Food Security Assessment Report for the Willits Area (95490)

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A copy of this report is available at: www.willitseconomiclocalization.org
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Background

North American small towns have seen dramatic changes over the past several decades. The advent of the automobile and associated highway systems, and the free-flow of trade goods from different regions of the world into small communities, has undermined the self-reliance rural towns once enjoyed. The erosion of self-sufficiency has paralleled the apparent gains in opportunities to find employment elsewhere. Hence the demographic crises of rural areas where young people move away and leave older generations stranded and demoralized. For example, in Willits, CA, 19 of 20 high school graduates leave the area.

These trends will reverse as energy limits and the need to cut back on greenhouse gas emissions force the local production and consumption of basic goods. Within Mendocino County, for example, several citizen groups have formed during the past year to deal with the security threats posed by Peak Oil and Climate Change, and to use these challenges as opportunities for positive community transformation.[1] The localization movement that began in Willits has already spread to Laytonville, Mendocino-Caspar-Ft. Bragg, Gualala-Pt. Arena, Anderson Valley, and Ukiah-Redwood Valley. Phone calls and emails from around the country also attest to the widespread attraction this movement has garnered. A Willits conference on economic localization April 7-9, 2006 has attracted over 100 participants from 34 groups in western North America. Just as Mendocino County inspired the nation with its passage of Measure H, it is being watched for its leadership on localization.[2]

While there exists great enthusiasm and desire to create locally thriving, sustainable livelihoods, information about how to accomplish this is difficult to come by. Much of 20th century thought was about centralization, automation and globalization of the means of production and governance. In Mendocino County, however, people from the "back to the land" movement have advocated more decentralized, personal and local economic systems. These sentiments touch core beliefs that cut across political spectrums in America. Celebrations such as farm and re-enactor festivals, and western-themed carnivals such as Frontier Days, harken back to traditional conservative values of responsibility, hard work, ingenuity, self-reliance and community. Therefore, the cultural seeds have been sown, potentially allowing for a rapid transformation and revitalization of our small towns.

[1] See www.willitseconomiclocalization.org
[2] Search for Willits at www.energybulletin.net

The Food Lens

Because food is a core human need, once people learn how dependent their current supply is on fossil fuels for production, processing, transportation, storage and preparation,[3] many turn their attention to growing their own food.

Anyone who studies the issue for long, however, realizes what a complex, multifaceted subject is food. To contemplate the relocalization of a food system one starts to ask: What varieties of crops are best suited to this area? Where are the seeds? How can seeds be selected and stored? How can abundance in one season be used in another by drying, canning, and storing? Who will make and repair tools, water pumps, fencing, hoses, etc.? What is the most effective and least environmentally damaging means of food production within a diverse landscape? How can local markets be created so that farmers have a means of exchange that supports the productivity of the farm? What renewable energy sources are needed to ensure the continued operation of the farm, including water pumping, tool and infrastructure maintenance, food storage and processing, and distribution to market? How can we produce a diversity of food for adequate nutrition, diet preferences, and farm ecosystem health?

Just looking at the issue of local, sustainable economics through the lens of food shows how interconnected are the parts of the system. The complexity of the issues and the fact that current generations lack the cultural knowledge of how they fit together means that basic re-education is necessary. This report is part of the author's education with the hope that it can be shared and appreciated widely.

Ecological Economics Model

An Ecological Economics model is useful both to comprehend the current food system and its vulnerabilities, and to guide the development of a sustainable alternative. In this model, the Human Economy is a subset of the Earth System, and therefore the *scale* of the Human Economy is ultimately limited. The Human Economy depends upon the *throughput* of materials from and back into the Earth System. Limits to the size of the Human Economy are determined by three related factors: (1) the capacity for the Earth System to supply inputs to the Human Economy (Sources), (2) the capacity of the Earth System to tolerate and process wastes from the Human Economy (Sinks), and (3) the negative impacts on the Human Economy and the resources it

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[3] See the following articles: Richard Manning, "'The Oil We Eat' Following the Food Chain back to Iraq." Harper's Magazine. Feb 1, 2004, archived at www.energybulletin.net/30.html; Bill McKibben, "The Cuba Diet: What will you be eating when the revolution comes?" Harper's Magazine. Apr. 9, 2005, archived at www.energybulletin.net/5225.html; Dale Allen Pfeiffer, "Cuba-A Hope" From the Wilderness. Dec. 1, 2003, archived at www.energybulletin.net/1342.html; Dale Allen Pfeiffer, "Eating Fossil Fuels" From the Wilderness. Oct 3, 2003, archived at www.energybulletin.net/281.html; Norman Church, "Why Our Food is So Dependent on Oil" Powerswitch UK. Apr. 2, 2005, archived at www.energybulletin.net/5045.html; James Brooke, "North Korea, Facing Food Shortages, Mobilizes Millions From the Cities to Help Rice Farmers" New York Times. June 1, 2005, archived at www.energybulletin.net/6486.html; Richard Heinberg, "Threats of Peak Oil to the Global Food Supply" Museletter. July 3, 2005, archived at www.energybulletin.net/7088.html

relies on from various *feedbacks* caused by too much pollution. For example, mining coal is a source of energy for industry that produces pollution such as sulfur dioxide that causes acid rain. Acid rain directly degrades built infrastructure and it damages ecosystems such as forests used to create the built infrastructure.

