

Profitability on a small farm

by Paul and Sandy Arnold

At the Guelph Organic Conference, Paul and Sandy Arnold will talk about "Organic market garden costing and budgeting for production and harvesting" in the Production-scale market garden seminar on January 23, 2004 from 1:15-4:15 p.m. at the University of Guelph.

PLEASANT VALLEY FARM IS LOCATED IN A VALLEY IN A RURAL TOWN 25 MILES NORTHEAST OF SARATOGA SPRINGS, NEW YORK AND WE HAVE BEEN OPERATING IT AS AN ORGANIC FRUIT AND VEGETABLE FARM SINCE 1988. We have two children, Robert (age 10) and Kimberly (age 7) who are home schooled and help on the farm. We own 60 acres and rent our neighbour's 120-acre farm, both of which have somewhat limited tillable soil for good vegetable production. Six acres are used for vegetable production, a half acre for large fruits, a half acre for small fruits, and four acres are kept in cover crops for rotation. We grow a diverse selection of more than forty types of vegetables and fruits for retail sales at four weekly farmers' markets. These operate from May 1st through the end of November.

Since the start of our farming career fifteen years ago, our goal was to make farming a full-time venture, to not work off the farm, and to raise a family with a good quality of life. We were able to accomplish our goals in a matter of four years and become profitable by using a combination of good business management techniques, good record keeping, season extension and creative marketing. Profitability to us means each year being able to pay all of our bills, maintain what we

have, invest money back into the farm, put money away for retirement and have a comfortable lifestyle.

Good business management is probably the key factor to our success. We treat our farm as a business so that farming becomes a lifestyle that we thoroughly enjoy. A good accountant that specializes in farms is very important. If the accountant is well versed in farming, taxes can be greatly reduced and the farm can be set up to be most beneficial in terms of type of business, employees, expenditure categorizing and other factors. Part of good money management is knowing when to spend money and when not to. Accountants can play a part in determining this, but also our own records help us to justify expenses for improving or purchasing equipment to make labour more efficient and crops more profitable. Our goal from

the beginning was to reinvest \$10,000* each year back into the farm and it was critical to know what would give us the best return on our money so that we can continually increase our profitability.

In our early years, we realized that irrigation was essential because the lack of irrigation was costing us a loss of at least \$10,000 each year due to inconsistent seedings, loss of sales and low yields. The year after irrigation was installed (at a cost of about \$15,000 for four acres), the irrigation made us an extra \$30,000. Another early purchase was a barrel washer, which cost \$1000 (built by farmer Dick DeGraff). The barrel washer is a large open-ended barrel that turns, while sprayers emit water onto the crop inside. When items, such as carrots, potatoes, beets, turnips

* All dollar figures are in U.S. dollars.



Paul, Kim and Robert Arnold on top of straw to spread on strawberries in November.

and rutabagas, are clean, the winch tips the barrel up and the produce slides out onto a sorting table. We calculated from our records that the barrel washer paid for itself in only two weeks. Good business expenditures over the years also included: a walk-in cooler, field tiling for drainage, basket weeders, a potato planter, a tater point to dig potatoes, a manure spreader specific for spreading compost and a vegetable washer.

In our first eight years, we spent a total of only \$12,800 on all equipment. In our ninth year, we finally bought a new tractor with a loader and 5-foot rototiller for \$21,000; at this time the farm was finally making enough money to justify the higher debt. It's important not to incur early unnecessary debt, and it's amazing what you can live without during the start-up years. We know how to save money, but also know that we have to spend money to make money, provided we've calculated the return on our dollars spent.

Our business management techniques involve a lot of attention to detail. It is important to know which crops are worth spending time on—there are only so many hours in a day. Time management is critical to making the most of our day and ensuring that what we are doing is profitable. This doesn't mean that we avoid doing things we enjoy or abstain from growing a few crops just because they have a low return per hour or acre; farming should be fun, but we strive to make everything as profitable as possible. One example of this is parsnips; we once read that parsnips are one crop that a farmer should grow simply because they taste good, not because they make money.



Final market day at the end of November with our highest diversity of vegetables and fruit.

Attention to detail covers all aspects of our farm from weed control to preparing produce for markets. We realized early on that if we prevented weeds from going to seed, it would reduce our weed seedbanks and the labour spent weeding. Good weed control also increases harvest efficiency, crop yields and everyone's morale; we enjoy working on a farm that everyone can be proud of, in terms of organization and visual appearance.

Our business management techniques involve a lot of attention to detail. It is important to know which crops are worth spending time on—there are only so many hours in a day.

