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**White Paper**

**A Secure, Sustainable Foodshed for the  
Sustainable Ozarks Region**

**Sustainable Ozarks Partnership**

**April 8, 2014**

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## White Paper

# A Secure, Sustainable Foodshed for the Sustainable Ozarks Region

**1. Purpose.**<sup>1</sup> The purpose of this paper is to present a number of agricultural program and project initiatives supporting a vision that could be adopted in the Sustainable Ozarks Region.

This is a living document. The ideas presented in this paper are the contributions of numerous individuals and groups. The paper needs the input of others and the expanded thoughts of those who have already contributed. The paper is intended to encourage discussion and further development of these ideas.

This paper is not endorsed at this time by Sustainable Ozarks Partnership or any other organization.

If you have questions or input, please contact Ron Selfors, SOP staff, [ronselfors@gmail.com](mailto:ronselfors@gmail.com), 573-855-8312. Also contact Ron if you want to be included on (or removed from) the supporting email list.

**2. Introduction.** The Sustainable Ozarks Region of Missouri includes the four counties of Laclede, Phelps, Pulaski and Texas and the Fort Leonard Wood military installation.

Sustainable Ozarks Partnership (SOP) is a partnership of the counties and communities, businesses and schools, and other organizations that surround and support Fort Leonard Wood and its many missions, Service Members and families. More information about SOP is available on the website, [www.SustainableOzarks.org](http://www.SustainableOzarks.org).

“...what’s common to highly effective movements seeking to change the food system is not necessarily a bright new idea but rather the conversation – the ability to meet with and work with other groups most likely doing different things but together aspiring to rebuilding the foodshed. It makes sense that the most impressive efforts are often not national in scope, but regional. They work in the context of their place and on behalf of the people who live there, and who have a stake in what happens. That’s what gives them the power to be effective.” Deborah Madison, *Forward to Rebuilding the Foodshed*, by Phillip Ackerman-Leist<sup>1</sup>

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<sup>1</sup> Ackerman-Leist, P. (2013). *Rebuilding the Foodshed*. Santa Rosa, CA: Post Carbon Institute. The boxed quote is from Deborah Madison’s Forward

A foodshed is defined as the geographic region that produces the food for a particular population.<sup>2</sup> The term is used to describe a region of food flows, from the area where it is produced, to the place where it is consumed, including the land it grows on, the route it travels, the markets it passes through, and the tables it ends up on. A foodshed is analogous to a watershed in that foodsheds outline the flow of food feeding a particular population, whereas watersheds outline the flow of water draining to a particular location. Through drawing from the conceptual ideas of the watershed, foodsheds are perceived as hybrid social and natural constructs.<sup>3</sup> The focus of this paper is to describe a process to change much the foodshed of the Sustainable Ozarks Region so it is inclusive to the region itself.

There are two major aspects to this initiative that need to be worked both separately and together. Both FLW and the region will be developing secure foodsheds. Army/DOD funding for this initiative will be for support of the FLW foodshed. There may be unique aspects to the FLW foodshed that do not have a regional component. However, it is envisioned that much of the effort will be shared.

This paper first presents a vision of where the Secure Foodshed initiatives could lead us. The paper then identifies the foundational factors that allow us to create such a vision and begins to identify benefits. Some guiding principles are proposed to help steer development and operation.

Next, the currently identified initiatives are introduced, stakeholders are identified, known challenges are listed, and near term actions are proposed.

The paper will be updated as the program and its initiatives mature. It will become the basis for a number of follow-on studies and plans.

**3. Vision.** The Sustainable Ozarks Region, in partnership with many organizations, encourages development over time of a secure foodshed that provides much of the food needs of Fort Leonard Wood (FLW) and the regional communities

The foodshed will include local controlled environment agriculture (CEA) production; local beef, hog and poultry production and processing; and other local small farm produce, egg, dairy and forest product production and processing.



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<sup>2</sup> Feagan, R. (2007). "The place of food: mapping out the 'local' in local food systems". *Progress in Human Geography* 31 (1): 23–42. doi:10.1177/0309132507073527

<sup>3</sup> Wikipedia. *Foodshed*.

The foodshed also supports farmers markets and food pantries. It has a marketing and distribution system that provides agricultural products to Springfield and St. Louis metropolitan areas and other markets along the I-44 corridor.

As a result, Fort Leonard Wood and regional food security and wellness are enhanced; local availability of affordable, quality food is increased; and a thriving agricultural industry is created with entrepreneurial opportunities and quality jobs. The region also becomes a national center for agricultural research, technology development, training and education; provides a special focus on veterans; and attracts researchers, students, entrepreneurs, and visitors from around the world.

