Minimum Parcel Size for Viable Adaptive Farms in Umatilla County: An Economic Analysis

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"With intelligence and persistence, it is possible to make money from a small farm." Bubl & Stephenson 2001

Introduction

What is the minimum number of acres necessary for a farm to succeed over time? Embedded within this question are many other questions and more political agendas than we can imagine. Still, it is an important question for current farmers, potential farmers, the prosperity of many rural communities and all Oregonians. The answer to this question can help people as they study the likelihood that a small farm could provide reliable income for their families. In terms of existing land use regulations, the answer may be useful as Umatilla County tries to gain authority from the State of Oregon to "go below" the current parcel size requirements for farms in certain circumstances. Oregon Revised Statute 215.780 (Oregon Revised Statutes 2007) and Oregon Administrative Rule 660-33-100 (Oregon Administrative Rules 2009) set criteria for parcel sizes of farms within Exclusive Farm Use zones – 80 acres for land not designated as rangeland and 160 acres for rangeland. Umatilla County currently uses 160 acres for the minimum parcel size for both types of land. A county can adopt smaller minimum sizes for parcels with sufficient information about the current agricultural enterprises and to the extent that smaller parcel sizes "…maintain this commercial agricultural enterprise (Ibid.)." This report provides a portion of the information necessary to consider whether or not a "go below" request can be supported by the economic feasibility of farms in the 10-40 acre range and how those sizes of operations might affect the agricultural industry and economic vitality of Umatilla County.

For many years, farm size was determined by the quality of the soil, amount of rainfall and the number of people able to work the land. Scientific research, technological innovations and competition that eventually extended across the globe changed those constraints and the agricultural enterprise. Even if a person or family wanted to farm a modest number of acres, the discoveries and improvements in farming practices continually reduced the cost per unit of output for undifferentiated products. In mainstream markets, agribusiness could purchase the lowest priced agricultural commodities without worrying about differences in the quality of the commodities they purchased.

Since there are lots of farmers and farming is very competitive with no institutional barriers to entry into the farming business, as the costs of producing commodities declined farmers were offered lower prices for their crops. They had to lower their prices to keep up with their competition and sell their crops.

As farmers' income per acre declined, they needed to farm more acres to survive. This was feasible because of rapid improvements in agricultural practices and equipment. On side effect of these changes was a rapid decline in the labor required per unit of output declined. The U.S. went from 39 percent of the population farming in 1900 to 1 percent farming in 2005 and the rural share of population declined from 60 percent in 1900 to 21 percent in 2005 (USDA Amber Waves 2005).

In some counties the percentage of farmers is much higher and certainly a few farmers can support a number of jobs in the local community. Even the remaining farmers have found it progressively more difficult to support themselves on the farm and have come to rely more and more on off-farm income. From national statistics, off-farm income provides all the income and more to cover farm losses for farms with less than $10,000 in sales, the majority of income for farms with sales greater than $10,000 and less than $250,000 and 25% of the income for farms with sales greater than $250,000. For all sizes of farms, off-farm income is very important and valuable. "Accordingly, diversification in earnings to include off-farm earnings by the operator and spouse as well as a diversification in agricultural production, were characteristic of those households that had income shocks but still managed to meet basic needs (Morehart et.al.2004)."

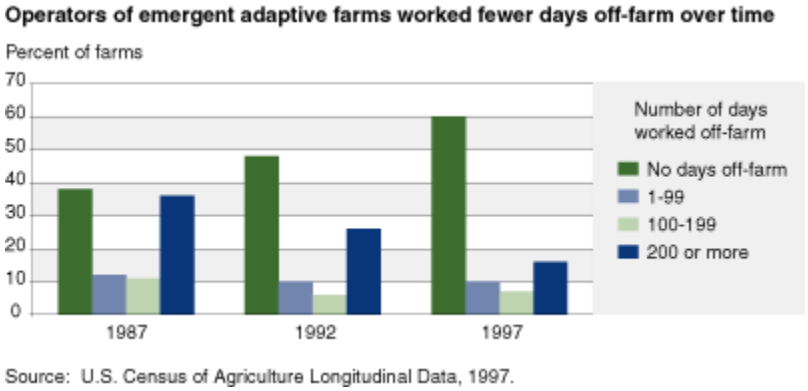
However, certain types of production enterprises are providing opportunities that directly conflict with the trends towards larger farms, smaller returns per acre and increasing dependence on off-farm income. Technological improvements have increased the ability of farmers to scale inputs more precisely to their operations and choose from a broader set of inputs. Communications systems have dramatically improved our ability to tell people about the differences between similar agricultural goods, to market goods and increase the consumers' knowledge of agricultural goods. Consumers can, in-person or electronically, meet the farmers who are producing their food. Consumers' preferences for locally grown or processed food are increasing and people are beginning to describe themselves as "locavores".

When agricultural products are differentiated in these ways, the farmers can regain some ability to set prices and thereby increase their income both overall and per unit of land. This is especially true when the farmers add value to their products by processing, marketing and/or distributing the agricultural products themselves. When they add value they can often receive retail rather than wholesale prices.

