

# **NCR-SARE Farmer Rancher Grant Program**

## **Final Report Form**

### **I. PROJECT IDENTIFICATION**

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- Project Title: Growing and Marketing for a Winter CSA in Central Missouri
  
- Project Number: FNC07-668
- Project Duration: March 24, 2008 – December 31, 2009
- Date of Report: March 1, 2010

### **PROJECT BACKGROUND**

Wintergreen Farm is a small family operation on 5 acres just west of Ashland in southern Boone County, Missouri. We currently use about 2 of these acres for vegetable production. Our primary focus is a winter CSA which we run from October through April. We use unheated hoophouses, large coldframes, and small high tunnels to grow cool-season greens and vegetables throughout the fall, winter, and spring. So far we have successfully grown more than 30 cool-season crops. These crops include several varieties of salad and steaming greens like lettuce, spinach, chard, mesclun, Asian greens (tatsoi, komatsuna, michihli), arugula, mustards, collards, and turnip greens. Successful root crops include many varieties of carrots, beets, turnips, radishes, leeks and green onions. Other crops include green and red cabbage, Asian cabbages, broccoli, cauliflower, broccoli raab, celery, and kohlrabi. Successful winter herbs include parsley, cilantro, and chives. We also grow storage crops such as winter squashes, sweet potatoes, onions, and garlic to sell as part of the winter CSA.

As a family we get approximately 70-80 percent of our meat and produce from local sources (either ourselves or our neighbors), and we have been doing this for the past 5 or 6 years now. We have been growing winter vegetables in cold frames and small unheated greenhouses for about 5 years. We also generate much of our own compost using yard waste, food waste, old straw and hay, and manure from our chickens, rabbits, and other livestock.

### **PROJECT DESCRIPTION AND RESULTS**

Goals: Our main goal was to develop a winter CSA (community supported agriculture) by growing and marketing cool-season greens and vegetables from November through March in central Missouri. We proposed to sell weekly CSA shares to 6-10 families and to sell winter produce regularly to 2-3 local businesses (restaurants, grocery markets).

As part of our overall objective, we had a secondary goal to do a comparison of 2 unheated winter greenhouse designs – a typical hoophouse type of coldframe/high tunnel, and a passive solar design currently used by the University of Missouri in both central and southwest Missouri.

Our plan was to compare these greenhouse types with regard to crop growth, productivity, survival, construction and maintenance costs, and overall ease/efficiency of operation.

## PROCESS

We literally had to start this project from the ground up. The process we went through to get things up and running can be summarized in 4 main categories: 1) ground preparation, 2) greenhouse construction, 3) crop selection and planting, and 4) marketing and CSA structure.

1) Ground preparation (summer 2008): Our small farm sits on a high flat terrace, just above a small somewhat ephemeral creek. This ground is naturally poorly drained both because of its landscape position and because of the high clay content in the soil. In order to improve the drainage for the greenhouse areas we had a series of 2 curtain drains installed to improve both the surface and subsurface flow of water.

Other ground preparations included demolishing an old shed on the site where we wanted to put greenhouses as well as extending our water line from the house out to the greenhouse areas and installing several hydrants for easy watering access.

2) Greenhouse/coldframe design and construction: As we investigated greenhouse and high tunnel designs and prices, we soon realized that we really did not have the time, money, or carpentry skills needed to build a passive solar greenhouse following the design from the University of Missouri at Bradford Farm (<http://aes.missouri.edu/bradford/education/solar-greenhouse/solar-greenhouse.php>). We also decided, especially after researching Eliot Coleman's work (The Winter Harvest Handbook, Four-Season Harvest, <http://www.fourseasonfarm.com>) that we didn't need a framed, insulated building to do what we wanted to do. Instead, we modified our plans and decided to compare a few different types of unheated hoopouses, coldframes, and low tunnels that represented a range from relatively large, expensive, pre-fab kits to relatively small, inexpensive homemade designs for winter growing structures. We decided to use and compare the following 4 types of winter growing structures:

