helped to make their dream of owning land a reality.

Figure 5: The farmstead on Laura and Adam's farm in Hutchinson, as seen from the fields on the east side of the property.

Farm Description

After closing on their new farm in the fall of 2008, plans and preparations for the next season began in earnest. Laura and Adam nearly tripled the amount of land they farmed, from just over two acres on the rented land to six acres on the new farm.

The current fields occupy a relatively small proportion of this gently rolling 40-acre farm. Adam and Laura estimate that their maximum tillable area is 15 acres of clay loam, and they don't anticipate putting more than 10 acres into vegetables. The remaining tillable area is earmarked for eventual perennials and fruit crops. The rest of the farm contains mixed grasses, woodland, and wetland. The wetland complex presumably prevented this particular section corner from being easily integrated into the adjacent fields of conventional row crops (Figure 6).

Educator's Perspective: Resource Tip

Soils

Farmers seeking land need to know what kind of soil they'll be dealing with. To get a map of soil types for a specific property, contact the local Soil and Water Conservation District or USDA Natural Resources Conservation Service. Click here for an office locator. Soil data are also available through the Web Soil Survey.

Once farming is underway, SARE"s[1] Building Soil for Better Crops is an essential reference. This one-of-a-kind, practical guide to ecological soil management was updated in 2010.

[1]Sustainable Agriculture Research and Education, a program of the USDA

Figure 6: The general layout of Laura and Adam's farm overlaid onto a 2007 aerial photograph from McLeod County GIS.

Although Laura and Adam's new farm had been operating as a CSA under the previous owners, the CSA was smaller and some of the farm's infrastructure needed updating to accommodate Loon Organics. Laura and Adam added a lean-to onto the north side of the existing barn to serve as a packing area (Figure 7). They also made other improvements to the barn, including addition of an 8' x 12' cooler, a concrete floor, shelves, and an electrical system upgrade (Figure 8). The irrigation system and irrigation pond did not require any improvements, but they did purchase a pump from the previous owners.

Figure 7: The new lean-to provides Adam and Laura with an area for post-harvest handling and packing.

The house on Adam and Laura's new farm was relatively small and built in the early 1900s. It had been partially remodeled and was in relatively good condition (Figure 9). Although it needs work, Adam and Laura found it provided them the necessary balance between functional living space and the overall affordability of the farm. If the home had been larger or newer, or if it had needed major improvements, it could have been a deal breaker for them.

Adam and Laura quickly started becoming a part of the surrounding community. In 2009 they had 55 local CSA members, many of whom were subscribers of the previous owners. Most of the local CSA members came to the farm every week to pick up their share of produce. Laura and Adam also hosted a few gatherings during the season (Figure 10). (Note that in 2009 they had an additional 70 CSA members, some of whom picked up their weekly boxes at the farmers market in Minneapolis [see Marketing Models] and others at a drop-off site in Chanhassen, a suburb southwest of the Twin Cities.)

Figure 8: Adam and Laura also added shelves and other improvements to the barn to enhance post-harvest handling and packing.

Other nearby farmers have pastured livestock and use organic farming methods, so Laura and Adam automatically had some peers in the neighborhood. They have found that even among their conventionally farming neighbors, to whom their crops may seem a little eccentric, respect is given to anyone who works hard.

Figure 9: The farmhouse meets Adam and Laura's needs and helped to make the farm affordable to them.

Figure 10: Adam and Laura help put the "community" in "CSA" by hosting on-farm gatherings.

Business Plan/Whole Farm Planning

Adam and Laura grow up to 250 varieties of 40-50 different crops, including vegetables, herbs, flowers, and some fruits. They chose to emphasize annual vegetables as their main product for a couple of different reasons. When they started out they were vegetarians, so for dietary reasons livestock farming was not a compelling choice. They were, and continue to be, interested in fruit trees and other perennials, but they wanted an enterprise that simplified start-up. As outlined in one of their articles at New Farm, the appeal of producing food for others and having a consistent product throughout the growing season, plus having access to the knowledge and resources of Gardens of Eagan, made vegetables the logical focus for them (Figure 11).

Laura and Adam put together a business plan in 2005 before they started farming on their own. It evolved into their initial production plan, with lists of selected crops and the associated details needed for each one (e.g., seeding vs. transplanting, fertilizing, harvesting/handling, equipment). With time, the business plan became more focused on overarching issues, such as goals and mission, and on finances. The production planning became linked to their organic certification process.

Figure 11: Laura and Adam wanted to focus on high-yielding annuals, such as tomatoes, when they started out.

Adam and Laura review their business plan each winter, compiling and evaluating financial information from the previous season. The indicators they track most closely are finances and crop yields, though they also consider personal indicators, such as how stressful the season was. During the growing season, they have weekly meetings to review their financial picture. Growing plans and/or the farm budget sometimes need to be adapted as the season progresses depending on weather, pests, and diseases. In 2009, for example, a summer drought resulted in less product than anticipated for their farmers market sales. They increased fall production by planting more than they had originally planned and were able to make up what they had lost over the summer through fall sales.

Laura and Adam have not engaged in whole farm planning, but they feel it's their next step and may attend a course soon. At the beginning, whole farm planning felt too overwhelming. Now, with five years of experience and a farm to call their own, the issues to be addressed seem more manageable and pertinent.

Educator's Perspective: Resource Tip

Business Planning

A MISA publication called Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses assists with the creation of a holistic business plan rooted in personal, community, economic, and environmental values.

A free online course called Strategic Farm/Ranch Planning and Marketing, one of a series in SARE's National Continuing Education Program in Sustainable Agriculture, covers goal setting, developing business and marketing plans, managing risk, meeting with lenders and alternative financing, transferring farms, and understanding retirement options.

A free online business planning tool called AgPlan, from the Center for Farm Financial Management, offers tips and resources for writing a plan and provides an option for getting it reviewed.

The U.S. Small Business Administration has Small Business Development Centers throughout the country that offer free consultations for business planning. Click here for an office locator.

Figure 12: The cooler and lean-to used as a packing area on Laura and Adam's rented land. They did not use the pole barn to which the lean-to is attached. Their rented field is the land in front of the lean-to.

Infrastructure

When Adam and Laura rented land, most of their infrastructure was also rented from Gardens of Eagan. They rented space in the greenhouse each spring to raise seedlings and transplants. In 2005, they also rented cooler space and built a lean-to for use as their packing area. They bought their own small cooler in 2006, placing it underneath the lean-to as shown in Figure 12.

Figure 13: Adam enters the shed that they use to store and work on their collection of tractors.

Because Laura and Adam purchased an operating farm, much of the infrastructure they needed for Loon Organics was in place when they arrived in October 2008. Aside from the barn and irrigation system mentioned under Farm Description, their new farm already had a farmhouse, two greenhouses, and two sheds. One shed serves as Adam's machine workshop (Figure 13). The other shed is a refurbished granary; they use half for tractor storage, and the other half provides living quarters for one to two people (Figure 14).

Figure 14: The refurbished granary provides on-site living quarters for farm employees.

Farmer's Perspective: Lessons Learned

It's Always Something…

The need for infrastructure upgrades is often overlooked when budgeting for a farm purchase. A new septic system or well may be needed, for example. In Adam and Laura's case, the necessary electrical system upgrade cost $5,734.

The primary greenhouse on the new farm is a 30’ x 48’ Gothic-style greenhouse that is heated with propane (Figure 15). Because it has roll-up sides and raised beds on one side, it can also be used for season extension without a mechanical heat source (Figure 16). These same flexible walls make it inefficient to heat through winter nights, however. Adam and Laura are exploring options such as in-ground heating to make their greenhouse operation more economical.

Figure 15: Radishes, salad mix, and turnips growing in raised beds in the primary greenhouse on May 5.

Figure 16: The primary greenhouse with its sides rolled up and newly sprouted seedlings in its raised beds on September 23.

The second greenhouse is a lean-to structure off the south side of the barn (Figure 17). They use it as an overflow greenhouse and for hardening off transplants. They are planning some structural and functional improvements so they can increase its use.

Figure 17: Laura and Adam's secondary greenhouse, attached to the barn.

Laura and Adam's major addition to farm infrastructure to date is a 30' x 96' Quonset-style (round roof) hoop house (Figure 18). They purchased a kit that included the plastic, hoops, and ground posts for $5,713 in 2008 (Figure 19). They spent approximately another $1,000 on end walls. In 2010, they plan to add better support beams for trellising crops at a cost of about $500. Their experience with this "pilot" hoop house is described further under Production Models and Methods.

Figure 18: Adam and Laura added what they hope is one of several hoop houses to their new farm for season extension.

Figure 19: Laura and Adam constructed the hoop house themselves (with lots of help) over a 2-3 week period.

Educator's Perspective: Resource Tip

Greenhouse vs. Hoop House

Hoop houses, or high tunnels, are unheated greenhouses used for extending the growing season.

ATTRA has a comprehensive resource list for greenhouses, including a section on hoop houses.

Hightunnels.org also has extensive hoop house resources as part of a USDA-sponsored project that is testing and promoting high tunnel systems in the Central Great Plains.

MISA and MOSES co-developed a season extension Web site that includes on-farm trials from the Midwest.

The University of Minnesota High Tunnel Production site is dedicated to furthering high tunnel research on fruit and vegetable crops in Minnesota.

A news release in late 2009 announced that the USDA Natural Resources Conservation Service would be funding hoop houses on farms in 38 states as part of a 3-year pilot study to increase availability of locally grown foods.

Equipment

Adam and Laura's strategy when they started out in 2005 was to use off-farm income to support themselves and to use their initial farming profits to acquire tractors, machinery, and other capital assets. Their goal was to buy as much equipment as possible while renting land, so that when they purchased a farm they could focus on the monthly mortgage payment.

Table 2 summarizes Laura and Adam's equipment purchases. They brought their 6' x 6' cooler with them to the new farm and placed it outside the barn next to the packing area (Figure 20). They keep it at 40˚F and use it for storing local CSA boxes. The new larger cooler that they added to the barn is kept between 35˚F and 45˚F and is used for storing Twin Cities CSA boxes and farmers market product.

Figure 20: Adam and Laura's 6' x 6' cooler is in an accessible location, giving their CSA members flexibility with pick-up time.

The primary uses for each tractor are described in Figure 21. Adam and Laura prefer to purchase used tractors and implements when possible because they are more affordable and sometimes more widely available. Certain implements that are custom-made, such as the tine weeder and the basket weeder, were purchased new. Adam's mechanical abilities are important for maintaining the equipment and allowing them to rely primarily on used machinery.

Figure 22: Workers transplant seedlings while Adam drives the electric tractor.

As an example of Adam's mechanical skills, he converted one of their gasoline tractors to an electric tractor using eight golf cart batteries. The primary motivation was a gas motor that was smelly and noisy, but a side benefit of the conversion is that they can attach two seats to the back for planting. Workers can sit with flats of seedlings between and in front of them for transplanting (Figure 22). With a gas motor, they would need a special (and expensive) gear to go slowly enough for this approach.