**4. Foundation for Success.** There are a number of factors that make achieving the vision possible and reduce the implementation risk. They include:



**a. Robust Local Demand<sup>4</sup>.** Fort Leonard Wood military dining facilities serve about 26K meals/day, except for 15 days in December when the daily meals drop to 250. Quantities of selected products are shown in Table 1. These quantities represent only a portion of the total foodstuffs used on FLW. Other commodities would include fruits, nuts, yogurt and ice cream.

| Table 1. Dining Facilities Food Consumption |               |                       |         |
|---|---------------|-----------------------|---------|
| Product                                     | Monthly       | Annually <sup>5</sup> | Unit    |
| Carrots                                     | 2,200         | 27,000                | Pounds  |
| Cucumbers                                   | 9,000         | 108,000               | Pounds  |
| Lettuce/Spinach                             | 50,000        | 600,000               | Pounds  |
| Peppers                                     | 6,700         | 81,000                | Pounds  |
| Baking Potatoes                             | 370           | 4,250                 | Pounds  |
| Tomatoes                                    | 14,000        | 168,000               | Pounds  |
| Beef  | 75,600        | 869,400               | Pounds  |
| Chicken                                     | <b>65,800</b> | <b>757,000</b>        | Pounds  |
| Fish  | 12,300        | 141,500               | Pounds  |
| Pork  | <b>41,500</b> | <b>477,800</b>        | Pounds  |
| Scrimp                                      | 850           | 9,400                 | Pounds  |
| Turkey                                      | <b>13,700</b> | <b>150,442</b>        | Pounds  |
| Dairy - Milk                                | 32,000        | 367,600               | Gallons |
| Eggs  | 8,000         | 92,200                | Dozens  |

<sup>4</sup> FLW, Aug 2013 data

<sup>5</sup> Annual is based on the monthly rate for 11.5 months.

**b. Strong DOD and other federal agency interest in secure foodsheds.** As part of its on-going efforts, the Department of Defense is evaluating various approaches to insure that secure food sources are used to provide safe foodstuffs for all military personnel. The Army Research Institute of Environmental Medicine is a strong advocate for secure foodshed for military installations. Also supporting the concept is the US Department of Agriculture (USDA). A list of related USDA programs is at Appendix A.

**c. Strong state support for FLW-related programs and projects.** Members of the Departments of Economic Development and Natural Resources are on the SOP Executive Committee. State has also provided Neighborhood Assistance Program (NAP) tax credits. The Missouri Military Preparedness and Enhancement Commission also supports FLW programs.

**d. Large number of farm operations in the region<sup>6</sup>.** There are over 2,600 farm operations in the Sustainable Ozarks Region. Most are in Laclede and Texas Counties (Table 2).

| Table 2 Number of Farms       |               |                |                 |        |       |         |                 |        |         |
|-------------------------------|---------------|----------------|-----------------|--------|-------|---------|-----------------|--------|---------|
| Area                          | Veg/<br>Melon | Fruit/<br>Nuts | Green<br>houses | Beef   | Hog   | Poultry | Aqua<br>culture | Other  | Total   |
| Missouri                      | 649           | 559            | 747             | 44,336 | 1,056 | 2,245   | 9,216           | 49,017 | 107,825 |
| Average<br>County*            | 6             | 5              | 7               | 403    | 10    | 20      | 84              | 446    | 980     |
| Laclede                       | 10            | 9              | 6               | 766    | 14    | 20      | 128             | 311    | 1,264   |
| Phelps                        | 2             | 7              | 6               | 444    | 10    | 22      | 137             | 200    | 828     |
| Pulaski                       | 4             | 2              | 0               | 286    | 7     | 9       | 62              | 111    | 481     |
| Texas                         | 7             | 3              | 7               | 847    | 9     | 8       | 129             | 317    | 1,327   |
| Average<br>4-County<br>Region | 24            | 20             | 27              | 1,612  | 38    | 82      | 335             | 1,782  | 3,921   |
| SO Region                     | 13            | 12             | 13              | 1,577  | 26    | 39      | 328             | 628    | 2,636   |
| * 110 counties in Missouri    |               |                |                 |        |       |         |                 |        |         |

**e. Strong capability in agriculture research, education and training in Missouri.** The University of Missouri and Lincoln University have active agricultural research, education and training programs that will support these initiatives.

**f. Long established tradition in the region for collaborating.** FLW and the communities in the region have a long history of successful partnerships.

<sup>6</sup> USDA Census of Agriculture, 2007

**g. Viable sustainability-focused regional organization with strong support from regional communities.** Sustainable Ozarks Partnership enjoys strong support from regional communities and organizations and businesses.

**h. I-44 transportation corridor.** I-44 provides easy access to the Springfield and St. Louis metropolitan areas.

**5. Benefits.** There are many benefits to achieving the vision. They include:

**a. Quality Food.** Better quality of food provided just in time for use. Since food is provided close to its point of use, there will be reduced spoilage, less reliance on produce that has been harvested while unripe, and no need for packaging for shipping great distances and lower handling costs.

**b. Wellness.** Individual and family wellness requires consumption of more healthy foods. Quality, affordable food locally grown and available year round will contribute to the promotion of wellness.

**c. Security.** Secure food for the military installation that is produced within the installation fence line or in the local area year round. Secure food for region that is independent of distant crop failures, transportation fuel costs and most weather disruptions.

**d. Reduced Environmental Impact.** Smaller environmental footprint accomplished through reduced use of petroleum for transportation and plastics/packaging for shipping. If the demonstration is powered (heat, lights and air handling) using a renewable power source, the impacts are reduced even further.

**e. Emergency Resilience.** Improved emergency situation support/adaptability by having a secure food source available in cases of emergency or disaster. Fort Leonard Wood, for example, will host various support functions in case of a disaster from weather or earthquake (Fort Leonard Wood is located within the region potentially impacted by the New Madras fault).