In many cases, modest and small size farms can take better advantage of these opportunities than larger farms that produce much more and then must rely on other businesses to market and distribute their products to distant consumers. Smaller farms can be more vertically integrated and capture the profits from each level of marketing, processing and even distributing their products. Technological improvements have increased small farmers ability to find just the right size of equipment for the number of acres they are farming (e.g. drip irrigation).

Research is emerging that supports the economic feasibility of small farms. These emergent adaptive farms tend to be more labor intensive and may produce a wider range of crops than conventional farms. Adaptive farmers tend to increase the time they spend working on the farm reversing the trend of farmers spending less time working on the farm. See Figure 1. from the Newton article.

Figure 1. Adaptive Farmers' Worksite by Days, 1987, 1992, and 1997



Source: U.S. Census of Agriculture Longitudinal Data, 1997.

In the past, larger farmers and agricultural professionals have frequently used dismissive terms such as "hobby farm" or "lifestyle farm" to describe smaller farms. Research and personal visits to adaptive farms indicate, however that the vast majority of these farmers are quite serious about achieving a reasonable return on their investments of time and money.

Thus being big or getting bigger are not the sole pathways to farming success. In fact, maintaining a minimum acreage requirement for the development of the crops and facilities on agricultural land can limit the diversity of viable agricultural enterprises in terms of what is grown, where it is grown and how it is grown. To the extent that diversity within any industry allows portions of that industry to dodge or more quickly adjust to economic shocks, minimum acreage requirements can limit the economic resilience of the agricultural industry and the prosperity of rural counties and communities.

Approach

We address the question of parcel size for farms by:

1) Profiling current agricultural production in Umatilla County.

2) Determining the most likely types of agricultural production that could take place on the 40, 20, or 10 acre parcel types as specified in each of the three areas while retaining the commercial agricultural use of those parcels.

3) Estimating the financial feasibility and economic effects of each type of production to Umatilla County. These estimates are in total sales or output. The income portion of the sales, less outside inputs, is typically 40-50% of the total sales.

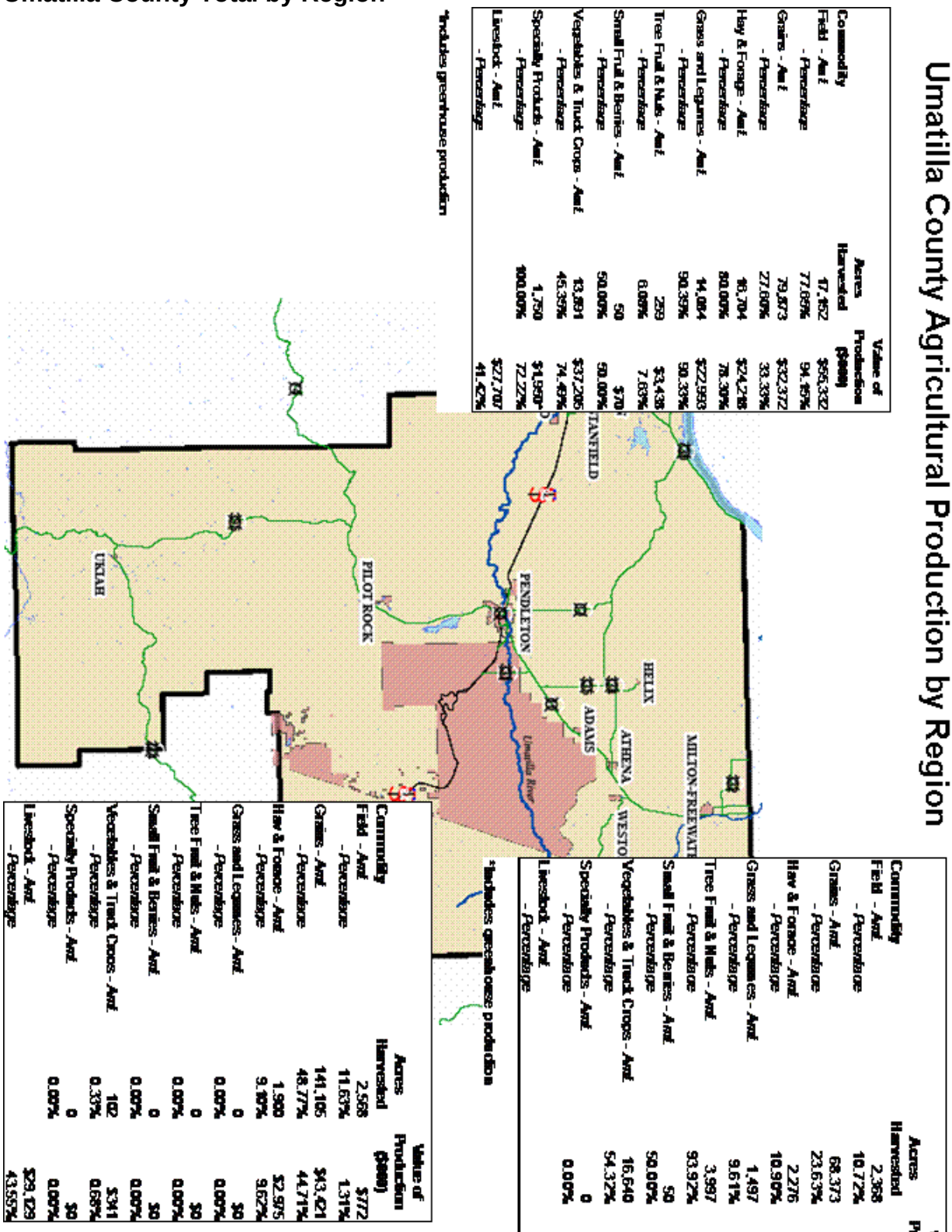
4) Summarizing the findings in a final report with an accompanying PowerPoint presentation.

