

MARKET GARDENING: A START-UP GUIDE

HORTICULTURE SYSTEMS GUIDE

Abstract: Market gardening, which entails the intense production of high-value crops, gives farmers the potential to increase their income from a few acres. It is also of interest to people looking at agriculture as an alternative lifestyle. This publication provides an overview of issues you need to be aware of as you consider undertaking market gardening, and suggests helpful resources.

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What is Market Gardening?

Market gardening is the commercial production of vegetables, fruits, flowers, and other plants, on a scale larger than a home garden, yet small enough that many of the principles of gardening can be applied. The aim, as with all farm enterprises, is to run the operation as a business and to make a profit. Market gardening is often oriented toward local markets, although production for shipment to more distant markets is also possible.



Preparing a bed for planting.
Marcie Brewster of Wildfire Farm, Berryville, Arkansas.

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Choosing Markets

You need to develop a clearly focused marketing plan before any crops are planted. Having marketing in mind before planting helps to ensure – but will not guarantee – that most of what you plant will be sold, thus eliminating wasted time, space, produce, and money. Many market gardeners try to maximize their income by selling directly to consumers, thus bypassing wholesalers and other middlemen. Farmers' markets, roadside stands, pick-your-own, subscription marketing arrangements, and sales to restaurants are common marketing strategies.

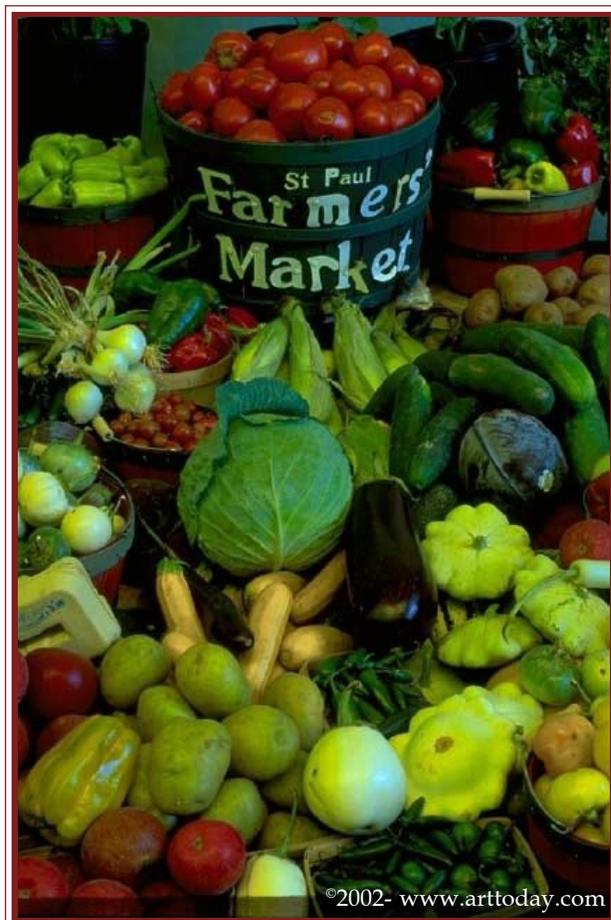
Tail-gate marketing is one of the simplest forms of direct marketing. It involves parking a vehicle loaded with produce on a road or street with the hope that people will stop and buy. This is commonly used for selling regional produce in season. Advantages of this method are that it takes very little investment and can be set up on short notice.

Farmers' markets are an excellent place for a beginner. They do not demand that a vendor bring a consistent supply of high-quality produce every market day, although that is still the ideal. If you have less-than-perfect

tomatoes, you may be able to sell them as canners at a reduced price. A farmers' market is a wonderful place to meet people and develop steady customers, which can also lead to additional marketing channels.

Disadvantages include the need to spend time away from the farm and the possibility of having produce left over at the end of the market.

On-farm marketing strategies include *roadside* or *farm stands* and *pick-your-own*. These often make a winning combination, as customers who come for the enjoyment of spending time in the field will often purchase more of the same crop, or different ones, already harvested. Innovative farmers have found that on-farm entertainment, such as animals to pet or pumpkins to carve, can be profitable additions to on-farm markets. For these marketing methods, a mower may be your most important piece of equipment since you will need to keep the farm landscape neat to attract customers.



Subscription gardening is a strategy that has gained a lot of interest in the past decade, and it can take many different forms. One form, also known as Community Supported Agriculture (CSA), involves providing subscribers with a weekly basket of seasonal produce. The subscribers pay partially or in full for their share of the farmer's planned production at the beginning of the season. This both eliminates the problem of covering upfront production costs at the beginning of the year and guarantees a market. The challenge for the grower is to have a consistent and continuous supply of popular vegetables throughout the growing season. It is helpful to survey the customers/members about their preferences before planting.

Restaurants that are interested in serving fresh, locally-grown produce can be a good market. One key to remember when working with chefs or restaurant owners is that they are very busy people. Ask the chefs what day and hour is the best time to call, and then be consistent about calling at that time every week to find out what they need. Delivery is another service chefs will require. Chefs who buy locally suggest that growers schedule a visit with seed catalogs in hand before ordering for the coming season; they appreciate the opportunity to tell you what they can use or would like to try.