**f. Economic Development Engine.** A secure foodshed can be a strong regional economic development engine that initially takes advantage of FLW's significant food product needs, but overtime becomes capable of expanding and supporting other large markets.

**g. Foundation for Additional Development.** As part of this effort, Fort Leonard Wood is working to establish educational programs to support Veterans who are interested in becoming farmers. The installation, through a partnership with a University, seeks to establish a program whereby interested Veterans can develop new skills that could (if they stay in the region) provide the installation with sustainable foodstuffs from small local farms.

**h. Adaptable to Other Installations and Deployments.** Secure Foodshed can be a foundational project in establishing local, sustainable foodsheds for other military installations and their regions and to support deployed forces.

**i. Adaptable to Other Regions.** Secure Foodshed can be a foundational project in establishing local, sustainable foodsheds for other regions whether they have a military installation or not.

**j. Supports Research, Education, Training and Eco-Tourism.** Secure Foodshed includes an important research, education and training component that will attract researchers, students, entrepreneurs and visitors from around the world.

**6. Goal Support.** The Secure Foodshed supports the goals of SOP.

**Goal #1: National Recognition.** *Achieve national recognition for the region as an excellent place for people to live, work and play and for businesses to prosper.* Secure Foodshed will provide many opportunities to gain positive national recognition as initiatives are accomplished.

**Goal #2: A Strong Fort Leonard Wood.** *Ensure that FLW continues to be an enduring installation that grows with expanding or new DOD, DHS or other federal missions.* Secure Foodshed directly supports FLW and Army goals for food security.

**Goal #3: A Strong Region.** *Be a catalyst for positive change for citizens and businesses throughout the region.* The development of a strong local foodshed is indicative of a healthy community

**Goal #4: Cost Reduction.** *Through partnership, help reduce Fort Leonard Wood's life cycle costs, making Fort Leonard Wood more valuable to DOD.* Secure Foodshed should increase quality of life for FLW soldiers and families at no additional cost to FLW.

**7. Guiding Principles.** The following principles will be considered as Secure Foodshed is implemented:

- a. Secure Foodshed shall be a sustainable development.
- b. Existing and new small businesses will be encouraged to participate.
- c. Citizens will be encouraged to participate.
- d. Programs will include to the extent possible the involvement and education of youth

**8. Initiatives.** To achieve the vision, several initiatives will be pursued. They are:



**a. Secure Foodshed.** Secure Foodshed is the capstone program for these initiatives. The goal will be an increasing level of local production used on-post for Soldier feeding over the next 20 years, approaching 100% by 2038. A similar goal will be set for the region.

The first step will be an analysis to determine the radius of production needed to meet the demands of the installation and community. What is the maximum distance food should have to travel to be used at Fort Leonard Wood? This evaluation will result in a feasibility analysis on various CEA systems and processing facilities, potential benefits to the community, and an assessment of the security benefit to the installation.

**b. Vertical Farming.** CEA, or Controlled Environment Agriculture is a combination of horticultural and engineering techniques that optimize crop production, crop quality, and production efficiency (Albright, 1990). One type of CEA is vertical farming. Vertical farming uses a high ceiling facility that stacks trays of plants from floor to ceiling and moves the trays up and down under computer control. Plants are grown without soil using computer control to regulate water, light, temperature and nutrients. Vertical farming is best for leafy vegetables such as lettuce and spinach.



For this initiative, a vertical farm facility will be built in an existing building either on FLW or nearby. The facility will be sized to support the leafy vegetable needs of the FLW dining facilities with an expansion capability to support other customers in the region or other market areas.

An article on the current state of vertical farming is at Appendix C.

**c. Hydroponic Greenhouses.** Hydroponic greenhouses are CEA facilities that grow plants in a non-soil media to which nutrient enriched water is added. The greenhouses are tall, glass tunnels that allows plants to grow very tall. It is best suited for tomatoes, peppers, cucumbers and some fruits.

Benefits of hydroponic greenhouses (and vertical farms) include:

- Year round growth in a controlled environment.
- Minimal weather impact
- Computerized control systems allow for more efficient use of energy.
- Vine ripened fruits and vegetables taste better and are healthier than those that have been artificially ripened by being picked green and gassed for shipping quality.



- Lower water consumption. Hydroponics actually uses much less water than conventional field farming.
- Environmentally-friendly disease and insect control.
- Crops can be grown on smaller parcels of land and in areas that are marginal for food production.

For this initiative, a hydroponic greenhouse will be built either on FLW or nearby. The facility will be sized to support the tomato, pepper and cucumber needs of the FLW dining facilities with an expansion capability to support other customers in the region or other market areas.

There is a description of New York State’s efforts to pursue CEA-based agriculture at Appendix D.



**c. Local Beef.** Missouri ranks third in the US for beef cows and eighth in the country for all cattle. There are 14 beef processors in Missouri, none in the Sustainable Ozarks Region.<sup>7</sup> Most of the beef raised in the region are transported to other states for processing.