Preparing our produce for markets incorporates many rules and details to ensure consistency of product, customer satisfaction

and efficiency. Since we sell at farmers' markets and there is a lot of competition between vendors, drawing customers to our table is important for our continued success. To do this, we want to send only the best products to the markets and have a table full of products that we are proud of. When we hire employees, it's important for us to know if they are detail-oriented and whether they have a good enough attitude; we've learned that matching personalities helps to maintain a positive atmosphere on the farm.

Reliable record-keeping

Some of our management decisions are made by a hunch, but many are based on the records that we keep on our farm. Record-keeping is very valuable for running a farm business. Maintaining very simple records works well in our farming system and requires minimal time outlay. We keep field seeding records in a notebook and list the date of seeding, variety, row footage and

spacing. From these few numbers, the square footage of each crop can be calculated. For example, many of our crops are planted in beds which have 4 rows planted 14 inches apart, are 100 feet long and have two feet between beds; each of these beds is therefore 550 square feet. We also use a simple spreadsheet in a notebook that is filled in each harvest day showing the product, quantity packed for the market (bunches, heads, pounds, etc.) and the quantity that returns from the market. From those few numbers, the total quantity sold of each product can be determined at the end of the year, and thereby we can calculate its total approximate value.

These simple records help us use two rules that we employ in our management. The first rule is what we call the "\$10,000* per acre rule." This means that each crop is expected to have a minimum gross value of \$10,000 per acre. This calculation is determined by using our records of the square footage of each crop that is grown and the actual dollar value that each crop produced for the entire year. The extrapolation is necessary because we do not grow an acre of most crops and we need to have a system to compare the crops. Planting most crops intensively in rows 14-inch on centre is an important way to use small acreage to its fullest extent. If a particular crop is not making \$10,000 per acre, then we must once again make a management decision to raise its value. Some of the options to accomplish this are:

- improve our production and harvesting techniques;
- change the variety;
- package or display it differently;

* All dollar figures are in U.S. dollars.



Fieldhouse on May 1st with spinach ready for market. The yield is \$3200 (U.S.) of spinach out of one fieldhouse. This extrapolates to \$113,000 per acre.

- increase the price; or
 - extend its growing season.
- Another option is to discontinue growing the crop, an option we rarely choose because that would reduce our diversity.

To give an example of how this rule has worked for us, we will examine pea production. In an average year (or an average over several years), our records showed the following:

Sugar snap peas:

**Income = 538 pints @\$3/pt
= \$1,614**

Field space = 2,700 square feet

**Since 1 acre = 43,560 square feet,
the actual acreage planted is
 $2,700/43,560 = 0.062$ acre**

**Then extrapolate to show the value
of the crop for one acre:
 $\$1,614/0.062$ acre
= \$26,000/acre**

Using these same formulas and our records, the value of the other peas were \$48,214 per acre (at \$3.00/pint) for snow peas and \$8,614 per acre for shell peas.

Thus, we decided to stop growing shell peas because the market would not bear a high enough price to make it profitable to grow according to our standards and there were no other options available. We increased our plantings of sugar snap and snow peas to accommodate the quantities that the markets would bear.

It's important not to incur early unnecessary debt, and it's amazing what you can live without during the start-up years.

Each year we evaluate our crops during the winter based on the simple records that are kept three days per week during harvest. The calculations take only a day or so to give us the final data. We are beginning to use our computer more and more, but for the most part, we use a pen, paper and a calculator.

The second rule that we employ in our management to maintain profitability is the "\$30 per hour rule." This rule means that each employee, while harvesting and preparing produce for the markets, must earn a minimum value of \$30 per hour for each crop. An average worker can pick 25 pounds of beans in an hour and that is a value of \$62 since we retail them at \$2.50 per pound. Beans therefore meet our criteria and are profitable enough to grow. However, raspberries are a different story, since an average worker can pick about 13 half-pints in an hour. We sold them for \$2 per half-pint; thus the value was only \$26 per hour at best. Since our customers love organic berries, we were able to raise the price to \$2.50 and could still sell all that we grew (now \$33.50 per hour). Even at the higher price, raspberries are a low value crop compared to most of the other crops, so we leave them to harvest last on each market harvest day. We then pick as many raspberries as time allows before the truck pulls out for the market. In this way, we maximize our income by harvesting the most profitable crops first.