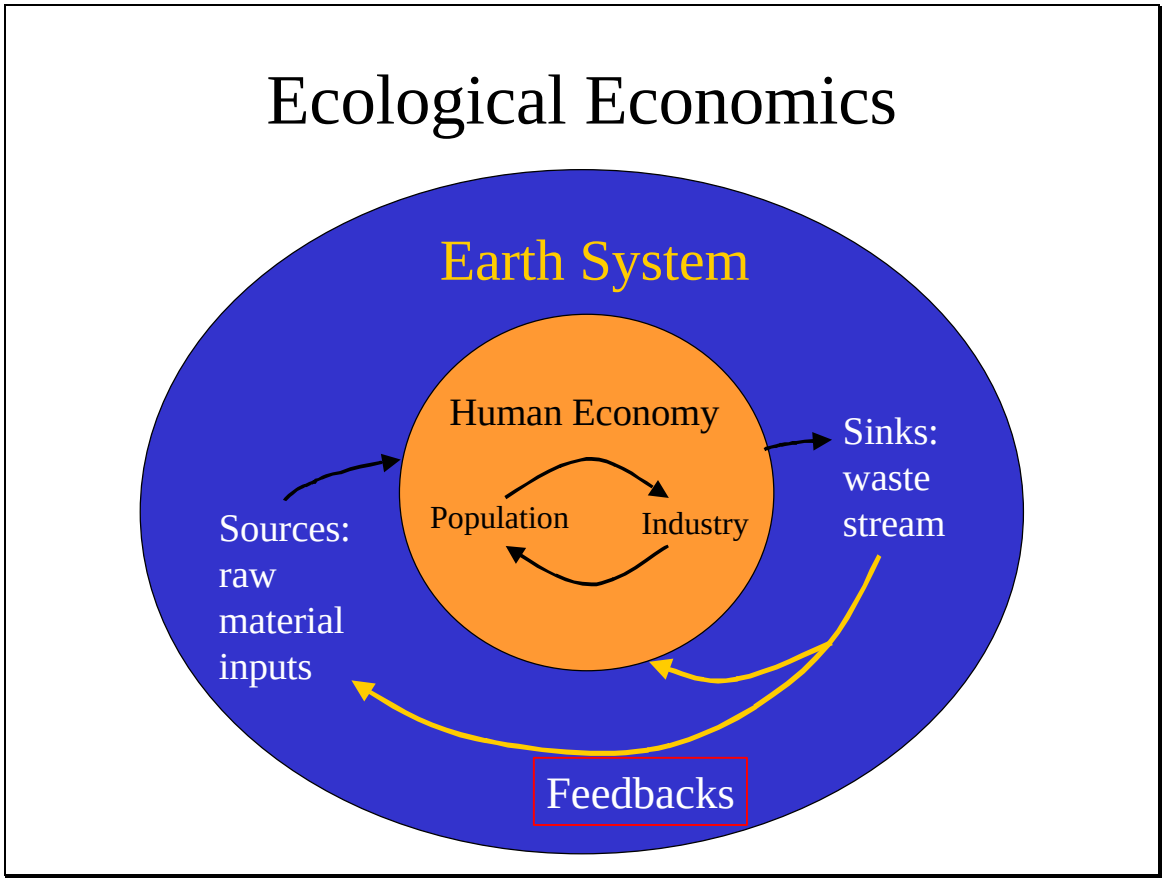

Fig. 1. The Ecological Economics Model of the relationship between the Human Economy and the Earth System highlighting the importance of sources, sinks, feedbacks and scale.

Our current food system is clearly unsustainable since it relies heavily on non-renewable raw material sources, the use of which produces tremendous pollution, leading to many negative feedbacks that impair food production. A sustainable food system would need to run on the income from solar energy, not degrade the farm ecosystem, and cycle nutrients removed the land back to it.

This model can also be understood in the classical terms of different forms of *capital.* The Earth System can be viewed as the Natural Capital and all other forms of capital are nested within and dependent upon it. Population can be rephrased as Human Capital that deals with issues of education, skill sets, and norms, standards and laws. Industry can be more broadly thought of as the tool sets people use, including their homes and transportation networks, which are also known as Built Capital.

We can assess these different forms of capital to address questions such as: Does Willits have a sufficient amount of arable land and water to potentially grow enough food for its population (Natural Capital)? Do the people of Willits know how to grow, process, store and use what can be grown here (Human Capital)? Does the infrastructure exist in the form of equipment, tools and storage devices to produce and use a local food supply (Built Capital)?

Components of a Local Food Economy

Although they are intertwined, an economy relies on both *material* and *information* systems. The information system includes the areas of policy, education, finance and research. The material system has, at its base, the Natural Capital of a region. The farming and a supporting set of energy systems are the basis of the rest of the Human Economy. Food produced feeds into a mid-level system of storage, processing and distribution. Farming is also dependent upon a manufacturing, storage and transportation system for tools and farm inputs. At the consumer end are retail outlets, such as restaurants and groceries. Finally, the waste stream is processed, ideally being captured for soil replenishment.