Table 2. Equipment purchases

Category	Item	Price	Year
Tractors	JD 2640 Tractor	$9,500	2006
	IH 140 Tractor #1	$3,000	2006
	Hefty G Tractor	$1,750	2007
	Electric Tractor Components	$1,705	2008
	Allis Chalmers WD45 Tractor	$2,500	2008
	IH 140 Tractor #2	$2,500	2008
	JD Lawn Tractor	$1,000	2008
Implements	Fertilizer Sidedresser	$75	2006
	Rototiller	$1250	2006
	18" Disc (new)	$830	2007
	IH 140 Cultivating Parts	$839	2007, 2009
	Chisel Plow	$350	2007
	Spring Tine Weeder	$450	2007
	Planet Jr. Seeders	$1,639	2007
	Field Cultivator	$450	2008
	2 Field Discs	$885	2008
	Basket Weeder Cultivator	$2,809	2008
	Drag	$210	2008
	Cultivating Parts	$227	2008
	Various Tractor Implements	$500	2008
	Bed Lifter	$300	2008
	Plow	$560	2008
	Potato Digger	$400	2008
	Tiger Flail Mower	$2,500	2008
	Gandy Fertilizer Spreader	$300	2009
Small Machinery	Garden Tiller	$666	2005
	Chainsaw	$210	2009
Other	Small Cooler (6' x 6')	$1,800	2006
	Large Cooler Compressor[1]	$500	2007
	Irrigation Pump	$800	2008
	250-gallon Water Tank	$100	2009
	Water Pump	$71	2009
	Welding Equipment	$1,234	2009
	Hydraulic Hay Wagon	$175	2009
	Total Spent	**$666**	**2005**
[1]purchased in advance of large cooler because of good price		**$15,625**	**2006**
[2]not including hoop house ($5,713)		**$5,719**	**2007**
[3]not including lean-to construction (including large (8' x 12') cooler) ($1,116), electrical upgrade ($5,734), or break room appliances/office equipment ($920)		**$17,346**	**2008[2]**
		$2,729	**2009[3]**

Figure 21: Adam and Laura's fleet of tractors.

(a) This John Deere 2640 is used for primary tillage and soil preparation, including field digging, chisel plowing, discing, rototilling (sparingly!), and plowing. It is also used for mowing.

(b) Adam and Laura's first International Harvester 140 is used for cultivating 1- or 2-row vegetable crops and for sidedressing. It is also used with the potato digger.

(c) The Hefty G is used for planting (both seeding and transplanting) and for fertilizing. This tractor was converted to an electric motor in 2008. The Gandy fertilizer spreader is attached to the back of the tractor.

(d) Adam and Laura bought this Allis Chalmers WD 45 from the farm's previous owners and use it for pulling wagons and spraying.

(e) Their second International Harvester 140 is used for cultivating with the basket weeder (shown under Production Models and Methods/Field Production).

PRODUCTION

Production Models and Methods

The exact combination of crops that Laura and Adam grow varies from year to year, as they acquire favorites and learn which varieties are a match for their growing conditions and markets. An excerpt from their 2007 seed list (Table 3) hints at the complexity of a CSA operation – and the organizational skills needed to plan for and manage production. Laura and Adam obtain their seeds from varied sources, including Johnny's Selected Seeds, High Mowing Organic Seeds, Fedco Seeds, and Wild Garden Seed.

Field Production

Adam and Laura combine a bed system with succession planting for their field production. Bed planting allows for more intensive production than standard rows and also provides flexibility for growing a diverse variety of crops with different spacing needs. While rows are more efficient at a larger scale, such as at Gardens of Eagan, the bed system works well for the smaller scale of Loon Organics (Figure 23).

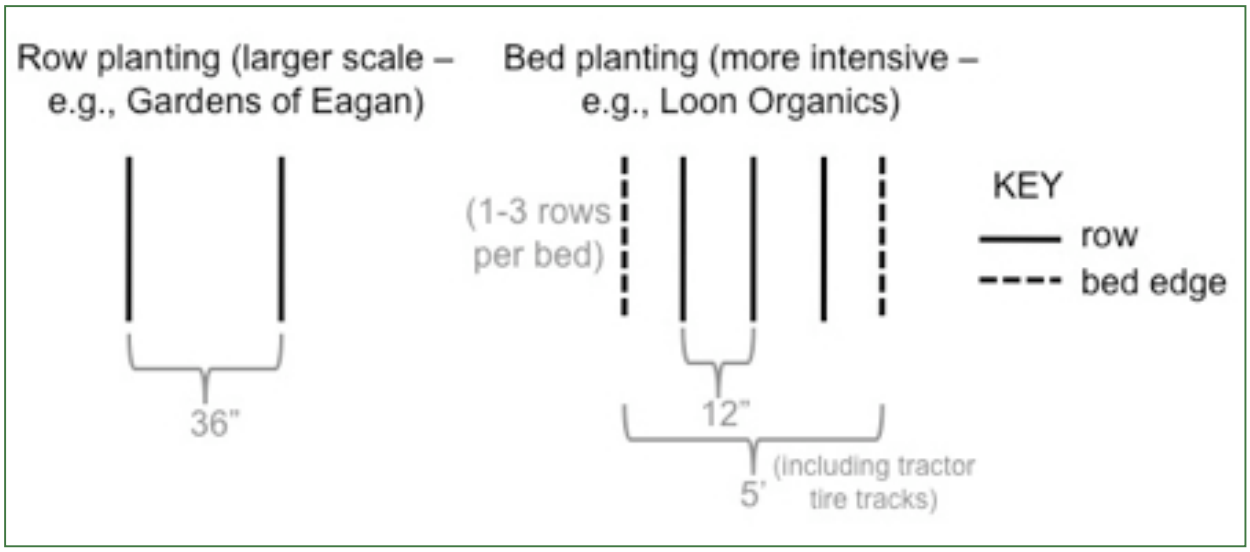


Figure 23: The production system at Loon Organics is based on beds that are 4' wide (or 5', including the tractor tires), allowing for more intensive farming than the standard row spacing used at Gardens of Eagan.

Table 3. Loon Organics' 2007 crop list

Category	Crop Type	# Varieties	Category	Crop Type	# Varieties
Allium	Leek	4	Herb (con't)	Sage	2
	Shallot	1		Thyme	1
Bean	Dry	1	Mustard	Arugula	2
	Green	3		Komatsuna	1
	Pole	1		Mibuna	1
	Purple	1		Mustard	3
	Wax	1	Onion	Bunching	1
Cucumber	Seedless	1		Cippolini	1
	Slicing	2		Red Storage	1
Eggplant	Globe	1		Sweet	1
Flower	Cosmos	1		Yellow Storage	1
	Nasturtium	1	Pea	Snap	3
	Snapdragon	1		Snow	2
	Sunflower	1	Pepper	Hot	3
	Zinnia	1		Sweet Bell	4
Garlic	Garlic	1		Sweet	10
Green	Arugula	1	Radish	Radish	4
	Beet/Chard Mix	1	Root	Beet	4
	Green Butter Lettuce	1		Carrot	4
	Kale	1		Hard Radish	1
	Lettuce	25		Kohlrabi	3
	Mustard	5		Parsnip	2
	Radicchio	2		Turnip	1
	Red Butter Lettuce	1	Squash, Summer	Patty Pan	1
	Spinach	2		Zucchini	3
	Swiss Chard	3	Squash, Winter	Acorn	1
Ground Cherry	Ground Cherry	1		Buttercup	1
	Heirloom Cherry	1		Butternut	1
Herb	Basil	5		Delicata	1
	Cilantro	3	Tomato	Cherry	4
	Dill	1		Heirloom	17
	Fennel	1		Heirloom Cherry	2
	Oregano	2		Heirloom Roma	1
	Parsley	2		Slicer	1

One of the keys to commercial production, whether in beds or rows, is matching row spacing to equipment for more efficient planting, cultivating, fertilizing, and harvesting. Laura and Adam have invested in tractor attachments that maintain consistent 12-inch spacing during seeding (Figure 24) and weeding (Figure 25).

Figure 24: This Planet Jr. seeder provides consistent spacing for crops that are sown directly into the ground.

The number of rows per bed varies by crop. Beets are an example of Adam and Laura's standard system of three rows per bed; beet production is described further in relation to Table 4 and under Crop Yields. Other crops, such as summer squash and certain greens, are planted in two rows per bed, using the outer two rows in each bed to attain a 24-inch spacing that works with the tractor implements. Tomatoes, watermelons, and cucumbers are unique in that they are planted in one (the central) row per bed. These heat-loving crops need good ventilation to prevent fungal disease; they also benefit from the use of plastic mulch, which heats up the soil earlier and minimizes soil splashing (and hence soil-borne pathogen transmission). Adam and Laura space the rows for the heat-loving crops at 10 feet to allow tractor passage for cultivation between rows.

Figure 25: This basket weeder maintains the same spacing as the seeder during cultivation for weeds.

Succession planting is critical to a CSA operation because it maximizes the period over which crops ripen and can be harvested, thereby providing customers with continuous product. Each crop has a different schedule of succession planting. There are two key factors that generally dictate the planting schedule.

1) Days to Maturity: For crops with a relatively short time between seeding (or transplanting) and harvest (i.e., 30-70 days) plus short harvest windows – such as salad greens, chard, cucumbers, summer squash, beets, beans, broccoli, cabbage, and cauliflower – Adam and Laura plant every 1-3 weeks to have a consistent supply throughout the season. Crops with longer maturity times (e.g., tomatoes, melons, eggplant, peppers, winter squash, onions) are planted in one or two large plantings in order to take advantage of the short harvest window that occurs in their USDA Plant Hardiness Zone. Longer-day crops must be in the ground by mid-June in order to mature in time (Figure 26). Although Adam and Laura are still learning about their farm's microclimate, the relatively flat topography means they have no major frost pockets to

deal with. They do use south-facing or south-sloping fields for earlier plantings and reserve other fields for crops that can tolerate some shade or other directional aspects.

2) Cold Tolerance vs. Frost Sensitivity: Because Adam and Laura plant a combination of cold-tolerant crops (e.g., broccoli, beets) and frost-sensitive crops (e.g., cucumbers, winter squash, melons), they must integrate the frequency of planting with the appropriate planting windows when planning production. Broccoli, for example, is transplanted successively every two weeks from May through July for harvest from early summer to late fall. Similarly, beets are one of the first crops planted in April or May, as soon as the ground can be worked. Beets are then planted every 2-3 weeks until late July. At Adam and Laura's location, frost-sensitive crops cannot be planted outside until late May, when the danger of frost has passed. Cucumbers are transplanted outside in late May and then planted every 3 weeks until mid-July for a continuous harvest. For crops with longer maturity times (i.e., 80-120 days), such as winter squash or watermelons, there are one or two large plantings in late May and early June to ensure that the plants have adequate time to mature before a fall killing frost.

Figure 26: Peppers, such as these Jimmy Nardello's Italian Sweet Frying Peppers (an heirloom variety and one of Laura and Adam's favorites), require a relatively long period to mature and so must be planted during a relatively short window.

Although Adam and Laura spend considerable time and effort scheduling their plantings, they inevitably have to make adjustments due to weather. They often plant earlier or later than planned once the season is underway. If germination of their first sowing of beets was delayed by a week, for example, and they were to do the second seeding a week after the first as originally scheduled, they would have both plantings come in at once and be overwhelmed with product.