Completing these tasks provides an idea of the current structure of the agricultural industry in Umatilla County, how that structure might change if more adaptive farms were created either with land that is now in agricultural production or land that could be converted to agricultural production, and the net economic effects, both at the producer and community levels, of an increase in adaptive farms.

Profile of Agricultural Production in Umatilla County

The three growing regions that we study in the County are shown in Figure 2. - working clockwise around the map from upper left; 1) Umatilla/Hermiston, 2) Milton-Freewater, and 3) Pilot Rock/Pendleton. Figure 2. provides a summary of the major crops grown in the three regions with the dollar sales, acres harvested, and the percentage each crop is of the total acres harvested and sales of that crop in Umatilla County. Figure 2. provides a general summary of what is grown in each region. In Appendix A, B, and C. maps are included for each region that give a more detailed picture of the parcel sizes in each region.

Figure 2. Umatilla County Agricultural Sales, Acres and Percentage of Umatilla County Total by Region



Umatilla County, established in 1862, has an area of 3,231 square miles (Umatilla County History 2009) and approximately 2,057,767 acres. Seventy percent of the land or 1,447,321 acres is divided among 1,658 farms (2007 Census of Agriculture). There are 804,065 acres of total cropland (Ibid.) with 357,529 (OAIN 2009) acres harvested and the products sold in 2008. The rest of the land was left fallow, grazed, or enrolled in the Conservation Reserve Program. In 2008, Umatilla County at $378,961,000 had the second highest agricultural sales among the 36 Oregon counties, behind Marion County (Ibid.).

As can be seen in Figure 2. Umatilla/Hermiston and Milton-Freewater primarily produce irrigated agricultural crops. Umatilla/Hermiston produces more than ninety percent of the Field Crops (potatoes, mint, etc.) and Grasses and Legumes in the County. Milton-Freewater produces more than ninety percent of the Tree Fruit and Nuts in the County. Pilot Rock/Pendleton has the highest sales of Grains (44.71%) and Livestock (43.55%) in the County.

Figures 3, 4, and 5. note the dollar amounts and graphically show the proportion of the total regional production each crop represents. The colors for each crop are the same among the three charts, which allows the types of production in each region to be compared with the other regions. These are the current structures of agricultural production in each region. As we shall see in the next section of this report, there are opportunities to modify the regional structures with other crops grown on small farms that can increase the diversity of crops in each region and possibly increase the region's economic resilience.

Figure 3. Umatilla/Hermiston Agricultural Production 2008 (*$000*)

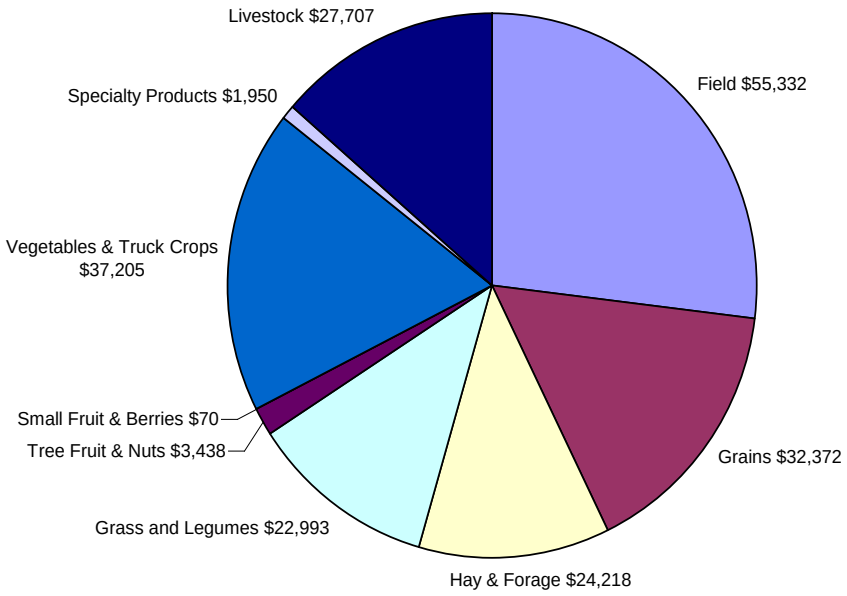


Figure 4. Milton-Freewater Agricultural Production 2008 (*$000*)