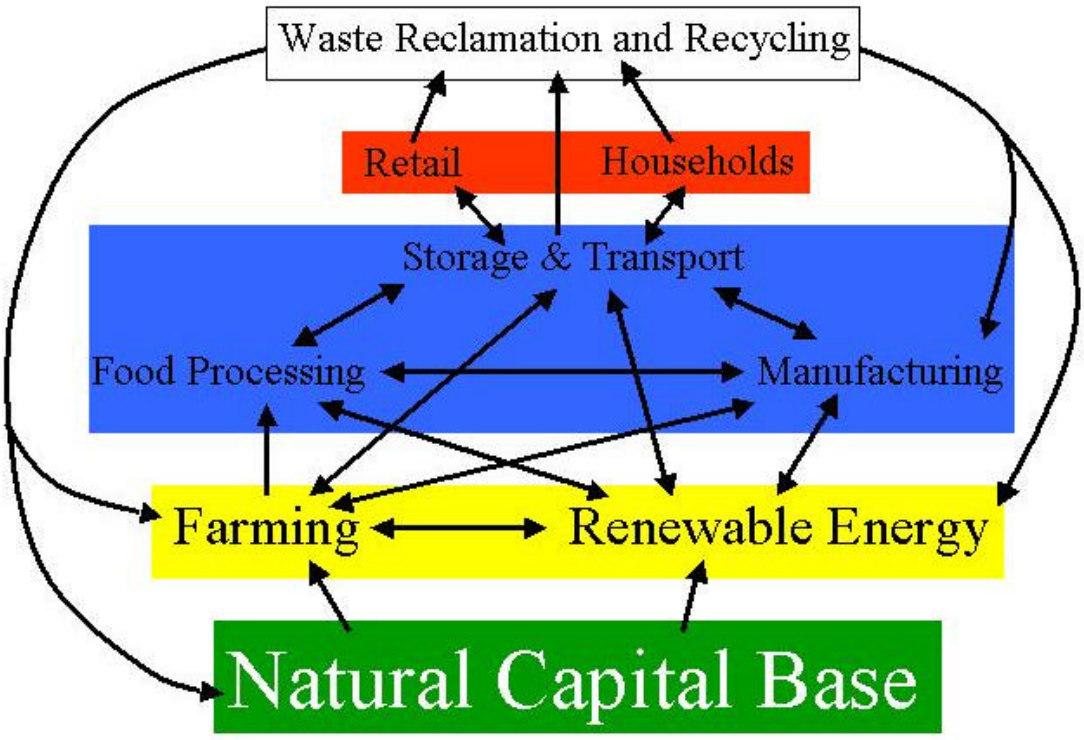

Fig. 2. A diagram of the material parts of a food system with arrows representing flows among parts.

A comprehensive plan to develop a local, secure food system would need to address the current status of these components of our food economy and elucidate strategies for transition to a new one. This report is currently a repository of information relevant to a more comprehensive plan.

Summary of Findings

The population of greater Willits (95490) of ca. 13,500 people requires approximately 12 billion calories per year for their sustenance. This figure can be placed into several different contexts:

1. Currently, Willits is almost entirely dependent upon food transported by truck to a few major grocery stores. There is little storage of food in town or production of food within Little Lake Valley. The food supply of the town is estimated to be a less than a week since stores have daily deliveries and a high turnover rate of their stock.
2. The average amount expended per person per year in the U.S. on food is about $2300. Almost half of these expenses are for food prepared outside of the home.
3. A year's supply of basic food rations would weight about 500 lbs, take up 75 gallons of volume and cost about $400 at today's wholesale prices. Community-scale storage systems are lacking.
4. Mendocino County, historically, had a diverse, local food system that included staples such as grains, potatoes, vegetables, dairy, and eggs. We have historic production data for many of these crops.
5. Current agriculture is export dominated in the areas of wine grapes, livestock and some fruits.
6. Much of the knowledge, market practices, farm, storage and processing equipment used to create a diverse, local food supply has been lost. Regaining these are new business opportunities.
7. To grow a diverse supply of food for Willits would require placing about 4000 acres of prime agricultural land into intensive production, rather than keeping it as pasture. This is about equal to the remaining prime ag land in Little Lake Valley.

Worksheets

The rest of this report is a series of worksheets that document data sources, discuss assumptions, and perform basic math regarding historic, current and possible future food systems in the Willits area especially, and with reference to Mendocino County. It begins by examining the topic of food from an individual's basic needs level, and then builds towards broader scales and more complex topics.

The Willits area is within a particular climatic and cultural region. I have emphasized crops that: (1) can be stored readily within a small area and over long periods, (2) can be grown here, and (3) are familiar parts of local diets.

<u>Worksheet 1. Individual food needs</u>

Daily human caloric need (on average):
2500 calories

For emergency purposes, the percent of above caloric need that will come from dried grains and legumes is given as *90%,* which assumes the remainder can be found from some local supply of vegetables, cheese, meat, etc.