Laura and Adam often plant different cultivars of the same crop together at the same time in order to achieve diversity in maturation dates and a diversity of plant characteristics, such as disease resistance. They select varieties that are best suited to production in certain seasons according to the yield quantities and the harvest windows they are targeting for each crop. Varietal selection, the bed system, and succession planting get integrated into a set of production details for each crop.

The sheer number of crops grown at Loon Organics makes it impossible to describe all the details of production here. Beet production from 2009 is summarized in Table 4 as an example of how the "when" and the "where" of the system come together for one crop (Figure 27). In the case of beets, four varieties were planted in four fields between April 28 and August 5, resulting in an almost continual harvest throughout the season. The table also shows how fertility, weed pressure, and irrigation are managed; these aspects of production are discussed further under Sustainable Practices, while the "audit trail" needed for organic certification is discussed at more length under Farm Management Operations. Below the table, Loon Organics' 2009 tomato crop is described in the sidebar as another example of how the bed system and succession planting are integrated; it also illustrates how their standard bed system is adapted for certain crops and how they integrate field and hoop house production.

Figure 27: Green-top beets provide a useful example throughout the case study because they illustrate Loon Organics' standard bed system and the use of succession planting to achieve product throughout the season. Laura and Adam also have continuous production data on beets because they have grown them consistently since start-up.

Table 4. Production log excerpts for 2009 green-top beet crop

FIELD PLANTING						SPRING COVER CROP			COMPOST			
Field #	Planting Date	Variety	Bed #	Row Feet	# of Rows	% Success	Type	Date Incorp-orated	Date Applied	Type (Source)	Rate	Method
1	28-Apr	A	6	100	3	n/a	none	n/a	10-May	Sustane (turkey)	20 lb/bed	sidedress
	10-May	A	7	100	3				25-May			
	25-May	A	8	100	3				15-Jun			
	25-Jul	A	9	100	3				n/a	none	n/a	sidedress
	5-Aug	A	10	100	3							
12*	13-Jun	A	1	300	1	80%	clover	15-Apr	5-Jul	Sustane (turkey)	40 lb/bed	sidedress
	13-Jun	B	1	300	1				5-Jul			
	20-Jun	C	2	300	1				12-Jul			
13	27-Jun	A	2	380	2.5	80%	clover	15-Apr	19-Jul	Sustane (turkey)	20 lb/bed	sidedress
		D	2	380	0.5							
		B	2	380	1							
9	5-Jul	A	5 & 6	300	5	80%	clover	15-Apr	1-Aug	Sustane (turkey)	20 lb/bed	sidedress
		B	6	300	1							

FIELD PLANTING			IRRIGATION						CULTIVATION		CROP INCORPORATION	
Field #	Planting Date	Variety	Source	1st Date	2nd Date	3rd Date	4th Date	5th Date	Basket Weeder Date	Wheel Hoe Date	Date/Method	Post-Tillage Type
1	28-Apr	A	sprinkler	3-May	10-May	25-May	9-Jun	16-Jun	mid-May	late May	late July, disced	field dug
	10-May	A		10-May	25-May	9-Jun	16-Jun	28-Jun	20-May	late May		field dug/chiseled
	25-May	A		25-May	9-Jun	16-Jun	28-Jun	n/a	15-Jun	late June		field dug
	25-Jul	A	drip	30-Aug	rain	n/a	n/a	n/a	late July	Aug	November, disced	field dug/chiseled
	5-Aug	A							late Aug	Sep		
12*	13-Jun	A	drip	20-Jun	27-Jun	*	n/a	n/a	late June	July	September, disced	field dug
	13-Jun	B							late June	July		
	20-Jun	C							mid-July	late July		
13	27-Jun	A	drip	27-Jun	8-Jul	20-Jul	n/a	n/a	mid-July	late July	October, disced	field dug
		D										
		B										
9	5-Jul	A	drip	5-Jul	20-Jul	rain	n/a	n/a	late July	Aug	November, disced	field dug
		B										field dug/chiseled

*Crop germinated, then in the middle of field growth was stunted (may have been due to nutrient imbalance); stopped watering.

NOTE: Pest pressure (type of pest, action taken) is normally recorded but none occurred with the 2009 beet crop.

At A Glance: Tomato Production

Laura and Adam seeded 24 tomato varieties in the greenhouse in 2009: 2 hoop house, 1 rootstock, 4 cherry, 1 heirloom cherry, 10 heirloom, 1 paste, and 5 slicer. They seeded two rounds about three weeks apart in early and late April, using open soil flats. Most varieties were started in groups of 25-50 seeds, with a few favorites seeded in quantities up to 250. They used heat mats for fast and even germination and achieved germination rates of near 100%. Seedlings were repotted in open flats (50 per flat) approximately 3 weeks after seeding date.

Five varieties were destined for transplanting in the hoop house in early June, while the remainder went to Field #2 (see Figure 48). Most field-transplanted varieties were in the ground by the third week in May, with the rest in by early June. In the tomato beds, Adam and Laura use 10 feet for between-row spacing (to fit their mower) and 2-3' for within-row spacing. Field tomatoes are trellised using the Florida basket-weave technique. Hoop house tomatoes are pruned to a single "leader" stem, and the stem is secured to twine with tomato trellis clips.

Field #2 had not been used by the previous landowners. Laura and Adam plowed the field in mid-April and used the field digger and drag to work out the oats and first flushes of weeds that covered the field and to break up soil clods. (Normally they would plow a new field the year before planting to allow a rest period due to their heavier soil, but the schedule was compressed the first season on their new farm.) In late May, they added a 3" x 3" application of composted cow manure as well as an application of Sustane 4-6-4 (at 25 lb per 300 row-feet) in the row centers just before transplanting the tomatoes They placed drip irrigation tape in the individual beds, covered the beds with a green plastic mulch approved for use by the Organic Materials Review Institute, and began transplanting (one row per bed as mentioned above) (Figure 28).

Adam and Laura used drip irrigation for Field #2 at planting times and again in mid-June and early July. The 2009 season was drier than normal until early August. Their soil type and some cooler than normal temperatures helped mitigate the drought to a certain degree. They cultivated weeds on June 20 and seeded a cover crop between tomato rows in early July. They chose Italian ryegrass as the cover crop and broadcast it at 50 lbs/acre. Germination of the rye was relatively low at 75% due to the drought, but it grew enough to be mowed twice between planting time and August.

The field tomatoes suffered from septoria leaf spot after early August rains (Figure 29). Although this fungal disease doesn't damage the fruit, the leaf damage leads to plant defoliation which in turn causes late-season tomatoes to be sun scalded. The disease cut short their harvest of saleable tomatoes by about two weeks, during the second half of September.

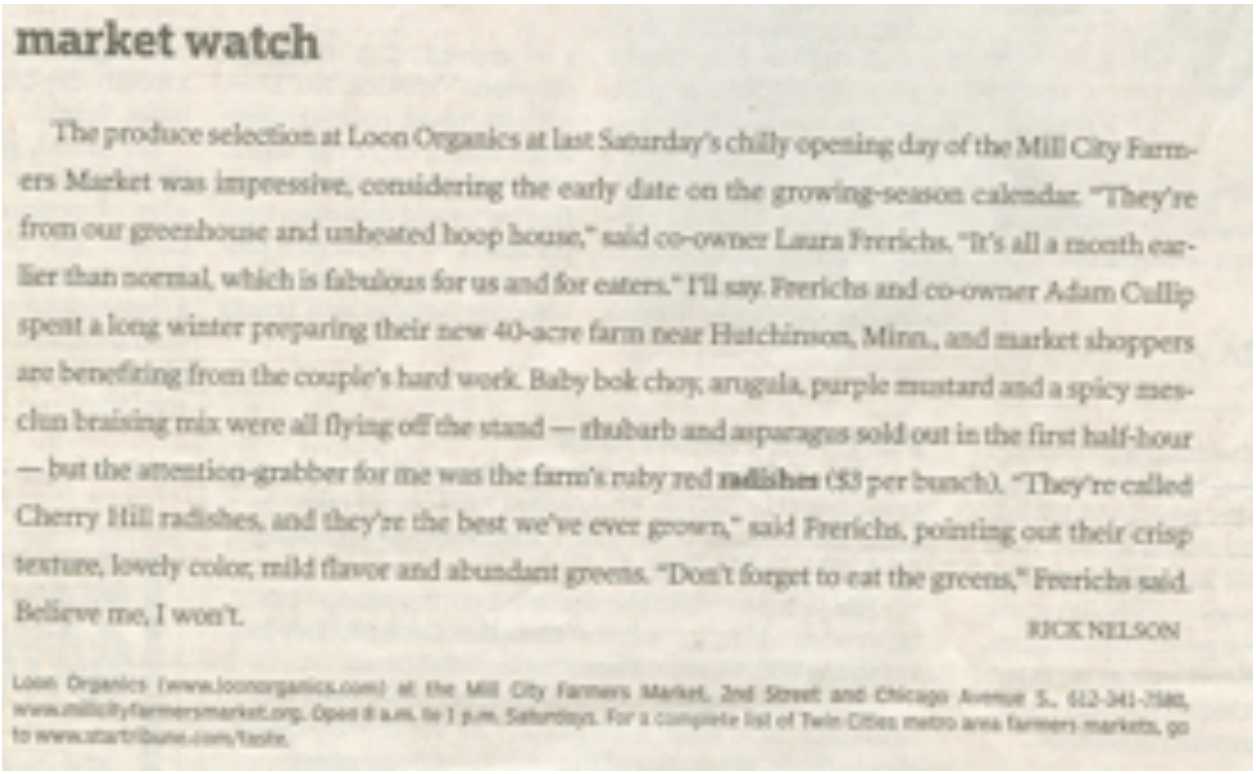
Figure 28: Tomatoes are planted on plastic mulch with 10' between rows.

Figure 29: Tomatoes are exposed to sun scald when the plants are defoliated.

Hoop House Production

As described under Infrastructure, Laura and Adam added a hoop house to their production system in 2009. Early in the season, they used it to grow radishes, bok choi, head lettuce, and other greens. They had product for sale at the farmers market by May 5, one month earlier than the same crops planted in the field (Figure 30). They appreciated the early income and jump-start it gave them on their season – as did their customers, including the food writer at the *Minneapolis Star Tribune* (Figure 31)!

Figure 30: Lettuce growing in the hoop house on May 5.



market watch

The produce selection at Loon Organics at last Saturday's chilly opening day of the Mill City Farmers Market was impressive, considering the early date on the growing-season calendar. "They're from our greenhouse and unheated hoop house," said co-owner Laura Frerichs. "It's all a month earlier than normal, which is fabulous for us and for eaters." I'll say. Frerichs and co-owner Adam Cullip spent a long winter preparing their new 40-acre farm near Hutchinson, Minn., and market shoppers are benefiting from the couple's hard work. Baby bok choy, arugula, purple mustard and a spicy mesclun braising mix were all flying off the stand — rhubarb and asparagus sold out in the first half-hour — but the attention-grabber for me was the farm's ruby red radishes ($3 per bunch). "They're called Cherry Hill radishes, and they're the best we've ever grown," said Frerichs, pointing out their crisp texture, lovely color, mild flavor and abundant greens. "Don't forget to eat the greens," Frerichs said. Believe me, I won't.