Extending the season

Season extension is important to our farm since it makes certain crops more profitable and extends our growing/selling season. Our farmers' markets begin May 1st each spring, and season extension has given us the opportunity to provide customers with an abundance of produce in May, produce which is in high demand after a long winter. Selling early crops also produces an income of much needed spring money. Having produce for the first markets gives us the advantage of getting

customers into the habit of coming to our table right from the start, and hopefully sticking with us all season long. Likewise, season extension allows us to have the greatest amount of diversity for our October and November markets. Creating a colourful display filled with a diverse supply of abundant, fresh, quality produce draws customers every week.

Row covers

Through the use of floating row covers, season extension houses, and frost irrigation, we have been able to extend the growing season. Row covers have been used extensively on our farm to enhance growth, and protect crops in the spring and fall from light frosts. Crops that benefit from row covers include peas, radishes, beets, spinach, lettuce, carrots, potatoes, Swiss chard, beans, cucumbers, squash, turnips, herbs and rhubarb. As an example, by placing row covers over rhubarb as soon as the snow has melted, production starts one to two weeks earlier (by May 1st in our area).

Small fruits such as strawberries and fall raspberries also work well with spring row covers. June-bearing strawberry production (both for matted row and annual bed systems) can be enhanced by applying a row cover as soon as the winter straw is removed. This row cover will stay on until 10% bloom is achieved. We then remove the covers to allow insects to pollinate the flowers.

In our experience, by using row covers on fall raspberries we have been able to start picking heritage berries by mid-August, thus increasing the yields since more are picked (and then frozen). We

mow down the raspberries sometime in late winter, then place wire hoops (#9 galvanized) over the beds as early as possible, often when the snow has melted in March. Row covers are then placed and secured over the hoops, which are about 18" high in the centre of the beds. The row covers must be removed when the plants start pushing up the covers or when outside temperatures reach 24–26°C (75–80°F).

Farming should be fun, but we strive to make everything as profitable as possible.

Row covers come in several layers of thickness. We use P-17 extensively on our produce, but we have also tried the heavier P-30. P-30 works well in the wide widths (30 feet) but P-17 is adequate in the smaller widths (15 to 20 feet) because there is no need for the added strength for handling. Using P-17 for crop protection for very cold temperatures (below -2°C/29°F) works well if we use multiple layers. Row covers last approximately two years on our farm and during that time, they are used on at least two spring and two fall crops. To lengthen the life of the row covers, whenever they are not used, they are rolled up, labeled and stored under cover (out of the sun and out of the reach of mice). Many types are now available, including a stronger brand called Typar.

Fieldhouses

Since 1992, we have been building season extension houses on our farm (see photo on cover). We have called these structures "fieldhouses" because they are

temporary, sit directly on our growing fields and lend themselves easily to rotations.

Two home-made designs have worked well for us. The fieldhouses are all 14 feet wide by 96 feet long with a 6–7 foot height in the centre. We have built two plastic-piped fieldhouses, each with an approximate cost of \$600* (for materials) and two metal-piped ones, each with an approximate cost of \$800. Both designs use 3-year 110 X 24-foot greenhouse plastic, which lasts 5–6 years. The two metal-piped houses are constructed in the fall and remain up all winter, since they can withstand snow loads. The two plastic-piped houses are constructed in the early spring, usually in March. All four houses are dismantled by approximately June 1st when all danger of frost has passed. Each house takes two people about eight hours to construct.

Many different vegetables can benefit from being grown in a fieldhouse. We have grown trials of lettuce, spinach, peppers, tomatoes, beets, Swiss chard, basil and interplanted radishes and scallions. We choose to extend the season on particular vegetables that are in high demand by customers, are high value crops and/or are crops that we would not otherwise have at that time of year. For example, lettuce is seeded weekly in 200-cell seedling trays in the greenhouse starting in February. Then in March, we transplant 600 lettuce plants each week for three consecutive weeks into one fieldhouse. Planting them 12 inches between rows and 8 inches in row gives us a total of 1800 early marketable heads of lettuce. Therefore, this one field-

* All dollar figures are in U.S. dollars.

house provides us with lettuce for the month of May and the lettuce has a value of about \$3100.

Similarly, we start spinach in the greenhouse in late February in 200-cell seedling trays. As with lettuce, spinach is seeded every week, then transplanted into two fieldhouses with a 5-inch spacing between plants and 12 inches between rows. We generally use the varieties Space and Tye, but several other varieties are also tried every year. We plant two fieldhouses with spinach over a 4-week period and each fieldhouse produces a crop valued at about \$3200 if we pick leaves only and sell them at \$6 per pound (extrapolates out to \$113,000 per acre). Our timing of transplanting crops into the fieldhouses and out in the fields provides a continuous supply throughout the year.