Therefore, the daily caloric need from stored dried grains and legumes is:
2500 calories x 0.90 = 2250

Daily lbs of dried legumes and grains to meet daily caloric needs:
2250 calories per day/1600 calories per pound of grain = 1.4 lbs per day

Worksheet 2. Yearly food and storage needs and costs for an individual

Pounds needed per year:
1.4 lbs per day x 365 days per year = 513 lbs per year

Number of 5 gallon buckets needed for a year's supply of food:
513 lbs per year/35 lbs of dry grain or beans per 5 gallon bucket = 15 buckets

Cost for 15 food grade buckets plus lids at Sparetime, August 2005:
15 x $6.29 per bucket = $94.35

Cost for the grain, organic (wholesale prices for buying clubs quoted from Mountain Peoples Warehouse, Auburn CA, August 2005):

80% grains = 15 buckets x 0.8 = 12 buckets
$0.34 hard red winter wheat per lb x 210 = $71.40
$0.52 rye per lb x 70 = $36.40
$0.72 barley per lb x 35 = $25.20
$0.60 oats per lb x 35 = $21.00
$0.64 corn per lb x 70 = $44.80

20% beans = 15 buckets x 0.2 = 3 buckets
$1.00 pintos per lb x 35 = $35.00
$0.72 brown lentils per lb x 70 = $50.40

Total cost = $378.55 (This is for illustrative purposes only, precise costs will always vary).

To give a more diverse perspective on what these calculations mean: A family of 4 could have about 3 months of food storage per person at less than $100 each. People are also familiar with 1 quart mason jars, and calculations could be made from that perspective also, e.g., there are 4 quarts in a gallon, and 20 quarts in 5 gallons, so 300 quarts jars would equal the volume of the 15 buckets used above.

The costs for the grains and beans may be reduced by a factor of 3 to 4 if purchased directly from a farmer. Organizing a large purchase and shipment could do this, but further research is needed for more details.

Worksheet 3. Annual food needs of the population

Size of population:
13,500 for 95490 zip code of greater Willits

Total annual requirements based on Worksheet 2:
13,500 people x 513 lbs per year/person = 6,925,500 lbs of dry grains and beans

Total for grains and beans in terms of bushels:
6,925,500 lbs/55 lbs* per bushel = ca.125,918 bushels

*a bushel is a volumetric measure and varies in weight among crops, 55 lbs is used as an average.

Total annual needs in terms of calories
13,500 people x 2500 calories per day x 365 days per year = 12,319,000,000 calories per year (over 12 billion calories)

Worksheet 4. Historic grain production levels in Mendocino County

	yields per acre, bushels						bushel	average	calories per
crop	1899	1909	1919	1924	1929	1934	average	in pounds	acre avg.
barley	30	23	27	22	28	27	26.2	1256.0	1,988,248
corn	31	27	20	16	28	23	24.2	1353.3	2,136,913
oats	31	27	26	31	34	28	29.5	944.0	1,669,936
wheat	20	15	15	15	21	17	17.2	1030.0	1,541,910
potatoes	105	128	88	104	115	93	105.5	6330.0	8,678,430

The available data on grain and potato production are sparse due to loss of records from fires. However, the 1899-1934 period pre-dates the Green Revolution and is therefore probably the best indication of what we can expect in a world without artificial fertilizers and large irrigation systems. Note that these data are Countywide and may not perfectly reflect conditions in Little Lake Valley.

Dry beans are similar to grains in terms of yields per acre and caloric density (Jeavons, 2002).

Source of data on production levels from:
"Statistical Information on Mendocino County Agriculture 1899-1936." J.M. Thompson, Extension Specialist in Agricultural Economics. University of California College of Agriculture and United States Department of Agriculture. January, 1938. (Made available via County of Mendocino Department of Agriculture, 2005).

Caloric data from:

"How to Grow More Vegetables." John Jeavons. Ten Speed Press, Berkeley and Toronto. 6th edition, revised, 2002.

Data on Willits area population derived from U.S. Census 2000, summarized at: http://www.city-data.com/zips/95490.html

Worksheet 5. Number of people potentially fed per acre in Mendocino County

crop	**calories per acre avg.**	**people fed per acre***
barley	1,988,248	2.2
corn	2,136,913	2.3
oats	1,669,936	1.8
wheat	1,541,910	1.7
potatoes	8,678,430	9.5

*total calories only, not other nutrients

This table carries over from Worksheet 4. It divides calories per acre for each crop by annual caloric need per person per year, which is:
2500 calories per day x 365 days per year = 912,500 calories per year.

For grains the average is about 2 people per acre, and for potatoes 9.5.

The actual yield in an agricultural system is highly dependent on the knowledge of the farmers, the methods employed, and the quality of the labor force. Much knowledge has been gained over the past century, but on a population level, much has also been lost.

Worksheet 6. Number of acres needed to sustainably feed the greater Willits population *using historic data*

Though the data on Worksheet 5 may tempt people to sustain themselves on potatoes, this would eventually lead to starvation. Potatoes are susceptible to a blight when grown too intensively, which periodically leads to crop failure (e.g., Ireland). Furthermore, potatoes deplete the soil when not part of a rotation with other crops, such as nitrogen fixing legumes and grains. They have the disadvantage of being more difficult to store and transport than grains as well.