RICK NELSON

Loon Organics (www.loonorganics.com) at the Mill City Farmers Market, 2nd Street and Chicago Avenue S., 612-341-7580, www.millcityfarmersmarket.org. Open 8 a.m. to 1 p.m. Saturdays. For a complete list of Twin Cities metro area farmers markets, go to www.startribune.com/taste.

Figure 31: This newspaper piece sung the praises of Loon Organics' early-season produce and was accompanied by a large photo of bright red radishes, essentially providing Adam and Laura with a free 1/8-page advertisement in a major metropolitan paper.

After the early greens, they planted cherry and slicing tomatoes in the hoop house. They also did a companion planting of basil. Adam and Laura found that the hoop house helped prevent cracking in the vulnerable cherry tomatoes because they were able to control moisture levels. The plants were also healthier overall because rainfall was not causing soil to splash up onto the plants and transmit disease vectors as easily as in the field.

Figure 32: These trellised tomatoes grew well in the hoop house but required a lot of labor due to the trellising height, a factor Laura and Adam plan to adjust in subsequent seasons.

Overall Laura and Adam were pleased with their pilot hoop house and plan to add one or more over the next five years. They found 15' to be too high in the current hoop house because it increased the effort required to trellis and prune the tomatoes (Figure 32). In the future, they anticipate putting up gothic-style hoop houses that better manage snow load during the winter. Aside from experimenting with optimum hoop house size and refining management of day-to-day hoop house operation, they are still figuring out the best crop rotation for hoop house production in their situation. They would like to grow cucumbers and other crops in the additional hoop houses, but only a limited number of crop types do well in this setting.

Harvest, Handling, and Packing

Adam and Laura harvest most produce within the 24 hours prior to delivery. Most produce is harvested by hand, with the exception of some roots and potatoes which can be harvested with a root digger (Figure 33) or potato digger (Figure 34). They designate Monday, Wednesday, and Friday of each week during the growing season as harvest days. They use a daily harvest schedule that specifies the order in which crops are harvested, according to the crops' respiration rates and whether the crops should be handled wet or dry.

Figure 33: Loon Organics' root digger, shown in full view (top) and close up (bottom).

Figure 34: Loon Organics' potato digger.

Educator's Perspective: Resource Tip

Post-Harvest Handling and Packing

North Carolina State University has a series of fact sheets for post-harvest handling of specific crops and post-harvest cooling and handling technologies.

UC-Davis also has a comprehensive series of crop-specific post-harvest technology fact sheets.

A manual called Wholesale Success: A Farmer's Guide to Selling, Post Harvest Handling, and Packing Produce includes comprehensive sections on issues such as Building Relationships with Buyers, Food Safety, and Calculating Return on Investment. It also includes 63 crop profiles that give specific harvesting, cooling, storage, and packing information on most of the fruits and vegetables grown in the Midwest.

Requirements surrounding food safety plans have been hotly debated. Beginning farmers should educate themselves on current and proposed regulations by reading publications such as Food Safety on the Farm: Federal Programs and Selected Proposals.

Laura and Adam and their crew bring the produce from the field to the lean-to area for post-harvest handling. They use dunk tanks (Figure 35), cold well water, sprayer hoses (Figure 36), and/or a pressure washer to wash and cool produce before storage and a washing machine for spin-drying the baby greens. Tsunami 100, an EPA-registered, peroxyacetic acid-based, antimicrobial water additive, is used in the processing water. Laura and Adam store produce needing refrigeration in their large cooler. Shelves outside of the large cooler are used to hold tomatoes for ripening and storage.

CSA shares are pre-packed in ¾-bushel boxes and refrigerated on the farm until they are picked up by members or delivered to drop-off sites. In 2010, Laura and Adam plan to continue investing in upgrades to their packing area, adding more concrete flooring, drainage, a hand-washing sink with an instant hot water heater, and other smaller amenities.

Figure 35: Washing cauliflower after harvest.

Figure 36: Post-harvest spraying of beets.

Sustainable Practices

Laura and Adam follow organic principles, and challenged themselves to achieve organic certification, because they agree with the focus on soil building and soil conservation. While organic farming emphasizes soil health and other important aspects of environmental sustainability, they also believe that sustainable farming needs to address social and financial factors. They even throw in a fourth component, emotional sustainability, having recognized the importance of ensuring that the stressors of farming do not start to outweigh the benefits.

Adam and Laura would like to minimize off-farm inputs but know that overarching goals such as carbon neutrality are difficult to achieve with tractor-based farming. Their conversion of one gasoline tractor to electric, as described under Equipment, is a step in that direction. They hope eventually to incorporate solar energy generation into their farm.

Laura and Adam sought organic certification when they started out in 2005 for several reasons. As described in one of their articles from the New Farm, they considered both environmental and marketing factors. Their certifying agency is International Certification Services Inc. Figure 6 shows the boundaries of the areas on their new farm that they include in their certification plan. The areas include "hay" or "pasture" in addition to their tillable fields so they can convert currently unused land into vegetable production in the future and have it already certified as organic. As with production methods, the details of Laura and Adam's organic practices are too voluminous to reproduce here (their annual certification plan alone is over 30 pages). Below, however, are the basic elements of their approach to soil and fertility management and biodiversity.

Educator's Perspective: Resource Tip

Renewable Energy

Minnesota farmers can contact Clean Energy Resource Teams (CERTS) for technical resources for community-scale projects involving wind, biomass, biofuels, and solar power.

Nationally relevant resources are available from ATTRA.

Farmer's Perspective: On the Bookshelf

The New Organic Grower: A Master's Manual of Tools and Techniques for the Home and Market Gardener

By Eliot Coleman

With more than 45,000 sold since 1988, *The New Organic Grower* has become a modern classic. In this newly revised and expanded edition, master grower Eliot Coleman presents the simplest and most sustainable ways of growing top-quality organic vegetables. Coleman updates practical information on marketing, small-scale equipment, and farming and gardening for the long-term health of the soil.

Soils

Adam and Laura practice soil conservation by maintaining cover crops on steeper areas of the farm, adjusting field layouts to minimize soil erosion from rainfall, and using tillage practices that minimize soil compaction and disruption of soil structure. Although their tillage practices vary according to crop type, their standard approach is to prepare the ground in the spring by integrating the cover crop with a disc (Figure 37) and using a field digger (Figure 38) with a drag 1-2 weeks later. This sequence prepares the soil for planting, incorporates the cover crop, and works out the first flushes of spring weeds while still allowing some surface residue to remain.

Adam and Laura prefer to dig and drag at least two times before planting or transplanting, if time and weather permit. They avoid overworking the soil in general and always avoid working it when it's wet. Often, just field digging with a drag provides a clean and sufficiently even bed for seeding or transplanting. A chisel plow (Figure 39) is sometimes used in the fall for deep tillage, especially on fields where root crops will be planted the following year, but it still allows surface residues to remain. A moldboard plow (Figure 40) is used only to prepare ground that has been in hay for several years.

Educator's Perspective: Resource Tip

Equipment

Although organic vegetable farmers use machinery to different degrees, it helps to understand what options are available. Excerpts from an educational video called Vegetable Farmers and Their Weed Control Machines are now available on the eOrganic You Tube channel and include many of the implements, such as chisel plows and basket weeders, in use at Loon Organics.

Figure 37: A disc plow, or disc, uses one or more rows of concave discs to work the soil without turning it over completely.

Figure 38: Loon Organics' field digger.

Figure 39: A chisel plow accomplishes deep tillage without inverting the soil.

Figure 40: Loon Organics' three-bottom (or moldboard) plow, used for initial cultivation of fields to prepare for sowing or planting.

Figure 41: Though tempting to use often because of its positive short-term effects, Laura and Adam are trying to minimize use of the rototiller because of its negative long-term consequences on soil health.

When Laura and Adam started out, they used a rototiller (Figure 41) frequently because it made such nice seed beds. They quickly saw, however, that it had several negative effects: extreme compaction, destruction of organic matter and soil structure, hardpan below the surface, and increased noxious weed species such as quack grass and thistle. They are trying to get away from using a rototiller at all. They still use a walk-behind tiller to make raised beds in the hoop houses, and occasionally they will use the larger 6' rototiller with a tractor to prepare outdoor seed beds when the digger/drag method isn't effective. By rototilling only where needed to prepare for seed beds that must be very fine and even, such as for salad mix, they are minimizing disruption of soil structure.

Cover Crops

Laura and Adam use cover crops to control weeds, reduce erosion, build soil, and manage fertility. Some of their preferred cover crop species are hairy vetch, buckwheat (Figure 42), clover, oats, winter rye, ryegrass, and field peas. Eventually they hope to use chickens in some cover-cropped fields to help build fertility. Seeds are typically broadcast with a hand-broadcaster and then incorporated with a disc or drag.

Most years, Adam and Laura grow at least one cover crop on each field. Fields are typically seeded in the fall to an overwintered legume, such as vetch, and the cover crop is incorporated the following spring just before it blossoms in order to capture as much nitrogen in the soil as possible. They also utilize cover crops between the time when early crops are harvested and late crops are planted and during non-vegetable production years. Cover crop selection in resting years depends on weed pressure, previous crop history, and the fertility needs of a given field.

Figure 42: Buckwheat was planted as a cover crop in the unused portion of a field of spring greens. The fast-growing nature of buckwheat makes it good for weed suppression. It also provides pollinator habitat. This cover crop stayed in place until October, when it was incorporated into the soil with a disc.

Cover crops are also integrated with vegetable production. Fields of fall crops may be undersown with clover, vetch, or rye to build fertility for the next spring while still producing cash crops. For cover crops integrated with crop production, the timing and type of cover crops depend in part on whether a field is used for production until late fall (e.g., for fall broccoli and cauliflower) or is needed for very early spring planting (as is the case for onions and early potatoes). In some cases, the fall crop itself leaves enough residue to act as "cover" over the winter, thereby minimizing erosion and allowing for continual addition of organic matter to the soil.

Farmer's Perspective: On the Bookshelf

Managing Cover Crops Profitably, 3rd Edition

By SARE

Revised and updated in 2007, the 3rd edition includes a new chapter on brassicas and mustards, 16 farm profiles, and a comprehensive chapter on the use of cover crops in conservation tillage systems. Appendices include seed sources and a listing of cover crop experts.

Steel in the Field: A Farmer's Guide to Weed Management Tools

By Sustainable Agriculture Network/Edited by Greg Bowman

This SARE publication shows how today's implements and techniques can control weeds while reducing - or eliminating - herbicides. In practical language, it presents what farmers and researchers have learned in the last 20 years about cutting weed-control costs through improved cultivation tools, cover crops, and new cropping rotations.

Fertilizing

Laura and Adam use Sustane 4-6-4, a slow release nitrogen fertilizer made of composted turkey litter, on certain crops. They apply it at a rate of approximately 25 lbs per 300 row-feet to heavy feeding crops such as sweet corn, tomatoes, brassicas (e.g., cabbage, broccoli, cauliflower), head lettuce, melons, and cucumbers. They either incorporate the fertilizer into row centers at the time of transplanting or sidedress with fertilizer after transplanting. On their new farm, they also do some pre-planting applications of composted dairy manure to heavy feeding crops and as an amendment to supplement fertility levels in certain low-fertility areas. Application rates are generally 1-5 tons per acre depending on fertility needs. The timing of application depends on whether the manure is raw or composted. As with all aspects of their operation, Laura and Adam use substances and practices in accordance with the National Organic Program rules.