Grocery and natural food stores may be one of the most difficult markets to break into for small-scale growers. Some stores, however, find they have customers who are pleased to find locally produced foods. If you want to sell to retailers, remember that they need products to be consistently available and of the highest possible quality. Have a sample of your product with you when you visit the store, and have a price in mind.

Schools and institutions are the targets of a number of "farm to school" programs across the country. Food service departments at schools across the country are joining forces with concerned parents, teachers, community activists, and farmers to provide students with healthy meals, while simultaneously

supporting small farmers within their region. *Healthy Farms, Healthy Kids* describes in detail seven farm-to-school projects from around the country, providing you with plenty of information to start a project in your community (1).

The Internet can be used to transact business or to distribute information about your farm and products – or both. *How to Direct Market Farm Products on the Internet* discusses the things to consider before using the Internet as a marketing tool, and provides examples of farmers' experiences, as well as links to more information (2).

Most market gardeners use several outlets. Diversity in marketing, as well as diversity in planting, is a cornerstone of stability.

Production Techniques and Equipment

Apprenticing with an experienced market gardener is probably the best way to learn good production techniques. If that opportunity isn't available, you can learn much by attending workshops and conferences, visiting with other market growers, reading, watching videos, and experimenting. State fruit and vegetable grower organizations, sustainable agriculture and organic grower groups, and national organizations such as the North American Direct Marketing Association and the Association of Specialty Cut Flower Growers, host annual conferences and trade shows where a wealth of information is shared. The Cooperative Extension Service is an excellent source of bulletins on production basics for most crops and may be able to provide on-site consultation if you have production questions. See ATTRA's Publications List for current publications on soil fertility management; insect pest, weed, and disease management; season extension techniques; the organic production of specific crops; and postharvest handling.

Books are often the core of our search for information. The three listed below are all highly recommended by those who have used

them. Which one will be most useful to you on a day-to-day basis may depend on your scale of production.

How to Grow More Vegetables (3) by John Jeavons details biointensive gardening techniques that can provide more food “than you ever thought possible on less land than you can imagine.” The system emphasizes the use of hand tools, raised bed production, intensive spacing, companion planting, and organic fertility management. The planning charts are aimed at helping families provide for their own food needs, but can be adapted for use by market gardeners as well.

Eliot Coleman’s *The New Organic Grower* (4) is written for market gardeners with about five acres of land in vegetable crop production. Coleman describes techniques using walking tractors, wheel hoes, multi-row dibble sticks, and soil block transplants. Sections on planning, crop rotations, green manures, soil fertility, direct seeding and transplants are inspiring. Coleman includes season extension techniques in this book, and has authored additional books on this topic, including *The Winter Harvest Manual* (5).

Sustainable Vegetable Production from Start-up to Market (6) was written by Dr. Vern Grubinger, vegetable and berry specialist for University of Vermont (UVM) Extension and director of the UVM Center for Sustainable Agriculture. The book is aimed at aspiring and beginning farmers, and introduces the full range of processes for moderate-scale vegetable production, using ecological practices that minimize the need for synthetic inputs and maximize conservation of resources. It provides practical information on such essential matters as selecting a farm site; planning and record keeping; marketing options; and systems for starting, planting, protecting, and harvesting crops. The book’s final chapter profiles the experiences of 19 individual vegetable growers, focusing on individual crops, and provides each grower’s budget for these crops.

Table 2, *Equipment Needs* (p. 14), is adapted from a chart distributed to participants at an

Advanced Organic Vegetable Production Workshop sponsored by the Michael Fields Institute. It provides an estimate of equipment needs for market gardens of various sizes. Please keep in mind that these are estimates. Your own needs will differ. You may be able to adapt machinery that you already have on hand, or you may be able to buy it used. If you are just starting out with a small amount of land, it may be more economical to purchase transplants than to build a greenhouse and grow your own. It may make sense to have primary tillage done by someone with a large tractor rather than to make that large purchase yourself.

Depending on your choice of crops, irrigation is a must for consistent and high-quality production, even on a scale of less than an acre. Successful vegetable production requires the equivalent of an inch or more of rain per week during the growing season. That is equal to almost 30,000 gallons or more per acre. In most areas of the country, there is not enough rainfall during the growing season. Supplemental water for crops can come from a river, pond, or well. The greatest danger associated with the use of ponds and other small surface sources is in underestimating the amount of water available. Estimates should be conservative and recognize that the period of maximum need will probably coincide with the period of lowest water levels. Another concern is how fish and other life forms will be affected by lowered water levels.

In addition to a source of water, you need a pump, a way to get water to the field, and a way to distribute it. Drip or trickle irrigation is becoming the method of choice for many fruit, vegetable, and flower growers. Drip has several advantages when compared to traditional methods, such as furrow and sprinkler irrigation (7).

A good drip system that is properly operated provides uniform water application and reduces the amount of water needed to grow a crop. For some crops, the amount of water used is reduced by at least one-third. Also, since the water is applied only to the soil, not

to leaves, the incidence of plant disease is reduced when compared with sprinkler irrigation. Properly filtering water is very important for drip systems, as dirty water can plug the holes in the drip tape. A sand media filter is the preferred type when the water source is a pond or river. Grubinger's book provides an overview of overhead sprinkle and drip or trickle irrigation systems and your local Cooperative Extension Service can supply detailed bulletins and possibly an irrigation specialist who will work with you to design a system to meet your needs.