For these reasons, an intensive agrarian system should probably sow an area of grains and dry beans about 5 times larger than the area of potatoes, i.e., a 5:1 ratio. These grains, dry beans and potatoes would represent about 90% or more of the area under cultivation, the rest being other vegetables and fruits.

If we take an average of 2 people per acre supported by grains, and 9.5 supported by potatoes (Worksheet 5), then the following equation gives the overall number of people supported per acre with the 5:1 ratio rule.

2 people per acre X 0.83 + 9.5 people per acre X 0.17 = **3.28 people per acre.**

13,500 people/3.28 people per acre = **4116 acres** for basic calorie crops.

Areas cultivated for grains and potatoes should be of prime quality. Marginal lands will have much lower yields and will degrade quickly if cultivated, and should instead be reserved for light grazing, tree and berry crops, or natural ecosystems. All these activities would provide diet diversity and added calories to the calculations given here for the fundamentals. Due to annual fluctuations in output and potential for large failures, any system should aim to have about 20% more food than required. The 4116 acres is therefore a minimum area based on the most important calorie crops, using the historic method approximation.

Not considered in this calculation is the area required for draft animals. If draft animals are used to cultivate, the actual area required for an agricultural system is greater, but the actual extra area needed is dependent on the trade-off between human and animal labor employed (See Worksheet 7).

Worksheet 7. Number of acres needed to sustainably feed the greater Willits population *using small-scale contemporary examples*

Mendocino County has potential models of agricultural systems that combine the best of the past (i.e., local, organic food), with improved practices from ongoing research. Data from these practitioners suggest that improvements can be made over traditional and modern industrial agriculture that will increase yields and make agriculture potentially sustainable.

One improvement is more efficient use of space. Instead of row cropping, 5-foot wide beds are made. This can easily double output per area, but requires more manual, rather than mechanized, labor.

The other major improvement is in crop diversity and balance. Instead of overspecializing, farmers would have a mixture of crops to ensure a healthy soil, and lower the chance for disease or total failure.

Ecology Action based in the Willits Area has been documenting yields per area for staple crops. Their experience estimates that about 7 people can be fed a balanced diet per acre (in the Willits area). The major caveat is that this system requires very high human labor inputs, and the yields they have are based on an available irrigation infrastructure for year-round cultivation of an area.

Ecology Action yields with irrigation: 13,500 people/7 people per acre = **1929 acres**

Without irrigation, the 1929-acre figure is increased by about 50%, to ca. **3000 acres** to feed 13,500 people. This estimate comes from a diet emphasizing winter grains followed by a summer fallow. However, some regions of Little Lake Valley may be best suited to dryland summer farming (see Worksheet 9). More accurate estimates would require a greater study of specific crops by areas within the Willits region.

Live Power Community Farm in Covelo grows winter grains and Spring-Fall vegetables by the wide bed method and draft horses. They report productivity per acre similar to Ecology Action, but to support the food needs of the draft animals requires more than half of their farm area. However, they also suggest that they could reduce the number of draft animals or use them on a larger area if it were available. The high cost of labor means that it makes sense for them to have horses do more of the work than would be necessary if more willing and able skilled workers were available. Live Power Farm also has an energy intensive irrigation system for their summer vegetable production.

If draft animals are employed in agriculture the total area needed for supplying a community's food needs certainly increases. Exactly how much it increases depends upon how the animals are used and therefore how many are required.

References:
Ecology Action. http://www.growbiointensive.org
Live Power Community Farm. http://www.covelo.net/agriculture/farm/pages/farms_lpf.shtml

Worksheet 8. How many acres of prime ag land are in our area?

The 95490 zip code encompasses about 322 square miles. The largest area with high agricultural potential is Little Lake Valley. Smaller areas include Ridgewood Ranch, with probably a few hundred acres of prime ag land, as well as Sherwood Valley and small pockets along area rivers such as near Hearst.

The main area of Little Lake Valley is about 2.5 miles wide and 5 miles long, with extensions on either side of Hilltop as well. The total area of valley fill is about 18 square miles, or ca. 12,000 acres. I estimate about a quarter of this area is wetland habitat, mostly in the northern section, another quarter is housing and roads, mostly to the west, and another couple thousand acres is forested, riparian zone, or non-prime ag land due to soil texture. **This gives about 4000 acres of potential prime ag land in Little Lake valley**.

Further research should use GIS products for more accurate estimates, both within Little Lake Valley and the County. The contact for Mendocino County GIS is: Leif Farr, Information Services, 175 S. School St, Ukiah, CA 95482; farrl@co.mendocino.ca.us. Available GIS layers include: USDA soil survey, county parcels, public roads, orthoquads, DEMs at 10 m and 30 m, flood zones, and scanned geological maps. With these data layers and knowledge of crop preferences, crop models could be developed for our area. The City of Willits GIS person is Anthony Trilli.

Irrigation water may be rate-limited in the southern portion of the valley, and water availability and quality may limit irrigation along the valley margins where boron, arsenic and other minerals reach high concentration. Dry-land farming methods are likely to be the norm, as was true historically.