Regular soil tests are performed to figure out how many tons per acre of manure or compost are needed in each field and for each crop. Laura and Adam work with a soil scientist to determine the exact application rates and how best to capture and scavenge extra fertility through cover cropping.

Rotations

Adam and Laura's cover cropping and fertility practices are integrated into their crop rotation system. They try to maintain at least three years between the same crop families in a given location to prevent soil-borne disease and insect pressure. Although they are still learning about the complex relationship between fertility, cover cropping, and crop rotations and determining what works best for them, they currently have three basic rotations in use. An example of one of them is given in the sidebar. Numerous factors affect their decisions about which rotation to use on a given field, including ease of irrigation.

At A Glance: Crop Rotation

An example of one of Adam and Laura's three basic rotations is described below.

Year 1
Composted dairy manure is applied pre-planting at about 5-10 tons per acre to a specific field and disced in the spring. Early broccoli is planted in May and sidedressed two weeks later with Sustane 4-6-4 at 25 lbs per 300 row-feet. After the crop is harvested, oats and peas are planted in August for a fall cover crop. The oats and peas winterkill at the first hard frost and cover the soil for the winter.

Year 2
Green beans are grown with a fall cover crop of nitrogen-fixing hairy vetch.

Year 3
Peppers and eggplant are grown. Crop residue is mowed in the fall.

Year 4
Composted dairy manure is applied pre-planting at similar rates to Year 1 in preparation for planting cucumbers. Sustane is also applied at the standard rate. Cucumbers are planted on silver plastic mulch, and rye grass/red clover are seeded between the rows as a living mulch. After cucumber harvest, the red clover is allowed to continue growing throughout the fall.

Year 5
Red clover remains on the field as a cover crop/green manure.

Another example of crop rotation is available from Riverbend Farm, one of the farms where Laura gained farming experience.

Irrigation

Laura and Adam use both drip irrigation and sprinkler irrigation. Their water sources are the farm's well and the irrigation pond (Figure 43). Both water sources are tested each year for pathogens and nitrates as required for organic certification.

Figure 43: Loon Organics' irrigation pond, shown with the pump they purchased from the previous owners.

Biodiversity

In addition to the attention given to soil husbandry, Adam and Laura take an ecological approach to managing their farm. They have at least 15 acres dedicated to wooded areas, wetlands, and perennial grasses. Thus they promote biodiversity not just by growing a large number of different crop types but also by allocating part of their land to wildlife habitat. Their farming practices also foster biodiversity, especially among pollinators. Herbs are left to flower, a flower garden is maintained (Figure 44), and broad-spectrum biological insecticides are avoided.

Figure 44: Adam and Laura's flower garden provides pollinator habitat for the farm and free "pick-your-own``' flowers to CSA members whenever they pick up their shares or visit the farm.

Crop Yields

Adam and Laura track crop yields through the invoices for their different enterprises – CSA, farmers market, and wholesale. Beets and spring mix (Figure 45) were selected as examples of crop yields because of the patterns they illustrate.

Figure 46 shows yields per tenth acre for the three enterprises combined from 2005 to 2008. Acreages per crop type for all crops generally ranged from 0.05 to 0.2 acres while Laura and Adam rented land.

Adam and Laura attribute the steady increase in beet yield during their first four years of farming to improved efficiency as their knowledge level grew. Many of their crops show similar increases over the same period. Other crops, such as spring mix, show more variability through time. Spring mix yield dropped in 2007 due to drought, then decreased further in 2008 due to weed pressure. Weed pressure increased that year because they were growing spring mix in a new location that resulted from crop rotation, but the weed issues were exacerbated because Laura and Adam were at maximum production on their rented land in 2008. They ran out of time to keep the weeds under control, and once the weed pressure reached a certain threshold it was no longer worth resolving to salvage the crop yield. Thus spring mix illustrates the variability that results from weather and other factors outside of the farmers' control, as well as the trade-offs that occur in managing a complex system like organic CSA production.

Educator's Perspective: Resource Tip

Crop Yields

Estimating crop yields is notoriously difficult because so many variables are involved. A simplified table of expected crop yields for vegetable crops is available as a starting point from The Midwest Vegetable Production Guide for Commercial Growers.

Another publication, though not currently available online, has hard-to-find information about CSA planning such as how much crop to plant for a certain number of members. The *Iowa Community Supported Agriculture Resource Guide for Producers and Organizers*, published in 1997, can be ordered from the Iowa State University Extension Online Store (Publication number PM-1694).

Figure 45: Adam washing spring mix, which is a combination of salad greens that vary depending on the season.

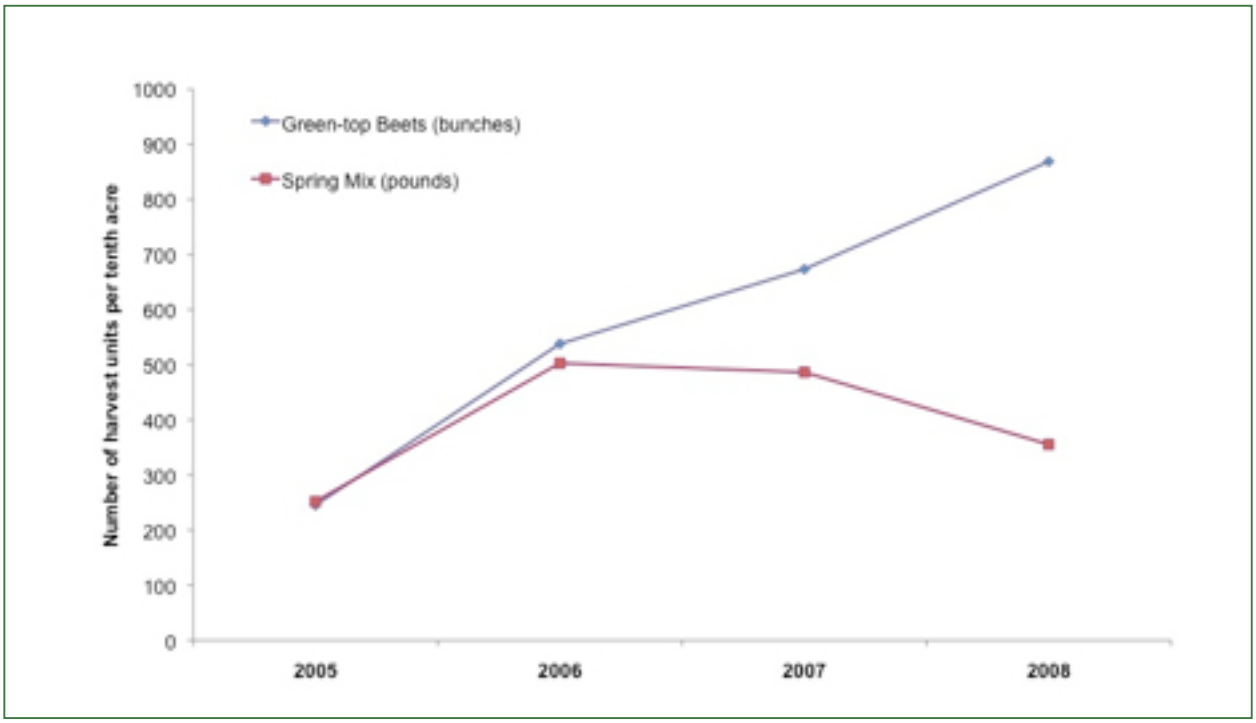


Figure 46: Yields for two Loon Organics products demonstrate the variable trends that different crops can follow.

MANAGEMENT AND MARKETING

Farm Management/Operations

Laura has heard CSA farming referred to as "graduate level farming." Their transition into producing crops for a CSA was gradual, because they bought certain crops from other farmers (described further under Finances) while renting land from Gardens of Eagan. It was not until 2009 that they grew all the crops they sold.

As alluded to earlier, the organizational skills needed for CSA farming can be one of its greatest challenges. After five years, Adam and Laura are just starting to feel like they have the planning aspects under control. They use a combination of spreadsheets, calendars, maps, and other tools to organize when and where crops will be planted and harvested and to track production and sales (Figure 47).

Laura and Adam consulted with other CSA farmers on organizational strategies but chose not to purchase customized software templates that are available for market farmers. They use Microsoft Excel to organize plans and schedules.

Figure 47: Adam and Laura use a variety of tools to manage their operations, from detailed spreadsheets to hand-written records.

Farmer's Perspective: On the Bookshelf

The Organic Farmer's Business Handbook: A Complete Guide to Managing Finances, Crops, and Staff—and Making a Profit

By Richard Wiswall

This book covers step-by-step procedures for making crop production more efficient; advice on managing employees, farm operations, and office systems; marketing strategies; and a discussion of the use of profits for business spending, investing, and retirement planning. A companion CD includes spreadsheets for projecting cash flow, a payroll calculator, comprehensive crop budgets for forty different crops, and tax planners.

One of the reasons Laura and Adam like this new resource is because it covers production efficiencies (such as raised beds and standardized spacing) that they utilize. They also appreciate its advice on how to set up and keep straightforward crop enterprise budgets. It has inspired them to begin tracking the costs of production for individual crops.

One of their keys to success is duplicating data just enough so that information is linked between different files and spreadsheets without doubling up on data entry effort or sacrificing the accuracy of numbers. Crops and varieties are grouped into categories, for example, as shown in Table 3. The crop categories and specific varieties then get placed into a seed inventory, where seed information (sources, organic vs. non-organic) and seed quantities (numbers used, in stock, and needed) are tracked. Seed varieties and starting quantities are then transferred to a greenhouse production data sheet, where propagation data (such as seeding dates and methods) get recorded. Key data from the greenhouse production records then get transferred to field planting data sheets (where planting dates; the number, location, and spacing of rows; and other information is recorded), and so on, until an entire production log is assembled for each crop.

Additional data sheets in the production log track the plants themselves (pest pressure, harvest dates, etc.), while others track the practices being used in the fields where each crop is grown (e.g., seeding and mowing of cover crops, application of fertilizer or soil amendments, irrigation, weed cultivation). Table 4 represents excerpts from the production log for beets in 2009. These records are essential for the organic certification process, though as described in one of their New Farm articles, Laura and Adam feel this "audit trail" would make them better farmers regardless of their commitment to certification.

In addition to spreadsheets and printed data forms, Adam and Laura use a calendar to schedule planting dates and intervals for succession planting. They also use hand-drawn maps (Figure 48) to plan for and document actual plant spacing. In deciding when and how much to plant, they think in terms of each week's CSA box and farmers market – what do they want to have in each box and at each market throughout the season? Then they count backwards to determine when to start the production process for each crop. In the beginning, they relied on seed supplier instructions plus trial and error, but now experience informs their decisions about how much crop to grow. Yields are highly variable, of course, depending on soil fertility, weather, and so many other factors; in order to mitigate these variations, Adam and Laura overplant some crops by 20% if space allows.