Planning and Record Keeping

Record keeping may well be one of the most difficult tasks for market gardeners. But good records are critical if you want to know which crops are profitable and which are not. Records are needed to fine-tune planting plans, cultivation and pest management schedules, and harvest schedules. They help to answer questions about labor, equipment, and capital needs, and to develop business plans.

Field maps are basic to most record-keeping systems. Richard DeWilde of Harmony Valley Farm in Wisconsin organizes his crop records beginning with *greenhouse notes*. His 1999 greenhouse onion record (Table 1) provides an example. Varieties are listed in the order that they will be transplanted to the field. Note that information recorded includes planting date, type of flats used, pre-plant preparation,

planting method, whether seed is pelletized or not, variety, seed sources, type of onion, percent germination, number of flats to be planted times cells per flat, and seeds per cell.

Other forms are used to plan and record outdoor plantings, harvesting, packing, and sales.

Dan Kaplan of Brookfield Farm in Massachusetts uses computer spreadsheets on MS Excel for crop planning and record keeping. The disks with the spreadsheet templates can be obtained by sending a donation of \$25 to Brookfield Farm. Contact:

Dan Kaplan
 Brookfield Farm
 24 Hulst Rd.
 Amherst, MA 01002
 413-253-7991
bfcsa@aol.com
<http://www.brookfieldfarm.org>

Marcie Rosenzweig of Full Circle Farm in California developed a computer-based record keeping system known as *Market Farm Forms: Spreadsheet Templates for Planning and Organizing Information on Diversified Farms*. It is designed to help organize and calculate the mix of vegetables and related crops raised by market gardeners, truck farmers, and CSAs. Included are a 95-page book and a diskette containing Excel spreadsheet templates available in PC or Macintosh formats.

Table 1. Harmony Valley Farm record keeping. Source: Richard DeWilde.

3/1 Onions: 200 plastimer/sterilized/dibble/deep as possible/cover with soil/sprinkle with vermiculite.					
(raw)	White spear/Purple (JS)	bunching	83%	10 X 200	2-3 seeds
(raw)	Bianca (JS)	cipollini	84%	5 X 200	2-3 seeds
(raw)	Bonettano (OE)	cipollini	98%	5 X 200	2-3 seeds
(pel)	Candy (Stokes)	s. Spanish	91%	20 X 200	2 pellets
(pel)	Frontier (Stokes)	98 day storage	91%	20 X 200	2 pellets
(pel)	Criterion (Stokes)	115 day storage	86%	20 X 200	2 pellets
(pel)	Copra (JS)	95 day storage	82%	20 X 200	2 pellets
(pel)	Mars (Stokes)	red	98%	20 X 200	2 pellets
(raw)	Red Wing		75%	5 X 200	2 seeds

Among the records that can be kept and/or calculated with this system are: seeds and purchased plants needed, farm-grown transplants, soil amendments and fertilizers, cropping and succession timelines, weekly task lists, crop yield and income projections, actual harvest and income data, produce availability sheets, invoices and pick sheets, Community Supported Agriculture share and yield sheets, budget worksheets, row calculations and input sheets, CSA share bed calculations and input sheets, certified organic producer certificate sheets, fax sheets, labels, order forms, point of sales labels, recipes, and flyers. It is available from:

Marcie Rosenzweig
Full Circle Organic Farm
3377 Early Times Lane
Auburn, CA 95603-7900
530-885-9201
fullcircle@jps.net
(\$45 plus \$5 shipping and handling)

Business Plan

Starting any business demands an investment of time and money. When we invest in our own business, be it market gardening or something else, we do not want failure. However, some numbers suggest that three out of five businesses fail in the first year. Why? According to directors of the Illinois Small Business Development Center Network, the primary reason for failure is lack of a business plan.

Developing your business plan helps you define your business, create a road map for operating the business, set the goals you will aim for, judge your progress and make adjustments, and satisfy outsiders' requests for a written explanation. The basics of a business plan include:

- ◆ What? Describe your product or service.
- ◆ Why? Describe the need for your product or service.
- ◆ Who? Describe the customer.

- ◆ When? Draw a timeline and list all the tasks that need to be accomplished.
- ◆ Where? Describe the location of your business.

An excellent guide to preparing a business plan for agricultural producers is available from Farm Business Management Information Network for British Columbia. You can find it at the website <http://fbminet.ca/bc/direct_farm/business_guide_direct_farm.htm>. A couple working through a plan for direct farm marketing is used as an example. Most rural libraries now have web access if you do not.

The US Small Business Administration (SBA), in partnership with state Small Business Development Centers, can also help you develop a business plan. In addition, the SCORE (Service Corps of Retired Executives) Association is a resource partner with the SBA. SCORE is dedicated to aiding in the formation, growth, and success of small businesses nationwide. You can reach them through their website <<http://www.score.org>> and find experts with agriculture backgrounds. They can consult with you via email regarding your business. The consulting services are free.