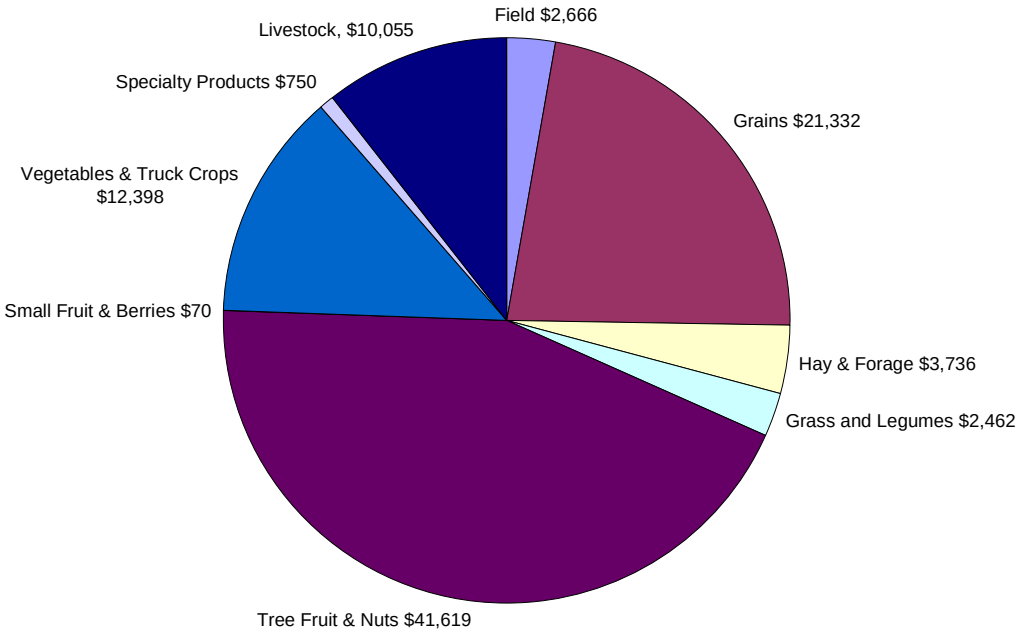
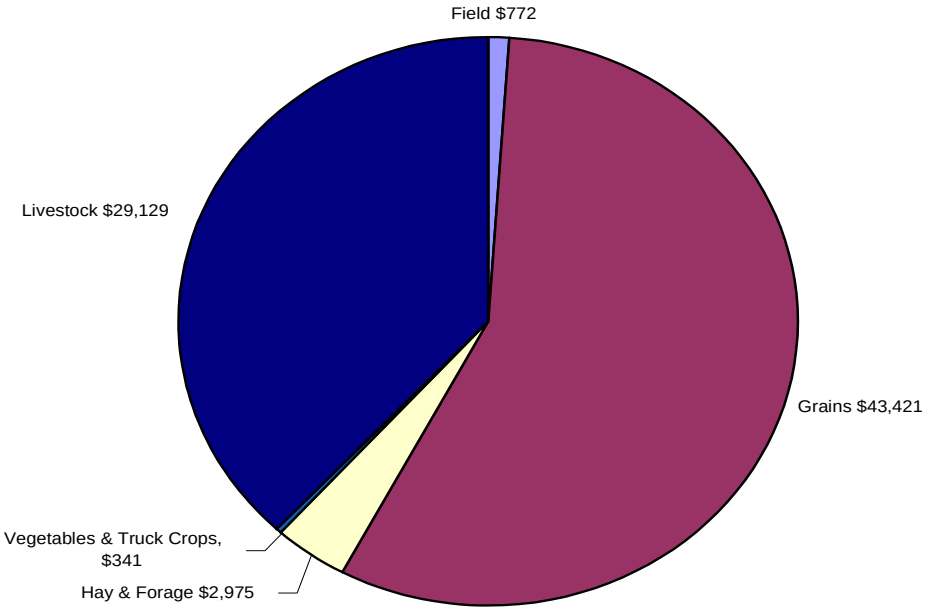


Figure 5. Pilot Rock/Pendleton Agricultural Production 2008 (*$000*)



Small Farm Crops and Economic Feasibility

This section discusses the types of small farms that could be *successful over time* in each region. Determining what will be *successful over time* is a challenging task. There are a number of metrics used to define a farm. They range from the USDA's definition of a farm as an operation that generates or would normally generate $1,000 of annual sales to the Oregon Department of Land Conservation and Development's criteria for a dwelling on farm land of $80,000 annual sales for high-value land and $40,000 annual sales for land not identified as high value. The USDA's definition sets the limit so low and that few believe the farms with only a few thousand dollars of sales should be considered farms. Oregon's land use definitions based on gross sales can be quite poor predictors of whether or not the farmer earns any net income after costs are subtracted and also provide a questionable definition of a farm.

Economists like to use the idea of opportunity cost to describe how much one is giving-up by choosing to do one thing over his/her next best alternative. If a person or family is considering starting a farm or remaining in farming, the farm enterprises need to be economically viable. Revenues need to exceed costs leaving a net stream of revenues that are larger than the next best use of the farmer's time and other resources. The purpose of this study is to search out and describe examples of crops when grown on 10-40 acres that could be economically viable for a family or household.