See the following publications for detailed information:

Farrar, C.D. 1986. Ground-water resources in Mendocino County, California. U.S. Geological Survey Water-Resources Investigations Report 85-4258

Howard, Richard F. and Roy H. Bowman. 1991. Soil Survey of Mendocino County, Eastern Part, and Trinity County, Southwestern Part, California. United States Department of Agriculture, Soil Conservation Service.

An image of Little Lake can be found at:
http://www.google.com/maps?ll=39.416370,-123.328829&spn=0.129776,0.088062&t=k&hl=en

Worksheet 9. What is the variety of ag land in our area and how does it influence what is grown and how?

What is Prime Ag?

Prime farmland soils "produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment" (Howard and Bowman, 1991, pg 127). These soils must receive enough water from rain or irrigation to reach these high yields. They have a favorable growing season length. They aren't too acidic or alkaline. They are not rocky and have good permeability. They are not easily eroded or saturated during the growing season. Some flood prone or dry soils can be classified as prime if subject to water management. Most prime farmland exists in large valleys where extensive layers of alluvial substrates, and the decomposed remains of vegetation, have build deep permeable layers with favorable balances of mineral nutrients, organic matter and tilth. Since crop plant roots can penetrate several feet deep, ideal prime soil has an A horizon (or topsoil layer) that is over 3 feet deep.

What classes of Prime Ag land exist in the valley?

The following Prime farmland classes can be found in Little Lake Valley.

Key:
Bold = very common
Italics = not very common, but in some large contiguous areas
Otherwise, only occurring in small patches

Classes:
112 Clear Lake clay, 0 to 2 percent slopes (where irrigated and drained)
113 Cole loam, drained, 0 to 2 percent slopes (where irrigated)
115 Cole clay loam, 0 to 2 percent slopes (where irrigated and drained)
123 Felix loam, 0 to 2 percent slopes (where irrigated)
124 Felix loam, 2 to 5 percent slopes (where irrigated)
125 Felix clay loam, gravelly substratum, 0 to 2 percent slopes (where irrigated)
128 Gielow sandy loam, 0 to 5 percent slopes (where drained and irrigated)
177 Pinole gravelly loam, 0 to 2 percent slopes (where irrigated)
178 Pinole gravelly loam, 2 to 8 percent slopes (where irrigated)

188 Russian loam, 0 to 2 percent slopes (where irrigated)

What are the characteristics of the common soil classes, and therefore what challenges and opportunities for crops exist for these soils?

115 Cole clay loam, 0 to 2 percent slopes

Very deep soil that is somewhat poorly drained. Formed from recent alluvium of sedimentary rock. Supports annual grasses and forbs where not cultivated. May include narrow bands of gravel with ca. 60 inches of soil depth. Water table depth may be as high as 18 to 36 inches year round, so water capacity is very high. Commonly used for orchards, vineyards, hay and pasture. Soil can be damaged if worked while moisture levels are high, so avoid heavy grazing or tilling in such circumstances. Managed drainage can improve productivity. Dominates the center to the southern end of Little Lake Valley, often mixed with 128.

This soil class may not support winter grains unless special measures are taken to create raised beds, enhance drainage and/or prevent flooding. However, the high water table may make this soil type suitable for dryland farming of summer crops, such as corn and potatoes.

123 Felix loam, 0 to 2 percent slopes

Very deep and well-drained soils on alluvial fans and plains derived from sedimentary rocks. Vegetation where not cultivated of oak savanna. May have lenses of gravel within the ca. 60 inches of topsoil. This unit has moderate permeability and high water capacity, giving it few limitations. Typically used for vineyards, orchards, hay and pasture. Homesite development is approved on this soil type. In some large patches and strips in Little Lake Valley, especially in the southern areas on either side of Hilltop.

(Note: the new hospital and subdivision site sits over the largest area of this soil type in Little Lake Valley. This is the highest quality soil in the area).

This soil class may be useable for year-round cultivation if irrigation is placed.

128 Gielow sandy loam, 0 to 5 percent slopes

Very deep soil that is somewhat poorly drained. Formed from recent alluvium of sedimentary rock. Vegetation in non-cultivated areas is mainly grasses, forbs, and scattered oaks. May include bands of gravel within a topsoil of ca. 60 inches in depth. Surface layers may be silty, sandy or loamy. Moderate permeability with high water capacity. Seasonal high water table between 18 and 36 inches between Nov. and Mar. The high water table moves frequently and so may provide suitable aeration for water tolerant, deep rooted crops. Used for vineyards, orchards, hay and pasture. Soil sensitive to compaction damage during wet season, so caution with equipment and heavy animals is warranted. Homesite development is possible, but must overcome high water table and seasonally poor drainage. Dominates the center of the valley in association with 115.

This soil class may not support winter grains unless special measures are taken to create raised beds, enhance drainage and/or prevent flooding. However, the high water table may make this soil type suitable for dryland farming of summer crops, such as corn and potatoes.