Another resource is the NxLevelL business-planning curriculum prepared by the University of Nebraska specifically to help small producers write and develop business plans unique to their operations. To find out if NxLevelL's program, "Tilling the Soil of Opportunity," is offered in your state, check their website at <<http://www.nxlevel.org>>.

Additional resources for help with business planning are the Cooperative Extension Service and the USDA/NRCS. County offices should be listed in your local phone book.

Labor

The size of your operation and the enterprises you choose will determine the amount of labor needed. Two of the three growers profiled in this publication have decided that they do not

want to hire outside help and have planned their production and marketing accordingly.

Many market gardeners, however, will find that they need help. Managing labor so that the crew will be happy and productive is covered by Richard DeWilde of Harmony Valley Farm in an Advanced Organic Vegetable Production workshop offered by the Michael Fields Institute. DeWilde's operation is one of the three described in the profiles.

Mr. DeWilde emphasizes that it is important to be clear about expectations and operating procedures. He does this by meeting regularly with his employees and by putting things in writing. An *employee manual* lays out farm standards and expectations. For example, it tells people what is to be done with trash. It includes a Friday night checklist to ensure that supplies and equipment are properly stored at the end of the week. Employees do not work on Saturday or Sunday. Mr. DeWilde said he is in the process of developing an *operating manual* for the farm.

On Monday morning Mr. DeWilde meets with his crew in the packing shed. He makes the day and week manageable by writing down all that needs to be accomplished on two dry-erase boards. On one is the "week-at-a-glance." On the other are posted tasks for Monday with assignments of who will do each task. Past records show how long it should take to do each task – such as harvest 1,000 bunches of kale. This information is critical for determining assignments.

Separate task sheets list supplies needed for each task. For example, if floating row covers are to be laid, the task sheet will include shovels, markers, and marking pens.

Harmony Valley Farm commits to providing full-time jobs. A list of rainy day tasks and extra chores is on hand to ensure that employees always have something useful to do. The average rate of pay for labor in 2000 was \$8.60 per hour.

Mr. DeWilde emphasizes that it is important for employers to be knowledgeable about

government regulations. Field sanitation, drinking water, worker protection, and safety regulations are among those that an employer must know about. A resource for learning about government regulations is Neil D. Hamilton's *The Legal Guide for Direct Farm Marketing* (See [Further Resources](#), p. 11). The book includes a chapter on labor and employment.

Food Safety

Changing lifestyles and growing consumer interest in fresh, nutritious food has brought an increase in produce consumption. There has also been an increase in the number of food-borne illness outbreaks associated with fresh fruits and vegetables. An occurrence can cause irreparable damage to a business, both from the legal point of view, as well as from the negative impact on its reputation (8).

Currently, there are no mandatory rules for the safe growing and packing of fruits and vegetables, except for those regulating water and pesticide residues under the surveillance of EPA. In October 1998, however, the EPA published the *Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*, comprising a set of Good Agricultural Practices (GAPs). Although they are optional, many growers are incorporating these practices into their operations. The Cooperative Extension Service in a number of states provides bulletins outlining safe growing and packing practices. Kansas State University has published *Food*A*Syst*, a handbook to help address food safety and environmental concerns. You can find chapter 3, *Growing Vegetables, Fruits, and Produce*, at the website <<http://www.oznet.ksu.edu/>>.

Organic Market Gardening

Many market gardeners choose to grow their crops organically. For some this is a philosophical decision – they believe it the socially and environmentally responsible thing to do. Market economics can also be a motivation. Organically grown produce typically commands higher prices in the

marketplace. Growers who sell through CSAs or use other forms of “relationship” marketing, sometimes find that their customers expect and demand organic produce. There is a long history that equates organic farming with fresh, “whole” foods.

The production and marketing of organic foods is now subject to federal regulation. Organic production is defined in legal terms and use of the term “organic” is controlled. Commercial producers are required to be certified if they wish to market their products as organic.

Farmers need to work through an accredited certifying body to become certified organic. ATTRA currently provides a list of certifiers, but the National Organic Program is expected to publish an updated list of accredited certifiers on its website at <http://www.ams.usda.gov/nop/>. A certifier will provide the grower with all the information necessary to work through the certification process. While there are many details, a grower considering certification should know the following:

- ◆ Synthetic pesticides and conventional “artificial” fertilizers may not be used in the production of organic crops.
- ◆ Any land considered for organic certification must be free of prohibited pesticides and fertilizers for at least three years prior to the first organic harvest.
- ◆ Growers must have an “organic plan” for their farm that shows how soil fertility will be developed and sustained, and how pests will be controlled without prohibited pesticides. (Hint: the books by Jeavons and Coleman, mentioned earlier in this publication, are especially good at describing organic production systems, and the principles and techniques that make them work. Also see ATTRA’s [Overview of Organic Crop Production](#).)
- ◆ Paperwork will increase. Growers must document many things to assure the organic integrity of their produce.
- ◆ Costs of certification are rising. Federal regulations have increased costs to certifiers. These costs will, no doubt, be passed on to farmers.

