SUSTAINABLE AGRICULTURE IN THE WILLAMETTE VALLEY

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March 2009

Conceptual Premise

The world currently faces unprecedented challenges due to long-term resource mismanagement and environmental degradation. This is particularly evident in the realm of agriculture where monoculture and industrial farming techniques have proven to be unsustainable. Topsoil loss, water shortages, and petrochemical dependency are stressing global grain production. Food security has progressed from a Third World concern to the forefront of First World issues. Oregon's Willamette Valley makes a useful case-study for both detailing the existing problem and applying the Progressive Utilization Theory as a possible solution.

Part I: Background

Fossil fuel-based agriculture and its global food system is a literal and figurative dinosaur. Over the last fifty years our methods of growing and distributing food have become more and more dependent on hydrocarbon products. Soil nitrogen levels are maintained by fertilizers made from hydrocarbon gases. Pests are fought with petroleum-based pesticides. Weeds are eliminated by petroleum-based herbicides. Fields are cultivated and harvested by machinery powered by petroleum-based fuels. Food products are transported by trucks or trains or airplanes powered by fossil fuels or their derivatives. Foods are processed with machines run by electricity generated by fossil fuels. Foods are packages in plastics made from petrochemical products. We cook with fossil fuels. From field to distributor to store to kitchen cabinet to stove, our entire food system flows upon a stream of petroleum and fossil fuel derivatives. This system has evolved and grown through a period when petroleum and natural gas were irrationally cheap. This is no longer the case.

Peak Oil: Oil production is reaching a maximum. This means the cost of all petroleum products are on the rise and will continue to rise for the foreseeable future. This trend has already made a significant impact on the agriculture industry with climbing prices for chemical fertilizers, herbicides, pesticides, farm machinery fuel, and product transportation. The net result is that foods of all kind are getting more expense. The entire food system must be remodeled to diminish petroleum inputs as much as possible.

Climate Change: The unknown potentials of climate change make all planning for the future extremely difficult. Extreme weather events, diminished snowpack, seasonal rainfall pattern changes, water shortages in general, and localized population increases or decreases due to large scale migration must be part of any long-term regional agricultural strategies.

Environmental Degradation: Humans have overworked the planet. Along with concerns for resource depletion and the effects of green house gases, the earth suffers from all grades of general and specific environmental degradation. Excessive aquifer pumping, soil loss, toxins in the water systems and the living biota, accelerated species loss, air pollution, the continuing trade off of cropland and forests for urban expansion, roads, or housing, all of these things and a litany of others cut into the vitality of life on the planet and the overall health of the land and living community it supports.

Globalization: Globalization, facilitated by cheap oil, has turned agriculture inside out. Over the last twenty-five years, the globalization of the market place has expanded trade with a rich and diverse new array of products and product sources; however, it has been at the cost of regional economic balance, especially at the local level and especially for local food systems. Regional agriculture has turned to monoculture for the targeting of specific global markets, diminishing diversity in what they produce for local markets and lending to the deterioration of regional food system infrastructure. Communities are actually losing the ability to feed themselves from local sources by relying too heavily on distance markets for their food.

Labor: Labor costs play a critical role in the economic gradient that has enabled the globalized food system. Farm labor wages are radically lower in many foreign countries than they are in the United States. This labor differential offsets freight costs and creates the situation where food products grown many thousands of miles away are cheaper than products grown at home. As fuel prices rise, freight costs are likely to offset these kinds of labor advantages.

Part II: The Willamette Valley

Bioregional Setting

For the purposes of this study, the bioregion under consideration will be defined as the Willamette River watershed or the Willamette Valley.

This bioregion is one of the most bountiful in the Untied States. The Willamette Valley is a hundred mile long, two-million acre stretch of prime farmland bordered by a dense, eco-rich coniferous forest. The climate is mild; wet in the winter, dry in the summer. It is excellent for raising livestock and farming, with soil particularly suited for a wide variety of grasses and legumes. There is tremendous flexibility in what can be grown and the way that the various field crops can be rotated for the health of the land. With the potential to grow more than two hundred different food crops and being home to a variety of fish and other wildlife, the Willamette River basin is essentially a garden valley.

Historical Agricultural Picture

In the 1950s, 60s, and 70s, Willamette Valley agriculture produced a wide array of grains, fruits, and vegetables. At times wheat represented almost a third of what was harvested. Barley, oats, snap peas, and sweet corn were also significant crops. Tomatoes, broccoli, cauliflower, carrots, potatoes, onions, cucumbers, peaches, raspberries, strawberries, hazelnuts, and squash fill out the mix. Prior to 1980, Willamette Valley farmers were providing more than half of what the valley residents were eating. Though there were consumer items which did not grow in the valley and the population was about half of what it is today, the region did have the agricultural capacity and food system infrastructure to feed itself.