We used one half of the Umatilla Median Household Income, which is $40,773, supplemented by off-farm income for the other half as the minimum amount that the farm enterprises would need to generate in net revenues to be economically feasible. To pass this test each small farm needs revenues net of costs, except for the owner's labor, that exceed $20,387 per year. This would be a significant contribution to household income. Notice this is not a gross annual revenue criteria, as are those above, it is a net income test.

Returns per acre vary a great deal depending on farm attributes (e.g. water availability, soil type, access to markets, etc.) and the knowledge and experience of the operator(s). In Table 1. typical returns per acre are summarized for some common crops or livestock that can be grown or raised in Oregon (Bubl and Stephson 2001) and in many cases raised in Umatilla County. Note that these returns per acre do not, except in the case of nursery structures, include equipment costs or take into consideration uncertainty. They are calculated using wholesale output prices thus no returns are credited for any value-added processing, marketing or distribution.

Table 1. – Crop production costs and returns per acre

Table 1.—Crop production costs and returns per acre.

	Establishment Costs	Annual Costs	Gross Returns/Year
Nursery stock**	$3,000–20,000	$3,000–10,000	$10,000–30,000+
Flower bulbs	—	2,000–9,000	4,000–14,000
Fresh vegetables	—	1,500–5,000	2,000–7,000
Garlic (fresh)	—	1,800–4,500	3,500–9,000
Onions	—	2,500–3,000	1,600–5,000
Apples**	3,000–7,000	1,500–3,000	3,000–7,000
Wine grapes**	7,000	1,200–2,300	1,800–4,000
Strawberries (3-year life)	1,500–2,500	2,000–3,500	3,000–6,000
Raspberries (8-year life)*	3,000	1,700–2,800	2,000–6,000
Blueberries**	5,500	2,000–4,000	2,000–6,000
Christmas trees***	1,000–1,600	600–800	9,000–16,000
Wheat	—	200–300	200–400
Grass hay	—	70–150	100–180
Cow/calf	—	80–100	70–200
Sheep	—	100–500	275–650

*Might be 1–3 years before return.
**No return for 3–4 years after establishment. Costs vary with harvest requirements.
***No return until 6–8 years after planting. Most annual costs are concentrated in the last 3 years before harvest. "Annual costs" is an average per year over the production cycle. "Gross returns/year" is for the year of harvest.

Note: These figures represent a range of returns under normal conditions for commercial-quality crops. **They do not include expenditures for equipment except structures for nursery production.** They also don't include weather-related crop loss or extreme price swings. These values are based on sales via wholesale markets and do not represent the higher gross receipts from direct marketing.

In the rest of this section, we return to some of the crops in Table 1. and discuss five examples of the types of farms that can provide the operators at least half of a Umatilla Median Household Income or $20,387 annually. To identify examples for each region, we used enterprise budgets from Oregon State University's Oregon Agricultural Information Network and enterprise budgets from other states when they were not available from Oregon. An 'enterprise budget estimates the typical costs and returns of producing an agricultural crop given a set of assumptions about management practices and costs (Weber et. al. 2004).' The budgets are specific about their assumptions, yet they need to be used with care because they describe what could, not what will happen financially even if all the assumptions are satisfied.

Two other features, which are mentioned in the individual sections, that make it difficult to directly apply information from these enterprise budgets to adaptive farms is that they are calculated on large operations, which benefit from significant economies of scale, and they typically use wholesale prices rather than prices that reflect the adaptive farmers value added efforts. So, particularly the overhead costs are underestimated and the revenues are probably underestimated, as well. These variables pull the analysis in opposite directions and can reasonably be expected to offset one another.

We also visited with agricultural scientists, OSU Small Farms Extension agents, farmers, and a farmers' market manager to ground-truth the extent to which the enterprise budgets were accurate for Umatilla County and/or discuss points that were not covered in the enterprise budgets. These visits were very valuable because while the enterprise budgets were often expressed on a per acre basis; they were built on information from acreages that typically were 100 acres or more.

Umatilla/Hermiston

In the last 20 years (LocalHarvest 2009), the growth of Farmers' Markets and Community Supported Agriculture (CSA) have encouraged the return of the few acre farm that sells produce to markets that are in close proximity to the farm and to local markets. We begin our discussion in the Umatilla/Hermiston region with an adaptive farm that grows vegetables.

Throughout this section we compare the different crops that could be grown by adaptive farms to the largest crop in Umatilla County, which is wheat. The comparisons are not close on a per acre basis. The comparisons are meant to give a sense of the high value per acre that can be achieved on adaptive farms. They are not meant to diminish wheat's contribution to the County which is critical to the economy. The total effects of the wheat harvest in Umatilla County are approximately $133 million. It is important that as a County diversifies its agricultural production that it protects its primary or core production. We discuss the importance of compatibility between crops and large and small farms later in the analysis.