Not all small and part-time organic producers need to undergo the costs and rigors of certification. Anyone marketing less than \$5,000 in organic products annually is exempt. Such producers must, however, still conform to all federal guidelines regarding organic production and marketing.

Grower Profiles

To give you ideas and inspiration, several market gardeners from different parts of the U.S. agreed to share information about their operations. The Hitts are featured in the SAN publications *Building Soils for Better Crops*, 2nd ed. (9) and *The New American Farmer* (10). DeWilde and Halley are also featured in *The New American Farmer*.

It is interesting to note that although each operation is unique, all have a number of things in common. These include:

- ◆ Diversity of crops
- ◆ Diversity of marketing strategies
- ◆ Cover crops grown for soil building
- ◆ Detailed record keeping system
- ◆ Willingness to share knowledge and ideas with others

Alex and Betsy Hitt, NC

Alex and Betsy Hitt began market gardening on their 26-acre farm near Chapel Hill, North Carolina almost 20 years ago. They grow vegetables and specialty cut flowers organically on five acres and have ¼ acre in highbush blueberries. The Hitts sell primarily to local farmers’ markets, but have also sold to restaurants and stores. “Our original goals,” Alex says, “were to make a living on this piece of ground while taking the best care of it that we could.” For them, making a living doing work they enjoy, and finding a scale that allows them to do most of it themselves are key aspects of sustainability. Their crop mix and markets have changed over the years, as they continue to evaluate the success of each operation and its place within the whole system.

When the horse stable down the road went out of business, it forced Alex and Betsy to re-evaluate their farm fertility program. Without this source of free manure, the Hitts, who have made the most out of every acre, created an elaborate rotation that includes both winter and summer cover crops to supply organic matter and nitrogen, prevent erosion, and crowd out weeds. “We designed a rotation so that cover crops play a clear role,” Alex says. “Many times, where other growers might say, ‘I need to grow a cash crop,’ we’ll grow a cover crop anyway.”

The Hitts stay profitable, however, thanks to a marketing plan that takes full advantage of their location near Chapel Hill, home to the University of North Carolina. Their more unusual produce such as leafy greens, leeks, and rapini find a home in restaurants, and — alongside their most profitable lettuce, tomato, pepper, and flower crops — sell well at area farmers’ markets.

A year in the Hitts’ rotation may include a cool-season cash crop, a summer cover crop such as soybeans and sudangrass, followed by a fall cash crop, and then a winter cover. “We have made a conscious decision in our rotation design to always have cover crops,” Alex Hitt says. “We have to — it’s the primary source for all of our fertility. If we can, we’ll have two covers on the same piece of ground in the same year.”

While other farmers grow beans, corn, or another profitable annual vegetable in the summer after a spring crop, the Hitts don’t hesitate to take the land out of production. Instead, Alex Hitt says, their commitment to building organic matter in the soil yields important payoffs. The farm remains essentially free of soil-borne diseases, which they attribute to “so much competition and diversity” in the soil. And, despite farming on a five-percent slope, they see little or no erosion. Their 10-year rotation plan is shown in Table 3 (p.15).

Anne and Eric Nordell, PA (11, 12, 13)

Neither Anne nor Eric grew up on a farm, but both worked on farms during and after college, before buying their own small farm near Trout Run, Pennsylvania. In this area with steep, rugged terrain and a relatively short growing season, they had three goals:

- ◆ To remain debt-free
- ◆ To keep the farm a two-person operation
- ◆ To be able to depend on the internal resources of the farm as much as possible

Of the 90 acres on the farm, 30 are wooded. Six are cultivated for the market garden. The remainder, excluding the homestead and house garden, is left in pasture. They use draft horses and low-cost implements for cultivation and tillage, and have the 6-acre plot divided into ½ acre strips of 20 yards by 120 yards, which they find to be a good size for working with horses and by hand.

Because the farm is distant from major markets, the Nordells first chose crops that could be sold wholesale: flowers for drying, medicinal herbs for drying, and root vegetables. As they became known in the area, they were approached by restaurant buyers to supply cool-season and specialty items. By 1998, they were selling to ten fine restaurants in the area and at the Williamsport farmers’ market. Income from wholesale markets is now only 10% of their total.

For the Nordells, as for all market gardeners, weeds presented a major challenge. They adapted a field-crop rotation system of corn/oats/wheat/grass and legume sod, traditionally used in the Midwest and Pennsylvania, to include vegetables, cover crops, and a summer fallow. The ½-acre strips are managed so that 3 acres are in crops and 3 are in fallow or cover crops. Over the years, they have been able to reduce the fallow period to six weeks or less as their weed population has diminished.

The Nordells offer a video of a slide presentation made at the 1996 P.A.S.A. Conference that explains their *Controlled Rotational Cover Cropping in the Bio-Extensive Market Garden* system. They also have collected copies of the articles they've written—about rotation, cultivation, growing onions, using pigs to turn compost, designing a barn for animals and for compost production, and more. The 52-minute video and the collected articles are available for \$10 each, postage and handling included (12).