A) EZ Build & Gro Coldframe from FarmTek/Growers Supply

\*We installed 2 12'x30' structures during the summer of 2008

\*We installed an additional 12'x50' structure in the summer of 2009

\*used untreated 2"x6" boards as baseboards around entire perimeter of each structure

\*1 layer 6mil greenhouse plastic on outside; Agribon 19 floating row covers over crops on inside (only use when night temps  $\leq$  20 degrees F); used stiff electrical wire for hoops to support row covers

B) Homemade Cattle Panel Hoopouses

\* To make these we take 5 sections of cattle panel fencing (16' long, 4' tall) and bow them over to form arches, connect each 'arch' with hog rings or wire to form tunnel (make sure it's tall enough for you to stand in); attach panels to 2"x6" baseboards using fencing staples; use 2"x4" to frame ends and doorways and steady the structure; use old garden hose (spliced) to cover ends and protect plastic; use 3/4" conduit clamps to secure plastic to ends (need a better method); several ways to secure plastic to baseboards (wiggle wire, pvc w/clamps, boards, etc.)

\*We built 2 cattle panel houses in summer, 2008; added 3 more in summer 2009

#### C) Homemade Low Tunnels

\*We simply took 10' sections of ½" pvc and bowed them over to form ribs to support plastic. Pounded ¾" or 1" short sections of pvc in ground, then stuck ends of ribs into these. Did this over existing raised garden beds, which are about 30' long, 4' wide.

\*used row covers underneath plastic during winter

\* We used one of these low tunnels for the 2008-09 season; Currently have 3 for the 2009-10 season.

#### D) Homemade Small Coldframes

Used 2 small coldframes (2'x8') used for 2008-2009 season. Basically: 2 2"x6" for the front (8' length), 3 for the back. Ripped 2"x4"s to frame the glass lid (from old patio doors) and to frame the sides (plywood). Oriented facing south to capture winter full winter sun.

### 3) Planting/growing/harvesting

More than 30 crops grown. Crops grown throughout fall-winter-early spring include: lettuce, spinach, chard, beets, carrots, bok choy, large Asian cabbages, tatsoi, komatsuna, mizuna, arugula, mustard greens, collard greens, turnip greens, parsley, cilantro, green onions, radishes, kale, leeks.

Crops grown in fall and then again in early spring include: snow peas, green cabbage, red cabbage, kohlrabi, turnips, Daikon, celery, chives, broccoli, broccoli raab.

Summer crops grown for winter storage include: winter squashes (spaghetti, acorn, butternut), sweet potatoes, garlic, onions (yellow, white, red).

I'm still working on timing the succession plantings. This is probably my biggest challenge for growing right now. I start planting most crops in mid-July, and try to plant 3-4 successions every 3 weeks.

We start harvesting and selling in mid-October, sell through the fall, winter, and early spring, and end our season in late April. I harvest 1 day a week when produce is available.

### 4) Marketing & CSA Structure

We had planned to sell to both individual families and restaurants by now, but I found that I just needed to focus on one type of customer until I learn more about winter growing and harvesting. By next year I hope to include 1-2 restaurants in my customer base.

We adopted a modified CSA model. Instead of customers paying a lump sum at the beginning of the season they pay weekly when they receive their produce. I am not comfortable with the traditional CSA model where people pay several hundred dollars up front with no guarantees on what they'll be receiving for the season. I think a weekly pay model works better for most family budgets. I also do not want the pressure of knowing I've taken a lot of money from people in case I have a crop failure, bad weather, or some other unforeseen event!

Currently our customers pay \$15/week for a large box of produce which typically includes: 2 bags greens (1 salad, 1 steaming); 2 bundles root crops (carrots, beets, turnips, radishes); 1 bundle herbs; 1 storage crop (squash, potatoes, etc.); 1 misc. (onion, kohlrabi, cabbage, etc.).

I deliver the boxes weekly. For customers in Columbia (15 miles from Ashland) we charge an additional \$2 for the delivery.