178 Pinole gravelly loam, 2 to 8 percent slopes

Very deep, well drained soil on terraces. Formed in alluvium dominated by sedimentary rocks. Uncultivated vegetation predominantly annual grasses, forbs and scattered oaks, as well as madrones and ponderosa pine. Surface layer typically a brown, gravelly loam about 10 inches thick, the subsoil is yellowish brown over variegated strong brown and yellow clay loam, and the lower layer is a sandy clay loam. Permeability is moderately slow. Available water capacity is high. Used for vineyards, orchards, hay and pasture, homesites and firewood production. Slight erosion hazard can be controlled by contour farming and cover crops. Manage cover crops by mowing instead of tilling to minimize erosion. Avoid heavy equipment use during wet periods as soil can compact and become rutted. Common along the eastern margins of the valley along Eastside Road and Reynolds Hwy.

This soil class may be best suited to winter grains, but may be too dry in the summer for dryland farming. Small-scale irrigation may extend its cultivation during the dry season.

Reference

Howard, Richard F. and Roy H. Bowman. 1991. Soil Survey of Mendocino County, Eastern Part, and Trinity County, Southwestern Part, California. United States Department of Agriculture, Soil Conservation Service.

Worksheet 10. What is the current turnover rate of our local food supply?

Market	Customers/Day	Delivery Frequency and Daily Turnover	# Days Supply in Stock	County Products
Mariposa Market (natural foods)	200-300	Fruits and vegetables: 3 deliveries/week Meet and dairy: 2 deliveries/week Groceries: 2 deliveries/week Frozen Foods: 2 deliveries/week	2-7 days 7 days 7 days 7 days	1% (10% in summer)
Ray's Sentry Market	1,200	Fruits and vegetables: 6 deliveries/week Meat and dairy: 3 deliveries/week Groceries: 2 deliveries/week Frozen Foods: 2 deliveries/week	1 day 3 days 3 days 3 days	15-20%
Safeway	1,900	Daily delivery of all items	1-2 days	2%

If we can assume that the vast majority of people depend on these supermarkets for their food supply, then we can say that less than a week's supply of food is available in town at any time.

The data on turnover rates of local grocery stores comes from interviews of store managers conducted in 2005 by Cyndee Logan of Willits.

Worksheet 11. What crops can be grown here in which seasons?

Cool season grains & legumes

wheat, rye, oats, barley, triticale, fava beans, lentils, chick peas

Warm grains & legumes
corn, sorghum, quinoa, amaranth, buckwheat, pintos, cowpeas, soybeans

Cool season and year-round root crops (frost tolerant)
parsnips, beets, onions, shallots, garlic, turnips, celeriac, carrots, turnips, horseradish, leeks, radishes

Warm season root crops (not frost hardy)
potatoes, Jerusalem artichokes

Greens (most of these like cooler weather yet are summer tolerant, but amaranth is summer only)
lettuce, chard, collards, spinach, beet tops, onion tops, amaranth leaves, kale, cabbage

Other vegetables (many of the cool season ones can last into summer)
Warm: tomatoes, peppers, summer and winter squash, cucumbers, eggplants, green beans, melons
Cool: peas, broccoli, cauliflower, celery
Perennial: artichokes, rhubarb, asparagus

Fruits and Nuts
apples, pears, peaches, cherries, pluots, plums, grapes, persimmons, raspberries, blackberries, blueberries, olives, walnuts, filberts

Animal husbandry in the Willits area can include beef and dairy cattle, meat and dairy goats, sheep, llamas, pigs, buffalo, horses, rabbits, ostriches and poultry. The local 4H club, run through the University of California Cooperative Extension program for Mendocino County, would be a good source of livestock information.

This list is not exhaustive, but probably covers what does best here. There are many varieties of most of the species listed here and some are better suited to our climate than others. Getting a varietal list is an important next step.

Worksheet 12. How many farms exist in Mendocino County and in the 95490 area?

There are three possible data sets for evaluating how many farms are in the area. The county maintains two relevant lists (source Dave Bengston, Ag Commissioner, 463-4208).

The agriculture department asks that users of herbicides and pesticides register with them. This is that list for the 95490 area

BROOKTRAILS COMM. SERVICE DIST
ATTN: DOUG POHLSON
24860 BIRCH STREET

WILLITS, CA 95490

CHERRY CREEK PARTNERSHIP
PO BOX 1952
WILLITS CA 95490

CINDY MIHELCIC
19840 N HWY 101
WILLITS, CA 95490

ED MITCHELL
Attn: GUY MITCHELL
31801 SHERWOOD ROAD
WILLITS, CA 95490

HOWARD FOREST (CDF)
17501 N. HWY 101
WILLITS CA 95490

J. C. ENGLAND
19450 SHAFER RANCH ROAD
WILLITS CA 95490

MALKLUTH RANCH
PO BOX 1366
WILLITS CA 95490

PETER L. HATHAWAY
19500 SHAFER RANCH ROAD
WILLITS CA 95490

COASTAL RIDGES, LLC
ATTN: WILLIAM LEHER
P.O. BOX 284
WILLITS CA 95490

WAYNE WATERS
P.O.BOX 126
WILLITS, CA 95490

JERRY COLWELL
2851 HEARST ROAD
WILLITS, CA 95490

This list is clearly inadequate for discovering farmers. Many on this list are property managers and foresters.