Richard DeWilde and Linda Halley, WI

Richard DeWilde has been farming for most of his life. He moved to Harmony Valley Farm in 1984, after his farm in Minnesota was paved over by urban sprawl. Linda joined him there in 1990. They grow vegetables, fruits, and herbs on 70 acres, and pasture, hay, and a few Angus steers on 220 acres. They sell produce wholesale, at the Dane County Farmers' Market in Madison, Wisconsin and through a 500-member CSA. DeWilde handles this scale of operation by hiring labor, becoming highly mechanized, and through careful management.

DeWilde notes that his wholesale markets have been the most profitable, and CSA the least. The time needed for management makes the difference. The wholesale market is the least diverse; the moneymaking crops are turnips and daikon radishes. A CSA market demands a tremendous diversity of crops. Table 4, *Harvest Calendar and Estimated Annual Amounts* (p. 16), from a flyer sent to past and potential CSA members, indicates the complexity of management needed for this market.

Soil building is done with cover crops, compost, and additional micronutrients as needed. Favored cover crops are sweet clover, vetch, rye, oats, and peas. Seeds for these are available locally and are reasonably priced. The residue is chopped into the top 1 or 2 inches of soil with a rotovator.

DeWilde and Halley have experimented with many ingredients for making compost and have been pleased with dairy manure and

cornstalks, which are readily available and have a good carbon: nitrogen ratio. The compost is made in windrows, turned with an old wildcat turner pulled by an International tractor equipped with a hydrostatic drive so that it can move slowly. Finished compost is spread on fields at a rate of 10 to 15 tons per acre.

One strategy for insect pest management on Harmony Valley Farm is to provide permanent habitat for natural predators and parasites. Refuge strips in the fields are made up of plants that attract and harbor beneficial insects and birds. A number of these plants can also be cut and sold as flowers or woody ornamentals.

Richard says his goal is "to develop an organic farming curriculum, complete with slides. My time and focus could be put into a Harmony Valley Farm Operating Manual. It would deal with communication, employee training, and record keeping. Who knows? Maybe I would retire and do training seminars . . ." Linda adds, "We really do have clear family goals; to continue to learn new ways to do things on the farm and communicate those things."

References

- 1) Anon. 2001. Healthy Farms, Healthy Kids. CFS Coalition. 64 p.
Available for \$12 plus \$4 shipping/handling from:
Community Food Security Coalition
P. O. Box 209
Venice, CA 90294
310-822-5410
asfisher@aol.com
<http://www.foodsecurity.org>
- 2) Klotz, Jennifer-Claire. 2000. How to Direct Market Farm Products on the Internet. USDA/AMS. 44 p.
For a copy, contact:
Jennifer-Claire Klotz
USDA/AMS/TM/WAM
Room 2642-South
1400 Independence Ave., S.W.
Washington, DC 20250-0269
202-690-4077
claire.klotz@usda.gov

- 3) Jeavons, John. 1995. *How to Grow More Vegetables*, 5th ed. Ten Speed Press. 210 p.
- 4) Coleman, Eliot. 1995. *The New Organic Grower: A Master's Manual of Tools and Techniques for the Home and Market Gardener*, 2nd ed. Chelsea Green Publishing Company. 340 p.
- 5) Coleman, Eliot. 1998. *The Winter Harvest Manual*. 63 p.
A supplement to The New Organic Grower, this manual records recent experiences in planning, carrying out, and fine-tuning a fresh-vegetable production and marketing operation on the back side of the calendar. The price of the manual is \$15 including postage, and it can be ordered from:
 Four Seasons Farm
 609 Weir Cove Road
 Harborside, ME 04642
- 6) Grubinger, Vernon. 1999. *Sustainable Vegetable Production from Start-Up to Market*. NRAES-104. 270 p.
The cost is \$42 plus \$5.50 for shipping and handling. Order from:
 NRAES, Cooperative Extension
 152 Riley-Robb Hall
 Ithaca, NY 14853-5701
 607-255-7654
 607-254-8770 Fax
nraes@cornell.edu
<http://www.nraes.org>
- 7) Inman, John W. 2001. Drip irrigation: A Success in the Salinas Valley. *American Vegetable Grower*. December. p. 36
- 8) Cuellar, Sandra. 2001. Assuring produce safety: A key industry marketing strategy. *Small Fruit News of Central New York*. Cornell Cooperative Extension of Oswego County. November. p. 3-5.
- 9) Magdoff, Fred and Harold van Es. 2000. *Building Soils for Better Crops*, 2nd ed.
Available for \$19.95 plus \$3.95 shipping and handling from:
 Sustainable Agriculture Network
 (SAN) Publications
 Hills Building, Room 210
 University of Vermont
 Burlington, VT 05405-0082
 802-656-0484
sanpubs@uvm.edu
<http://www.sare.org/>
- 10) Anon. 2001. *The New American Farmer*. p. 14-16, 97-99.
\$10 for book or \$5 for book on CD, from SAN Publications (see ref. 9 above).
- 11) English, Jean. 2001. Rotating out of weeds. *Maine Organic Farmer & Gardener*. March-May. p. 18-19.
- 12) Nordell, Anne and Eric. 1998. Horse-powered market garden. *Rural Heritage*. Autumn. p. 37-39.
- 13) Anne and Eric Nordell
 RD 1 Box 205
 Trout Run, PA 17771
 570-634-3197