Educator's Perspective: Resource Tip

Organic Documentation

The effort required for recordkeeping in organic certification can be daunting at first, so it helps to start out with templates.

Organic Field Crop Documentation Forms is a set of forms from ATTRA that can be photocopied.

Appendix A of Organic Certification of Vegetable Crops from the University of Minnesota Southwest Research and Outreach Center has step-wise instructions, recordkeeping tips, and example formats for data sheets.

Laura and Adam have learned that there are pros and cons to every recordkeeping system and that systems evolve. There is some give-and-take, for example, when it comes to deciding whether a pre-made data sheet or a blank notebook will be the best way for documenting the information needed at different stages of production and planning. They acknowledge that, as far as they've come, their system is still a work in progress.

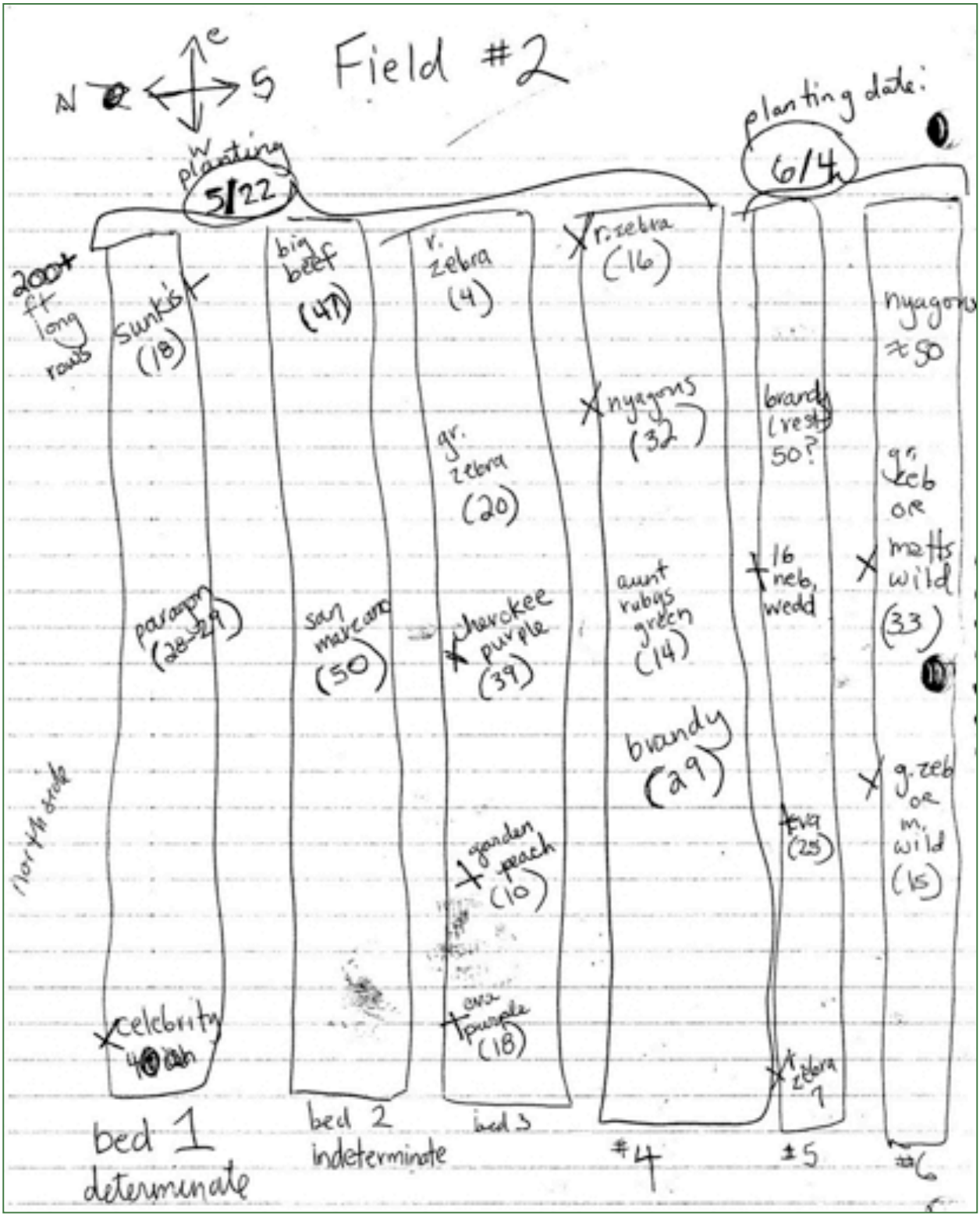


Figure 48: Laura and Adam use hand-drawn maps such as this one, for their 2009 tomato crop, to track field production in combination with spreadsheets and calendars.

Marketing Models

Adam and Laura started out focusing on wholesale sales in 2005 because it was a low-risk model for their first year and they knew they didn't have enough farming experience to commit to the pre-paid nature of a CSA. They wanted some initial experience farming on their own before transitioning to a direct-marketing model.

Laura and Adam quickly changed strategies, however. Wholesale was appealing because it felt like a more efficient way to grow and sell their product, but they found it was not profitable at their small scale. When they switched to a direct-marketing emphasis in 2006, their operating profit margin jumped from 7% to 26% (see Finances).

Educator's Perspective: Resource Tip

Marketing Local Foods

This handbook is designed to help Minnesota farmers explore the various options for marketing local food. It introduces the basics of different marketing systems, suggests resources, and includes profiles of farmers who are selling farm products directly to consumers via farmers markets, roadside stands, CSAs, and on-farm stores. It also contains information and profiles about selling indirectly via retail food establishments or food services.

Adam and Laura have maintained wholesale as a small percentage (5-10%) of overall sales since 2006 so they are not completely reliant on direct marketing for their income (Figure 49). It also provides them with an avenue for selling excess product.

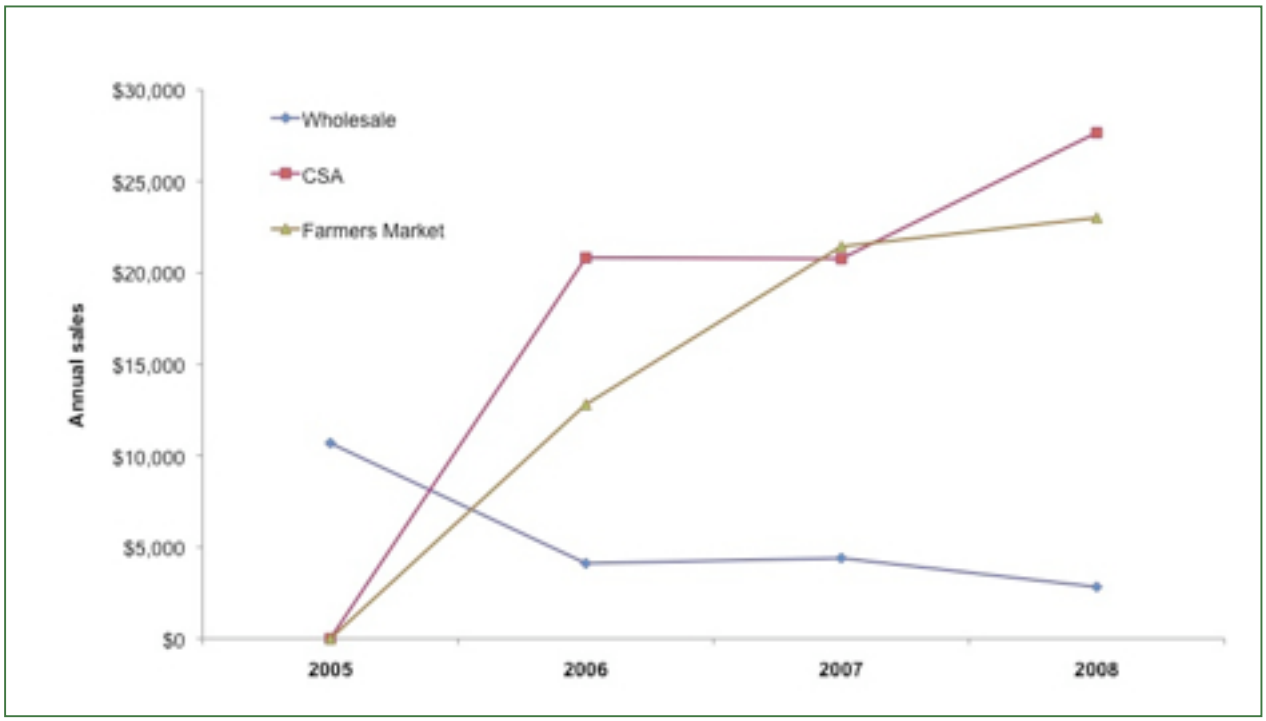


Figure 49: Loon Organics transitioned from wholesale-only in their first year to an emphasis on direct sales. They like their current combination of three enterprises.

Laura and Adam's preferred methods of direct marketing are CSA and the farmers market. They have no plans to set up a roadside stand at their new farm; they don't want to deal with the constant labor involved, and they like partitioning their marketing time into periods of concentrated sales. They also ruled out a "pick-your-own" operation because they didn't want the liability or efficiency issues of having customers in the fields and around machinery. They don't anticipate adding other direct-marketing methods, such as consumer buying clubs, to the mix because they're happy with their current combination and don't feel they could handle the administrative burden of additional channels.

CSA

Since 2006, the Loon Organics CSA has provided half or more of Laura and Adam's direct-market sales. This enterprise has been their most profitable. They have found a high demand for CSA, both when in proximity to the Minneapolis-St. Paul metropolitan area and now on the outskirts of Hutchinson, a town of about 13,000.

The number of shares they offer has grown each year (Table 5). They anticipate offering a maximum of 175-200 shares in the future. Their subscription covers an 18-week period from mid-June through mid-October. Starting in 2009, they offered a separate Thanksgiving CSA box in November. They also offered "preserving shares," or extra boxes of product sold to existing members during the fall at wholesale prices. The boxes contained surplus greens, tomatoes, or themed combinations called "salsa shares" or "pesto shares," an idea gleaned from the previous farm owners (Figure 50).

Table 5. CSA sales, 2006-2009

CSA Year	2006	2007	2008	2009
% of Direct Sales	61.9	49.2	54.6	73.0
# Shares Offered	35	40	60	125

Farmer's Perspective: On the Bookshelf

Sharing the Harvest: A Citizen's Guide to Community Supported Agriculture

by Elizabeth Henderson and Robyn Van En

This resource is the closest thing Laura and Adam have found to a "bible" of CSA farming. Why Laura likes it: "It has tons of great information for new and old CSA growers alike. It is also written geared towards citizens that would like to form a CSA themselves and hire a farmer to grow food for them. Elizabeth and Robyn were at the forefront of founding some of the first CSA farms in the U.S. The book was recently revised and expanded, and at the end of the book there is a list of comprehensive CSA Resources."

Figure 50: Adam and Laura offered extra shares to their CSA customers due to a good harvest in the fall of 2009.