For this initiative, a beef processing facility will be established in the region. The facility will be sized to support the beef needs of the FLW dining facilities with an expansion capability to support other customers in the region or other market areas.

| Area           | Beef Cows (Heads) |
|----------------|-------------------|
| State          | 1,968,000         |
| Average County | 17,900            |
| Laclede        | 27,000            |
| Phelps         | 14,600            |
| Pulaski        | 8,700             |
| Texas          | 36,500            |
| Region         | 86,800            |

**d. Forest Foods.** There are currently twelve commercial fruit and nut producers<sup>8</sup> in the region. These products provide variety in local stores, farmers markets and through roadside sales. The large number of forests in the region, both private and public, make this a segment that could significantly grow.

**e. Small Farms.** There are over 900 small farms (< 50 acres)<sup>9</sup> in the region that may provide the basis for expanded production of specialty crops. Some are or may become community supported agriculture (CSA) farms, educational farms and/or agri-tourism farms. Products from these farms provide variety in local stores, farmers



<sup>7</sup> <http://meat-processing.regionaldirectory.us/missouri.htm>

<sup>8</sup> USDA data 2007

<sup>9</sup> USDA data 2007

markets and through on-farm or roadside sales. Their owners may be the entrepreneurs for many of the initiatives discussed in this paper.

f. **Aquaculture.** There are over 300 aquaculture operations<sup>11</sup> in the Sustainable Ozarks Region. These operations provide fish and shrimp both for local markets and for export. The types of fish consumed in the Fort Leonard Wood dining facilities are shown in Table 4.



| Table 4. Dining Facilities Food Consumption – Fish and Scrimp |               |                        |               |
|---|---------------|------------------------|---------------|
| Product   | Monthly       | Annually <sup>10</sup> | Unit          |
| Catfish   | 4,900         | 56,100                 | Pounds        |
| Cod   | 4,600         | 53,000                 | Pounds        |
| Salmon  | 2,800         | 32,400                 | Pounds        |
| <b>Fish Total</b>   | <b>12,300</b> | <b>141,500</b>         | <b>Pounds</b> |
| <b>Scrimp</b>   | <b>850</b>    | <b>9,400</b>           | <b>Pounds</b> |

g. **Veterans to Farmers.** There are a number of veterans who have expressed interest in careers in agriculture. USDA is interested in supporting programs that assist veterans in pursuing agriculture careers. A number of programs already exist across the country. They include a Denver-based initiative (<http://veteranstofarmers.org/>), a national Farmer/Veteran Coalition (<http://www.farmvetco.org/>), and a farm for disabled veterans in Florida (<http://veteransfarm.org/>). The Center for Rural Affairs ([www.cfra.org](http://www.cfra.org)) has provided a grant to Lincoln University to explore such a program.

h. **Farmers Market.** There are a number of farmers markets in the region that support local farms and community gardens. Many of these need better facilities, and more are needed. A Farmers’ Market at Fort Leonard Wood would increase retail options for local producers while also providing the installation community with additional access to local products.



i. **Community Gardens.** Community gardens can be urban, suburban, or rural. They can grow flowers, vegetables or community. They can be one community plot, or can be many individual plots. They can be at a school, hospital, or in a neighborhood. They can also be a series of plots dedicated to "urban agriculture" where the produce is grown for a market. Community gardening improves people’s quality of life by providing a catalyst for neighborhood and community development, stimulating social

<sup>10</sup> Annual is based on the monthly rate for 11.5 months.

<sup>11</sup> USDA data 2007

interaction, encouraging self-reliance, beautifying neighborhoods, producing nutritious food, reducing family food budgets, conserving resources and creating opportunities for recreation, exercise, therapy and education.<sup>12</sup>

There are several community gardens in the region. As part of the evaluation, Fort Leonard Wood will explore options for promoting on-post community gardens to support families and the surrounding community (as participants in a Farmers’ Market). The Residential Community Initiative (RCI) may be able to sponsor community gardens in the FLW residential areas. Cities and counties normally sponsor community gardens, often with the assistance of Master Gardeners.



**j. Local Pork, Poultry and Eggs.** Like local beef, there is no processing capability in the region that can support the pork, poultry and eggs needs of the FLW dining facilities.



For this initiative, processing facilities will be established in the region. The facilities will be sized to support the needs of the FLW dining facilities with an expansion capability to support other customers in the region or other market areas.

Turkey consumption in the Fort Leonard Wood dining facilities are detailed in Table 5.

| Table 5. Dining Facilities Food Consumption –Turkey |               |                        |               |
|---|---------------|------------------------|---------------|
| Product   | Monthly       | Annually <sup>13</sup> | Unit          |
| Turkey, Breast                                      | 2,000         | 23,000                 | Pounds        |
| Turkey, Ground                                      | 4,700         | 53,800                 | Pounds        |
| Turkey, Patty                                       | 4,600         | 52,600                 | Pounds        |
| Turkey, Boneless Carving                            | 1,800         | 20,600                 | Pounds        |
| Turkey, Whole                                       | Nov-Dec       | 400                    | Pounds        |
| <b>Turkey Total</b>                                 | <b>13,100</b> | <b>150,400</b>         | <b>Pounds</b> |

<sup>12</sup> <http://www.communitygarden.org/>

<sup>13</sup> Annual is based on the monthly rate for 11.5 months.

**k. Food Waste Composting.** FLW is pursuing establishment of a food waste composting site on FLW with an on-going study effort. Food waste would be mixed with carbon-source materials (chipped wood, grass clippings). The site would be entrepreneur operated and recover some of its cost from the sale of composted material.