Further Resources

Books

- Gibson, Eric. 2001. **The New Farmer's Market: Farm-Fresh Ideas for Producers, Managers and Communities**. 272 p. \$24.95
Covers the latest tips and trends from leading-edge sellers, managers, and market planners all over the country, including the "hottest" products to grow and sell as well as how best to display and merchandise your products, set prices, and run a friendly, profitable business. The second half of the book, written for market managers and city planners, offers ideas about how to use farmers' markets as a springboard to foster community support for sustainable and locally grown foods. List of additional resources. Available for \$24.95 plus \$3.95 shipping/handling from:
 SAN Publications
 Hills Building, Room 210
 University of Vermont
 Burlington, VT 05405-0082.
 802-656-0484
sanpubs@uvm.edu
- Hamilton, Neil D. 1999. **The Legal Guide to Direct Farm Marketing**. Drake University. 235 p.
Covers questions about liability, insurance coverage, labor laws, advertising claims, zoning, pesticide drift, inspections, and food safety issues.

Green, Diane. 1999. **Selling Produce to Restaurants: A Marketing Guide for Small Growers.** 50 p.

The author is a certified organic grower in Idaho who markets through restaurants, CSA subscriptions, and a farmers' market. Her guide is available for \$10 from:

Greentree Naturals
2003 Rapid Lightning Road
Sandpoint, ID 83864
208-263-8957
gtreenat@dm.net

Periodicals

Growing for Market

Lynn Byczynski, Editor and publisher
P.O. Box 3727
Lawrence, KS 66046
785-748-0605

growing4market@earthlink.net
<http://www.growingformarket.com>

A monthly journal of news and ideas for market gardeners. Subscription rate \$30 per year in US. From the website, you can find links to many other useful resources.

Small Farm News (newsletter)

Small Farm Center
University of California
One Shields Ave.
Davis, CA 95616
530-752-8136
sfcenter@ucdavis.edu

The 12-page Small Farm News is published four times per year. It features farmer and farm advisor profiles, research articles, farm-related print and website resources, news items, and a calendar of state, national, and international events. The newsletter is free. However, contributions to help defray expenses are encouraged. Many past newsletters contained articles on marketing produce and crafts.

Newenhouse, Astrid et al. 1998–2001. **Work Efficiency Tip Sheets.** University of Wisconsin.

A series of tip sheets on labor efficiency for vegetable and berry growers. Available from:

Healthy Farmers, Healthy Profits
Project
Biological Systems Engineering, UW-
Madison
460 Henry Mall
Madison, WI 53706
<http://bse.wisc.edu/HFHP/>

The Packer

Vance Publishing Co.
10901 W. 84th Terr.
Lenexa, KS 66214-1631.

Target audience is primarily large-scale produce growers and wholesalers. Subscription rates are \$65 per year. The Packer's Annual Produce Services Sourcebook provides information about packing equipment and supplies, including contact information for suppliers. Copies of the Sourcebook are available for \$20 per copy.

American Vegetable Grower

Meister Publishing Co.
37733 Euclid Ave.
Willoughby, OH 44094

*Monthly publication featuring production and marketing information. Annual Sourcebook provides information on state vegetable grower organizations. Also information about equipment and supplies. A one-year subscription is \$19.95. Meister also publishes **American Fruit Grower**. Same subscription rate.*

The Seasonal Marketer

Kelly Fuerstenberg, editor
Red Pen Publishing
76 Applewood Dr.
Meriden, CT 06450-7900
203-440-3992
seasonalag@home.com

A quarterly newsletter for direct marketers. Subscription rate is \$7 per year.

Agencies and Associations

North American Direct Marketing Association

62 White Loaf Road
Southampton, MA 01073
413-529-0386
<http://www.familyfarms.com>

Association of Specialty Cut Flower Growers
MPO Box 268
Oberlin, OH 44074
440-774-2435
ascfg@oberlin.net
<http://www.ascfg.org>

USDA Agricultural Marketing Service Farmer
Direct Marketing Website
<http://www.ams.usda.gov/directmarketing>

Video

**Farmers and Their Diversified Horticultural
Marketing Strategies, NRAES-139.**

*Profiles vegetable, fruit, and other horticultural
growers in Maine, Massachusetts, New York,
and Vermont who have pursued a variety of
rewarding approaches adapted to their unique
products and conditions. Available for \$15 plus
\$3.75 shipping from:*

NRAES, Cooperative Extension
152 Riley-Robb Hall
Ithaca, NY 14853-5701
607-254-8770
607-254-8770 Fax
nraes@cornell.edu
<http://www.nraes.org>

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The electronic version of **Market Gardening: A
Start-up Guide** is located at:

HTML

[http://www.attra.ncat.org/attra-pub/
marketgardening.html](http://www.attra.ncat.org/attra-pub/marketgardening.html)

PDF

[http://www.attra.ncat.org/attra-pub/PDF/
marketgardening.pdf](http://www.attra.ncat.org/attra-pub/PDF/marketgardening.pdf)



Hoophouse at Wildfire Farm, Berryville, Arkansas.



Salad mix transplants.