Current Agricultural Picture

Over the last twenty-five years, the dynamics of the global market place have centralized food distribution into large storage, processing, and transport conglomerates while delocalizing regional food systems throughout the world—to the extent that nearly everything Americans eat comes from someplace else—often from over fifteen hundred miles away. The Willamette Valley has not been immune to this dynamic and makes a good study for the effects of globalization on agriculture.

The graph labeled "Willamette Valley Crop Trends 1" tracks all significant crops grown in the Willamette Valley by acreage over the last thirty years. On one hand this graph shows the incredible diversity of crops that can be grown in the Willamette Valley and the quantity that they, at times, have been grown. On the other hand, it also very clearly reveals the effect of the global market on Oregon agriculture. Beginning about 1983, as wheat prices eased off record highs, Willamette Valley farmers began a steady trade-off of wheat acreage for ornamental grasses, that is grass grown to produce grass seed which is then shipped all over the world for suburban lawns and golf courses. Grass seed is now the valley's most important cash crop. Sixty percent of all the acreage harvested in the Willamette Valley in 2006 was for grass seed. That was over 500,000 acres. At the same time, less than 30,000 acres of wheat were harvested in the valley, down from a 1982 high of 270,000 acres.

In other words, high-grade Oregon cropland is being used primarily to grow a non-edible luxury item instead of food. The graph labeled "Willamette Valley Crop Trends 2" clarifies this by mapping all food crop acreage, not including silage for livestock feed, against grass seed acreage. The divergence is hard to miss. Globalization has enabled specialized and long distant markets while at the same time diminishing food crop diversity at home. The net effect is that the Willamette Valley populace is now eating less than five percent locally grown food.

At the ground level, the use of petrochemicals to enhance the productivity of all variety of foods and grass seed crops is not sustainable. It has been thoroughly documented that the long term use of petrochemical fertilizers wears out the soil. After a while, the soil is essentially dead, devoid of bacteria and microorganisms. The soil becomes little more than a medium for washing through chemical fertilizers. Even in a region as fertile as the Willamette Valley, this kind of agriculture can not endure and is essentially a dead end.

In addition to petrochemical fertilizers, other chemicals are used as pesticides and herbicides to protect crops from pests and weeds. Farming with these kinds of chemical inputs can be tentatively successful, but what is produced is tainted by chemical residues. Also excess chemicals are washed away by rain or irrigation and enter the groundwater systems and eventually the entire watershed. High levels of agricultural toxins have been found in Willamette Valley ground water and must be consider a health issue—again pointing to a dead end.

<u>Other Food System Factors</u>

Because the Willamette Valley is now receiving ninety-five percent of its food from outside the bioregion and because much of it is already packaged, grain millers, food processors, storage

capacity, and local farm produce distribution hubs have all but disappeared from the region, meaning not only does the valley not grow its own food, but it also doesn't have the capacity to process, store, or distribute more than a small portion of what the populace consumes.

A related problem is that local farmers markets exist only in proportion to local food sales. Even including purchases made by restaurants, institutional cafeterias, and grocery stores, the bioregion buys no more than five percent of its food from local growers. About two percent of that comes from community supported agricultural coops or local farmers markets. Even should regional farmers increase food production there are not enough markets currently available for increased product sales.

Labor is a huge part of agriculture. Currently the average age of Willamette Valley farmers, weighted by acreage, is in excess of sixty years. There is no next generation of Oregon farmers ready to pick up the hoe. At the moment, almost all of the hired agricultural labor in Oregon comes from an increasing pool of Mexican immigrants—legal and otherwise. In the next ten years, these Mexican immigrants will be the most likely to replace aging Oregon farmers.

Part III: Relocalization

PROUT's Conceptual Tools

P. R. Sarkar's Progressive Utilization Theory offers several basic conceptual tools for the appraisal of any social/economic situation. In the case of agriculture, five of these tools stand out as particularly valid for evaluating Willamette Valley sustainability: decentralization, balance, diversity, maximum utilization, and cooperative business models. All apply readily to the current circumstances.