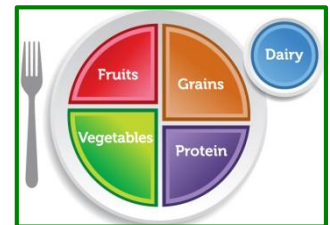


The site could also support off-post food waste and provide an environmentally friendly soil nutrient for various other Secure Foodshed initiatives.

**l. Secure Food Technology Center.** At the center of the region’s Secure Foodshed initiatives would be a Secure Food Technology Center. The center would support research, education and training. It would operate a food hub to provide regional food processing, aggregation, and marketing. It would also be a distribution coordination center to facilitate the just-in-time movement of local products to local and external markets. It would sponsor an ag entrepreneurs club to assist and network entrepreneurs creating new ag-related businesses and expanding existing ones. It would assist all elements of the food chain to understand FDA food safety rules and inspections. An introduction to food hubs is at Appendix E.

The center would be developed in phases as the Secure Foodshed is implemented. It may initially be virtual with staff operating out of existing offices and facilities. It may late become a physical location and collocate with the first vertical farming facility.

**m. Wellness Program.** Secure Food would support the wellness programs of FLW and the region. A proper diet requires substantial portions of quality vegetables and fruit on a daily basis. Other Secure Food initiatives can help provide this.



Secure Foodshed and its initiatives should also consider the needs of food banks, senior citizen centers, meals on wheels, senior care centers, hospitals, and schools.

**9. Stakeholders.** A list of potential stakeholders and participants is at Appendix B.

**10. Challenges.** There are a number of challenges to be overcome if the Secure Foodshed is to be accomplished. Known ones include:

- a. Are the product needs of the FLW dining facilities great enough to leverage a move to establishing a local foodshed for these products?
- b. Is there enough funding available to conduct the needed study efforts?
- c. Is there entrepreneurial interest in pursuing the Secure Food initiatives?

d. Are there good business cases for the Secure Foodshed initiatives?

**11. Near Term Actions.** A significant amount of work is needed to move the concept of a secure foodshed for the Sustainable Ozarks Region forward. Priorities need to be established, funding found, studies conducted, public support solicited and implementation plans developed. A summary of a similar program in New York State is described in Appendix C.

A workshop was held on January 15, 2014, that brought together a number of individuals interested in exploring the development of the Sustainable Ozarks Secure Foodshed.

A second meeting was held on March 13, 2014, that brought together even more participants. At this meeting, Bill Rostad, the Missouri Farm Bureau representative, stated that they would develop a concept for a regional cooperative to provide multiple-commodity aggregation, processing, marketing and distribution. Also at the meeting were Pat Curry and Sarah Massengale, University of Missouri Extension, who stated that they would develop a proposal for a regional market survey.

On April 4, 2014, a local foodshed workshop was held by the University of Missouri Extension in Lebanon which drew over 40 participants. The workshop was entitled, "Food Entrepreneurship: A New Way of Thinking about Local Food and Jobs."

Among the many speakers was Patty Cantrell, Regional Food Solutions, LLC (<http://regionalfoodsolutions.com/>). She discussed the importance of food hubs to local food production, processing, marketing and distribution. It helps to provide the necessary food system infrastructure between the farm and the plate. Some food hubs are cooperatives, but most are not.

Another speaker was Randy Crabtree, a local farmer who recently built and is operating a 30' by 128' hydroponic greenhouse for leafy vegetables. He is now growing lettuce ten months of the year in Montreal, MO (one hour northwest from Fort Leonard Wood). He currently has the capability of growing about 60,000 pounds of lettuce per year and plans to double that capability.

The white paper has been revised based on these meetings.

The Army is pursuing a feasibility study to address the capability of the local area to support the food needs of the FLW dining facilities and other food consumers to include commissary and direct sales to military families. The region and state will be asked to input into the study. The results should be of value to both the Army and the region.

Other near-term actions may include:

- Sharing the revised white paper and gathering additional comments and offers of support
- Forming a working group to continue the development effort
- Identifying one or more initiatives for initial study
- Developing request for proposal for a regional feasibility study
- Identifying funding sources for the study

## Appendix A

### USDA Local Food Initiatives

**The Beginning Farmer and Rancher Development Program** provides grants to organizations that train, educate, and provide outreach and technical assistance to new and beginning farmers on production, land management, marketing, business management, legal strategies, and other topics critical to running a successful operation.

[www.nifa.usda.gov/funding/bfrdp/bfrdp.html](http://www.nifa.usda.gov/funding/bfrdp/bfrdp.html)

**Small Business Innovation Research Grants** help small businesses conduct research on scientific problems and opportunities in agriculture. Research is intended to increase the commercialization of agricultural innovations and foster participation by women-owned and socially and economically disadvantaged small businesses in technological development.

[www.nifa.usda.gov/about/small\\_businesses.html](http://www.nifa.usda.gov/about/small_businesses.html)

**Specialty Crop Block Grants** are awarded to state departments of agriculture to administer grant programs that enhance the competitiveness of specialty crops—fruits, vegetables, tree nuts, horticulture, nursery crops, and floriculture—including those that are locally grown and consumed. The program supports each state’s specialty crop funding priorities, including state and local food systems, school and community gardens, farm-to-school programs, and improving access to specialty crops in underserved communities.