## **PEOPLE**

Janice and Jerry Schuerenberg – Heartland Family Nursery – greenhouse management techniques/skills, taught me how to get plants started by seed, do transplanting, etc.; provided additional greenhouse space when needed.

Jim Jarmon, Debbie Kelly – University of Missouri Extension – instruction through the ‘Grow Your Farm Course’ on farm/business plan development, financial, legal, marketing issues to consider with farm business; provided many valuable resources for information.

Andy Reed – Univ. of Mo. Extension – I attended his workshop on growing winter greens in High Tunnels (Dec. 2009).

Lesli Moylan & Sylvia Donnelly – Southern Boone School Learning Garden – provided many hours of labor for greenhouse construction, planting, thinning, weeding, harvesting; Lesli also helped get me started with a Wiki page for Wintergreen Farm (<http://wintergreenfarm.wikispaces.com>)

## **RESULTS**

1) Overall -

- Grew for 8 families plus ourselves for the 2008-09 season
- Sold weekly from early Oct through Dec.
- Started again in early March selling at Ashland farmer’s market
- Reasons for no production Jan/Feb. 09 – shoulder injury/surgery, didn’t plant enough in late summer/fall 08 to get through short cold days.
  
- Growing for 16 families plus ourselves for the 2009-10 season
- Sold weekly from late Oct. through Nov.
- Sold every-other-week from Dec. through Feb.
- Trouble with cold wet fall – multiple crop failures, bad weather put us behind for fall
- Cold gray winter – slow production, poor harvesting conditions, crop failures, didn’t plant enough in late summer/fall to carry through spring

Lessons learned so far:

- Cloudy weather strongly affects growth from fall through early winter.
- Critical to plant plenty (over plant by 2x or so) from mid July through October in order to have harvestable crops through February.

I have also learned that I need a break from Christmas through the end of January. My mind and body just naturally need to settle in for the winter for those 3-4 weeks. In the future, I will plan to only harvest once or twice during that period. This is also typically our coldest time, so I will minimize disturbance in the greenhouses during that time.

I will probably increase our CSA weekly prices next year – up from \$15 to possibly \$20? Weekly pay model is great because it allows for flexibility both for me and the customers. It also fits much better for most family budgets.

Need to consider some sort of contract for customers in future to ensure they'll buy each week. Expansion to include 1-2 restaurants within the next year or 2 is very likely. There are at least 4 restaurants in Columbia which work hard to use local products now. This has more than doubled over the past 3 years.

### 2) Crops

Good reliable hardy crops: spinach, carrots, Asian greens (tatsoi, komatsuna, mizuna), Asian cabbages (bok choy, pac choy), beets, red-leaf lettuce, arugula, mustard and collard greens, parsley, cilantro, green onions, kale. Each of these crops seems to be amazingly hardy in the cold. We had 2 weeks in January of single digits during the day, negative temps at night. These plants survived (some even grew!) very well during this period.

The taste of winter greens and root vegetables is far superior to those I've grown during the spring and summer. Hands down!

Customers LOVE winter carrots and spinach! It should be possible to obtain a premium price from both families and restaurants for these winter crops.

### 3) Greenhouse designs

We saw virtually no difference between 4 designs with regard to seedling germination, growth, productivity, or survival. Main differences between designs deal with building & maintenance costs and ease of operation. See the table below for a breakdown of the costs, growing space, and pros and cons of each:

	EZ Build & Gro Coldframe/hoophouse (FarmTek)	Cattle Panel hoophouse (5 panels long)	30' Low Tunnel over raised garden bed	Standard Wooden Coldframe (2'x8'box w/lid)
Initial costs (frame, lumber, plastic, soil, fertilizer, etc.) * \$ for row cover & hoses	12'x30': \$825 12'x50': \$1035	\$290	\$45-50	\$30-45

not included				
Growing space	12'x30' = ~300sq. ft. 12'x50' = ~500sq. ft.	~ 110sq. ft	~ 110-120sq. ft.	16-20sq. ft.
Cons for winter growing	Somewhat expensive; risk losing to wind/hail	A little small for commercial use	Pain to work with in winter weather; hard to ventilate	Pain to work in winter weather; hard to ventilate; small growing space
Pros for winter growing	Easy to install with 2-4 people (1/2 day); easy to use all winter; Lots of growing space; cheaper than other greenhouse kits; easy to vent w/doors	Relatively cheap; Easy to build w/1 person (2hrs); easy to use all winter; moderate growing space; easy to vent w/doors	Cheap; Very easy to build w/1 person (1/2 hour); good growing space for the \$	Cheap; Moderately easy to build for 1 person w/carpentry skills;

## DISCUSSION

See the previous section for what we learned.

How has this affected our operation? This SARE Grant absolutely made it possible for us to begin this venture. Without the startup funds there is no way we would have been able to put the greenhouse up and give this a try.

Did we overcome identified barriers? Well, we really didn't know what the barriers were until we jumped into it. Some 'barriers' or 'challenges' we see now are listed below:

- This is basically a 1-woman operation, so it can be a challenge to get all the physical labor done by myself. We may need to hire 1-2 hourly employees for critical times during the year.
- We currently have 8 small greenhouses (3 EZ Build houses, 5 cattle panel houses). It would be much easier to have just 2 or 3 large structures (high tunnels) to manage instead.
- It is critical to plant a LOT from mid July through October. It has been challenging to figure out the appropriate timings for successions of plantings for each crop to ensure plenty of harvest through February. The past 2 years have taught me a LOT in this regard!
- It has also been a challenge to successfully grow enough storage crops (winter squash, sweet potatoes, garlic, etc.) and store them correctly so they're available as part of the winter CSA boxes. We are still learning how to organically deal with squash bugs, and how we can grow sweet potatoes on our poorly drained ground. We're learning a lot about proper storage conditions for these crops.

What are the advantages and disadvantages of implementing a project like this?

Advantages: -Great tasting winter greens and veggies from October through April!  
-Fills a big gap in the local food markets for our area.  
-Winter gardening is relatively easy...very few pests, very low watering requirements, very few weeds! Easy to be organic.

Disadvantages: -Requires you to work outside in winter weather frequently  
-Long cold spells can be problematic if you need to water or harvest during those times  
-Short windows for replanting if you have seed/crop failures  
-No rest period if you farm/garden during the warm season too!

## **OUTREACH**

Summer 2008-present – small tours/demonstrations for CSA customers and other growers.

Various articles in the Boone County Journal (local weekly newspaper):

<http://www.bocojo.com/articles/2009/07/15/news/news3.txt>,

<http://www.bocojo.com/articles/2009/11/12/news/news2.txt>,

<http://www.bocojo.com/articles/2009/04/08/news/news4.txt>,

<http://www.bocojo.com/articles/2009/11/18/news/news3.txt>,

Spring, 2009 – Farm Tour for Southern Boone Learning Garden steering committee

November, 2009 – Gave presentation at National Small Farm Conference & Trade Show

November, 2009 – newspaper article in Columbia Daily Tribune  
(<http://www.columbiatribune.com/news/2009/nov/11/hoopdreams>)

November, 2009 – demonstration work day – demonstrated how to build cattle panel greenhouse; work day for Southern Boone School Learning Garden

Wiki page – <http://wintergreenfarm.wikispaces.com>

### Future plans for outreach:

- Continue to build and update the Wiki page; add recipes and information about the crops.
- Write instructions and record video on how to build and use cattle panel greenhouses. Possibly make this available via Wiki page?
- I will probably give another presentation next year – hopefully at the Great Plains Vegetable Growers Conference in St. Joseph in January, 2011.
- Continued contact with local newspapers.

## **PROGRAM EVALUATION**

It's a great program. Thank you so much for this opportunity. It truly has changed our life for the better. I also believe this has helped open the eyes of my community to possibilities for fresh healthy produce during the winter months! Thank you!!!