PROUT Blueprint for Sustainability

Decentralization is arguably foremost in PROUT economic principles. In the instance of Willamette Valley agriculture this seems to be a necessity. Grass seed production for the global market has unbalanced the farming of the valley in an obvious way and led to the deterioration of local food system infrastructure. Rebuilding a localized Willamette Valley food system makes tremendous sense at a time when peaking oil production will mean a steady increase of freight costs and higher prices for imported foods. Decentralization would emphasize using regional agricultural production to first fulfill local consumer needs; remaining surpluses are then available for export—and if possible with added value.

Petroleum concerns will be more than cost. Recent studies report that large grocery stores rarely hold more than three days worth of food on their shelves. As petroleum demands task supply, trucking depots will be reliant on tighter and tighter day to day, hour to hour fuel delivery and freight scheduling. Breaks or delays in fuel supplies will translate into increased unpredictability for long distance food delivery and, on occasion, empty grocery market shelves. *Decentralizing* food production and processing, that is, growing and processing more food close

to home, diminishes the need for long-distance product transportation and, in the face of petroleum depletion concerns, creates a more reliable food system.

Trading Willamette Valley grass seed production for food production makes sense for a number of reasons beyond the clear concerns of oil prices and food security. In terms of long-term sustainability and crop management, *balance* and *diversity* in any economic or environmental system lends to its stability. Right now grass seed acreage dominates cropland usage by a large measure. Though grass seed has been a profitable crop for Oregon farmers for the last twenty years, changing geo-economic circumstances will speak to a reduction in grass seed acreage. Not only is grass seed a non-edible luxury item, its unbalanced presence in the Willamette Valley is hazardous to long-term regional economic durability. It is only prudent to reduce grass seed acreage in favor of a wide variety of food crops. Production of grains, legumes, and the complete array of vegetables that are suited for the soils and climate should be prompted in the valley.

With decentralization, diversity, balance, and long-term sustainability as guiding principles, and peak oil and climate concerns for transitional food security as a backdrop, the concept of *maximum utilization* applies across the spectrum of agricultural systems by targeting efficiency, reduction of waste, stacking of farm usages, and full capacity composting and recycling.

Cropland utilization can be maximized by knowing the soil and its potentials. Using GIS mapping techniques, human held local knowledge, and historical records, the best locations, both by soil and micro-climes, can be determined for each variety of crop. This information can then be cross-referenced with each crop's nutritional value, available acreage, and human nutritional requirements to generate an overall balanced harvest, again with the intention of first fulfilling the populace's food needs, then using surplus for export or trade.

Maximum utilization also speaks to the full integration of each agricultural system. In terms of a farm, notions of permaculture and organic farming practices are apt. The farm should be considered a living entity. The mix of crops, livestock, natural processes, water usage, and the people that live on the farm become a stacked system of interrelated and complementary parts. This offers one clear way to address the need to move away from petroleum inputs both for fuel and soil enrichment. Excess crop biomass can be used to either create compost for building the soil, food for livestock, or sources of biofuels. Livestock manure likewise can be a compost additive, directly tilled into the soil, or another ingredient for the production of biofuels. The same is true of human wastes and refuse. An all encompassing set of recycling processes support enduring system sustainability. What is waste in one system becomes an input in another.

Stacking production usages is another form of maximum utilization. Most crops are grown with a primary use in mind, but it is important to consider secondary usages. Composting biomass waste is a secondary use, but other waste products uses can be for cottage or micro-industries—the weaving of biomass residues, leather products from rendered livestock, wool from sheep, etc. Everything should have more than one derivative product.

Coupled with this reassessment of what is grown and how it is grown, decentralization will require a steady rebuilding of the necessary food system infrastructure. As farms transition to more and more food crops and livestock, there will have to be more storage facilities, food processors, distributions hubs, and markets to enable the local food economy. In some cases, storage and processing can be part of the farm. In others, it will be necessary to address each lacking and integrate necessary facilities into the community as a whole. In the end, locally grown food consumption in the Willamette Valley must increase beyond the current five percent and support a step by step rebuilding of the entire food system with it. Twenty-five percent local consumption would be a minimum figure for any kind of local food security. Fifty percent would be a heroic goal.

With these kinds of changes, farm labor, particularly knowledgeable farmers, will become a high priority. As mentioned earlier, there is no next generation of Willamette Valley farmers and Oregon's largest base of experienced farmers is our current Mexican labor force. One way to address this is through PROUT's *cooperative business model.* Farm cooperatives or small farms acting in a cooperative manner are one answer. The sharing of machinery, large jobs, housing, agricultural knowledge, storage facilities, seed buying, produce marketing, produce transportation, and an integrated culture will all be necessary as the agricultural landscape and the region in general is relocalized.