Vegetables

Many of the adaptive farms in the region are growing a variety of vegetable crops and selling them directly to customers at farmers' markets, roadside stands and/ or through a CSA enterprise. Since enterprise budgets focus on individual crops, and often are formulated based on production practices from larger farming operations, they do not accurately reflect this type of adaptive farm. However, there have been surveys of CSA's that summarize the net return per acre from CSAs. This net return per acre is revenue minus operating and capital expenses without opportunity costs for the operators and land, which is consistent with income information from the U.S. Census of Agriculture (Tegtmeier and Duffy 2005). The median net return per acre for these

adaptive produce farms was approximately $2,000. If there is sufficient local demand through CSAs, farmers' markets, or institutional purchases, a ten acre vegetable farm could be capable of generating net revenue equal to half the median income in Umatilla County. To determine the per acre economic effects to the community or county of an adaptive vegetable farm, we also need to include the variable and capital costs. Using the individual enterprise budgets for carrots, broccoli, and lettuce we determined an average per acre cost for vegetables of $2,670. Sales or gross revenue per acre would be $4,670 ($2,670+$2,000).

The community economic effects can be estimated using an IM*pact*PLAN*ning* input-output model, which has been developed and refined over the last 30 years. This IMPLAN software, which is now proprietary, can provide a good sense of the magnitude of the economic effects and it is transparent or flexible enough to be modified and run by its users. The economic effects per acre of $4,670 in vegetable sales plus the respending of by suppliers and service industry businesses like grocery stores totaling $1,930 in Umatilla County related to the vegetable production or income earned by workers, would be lead to approximately $6,600 in total community economic activity resulting from one acre of vegetable production. This compares to $325 gross income or 57bu./acre * $5.70(Oregon Wheat Growers League 2009) of direct effects and when $125 of respending is added, $450 total economic effects per acre of wheat.

Specialty Products

Examples of crops in the specialty products category include nursery crops, bulbs, and Christmas Trees. This wide variety of crops can be more risky in terms of crop failure and market disruptions (e.g. downturn in the construction industry, which reduces demand for nursery products). At the same time specialty products can be more responsive to efforts to market the products directly or indirectly (e.g. wedding receptions within the area where flowers are being grown).

Carrot seeds can be used as a "conservative" representative of the specialty products category. "Conservative" because we would expect an adaptive seed producer would usually grow a variety of seeds offering the consumer a type of one-stop shopping for seeds. The carrot seed enterprise budget was the closest of the available enterprise budgets to representing an adaptive farming operation for specialty crops. In our example, carrot seeds are relatively labor intensive to grow and utilize drip irrigation to conserve water.

Anticipated income (gross revenue) was estimated at $3,164.80 per acre in this 2004 OSU OAIN enterprise budget for carrot seeds. When variable and fixed costs are deducted, net income (net revenue) is $1,283.35. Twenty acres of carrot seed could generate $63,296 in gross revenue and $25,667 in net revenue.

Although we do not have a specific enterprise budget for carrot seed marketed on the internet and sold at retail prices, carrot seed is marketed on the internet. If a variety of seeds were grown, they were packaged on-farm and marketed on the internet, we would expect the net revenue per acre could increase to at least $2,500 dollars and the acreage required to reach half of the Umatilla County median income could be reduced to ten acres.

Peonies are another example of a specialty crop and they are already grown in Umatilla County. A dated example of fresh-cut and dried flowers from North Dakota State University Extension Service, estimated net returns at $4,000 for plots smaller than an acre (Sell and Aakre 1993). Although the North Dakota bulletin, warned potential growers to start small and increase scale with the market (Ibid.), which is variable for all specialty crops.

The community economic effects from the basic gross revenue of an acre of carrot seed production at $3,164 is $4,799 or $95,980 from twenty acres. The total economic effects in Umatilla County from 20 acres of wheat are an estimated $9,000.

Milton-Freewater

The Walla Walla River Subbasin is an excellent area for tree fruit and grape production. In this section we provide an overview of sweet cherry and grape/wine production.

Sweet Cherries

In 2008, Clark Seavert, Jenny Freeborn and Lynn Long updated the OSU enterprise budget for fresh market sweet cherries. The budget was for 15 acres, however the 15 acres were projected to be part of a 100 total acre farm. So, the production on these 15 acres had the benefit of larger and more equipment than a farm that was just 15 acres. Here again the increase in choices in both new and used smaller equipment means that while the equipment costs are underestimated, the difference may not be all that much . Those higher costs can be offset by the more extensive marketing efforts that we would expect to see in the smaller operations. Table 2. shows the budget and indicates gross revenue of $11,900 per acre and net revenue of $2,083.48. These high revenues reflect the higher risk of crop loss in cherries from the splitting of ripe cherries after a rain. Technological advances have steadily reduced those risks.