[www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateN&navID=SpecialtyCropBlockGrant%20Program&rightNav1=SpecialtyCropBlockGrant%20Program&topNav=&leftNav=&page=SCBGP&resultType=&acct=fvgrntprg](http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateN&navID=SpecialtyCropBlockGrant%20Program&rightNav1=SpecialtyCropBlockGrant%20Program&topNav=&leftNav=&page=SCBGP&resultType=&acct=fvgrntprg)

**The Agriculture and Food Research Initiative** supports research and education to support the viability of farms, small businesses, and community development initiatives.

[www.nifa.usda.gov/funding/afri/afri.html](http://www.nifa.usda.gov/funding/afri/afri.html)

- **The Improved Sustainable Food Systems Program** supports research, education, and project-specific efforts that will increase the security and viability of sustainable local and regional food.
- **The Agricultural Economics and Rural Communities Program** supports research, education, and project-specific efforts that enhance the long-term viability of small and medium-sized farms, small businesses and entrepreneurs, markets and trade, and rural communities broadly.



**The Sustainable Agriculture Research and Education Program** aims to advance sustainable innovations in agriculture. The program is managed by four regional offices that are guided by councils of local experts. The following types of grants are offered:

- Research and Education Grants: Ranging from \$100,000 to \$200,000 or more, these grants fund projects that involve scientists, producers, and others in an interdisciplinary approach
- Professional Development Grants: Ranging from \$20,000 to \$120,000, these grants spread knowledge about sustainable practices by educating Cooperative Extension Service staff and other agricultural professionals.
- Producer Grants: These grants typically run between \$1,000 and \$15,000 to conduct research, marketing, and demonstration projects and share the results with other farmers and ranchers.

[www.nifa.usda.gov/sustainableagriculture.cfm](http://www.nifa.usda.gov/sustainableagriculture.cfm)

**Community Food Projects**, supported by grants to nonprofit organizations, are designed to increase community food security by assessing strengths, establishing linkages, and creating systems that improve the self-reliance of community members over their food needs.

[www.nifa.usda.gov/fo/communityfoodprojects.cfm](http://www.nifa.usda.gov/fo/communityfoodprojects.cfm)

**The Farmers' Market Promotion Program** provides grants to help communities support direct producer-to-consumer opportunities such as farmers' markets, roadside stands, community supported agriculture, and agritourism. Grants increase access to local foods by low-income consumers, allow growers to market their products directly to consumers, and raise awareness of local products through promotion and outreach.

[www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateN&navID=WholesaleandFarmersMarkets&leftNav=WholesaleandFarmersMarkets&page=FMP&description=Farmers%20Market%20Promotion%20Program&acct=fmpp](http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateN&navID=WholesaleandFarmersMarkets&leftNav=WholesaleandFarmersMarkets&page=FMP&description=Farmers%20Market%20Promotion%20Program&acct=fmpp)

**The Federal-State Marketing Improvement Program** provides grants to address barriers, challenges, and opportunities in marketing, transporting, and distributing food and forest products. State Departments of Agriculture are eligible recipients, but they often partner with local organizations, so see your State Department of Agriculture website for more information.

[www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateC&navID=WholesaleandFarmersMarkets&leftNav=WholesaleandFarmersMarkets&page=FSMIP&description=Federal%20State%20Marketing%20Improvement%20Program&acct=gpfsmip](http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateC&navID=WholesaleandFarmersMarkets&leftNav=WholesaleandFarmersMarkets&page=FSMIP&description=Federal%20State%20Marketing%20Improvement%20Program&acct=gpfsmip)

**The Senior Farmers' Market Nutrition Program** provides low-income seniors with coupons that can be exchanged for fruits, vegetables, herbs, and honey at farmers' markets, roadside stands, and community supported agriculture programs. Low-income seniors, generally defined as individuals who are at least 60 years old and who have household incomes less than 185% of the federal poverty level, are eligible.

[www.fns.usda.gov/wic/seniorfmnp/sfmnpmenu.htm](http://www.fns.usda.gov/wic/seniorfmnp/sfmnpmenu.htm)

**The Women, Infants, and Children (WIC) Farmers' Market Nutrition Program** aims to provide locally grown fruits and vegetables through farmers' markets to WIC participants and to expand their awareness and use of farmers' markets. Women, infants over 4 months old, and children under five years old who have been certified to receive WIC program benefits or who are on a waiting list for WIC certification are eligible.

[www.fns.usda.gov/wic/FMNP/](http://www.fns.usda.gov/wic/FMNP/)

**Appendix B**

**Potential Stakeholders**

The following is a list of potential stakeholders in Secure Foodshed.