On a cooperative farm, there would be plenty of apprentice positions. This would give younger people interested in farming the opportunity to learn on the job, while at the same time enabling new kinds of living situations. Cooperative farms could become models for rural eco-villages and more efficient ways to live and produce on the land.

In the big picture, the whole of Willamette Valley agriculture must be thought of as expansive exercise in permaculture—a permanent or sustainable culture. Each aspect of the region should affirm, support, or stack upon the others. The set of farming units, farms acting cooperatively, should be envisioned as an integrated system with a sense of maximum and balanced utilization for the entire valley.

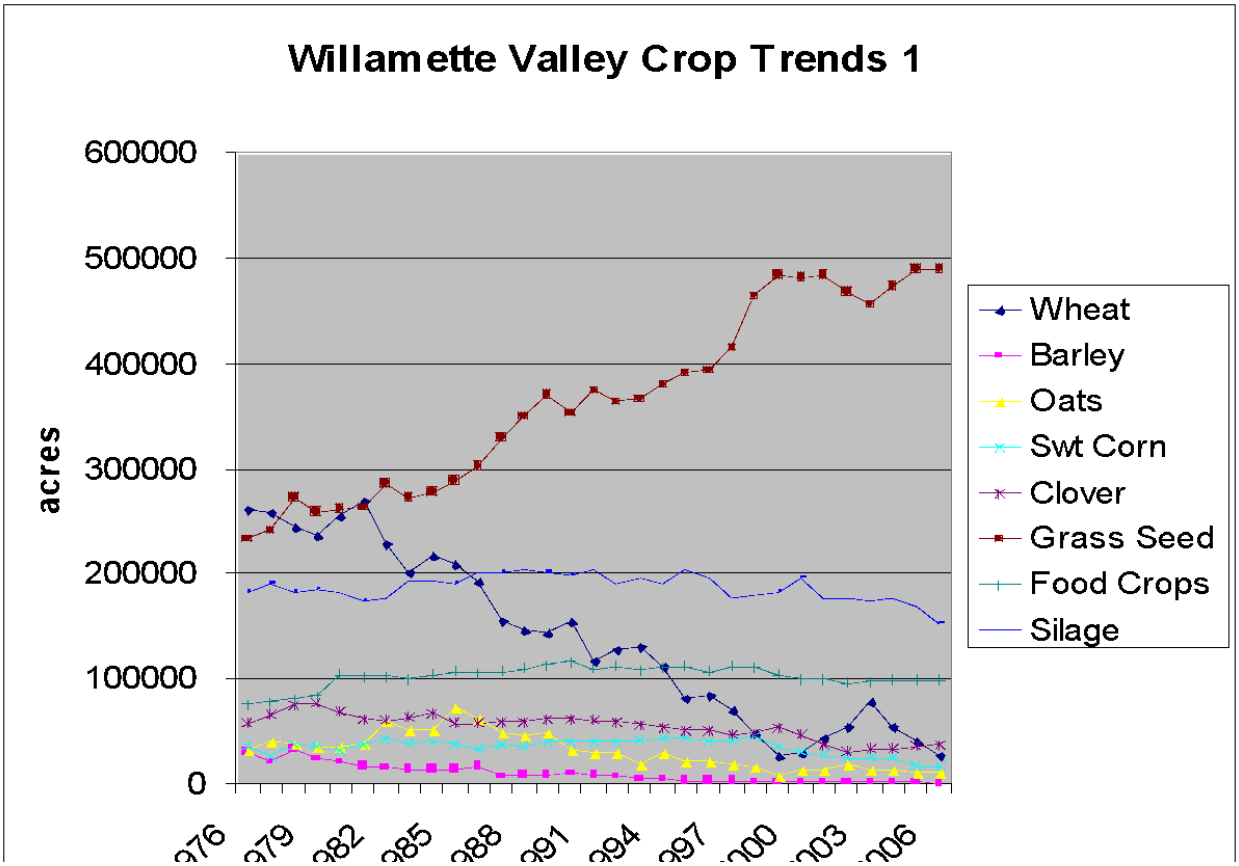
Summary

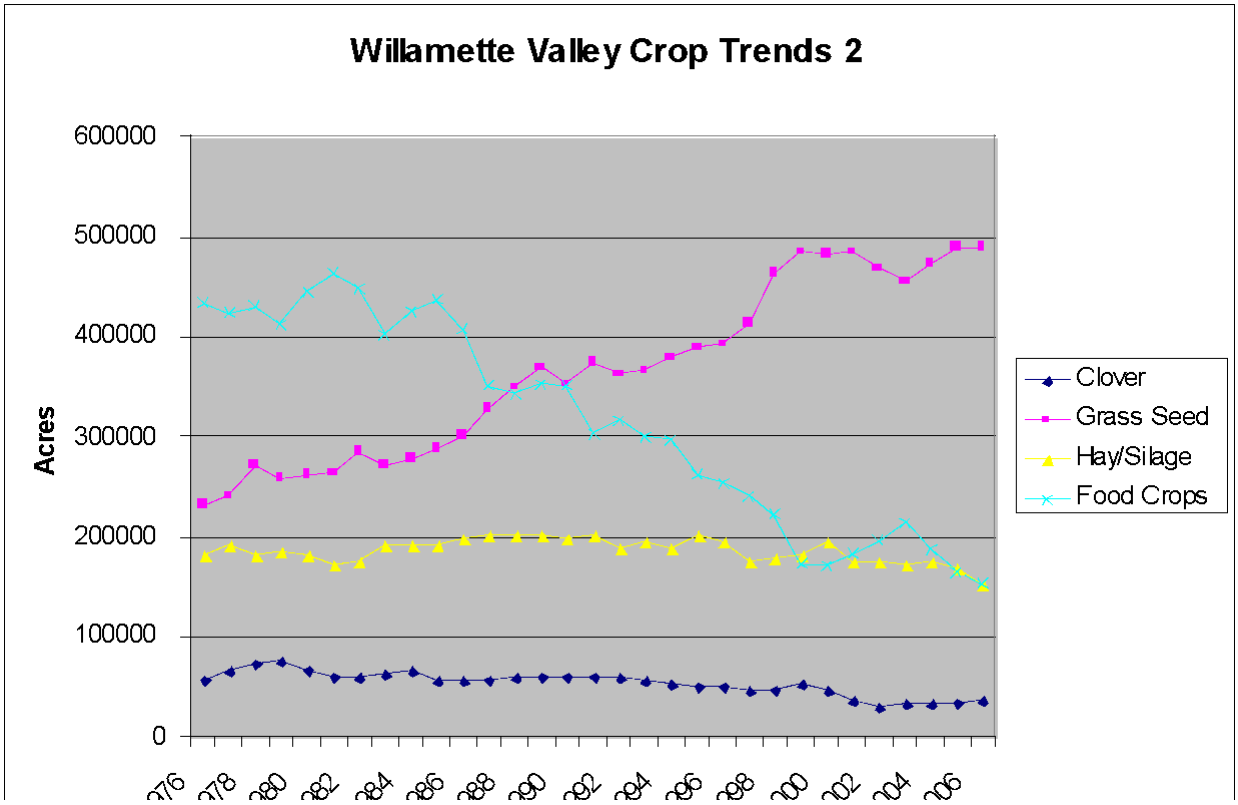
The current Willamette Valley food system is in disrepair. Increasing fossil fuel prices will only add pressure to a damaged and unsustainable system. PROUT's decentralized economic model is a definitive way to strengthen the local agricultural economy and cut petroleum and global market dependency. As part of the decentralization process, increasing the diversity of Willamette Valley food crops will add balance to the economy and optimize agricultural production. Increased local food production and consumption will inspire a steady rebuilding of local food system infrastructure. Add cooperative, whole system organic/permaculture farms and living situations and a complete sustainable regional agriculture is possible.

Notes

1. The transition from family-owned market-driven farms to cooperative consumption-based farms or systems of small farms operating cooperatively may represent a considerable cultural hurdle in the Willamette Valley, but it could occur organically as impending needs force the question. PROUT offers a four phase program for introducing farm cooperatives. Though this program was designed for the circumstances of social collapse, it could well be adapted to purposeful transition as a means of avoiding collapse, starting will converting failing market-driven farms to cooperatives and gradually incorporating other farms as elderly farm families need assistance or move on. The transition could then gain momentum through the incentive of success. New pieces of cropland could be converted to cooperative systems as the situation required.

2. A long-term drought in Australia, the push to grow corn for ethanol, a growing middle class in Asia, and other lesser factors have turned the grain market upside down in the last year. The price of wheat jumped from a rather predictable $3.50 a bushel to a very volatile $12 to $20 a bushel over this last winter. This had an immediate impact on agriculture in the Willamette Valley. Wheat acreage climbed from 30,000 to 125,000.




Willamette Valley Crop Trends 2
Acres
600000
500000
400000
300000
200000
100000
0
76
78
80
82
84
86
88
90
92
94
96
98
00
02
04
06
Clover
Grass Seed
Hay/Silage
Food Crops