Table 2. Enterprise Budget – Sweet Cherries

Full Production, Sweet Cherries, High Density, $/acre economic costs and returns							
GROSS INCOME			**Quantity**	**Unit**	**$/Unit**	**Total**	**Price/Lb**
Sweet Cherries			14,000	pounds	0.85	11,900.00	0.85
Total **gross** income						11,900.00	0.85
VARIABLE CASH COSTS	**Description**		**Labor**	**Machinery**	**Materials**	**Total**	**Cost/Lb**
Pruning trees	40.0	hours	$460.00	$0.00	$0.00	$460.00	$0.0329
Tree Removal & Tree Replacement	1.0	hours	24.50	20.44	21.00	65.94	0.0047
Shredding Brush	1.0	x/acre	13.40	26.43	0.00	39.83	0.0028
Fertilizer (broadcast applied)	2.0	appl.	6.38	10.53	68.00	84.92	0.0061
Fertilizer (foliar applied)	1.0	x/acre	0.00	0.00	100.00	100.00	0.0071
Herbicide strip maintenance (.30x)	2.0	appl.	10.21	16.61	16.67	43.49	0.0031
ATV herbicide maintenance (.30x)	1.0	appl.	3.57	1.29	8.33	13.20	0.0009
Disease Control	5.0	appl.	41.89	112.13	120.00	274.02	0.0196
Insecticides, ground applied	1.0	appl.	8.38	22.43	127.50	158.30	0.0113
Insecticides, aerial applied	5.0	appl.	0.00	0.00	67.50	67.50	0.0048
Growth Regulators	1.0	x/acre	0.00	0.00	38.00	38.00	0.0027
Bee Rental	2.0	hives	0.00	0.00	72.00	72.00	0.0051
Mowing & Flailing Orchard Floor	4.0	times	45.47	90.16	0.00	135.63	0.0097
Rodent Control	1.0	hours	7.43	2.68	20.00	30.10	0.0022
Irrigation	3.5	hours	40.25	10.00	0.00	50.25	0.0036
Ladders, Pruning, & Picking Equip.	1.0	x/acre	0.00	18.38	0.00	18.38	0.0013
Harvesting Costs	7.0	ton	3,569.00	140.58	0.00	3,709.58	0.2650
General Labor	6.0	hours					
Pickup, Truck & ATV	1.0	x/acre	0.00	106.16	0.00	106.16	0.0076
Housing Facilities	1.0	x/acre	0.00	0.00	33.02	33.02	0.0024
Miscellaneous and Overhead	1.0	x/acre	0.00	0.00	75.00	75.00	0.0054
Interest: Operating Capital	6.0	mons	0.00	0.00	118.48	118.48	0.0085
Total **variable** costs			4,230.49	577.82	885.50	5,693.80	0.4067
FIXED CASH COSTS					**Unit**	**Total**	**Cost/Lb**
Pickup, Truck & ATV Insurance					acre	20.57	0.0015
Water Assessment					acre	175.00	0.0125
Farm Foreman					acre	368.00	0.0263
Helicopter - Remove water					acre	60.00	0.0043
Property Insurance					acre	50.00	0.0036
Property Taxes					acre	60.00	0.0043
Total **cash** costs						733.57	0.0524
FIXED NON-CASH COSTS					**Unit**	**Total**	**Cost/Lb**
Machinery and Equip. Insurance, Depreciation & Interest					acre	322.60	0.0230
Pickup, Truck & ATV Depreciation & Interest					acre	58.51	0.0042
Housing Facilities					acre	91.67	0.0065
Land Interest Charge					acre	400.00	0.0286
Amortized Establishment Costs*					acre	2,516.37	0.1797
Total **non-cash** costs						3,389.15	0.2421
Total **fixed** costs						4,122.72	0.2945
Total of all costs per acre						**$9,816.52**	**$0.7012**
Net projected returns						**$2,083.48**	**$0.1488**

*Based on "Orchard Economics: The Costs and Returns of Establishing and Producing High-Density Sweet Cherries in Wa
EM 8802-E, Revised March 2008.

A ten acre orchard of sweet cherries can provide gross revenues of $119,000 and net revenues of $20,835. Just ten acres of sweet cherries could initiate approximately $173,969 total or $17,397 per acre of economic activity in the County from the gross revenue direct effects of $119,000.

Grapes/Winery

"Eastern Oregon has the ideal climate, soils and edaphics [resulting from or influenced by the soil rather than the climate (Merriam-Webster 2009)] for producing wines of superlative quality. These have become the hallmark of the unique terroir [A " terroir " is a group of vineyards (or even vines) from the same region, belonging to a specific appellation, and sharing the same type of soil, weather conditions, grapes and wine making savoir-faire, which contribute to give its specific personality to the wine (Terroir-France, French Wine Guide 2008)] that is symbolic of the Walla Walla Valley American Viticultural Area (AVA) which spans the border of eastern Oregon and Washington. This region's unique soil and climatic characteristics play a role in producing high quality grapes with complex color, flavor, and aroma volatiles: sandy loess, rocky soils, long day length in summer, hot days and cool nights during late summer and early fall, and low rain all throughout the growing season." (Julian et. al. 2009).
Although the climate is "ideal" for raising grapes the prices are too low for the average 10 acre vineyard to be expected to make a profit. Gross revenue per acre is projected at $7,000 and total costs are estimated at $10,505.28 for an anticipated loss of $3,505.28 (Ibid.). However a ten acre winery that is in full production can grow more than enough grapes to produce 2,000 cases of wine per year, which can generate a total net return, once the loss on the grapes is backed out, of $79,921.02(Fickle et. al. 2005) or $7,992 per acre.

As discussed earlier, we need to use the total output or gross revenue to determine the community impacts of a winery's expenditures for inputs as well as how the owners expend their net revenue. Table 3. shows the cash flow of the winery from year 1 to full production in year 10 to give the reader a sense of the different types of expenditures.