Laura and Adam have built their CSA member base by using their Web site, posting at Local Harvest and other sources, and relying on word of mouth. Although the CSA requires a substantial investment of time because of the customer service, administrative duties, and communication skills involved, they like that most of the marketing effort can be done in the off-season rather than taking hours from the growing season. Duties during the season include preparing a weekly newsletter; handling phone and e-mail correspondence; arranging and conducting farm visits, tours, and farm gatherings; processing payments; and conducting surveys.

Farmers Market

The farmers market has generally made up a smaller percentage of Adam and Laura's direct-market sales (33.3-50.8%). Their current breakdown of direct sales is two-thirds CSA to one-third farmers market. They have been participating in the Mill City market in Minneapolis each weekend from May through October since 2006 (Figure 51). The farmers market is time-intensive in the sense that they must spend a whole day off the farm, but the market provides them with two benefits – profitable sales and an advertising opportunity (see Figure 31).

Figure 51: Adam and Laura at their booth in the Mill City Farmers Market in Minneapolis.

Although it is a relatively small part of their operating budget, Laura and Adam do incur some advertising costs. There are fees associated with Local Harvest and the Land Stewardship's Project CSA directory, for example, and in 2009 they paid some blog and Web site fees. When asked why they think Loon Organics is so locally well-known for such a relatively small and new operation, they attribute it to several factors. They benefited from some press received through Twin Cities newspapers, and their profile was raised through their affiliation with the prominent Gardens of Eagan and their participation in a high-traffic, Minneapolis farmers market. The appeal of their "back to the land" story has also provided them with some notoriety, especially as the local food movement has gained more attention in the media.

THE FARM BUSINESS

Human Resources

Laura and Adam generally each work 55-70 hours per week during the height of the season (from June through September) and 30-40 hours per week in the off-season. Off-season time is spent on marketing, recordkeeping, taxes, equipment repair, planning for the next season, and other management details. While Adam worked off-farm, their first winter on the new farm required consistent 40-hour work weeks for Laura as they prepared for increased production.

Laura handles most of the administrative office work as well as communications, marketing, and greenhouse production. Adam handles all equipment and machine repair and most of the equipment operation. They divide responsibilities for field management, employee management, harvesting, and post-harvest handling. The division of labor allows Laura and Adam to concentrate on what they do best, gives them each autonomy within the partnership, and helps mitigate potential disagreements. They further minimize disagreements by trying to hold regular meetings throughout the year.

Figure 52: Adam and Laura have used workshare volunteers since 2006 and started hiring employees in 2009.

Laura and Adam did not have employees during their first four years of farming. Since 2006, they have had 4-5 "workshare" volunteers who help with harvesting two mornings per week in exchange for a box of produce (Figure 52). Starting in 2009, they hired three employees, two of whom lived in the refurbished granary on the farm while the third lived in Hutchinson. Laura and Adam found the employees through their Web site and word of mouth. The responsibility of managing full-time employees and having them live on the farm added a new challenge to the 2009 season. Although hired labor is a substantial expense and the training and management time can be intensive, Laura and Adam felt the benefits far outweighed the negatives. A larger, full-time workforce allowed them to increase production to a level that was financially sustainable and brought more social interaction to a profession that has sometimes felt too solitary for them.

Adam and Laura's annual labor hours have varied through time, as shown in Table 6. The variation resulted in part from one or both of them working off-farm. Labor hours increased as they increased production and CSA membership. Adam and Laura don't keep time sheets for themselves or employees, so labor hours are estimates. In general, however, employees work weekdays from 8:00 am to 5:00 pm with an hour lunch. Workshares, as described above, work about 4-5 hours per week during the CSA season.

Table 6. Estimated labor hours, 2005-2009

Estimated Labor Hours	2005	2006	2007	2008	2009
Adam and Laura	1,280	2,082	2,490	2,825	5,000
Workshares and Employees[1]	0	576	576	576	2,200

[1]Employees only in 2009.

Looking to the future, Adam and Laura feel one of their biggest challenges will be balancing family life with farming if they decide to have children. The main concerns are health care and child care. They expect they will either need to scale up, so that they have enough income to hire a farm manager to replace one of them during the children's early years, or that they will scale down their operations, so that the farm duties are manageable for one person.

Finances

Loon Organics took advantage of a Minnesota Department of Agriculture cost-share opportunity to take a one-on-one Farm Business Management (FBM) course offered through the Minnesota State Colleges and Universities system. The state offered the cost-share to certified organic farmers because it wanted more information on the economics of organic farming. FBM showed Adam and Laura how to evaluate their farm financially and which benchmarks are important. It also helped them improve their recordkeeping skills and set up a system for tracking income and expenses separately for each enterprise.

Although Laura and Adam use Microsoft Excel and Quickbooks for bookkeeping on a regular basis, they used FINPACK as the financial analysis tool in FBM. Laura and Adam's use of the software provided an unexpected benefit from participation in FBM. Because most local agricultural lenders in the Midwest are familiar with FINPACK, it helped Laura and Adam's financing process when they purchased their farm. Completion of FBM courses can also be a requirement for FSA loans and commercial agricultural lenders.

Educator's Perspective: Resource Tip

Managing Farm Finances

The Center for Farm Financial Management (CFFM) at the University of Minnesota provides educational programs and software tools, such as Interpreting Financial Statements and Measures, an online video workshop that helps producers understand and use the 4 major financial statements and the 21 financial measures recommended by the Farm Financial Standards Council.

In 2008 the CFFM published a report entitled Organic Farm Performance in Minnesota. It summarizes individual farm financial results for participants in the Minnesota Organic Farm Business Management Project for 2008 and provides comparisons to previous years.

CFFM works with other groups to manage FINBIN, a farm financial database that provides benchmark financial information to farm producers, educators, lenders, and other agricultural professionals.

Use the USDA Service Center Locator to find a local office with information on FSA loans.

Start-up Capital and Loans

Adam and Laura financed the start-up of Loon Organics in 2005 with personal savings. They were able to pay themselves back within the first few years. Their sources of capital are summarized in Table 7. Start-up funds were used for capital purchases, seeds, and other supplies in 2005-2006. The capital in 2009 was used for start-up expenses for the first season at the new farm, before CSA payments started coming in.

Table 7. Sources of capital, 2005-2009

Year	Amount	Source	Payback Period
2005	$5,750	Personal savings	2005
2006	$6,000	Personal savings	2006-2007
2007	$0	n/a	n/a
2008	$250,000	FSA loan	Ongoing (40-year mortgage)
2009	$6,000	Personal savings	2009 (half), 2010 (half)

Laura and Adam purchased their farm for $265,000 in 2008. They financed the purchase through a USDA FSA loan program targeted to beginning farmers and ranchers who have difficulty obtaining a loan from traditional agricultural lenders. Applicants need to have at least 3 years of demonstrated farm experience. Although Laura and Adam found the application process lengthy and time-intensive, they felt the effort was extremely worthwhile because it was one of the major factors that made the farm affordable to them. They used tax returns and a projected 3-year cash flow that their FBM instructor helped them to create, along with a current balance sheet, in order to document their production history. The FSA loan had a low fixed interest rate, long amortization, and no closing costs. Once Laura and Adam are in a more secure financial position, the loan will be refinanced with a shorter amortization through a commercial agricultural lender.

Farm Income Overview

Adam and Laura's gross farm income has increased each year since they began, as shown in Table 8. There was a large jump from the first to second year of farming, when they switched to an emphasis on direct sales. They also increased production a bit in their second year, but more importantly they became much more efficient. There was another substantial increase in 2009, when their direct-market sales nearly doubled. This was almost entirely due to an increase in CSA shares with the move to the new farm. Their expenses increased as well from 2005 to 2009, but overall their net farm income has grown annually. The exception was from 2007 to 2008, when net farm income dropped slightly. This drop was due to their purchase of the farm in 2008. Adam and Laura decided to buy everything they knew they would need on the new farm (such as seeds and two additional tractors) using their 2008 income, because Adam still had off-farm employment at that time. Adam and Laura's sales per acre are difficult to interpret because they have been in such a growth state, but it is worth noting that their high gross sales per acre is what allows them to earn a living at their small scale.

Farmer's Perspective: Lessons Learned

Expect the Unexpected

From the earliest days when the number of zeroes behind certain expenditures left them dazed, Adam and Laura have learned to prepare for both large and unexpected expenses. They budget at least $5,000 to $10,000 more for expenses than they think they will need to account for contingencies.

Proceed with Caution

Adam and Laura have learned to budget carefully in order to make income from CSA payments last all year. They distinguish between urgent needs and those expenses that can wait until year's end. Sales from the farmers market and wholesale accounts also help provide cash flow during a larger window of time than when CSA payments are collected.

Table 8. Farm income overview, 2005-2009

Financial Indicator	2005	2006	2007	2008	2009 (Actual)	2009 (Projected)
Gross Farm Income	$10,690	$37,749	$46,615	$53,273	$93,533	$85,000
Wholesale Sales	$10,690	$4,117	$4,401	$2,725	$1,688	$5,000
Direct-Market Sales	n/a	$33,632	$42,214	$50,548	$91,845	$80,000
CSA	n/a	$20,830	$20,773	$27,530	$68,600	$55,000
Farmers Market	n/a	$12,802	$21,441	$23,014	$23,245	$25,000
Total Expenses	$9,894	$28,065	$35,681	$44,152	$71,834	$54,147
Capital Purchases	$666	$15,625	$5,719	$33,059	$10,497	$14,600
Start-up Capital/Loans	$5,750	$6,000	$0	$250,000	$6,000	$6,000
Net Farm Income	$796	$9,684	$10,934	$9,121	$21,699	$30,853
Acres Farmed	1.5	2	2.2	2.5	6	8
Gross Sales/Acre	$7,127	$18,875	$21,189	$21,309	$15,589	$10,625
Net Sales/Acre	$531	$4,842	$4,970	$3,649	$3,617	$3,857
Owners' Hourly Wage	$0.62	$4.65	$4.39	$3.23	$5.00	$6.17
Operating Profit Margin[1]	7.45%	25.65%	23.46%	17.12%	23.20%	36.30%
Net Non-Farm Income	$16,909	$18,227	$40,766	$43,000	$5,934	$9,000

[1]Does not include capital purchases.

Laura and Adam analyze their financial picture each winter. In addition to assessing the standard items such as income and expenses, they look at how their projections from the past winter (as shown in gray for 2009 in Table 8) compare to their actual numbers for the year. In 2009, Laura and Adam had a higher gross income than expected (mainly due to the sale of "preserving shares" in the fall, as discussed under Marketing Models), but they netted less. Their net income was lower than expected in part due to some unforeseen expenses such as a new van. They also spent several more thousand dollars than anticipated on the electric upgrade for the farm outbuildings, and they were still accumulating a lot of basic supplies and materials to run their own farm. Overall, Laura and Adam have been surprised at how well the actual data have tracked their projections, given the number of uncertainties and their recent transition. They expect their gross income to increase gradually as sales increase each year and for expenses to level off by 2011. They anticipate their 2010 net income will increase to $25,000-$30,000, and they are approaching a profit margin in their target range of 30 to 50 percent.