Table 2. Estimated Equipment Needs for Various Sizes of Vegetable Farms.									
Scale	Seed Starting	Power Source and Tillage	Direct Seeding	Equipment	Cultivation	Harvesting	Postharvest Handling	Delivery	
1-3 acres	small hoop house, grow lights, planting trays	rototiller or walking tractor, custom work	Earthway seeder, Cyclone seeder	Back-pack sprayer, irrigation, tools	Wheel hoe, hand hoes, digging forks, spades	Field knives, hand boxes, buckets, carts	Bulk tank, canopy, packing containers	Pickup with topper or van	
4-6 acres	1,000 sq. ft. greenhouse, cold frames, field tunnels, planting trays	35-40 hp tractor, with creeper gear, power steering, high clearance	Planet Jr. plate seeder	1-row transplanter, irrigation, more tools	Cultivating tractor (IH Super A or IH 140)	Potato digger, bed lifter, wagon, more boxes, buckets	Roller track conveyor, hand carts, walk-in cooler	Cargo van	
7-10 acres	Additional cold frames, planting trays	40-60 hp tractor, chisel plow, spader	Stanhay precision belt seeder with belts	2-row transplanter, sprayer	Tool bar implements: beet knives, basket weeder	More field crates	Barrel washer, spinner, pallet jack	1 ton truck with refrigeration	
20 + acres	2,000 sq. ft. greenhouse	80 hp tractor with loader bucket and forks, compost spreader	Nibex or Monosem seeder	Irrigation, bed shaper, mulch layer	Sweeps (Bessertides), Buddingh finger weeder, flame weeder, potato hiller, 2nd cultivating tractor	Asa lift, harvest wagon	Wash line, larger cooler, packing shed and loading dock	Refrigerated truck	

Adapted from a table distributed at Michael Fields Institute Advanced Organic Vegetable Production Workshop, 2/2001, Jefferson City, MO.

Table 3. Peregrine Farm 10 Year Rotation. Source: Alex and Betsy Hitt.			
	Spring	Summer	Fall
Year 1	Tomatoes & leeks (half no-till)		Oats with crimson clover
Year 2	Cool season flowers	Sudangrass with soybeans	Oats with crimson clover
Year 3	Spring lettuce	Summer flowers	Rye with hairy vetch
Year 4	No-till squash		Fall-planted flowers
Year 5	Over-wintered flowers	Sudangrass with soybeans	Rye with hairy vetch
Year 6	Peppers (half no-till)		Wheat with crimson clover
Year 7	Summer flowers		Oats with crimson clover
Year 8	Mixed spring vegetables	Cowpeas	Fall-planted flowers
Year 9	Over-wintered flowers	Sudangrass with soybeans	Oats with crimson clover
Year 10	Summer flowers		Wheat with hairy vetch



Wildfire Farm, Berryville, Arkansas.

Table 4. Harvest Calendar and Estimated Annual Amounts for a CSA. Source: Richard DeWilde.

CROP	QUANTITY PER SHARE	May	June	July	Aug	Sept	Oct	Nov	Dec
Asparagus	5#								
Rhubarb	5 #								
Ramps (wild leeks)	2 bunches								
Leaf lettuce	6 heads								
Green onions	6 bunches								
Washed salad mix (6 oz bag)	18 bags								
Bunched radishes	2 bunches								
Washed leaf spinach (8 oz bag)	10 bags								
Parsley, Italian and curly	2 bunches each								
Cilantro	6 bunches								
Peas, snow and snap	2 # each								
Mixed saute greens (8 oz bag)	6 bags								
Strawberries	6 quarts								
Fennel	4								
Currants	1 pint								
Beets; red, chioggia, gold	15 #								
Broccoli, broccoli Romanesco	15 #								
French petite green beans	10 #								
Edamame (edible soybeans)	4 #								
Zucchini and summer squash	35 small								
Cucumbers	15								
Onions, red and yellow	30 #								
Chard, red and rainbow	6 bunches								
Garlic, green garlic, scapes	36 bulbs								
Carrots	30 #								
Bicolor sweet corn	3 dozen								
Melons	10 to 15								
Basil	2 to 3 #								
Eggplant	10								
Tomatoes, cherry tomatoes	20 #								
Ground cherries	1 pint								
Peppers, sweet and hot	50 and 20								
Cauliflower	5 heads								
Raspberries, gold and red	4 pints								
Turnip; scarlet, gold, purple top	4 #								
Daikon and winter radish	5 #								
Asian greens; tat soi, bok choy	3 heads								
Cabbage; red, green, savoy	6 heads								
Sweet potatoes	10 #								
Fresh herbs; sage, oregano, thyme	1 bunch each								
Kale; green, red, lacinato	6 bunches								
Winter squash; butternut, delicata	15								
Shallots	2 #								
Potatoes	25 #								
Parsnip	5 #								
Celeriac	6								
Rutabaga	5 #								
Brussels sprouts	4 #								
Horseradish	1/2 #								
Jerusalem artichokes	3 #								

The above amounts represent actual average amounts of each crop received by each CSA shareholder for an average year. Each season these amounts are exceeded for many crops. Harmony Valley Farm CSA does not guarantee a minimum amount for any crop.