**Regional.**

- The counties
- The cities
- Fort Leonard Wood
- Regional planning commissions
- Mark Twain National Forest
- Colleges and universities
- Extension services
- Hospitals
- Food pantries
- School districts
- Churches
- Sheltered workshops
- Farmers markets
- Local farmers and ranchers
- Local food processors
- Community gardens
- Master Gardeners
- FAA and 4H clubs
- Boy and Girl Scouts
- FLW Spouses Club
- Rancher Associations
- Electric Co-ops

**State.**

- Farm Bureau
- Lincoln University
- Missouri Department of Agriculture
- Missouri Department of Economic Development
- Missouri Department of Natural Resources

- Missouri Master Gardener Association
- Missouri River Commission
- University of Missouri Columbia

**Federal.**

- Army Civil Engineering Research Laboratory (CERL)
- Army Research Institute for Environmental Medicine
- US Department of Agriculture
- US Forest Service
- US Department of Veterans Affairs

**Other.**

- American Community Gardening Association
- American Legion Auxiliary
- Center for Rural Affairs (CFRA)
- LocalHarvest
- Mission Continues

Appendix C

Vertical Farming Today

*This blog summarizes some of the current commercial growth in vertical farming. It is from the Vertical Farming website of Dr. Dickson Despommier, <http://www.verticalfarm.com/blog>*

**My Kinda' Town, Chicago is.....**

4/1/2013 3:58:49 PM

Big news: a new vertical farm just opened in Bedford Park, Illinois, a suburb of Chicago, the current epicenter of vertical farming in the United States. And it's not just an ordinary vertical farm (if that term can be used at this early stage of this fledgling industry). It's a *really big* commercial vertical farm, encompassing some 90,000 sq. ft. of growing space inside a two story-tall, windowless, abandoned warehouse. Called [Farmed Here](#), it is designed to occupy the full extent of the indoor space of that facility – 150,000 sq. ft.! It currently produces oodles of tasty leafy greens (basil, arugula, etc.) and one value-added product, a vinaigrette.

What's more, *Farmed Here* will eventually employ some 200 people when it finally reaches its full production potential. With that much room to fill up with edible plants, and no outside sunlight to help it along, the energy budget might intimidate faint of heart entrepreneurs, but *Farmed Here's* forward-looking CEO, Yolanta Hardej, expects that within just a year from now, her enterprise could be deriving most of its energy needs from composting, generating methane gas.

A similar energy scheme will soon be employed by the highly successful vertical farm [The Plant](#), located in the heart of the abandoned stockyards district of Chicago and run by John Edel and colleagues.

One gets the distinct impression, and correctly so, that the “*City With Big Shoulders*” is about to burst onto the global scene as a major player in urban sustainability, encouraged by a rising number of urban agricultural initiatives. Chicago's Mayor Rahm Emanuel has repeatedly endorsed urban agriculture as an integral part of that city's push for long-term sustainability in several press conferences he has presided over within the past few months.

Bloomberg Weekly News in January of 2013 declared that vertical farming would be a sound small business investment for the near future ([images.businessweek.com/slideshows/20101105/20-small-businesses-of-the-future#slide20](http://images.businessweek.com/slideshows/20101105/20-small-businesses-of-the-future#slide20)); Yahoo News agrees (<http://smallbusiness.yahoo.com/advisor/five-careers-future-031453252.html>).

A recent workshop I attended in Berlin, organized and sponsored by a branch of the German government exploring the prospects of federal funding for the development of vertical farms, attests to the fact that some countries (Korea, Japan, China, Germany) are getting wise to the fact that vertical farms may be the answer to many environmental issues, such as a rising atmospheric temperature and an out-of-control climate regime.

Meanwhile, back in the U.S. of A., several other new vertical farm initiatives have been announced: "[\*Green Girls\*](#)" in Memphis, Tennessee, and [\*Green Spirit Farms\*](#) in New Buffalo, Michigan. [\*Gotham Greens\*](#), a commercially successful high-tech 2,000 sq ft. greenhouse operation in Brooklyn, just announced that construction of another facility of theirs has begun (20,000 sq ft), and will be located on top of the new Whole Foods supermarket in the Gowanus section of that same borough of New York City.

I can only hope that when that new facility achieves maximum production several years from now, but consumer demand for fresh, local produce still exceeds their capacity to provide for everyone in that neighborhood, then perhaps another floor's worth of greenhouse will be added to *Gotham Greens* already existing structures, turning them into true vertical farms! This would naturally lead to the emergence of a friendly competition between *The Big Apple* and *The Second City* in promoting vertical farming as an integral part of all urban agricultural initiatives. Onward and upward!

## Appendix D

### Future of CEA Industry In New York State

*This is an extract of a paper discussing New York State intent to pursue Controlled Environment Agriculture in New York.*<sup>14</sup>

New York State's production of fresh vegetables and fruits in controlled environment agriculture (CEA) facilities is likely to grow explosively over the next decade. This surge will stem from water quality and other problems resulting in field-crop contamination sources in major vegetable growing states. These health and safety concerns combined with rising energy and fertilizer costs will position the Empire State to resume a larger food production role.

CEA crops will have consistently high quality, will be available "out-of-season," and will be grown with little or no pesticide. Currently, the "out-of-season" fresh vegetable markets (e.g. lettuce, tomatoes, spinach and green peppers) are dominated by southern and western United States growers and foreign producers. The development of a vibrant New York CEA industry will provide a major economic boost to the state's agricultural sector.

In 2020 the impact will include:

- 1,000–1,500 acres of greenhouses
- 10,000–15,000 jobs (10 jobs/acre)
- \$400–600 million annual sales (\$40,000 sales/job)

Beyond the economic impact, there are several additional benefits and likely outcomes from a strong CEA industry:

By 2020, NYS is likely to be recognized as the leader of the CEA industry in the Northeast, where CEA is an established and growing industry. As a result of a coordinated and integrated statewide effort, CEA facilities and products are available across the state in both rural and urban settings.