A better source is the county's registered list of certified farmers market vendors. There are 218 farmers on this list from 2005, and here are the 21 in the 95490 area:

Mike	A'Dair	21265 Locust Street	Willits	95490 459-2728
Helen	Bartow	21351 East Side Road	Willits	95490 459-2835
Mariah	Bath	1491 Crawford	Willits	95490 459-2297
Meridith	Blum	4655 Bear Canyon Road	Willits	95490 459-4859
Johanna	Burkhardt	P.O. Box 1179	Willits	95490 459-9220
Sharon	Crothers	8001 Hearst Rd.	Willits	95490 459-5470
Debra	Derry	P.O. Box 124	Willits	95490 459-6092
Christine	Holly	P.O. Box 1876	Willits	95490 459-4399
Dianne	Knotts	19401 Walker Road #5	Willits	95490 459-5729
Leilani	Levy	P.O. Box 1852	Willits	95490 459-0180
Charles	Martin - Golden Rule	16200 N. Hwy 101	Willits	95490 459-5382
Matthew	Molyneaux	16000 Hearst Post Office Road	Willits	95490 456-0557
Sue	Morganti	P.O. Box 887	Willits	95490 459-5490
Robert & Wenda	Munson	3851 Hearst Road	Willits	95490 459-2440
James	Norris	16180 Black Bart Drive	Willits	95490 459-4406
Marlin & Carole	Press	30101 Timberline Road	Willits	95490 459-5960
Alvin	Rosen	3775 Ridgewood Rd.	Willits	95490 459-6453
Mimi	Stoll	795 B Coast Street	Willits	95490 459-8790
Pamela	Temple	5111 Westview Road	Willits	95490 459-8625
Gabriel	Waterhouse	28895 A Timberline	Willits	95490 459-2593
Catherine & William		4000 Hwy 20	Willits	95490 459-0180

While this list is more of what we are looking for, it doesn't capture farmers who primarily grow for the broader commodity market and is likely skewed to season vegetable production and small-scale dairy.

The other source I am aware of is the certification list from the Mendocino Organic Network (MON) (Source: Els Cooperrider, 937-6250, last updated in Nov. 2004). This list appears to capture commercial farms, food processors, and stores that sell organic products. For example, the 112 names on this list include only one from Willits, i.e., Mariposa Market, a grocery store. Others include CSA farms, such as the Oz Farm in Manchester, and organic vineyards and wineries, such as the Frey Vineyards in Redwood Valley. Although Willits has no farmers on this list, the adjacent Redwood Valley has 23 entries.

A look at these lists also reveals that they are incomplete. Major commercial operations that primarily export from the county are not included. Neither is a major CSA operation, Live Power Farm in Covello. Clearly, more data need to be gathered and interpreted.

<u>Worksheet 13. What farm products are already produced in adequate abundance for local consumption and what farm products are lacking?</u>

The data for the flyer included below comes from the 2004 Mendocino County crop report. Poultry products are lacking in the flyer and these should be in the "What we don't have" section—meaning what we don't have in adequate, local supply.

As noted in the Business Opportunities section, even for those farm products that are plentiful, we often lack local processing centers, e.g., slaughtering and butchering.

Greater Ukiah Localization Project

Panel Discussion Jan 24, 2006

Els Cooperrider: els@ubcr.com 937-6250

Food: The good news and the bad news:

What Mendocino County has, and what it has not

What we have:
Wine grapes-(15,600 acres)
Beef cows
Sheep and lamb (meat and wool)
Seafood
Pears
Apples
Dairy (some)

What we don't have:
Beer
Grains (bread)
Potatoes
Oil (for cooking)
Vegetables- (only 320 acres)
Nuts
Pork

Farm Opportunities:
Grains: wheat, rye, oats, barley
Trees: olives, fruit, nuts
Oils: olives, soybeans
Vegetables: all
Seed: all varieties
Misc: hops, fiber, hay

Some Business Opportunities:
Meat processing plant
Leather tanning plant
Textile plant
Bottle washing plant

Workshop 14. Household food expenditures in the U.S.

When planning for how to localize food, it helps to have a perspective about how much people are currently accustomed to spending on food. The USDA maintains a "Food Consumption (Per Capita) Data System" and the Bureau of Labor Statistics conducts an annual "Consumer Expenditure Survey" that includes food.

These data show that in 2002 the average food spending per person was $2,245 (including alcohol). Significantly, 43% of the food dollar was spent away from home. Inflation adjusted costs show a steady rise in food expenditures over the past several decades, with a higher proportion of costs directed towards transportation and processing and less for farmers. This indicates a significant potential to "short circuit" the existing food system by developing a local system that pays farmers more while lowering costs associated with long-distance transport and high-input processing. This local system will only become more competitive as energy costs and general inflation rise.

Sources:
See this web site and related tables linked from there:
http://www.ers.usda.gov/briefing/consumption/Expenditures.htm

General References
Willits Planting Guide (available at Sanhedrin Nursery)
Ecology Action grain sheet (available from Ecology Action). http://www.growbiointensive.org

General Resources
http://www.foodsecurity.org/cfa_home.html