These fieldhouses have given us a great return over the years, especially since the structures are used over and over each year. They are basically unheated except when planted to crops such as tomatoes and peppers. In those cases, the plants are started in the greenhouse in February and planted into the fieldhouse about May 1st in 4-inch soil blocks and flowering. When necessary, we have used a portable, propane-fired heater when the temperature drops below 4.5°C (40°F). One year we grew lettuce and then interplanted tomatoes; those two crops grossed \$5300, a high return from these fieldhouses.

In addition to using the fieldhouses for growing early crops, we have also used them as an overflow area for transplants which had been started in our small greenhouse in the spring, including perennials, onions and

cold-tolerant greens. During the winter, our ducks and laying hens live in one of the metal-piped fieldhouses, which gives them shelter. In the other metal-framed house, we grow hardy greens that are planted in early fall, such as spinach, mache, kale and lettuce. By covering these greens with two layers of row cover and putting wire hoops over the lettuce, the greens provide our family and friends with good eating all winter long.

Fieldhouses are temporary, sit directly on our growing fields and lend themselves easily to rotations.

Frost irrigation

Since the installation of our full-overhead irrigation system in 1993, we have been able to use frost irrigation to extend the season both in spring and fall. In the spring, when the strawberries are in flower and row-covered, they can benefit from the added protection of frost irrigation during cold nights. During the cold autumn nights, crops that are difficult to row-cover, such as staked tomatoes, fall raspberries, and squash can also be protected. We have harvested tomatoes until the end of October through the use of this method. The drawback to this frost protection system is that multiple nights of sub-freezing weather can cause over-saturation of the soils due to the excessive quantity of water sprayed and possible diseases. We now try to double or triple row-cover strawberries instead of frost irrigating them.

Creative marketing

Marketing is very critical to the

success of our farm. We feel that we need to be better marketers than growers to be successful. Good production techniques may produce an excellent product, but there will be no benefit to our farm if we have no place to sell this produce. We have, in a limited way, used all types of marketing over the years, but have relied on farmers' markets in recent years as the outlet for selling nearly all of our products.

At a farmers' market, we are not only selling our produce, but also ourselves. It is very important that at least one of our family members is present at every market; customers want to know the farmer. We have policies that are customer friendly and keep them coming back each week, such as a 100% satisfaction guarantee on all our produce. We try to give 110% service to all our customers by giving them more than what they expect, such as special orders, growing advice, recipes and brochures.

A good tarp system that protects the produce, ourselves and customers from the hot sun or rain is critical. We use two different tarps: a white one for cloudy days and a silver one for sunny days. A silver tarp totally reflects the sun and gives dense shade underneath. Coloured tarps tend to cast unnatural colours on the produce. We added a red and white awning several years ago that brightens up our stand and assists customers in finding us.

A lot of time and effort are put into our table displays. Fresh, high quality produce is displayed and kept well stocked throughout the market. Freshness can be maintained by misting the produce with a spray bottle; misting vegetables like carrots and potatoes enhances their colour and



An early spring crop flourishes in a well-designed shelter.

Photo credit: Dan Ferguson

makes them more appealing. Displays are done with colour and eye appeal in mind; we spread brightly coloured items throughout the table to draw attention to everything. Getting to know our customers by name and growing what they want is also valuable. Growing a diverse selection of produce makes a colourful display and promotes "one stop shopping" for the customers.

Conclusions

To maintain a profitable farm year to year, stability of income is important and we achieve that through our diversity of crops. In any given year, there are always a few crops that do not do well, while others do better than average. Also, so that we can increase farm net income to follow along with all other cost of living increases, we choose not to increase the acreage, but merely raise a few prices by 25 cents to gain a 5% increase in total income. For example, increasing our lettuce price alone in 2002 from \$1.50 (where it had been for over

5 years) to \$1.75 gave us the 5% increase. We talk about raising our standards for our rules to \$35 per hour and also \$15,000 per acre; most of our prices and crops are at or above these thresholds already.

In summary, good business management techniques, good record keeping, season extension and creative marketing have helped us to make a living on small acreage. Other factors for our success are having both a mission statement and defined goals to help us achieve the quality of life that we want for our family. There are many other aspects that are key issues in managing a profitable farm, such as trials of different varieties, being knowledgeable about what creates healthy soils, knowing insect and disease life cycles, managing money, operating a time-efficient irrigation system and managing labour. Farming with all of its challenges and hard work gives us the lifestyle we thoroughly love and find rewarding.