Locally grown CEA fruits and vegetables are both publicly accepted and expected in grocery stores, restaurants and public markets because of their quality, safety, cost competitiveness and availability in NYS.

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<sup>14</sup> <http://www.nyserda.ny.gov/Energy-Innovation-and-Business-Development/Research-and-Development/Manufacturing-Technology-Development/Controlled-Environmental-Agriculture/Future-of-CEA-Industry.aspx>. 8/20/2012

The establishment of a strong CEA industry has created a stable, community-based agricultural workforce that is well-integrated into the local community.

Due to progressive state policies and tax incentives, CEA facilities are developed atop capped Brownfield sites and support sustainable, green urban development.

At the state and federal levels, energy policies to encourage energy efficiency and renewable energy development support the development of energy-efficient CEA projects that manage electrical loads in order to minimize peak demand and use indigenous energy resources such as stranded natural gas, off-grid wind, biomass, landfill, and biogas to provide combined heat and power.

In NYS, the combination of energy efficiency, decentralized power generation, and supportive net-metering policies, has CEA systems tied into and supporting the electric grid wherever possible. These sites use off-peak utility resources, to minimize utility system use during peak demands thereby boosting utility system reliability for all consumers.

By 2020, New York has established a world-class regional network of CEA Academic programs to lead the way in the development of new CEA technology, technology transfer and workforce training.

New York's favorable business and regulatory climate has attracted many new jobs and high-tech agricultural industries, and its competitive advantages in R&D, market pull, and access to financial markets have all contributed to its success.

Building on its base of fruit and vegetable production, the CEA industry in New York has diversified into such areas of research, development, and commercialization as nutraceuticals and pharmaceuticals derived from CEA.



Appendix E

Food Hubs: Solving Local

by Patty Cantrell on February 27, 2014<sup>15</sup>

Small-farm aggregators, called food hubs, are helping wholesalers stock local food and sell it with integrity; with the local economic, environmental, and social benefits consumers want. The new Wallace Center-National Good Food Network report — [Food Hubs: Solving Local](#) — shows how.

Here’s an excerpt of the report, co-authored by Patty Cantrell, Regional Food Solutions LLC:

Food Hubs: Solving Local

*Small-farm aggregators scale up with larger buyers*

Consumer demand for local food is undeniable and growing. Not so obvious is what qualifies as “local.” Nor is it clear how the food retail and service industries can pull safe and reliable quantities of small-volume product through large-volume wholesale channels.

Responding to these market challenges is a new intermediary: The regional food hub. Retailers and food service companies, large and small, are teaming up with food hubs to differentiate themselves with local food programs and satisfy strong consumer demand.



Food hubs are the scaling up strategy for local food. Industry executives can get ahead of the curve by becoming acquainted with the food hubs in their territories and taking strategic steps to grow local food sales with them.

Food hubs bring farmer networks, food safety protocols, and logistics and marketing strengths. Buyers identify assets and opportunities, from receiving to merchandising, for fitting the small-farm aggregators and their diverse product lines into supply chains.

These partnerships are delivering trust to the consumer, and the consistency and safety the market demands. They are building business models for scaling up the supply of



<sup>15</sup> <http://regionalfoodsolutions.com/2014/02/27/food-hubs-solving-local/>

local food with the attributes consumers want.

### **Next Steps for Execs**

*Solving Local* is a resource to help industry executives get started. The report briefs industry leaders on the functions and expertise of regional food hubs. Case studies introduce five established food hubs from among a growing field of such enterprises across the country. The cases illustrate similarities and differences among food hubs, and the many ways retailers and distributors are working with them to build successful programs.

Food hubs bridge the gap between smaller-scale farms and larger-scale wholesale with knowledge and expertise in both worlds. They work with producers and buyers to address challenges involved in scaling up for wholesale channels while maintaining local food's value for increasingly discriminating consumers.

The distance food travels is only one variable in the local food equation. What more and more consumers are looking for is transparency.

"Local" embodies positive returns to farmers, workers, communities, and the environment. "Local" also means fresh and healthy food produced in harmony with nature and neighbors. Promoters call it "good food:" Healthy for the body, green for the environment, fair to workers, and affordable to everyone.

More than 200 food hubs are now in operation across the country, a product of market forces and new consumer values. Some are well established and growing. Many are new and developing. All are working with industry partners, and increasingly with each other across regions, to deliver the local taste and transparency consumers demand.

### **Case Studies: Five Food Hub Leaders**

#### *Red Tomato*

This food hub lines up the supply, logistics, and marketing for branded local food programs featuring products from a network of farms in the Northeast.

#### *Good Natured Family Farms*

Operating out of a regional grocery chain's warehouse, this branded alliance of 150 farmers supplies metropolitan Kansas City and beyond.

#### *La Montanita Cooperative Distribution Center*

This distribution arm of a retail grocery cooperative uses its Organic Valley routes to open markets for New Mexico producers from Albuquerque to Connecticut.

*Cherry Capital Foods*

The Michigan logistics company leverages accounts with Kroger and Chartwells to build statewide routes that connect demand and supply.

*Common Market*

The Philadelphia distributor brings wholesome food to the inner city and Mid-Atlantic region by linking area farms with small food service accounts.