Off-Farm Income

As described under Equipment, Adam and Laura's strategy has been to use off-farm income to support themselves while using farming profits to make capital purchases. One or both of them worked off the farm between 2005, when they started Loon Organics, and 2009, when the bought their own farm. Laura's off-farm hours during their first season in business made the harvest especially challenging, as described in one of their articles in the New Farm.

Between 2006 and 2008, Laura worked full-time on the farm during growing seasons and worked full-time during the off-season in the produce department of a local food co-op. She also filled in at the co-op in 2009. Adam started a full-time job as an environmental chemist in early 2006 and worked there until March 2009. Adam's job helped them to fast-track the purchase of a farm. It allowed them to save for a down payment, have health insurance, put the farm profits back into the business, and have a steady income to show to loan officers.

Expenses

The nature of a farming operation means that many expenses are capital purchases, as described under Infrastructure and Equipment. Other expenses that Adam and Laura have incurred since start-up include seeds and fertilizer; equipment fuel, repair, and maintenance; land rental or mortgage payments, interest, and property taxes; advertising, marketing, and continuing education costs; employee wages; insurance; utilities; and a wide range of supplies. A summary of their annual expenses is provided in Table 9, modified from Schedule F of their income tax return.

Table 9. Farm expenses, 2005-2009

Expense	2005	2006	2007	2008	2009
Advertising		$40	$23	$25	$244
Car and truck	$1,173	$4,608	$2,215	$3,402	$5,500
Continuing education		$150	$603	$1,221	$846
Depreciation	$205	$5,010	$8,859	$8,859	$13,397
Employee wages					$9,565
Fees (marketing, certification, etc.)	$933	$1,442	$1,897	$1,899	$2,067
Fertilizers, lime, and chemicals		$53	$466	$701	$2,754
Gas, fuel, oil (tractors, etc.)		$119	$152	$212	$814
Greenhouse[1]			$379	$1,518	$4,170
Insurance (other than health)[2]	$282	$493	$558	$77	$1,721
Internet/telephone					$1,012
Mortgage interest				$1,860	$12,747
Product purchase for re-sale		$5,866	$10,131	$11,826	
Rental, equipment	$46	$100	$92	$321	
Rental, land	$800	$1,025	$400	$950	
Repairs and maintenance		$1,167	$3,627	$2,465	$2,056
Seeds and plants	$2,853	$2,525	$1,904	$3,350	$5,442
Supplies (building materials)[3]					$1,343
Supplies (farmers market)[3]					$382
Supplies (misc. farm supplies)	$3,440	$3,659	$2,436	$2,034	$841
Supplies (office)	$18	$156	$233	$551	$419
Supplies (row covers)				$223	$955
Supplies (T-tape, plastic mulch)			$403	$565	$295
Supplies (tools, boxes, signs)		$35		$703	$1,406
Taxes[4]		$120	$125	$130	$1,673
Utilities	$41	$1,497	$1,178	$1,260	$1,915
Total[5]	**$9,791**	**$28,065**	**$35,681**	**$44,152**	**$71,565**

[1]Greenhouse expenses increased significantly in 2009 when Laura and Adam went from renting greenhouse space from Gardens of Eagan to equipping and running their own.

[2]Cost of insurance was low in 2008 because much of the premium was paid in 2007. Cost increased in 2009 because of farm ownership.

[3]New categories in 2009.

[4]Included accountant fees from 2006-2008. Included taxes on paid labor in 2009.

[5]Totals may not equal amounts presented in Table 8; some minor or occasional expenses were not included here.

One of Laura and Adam's most noteworthy expenses in the first few years was the purchase of product for re-sale. Produce was purchased from Gardens of Eagan and other farms at wholesale prices between 2006 and 2008, as shown in Table 9. They purchased land-intensive crops (such as sweet corn, watermelons, kale, broccoli, cauliflower, and cabbage) that they didn't have room to grow on their rented land (Figure 53). The items were used to supplement their CSA and farmers market offerings as they switched to an emphasis on direct marketing. Although the purchased items were an additional expense in their first years, they saw it as an investment in the Loon Organics brand. They also considered it a substitute for hiring labor, which they would have had to do if they were growing all the crops and farming more land. They feel that having offered CSA boxes that were consistently full of high-quality product was crucial to their early success. They also didn't have to learn how to grow dozens of crops all at once. They could focus their own growing efforts on shorter day-length crops (such as salad mix, beets, greens, carrots, roots, heirloom tomatoes and peppers, herbs, cucumbers, and summer squash) that have high yields on small amounts of land. They were very up-front with customers about where all the products came from and got only positive feedback about the quality and variety of the produce they sold.

Figure 53: Laura and Adam purchased certain land-intensive crops, such as watermelons, for re-sale in order to provide complete CSA boxes in their early years.

Farmer's Perspective: Lessons Learned

Establishing a Reputation

Adam and Laura feel strongly that supplementing CSA boxes with produce grown by other farmers is crucial to beginning CSA farmers. Beginners do not have to rent land and have "built-in" mentors as Loon Organics did, but they can network with nearby farmers and negotiate arrangements for supplemental product. Even experienced CSA farmers make these arrangements when time or land availability is limited.

Educator's Perspective: Resource Tip

Produce Handler's Licensing

Minnesota law allows farmers to sell the produce of their own operation, from land "occupied and cultivated" by themselves, without any licensing. However, if product is purchased from another farmer or entity for re-sale, farmers are required to have a produce handler's license.

MISA has a fact sheet entitled Providing Safe Locally-Grown Produce to Commercial Food Establishments and the General Public that provides further information.

Business Structure

Laura and Adam started out structuring Loon Organics as a partnership. They didn't marry until fall of 2008 but wanted their business to be a 50:50 venture from the outset, so a sole proprietorship wasn't appropriate. Because they weren't sure at first how long they would be farming, they didn't want to spend money on incorporating.

Once Adam and Laura were ready to purchase their farm, they restructured to a domestic family farm corporation. It gives them several benefits, including greater liability protection than they had as a partnership. The main driving force behind incorporating was the regulations surrounding the type of loan they obtained for purchasing the farm. The corporation now owns the property and the farm assets.

Educator's Perspective: Resource Tip

Business Structures

The decision about whether to incorporate a farm or use another business structure tends to be very specific to each farmer's set of circumstances. Professional advice is highly recommended, but the resources below provide a starting point for understanding the different options.

MSU's Beginning Farmers Web site has a useful post about Farm Incorporation.

The University of Wisconsin Center for Cooperatives has a comprehensive comparison chart of business structure types that is tailored to farming.

Risk Management

Certain risk management strategies are embodied in Laura and Adam's approach to farming. Farming as a CSA helps them manage financial risk by getting payments up front for the crops to be produced. The diversity of Laura and Adam's crops and the nature of succession planting help to reduce the risk of crop failure. The existing hoop house, and the additional ones they hope to acquire, provide protection from hail and wind. The first season of growing crops in the hoop house also suggests that it offers some measure of disease protection.

Adam and Laura do not currently carry crop insurance. Typical programs provide insurance specific to each crop and only reimburse farmers for seeds and possibly a percentage of production, thus making standard crop insurance too complicated for their number of crops and not sufficiently cost-effective. A new program, however, may soon become an option for them. AGR-Lite, which is administered by the USDA Risk Management Agency and offered through private insurers, is a program that compensates farmers for reduced revenue due to covered losses. AGR-Lite allows organic farmers to take into account the anticipated premiums for their crops, which other Federal Crop Insurance programs have not. AGR-Lite first became available in Minnesota in 2007, but Adam and Laura were not eligible until they had five years of documented farm revenue. Now that they are more established, they plan to look into this option as their Gardens of Eagan mentors have done. Laura and Adam do carry insurance policies for general liability, product liability, and workers' 'compensation.

Educator's Perspective: Resource Tip

Farm Transition Planning

The Farm Transfer and Estate Planning online workshop addresses the transfer of farm businesses to the next generation. The program is targeted at farm family members and involves three focus areas:

1. introduction of farm transition and estate planning information, laws, regulations, concepts and techniques;
2. outline of potential strategies farm families can consider as they develop and implement their farm transfer and associated estate plan; and
3. outline of methods whereby farm family members can develop individual, family, and farm business goals and use those goals to develop a transfer plan outline including their personal transfer team.

AgTransitions helps farmers develop a plan to transition their business to the next generation and includes interaction with reviewers for feedback and assistance.

Professional Development

Adam and Laura's current professional memberships include the Land Stewardship Project (LSP), the Sustainable Farming Association of Minnesota (SFA-MN), the Minnesota Farmers Union, and Slow Food USA. They use conferences associated with these and other organizations to supplement the training they received by working on other farms and to network with other farmers. They are devoted attendees of annual conferences including the MOSES Organic Farming Conference, the Minnesota Organic Conference (sponsored by the Minnesota Department of Agriculture), and the SFA-MN conference. They have also attended many other one-day educational seminars and field days offered through farming organizations, universities, and individual farmers.

Laura and Adam also stay up to date by reading a variety of farming-related periodicals. *Growing for Market* is a monthly publication covering news, advice, and resources for market farmers. *The Organic Broadcaster*, published bimonthly by MOSES, is geared toward organic farmers, processors, and certifiers. *The Land Stewardship Letter* is LSP's bimonthly newsletter, and *The Corner Post* is published quarterly by SFA-MN. Adam reads *Farm Show*, a bimonthly newspaper dedicated to farm equipment and unique, do-it-yourself projects. Laura frequents Rodale Institute's New Farm Web site for its farmer-to-farmer resources.

Educator's Perspective: Resource Tip

Continuing Education

In addition to the conferences that Laura and Adam attend regularly, the annual Midwest Value Added Agricultural Conference is a major regional event.

MISA maintains a list of educational opportunities that includes lectures, seminars, conferences, college courses, and workshops.

Laura experienced a special opportunity in 2008 when she was selected as a Minnesota delegate to Terra Madre, Slow Food's gathering of world food communities in Italy. Laura was among 7,000 farmers, students, activists and educators from 130 countries that convened around the theme of promoting "good, clean, and fair food" and involving youth in the future of global sustainable agriculture. It was an inspiring and educational experience that gave hope and new meaning to the work they do on their farm. After the Terra Madre experience, Laura feels a sense of solidarity with the thousands of other sustainable farmers across the globe.

CONCLUSION

Next Steps

Laura and Adam have made great strides in the seven years since they caught the farming bug (Figure 54). They have gone from on-farm training to starting a farming business and buying their own land. They learned an enormous amount, established a quality brand of farm product, and are on the road to a financially sustainable farming enterprise. Ideas for the future include increasing the number of acres in production and the number of CSA shares, adding hoop houses, establishing perennial crops, and installing a certified kitchen for value-added products to be sold year-round. In recognition of how valuable their own early farming experiences and mentoring relationships were, Laura and Adam are now bringing the process full circle by sharing information and providing employment opportunities for other beginning farmers.

Figure 54: Adam, Laura, and Toblerone in their greenhouse on April 11, 2009.

Final Note

Remember the three-legged stool of farming? As you start planning your own enterprise, be sure your learning process incorporates all three components of a successful farm: production, marketing, and financial management. Go ahead and get some dirt under your fingernails with a hands-on learning opportunity. But be prepared to spend time tapping away at the keyboard too, as you explore the numerous planning and management resources provided in this case study!