Table 3. Small Winery Cash Flow – Washington State University Extension

EXHIBIT C.1: Cash Flow Projection for the 2,000 Case Winery

CASH FLOW PROJECTIONS
2,000 Case Winery

Assumptions				
Tasting Room Price	$15	/Bottle	$180	/Case
Whsl. Price	$10	/Bottle	$120	/Case
% of Sales	75	% TR	25	% WS
Rate of Inflation	2	%		

Period	1	2	3	4	5	6	7	8	9	10
T.R. Price	$180	$184	$187	$191	$195	$199	$203	$207	$211	$215
Whsl. Price	$120	$122	$125	$127	$130	$132	$135	$138	$141	$143
REVENUE:										
Tasting Room Sales	$0	$165,240	$280,908	$286,526	$292,257	$298,102	$304,064	$310,145	$316,348	$322,675
Whsl Premium Sales	$0	$36,720	$62,424	$63,672	$64,946	$66,245	$67,570	$68,921	$70,300	$71,706
Total Revenue	$0	$201,960	$343,332	$350,199	$357,203	$364,347	$371,634	$379,066	$386,648	$394,381
EXPENSES:										
OPERATING COSTS										
Grapes	$32,959	$33,618	$34,291	$34,976	$35,676	$36,389	$37,117	$37,860	$38,617	$39,389
Cooperage	$0	$47,328	$48,275	$36,930	$37,669	$38,422	$39,190	$39,974	$40,774	$41,589
Packaging	$44,951	$45,850	$46,767	$47,703	$48,657	$49,630	$50,623	$51,635	$52,668	$53,721
Mobile Bottling	$0	$8,772	$8,947	$9,126	$9,309	$9,495	$9,685	$9,879	$10,076	$10,278
Excise Tax (Fed)	$0	$4,164	$6,274	$6,399	$6,527	$6,658	$6,791	$6,927	$7,065	$7,206
Excise Tax (State)	$0	$2,713	$4,428	$4,516	$4,607	$4,699	$4,793	$4,889	$4,987	$5,086
B & O Taxes	$0	$977	$1,662	$1,695	$1,729	$1,763	$1,799	$1,835	$1,871	$1,909
Wine Commission	$169	$173	$176	$179	$183	$187	$190	$194	$198	$202
Full-Time Labor	$32,000	$32,640	$33,293	$33,959	$34,638	$35,331	$36,037	$36,758	$37,493	$38,243
Part-Time Labor	$9,360	$9,547	$9,738	$9,933	$10,132	$10,334	$10,541	$10,752	$10,967	$11,186
Marketing	$0	$5,949	$9,914	$10,113	$10,315	$10,521	$10,732	$10,946	$11,165	$11,389
Utilities	$2,700	$2,754	$2,809	$2,865	$2,923	$2,981	$3,041	$3,101	$3,163	$3,227
Office Supplies	$740	$755	$770	$785	$801	$817	$833	$850	$867	$884
Miscellaneous	$2,060	$2,101	$2,143	$2,186	$2,230	$2,274	$2,320	$2,366	$2,414	$2,462
Total Operating Costs	$124,940	$197,341	$209,487	$201,367	$205,394	$209,502	$213,692	$217,966	$222,325	$226,771
FIXED COSTS										
Insurance	$2,300	$2,346	$2,393	$2,441	$2,490	$2,539	$2,590	$2,642	$2,695	$2,749
Maintenance	$1,000	$1,020	$1,040	$1,061	$1,082	$1,104	$1,126	$1,149	$1,172	$1,195
Property Tax	$7,095	$7,032	$6,756	$6,353	$6,077	$5,863	$6,053	$6,246	$6,451	$6,653
Depreciation	$28,064	$64,016	$79,949	$85,883	$82,161	$76,559	$72,944	$59,720	$45,993	$47,302
Interest Payments	$31,377	$28,059	$24,496	$20,670	$16,560	$12,147	$11,645	$11,110	$10,540	$9,934
Total Fixed Costs	$69,835	$102,473	$114,635	$116,408	$108,370	$98,212	$94,358	$80,867	$66,852	$67,833
Total Expenses	$194,775	$299,814	$324,122	$317,774	$313,764	$307,714	$308,050	$298,832	$289,176	$294,604
Earnings Before Taxes	($194,775)	($97,854)	$19,210	$32,425	$43,438	$56,632	$63,584	$80,234	$97,471	$99,776
Carryover Loss	$0	($194,775)	($292,629)	($273,419)	($240,994)	($197,556)	($140,924)	($77,340)	$0	$0
Taxable Income	($194,775)	($292,629)	($273,419)	($240,994)	($197,556)	($140,924)	($77,340)	$2,894	$97,471	$99,776
Income Tax	$0	$0	$0	$0	$0	$0	$0	$434	$21,390	$22,163
Gross Cash-Flow	($194,775)	($97,854)	$19,210	$32,425	$43,438	$56,632	$63,584	$79,800	$76,081	$77,614
+Depreciation	$28,064	$64,016	$79,949	$85,883	$82,161	$76,559	$72,944	$59,720	$45,993	$47,302
-Principal Payments	($44,991)	($48,308)	($51,872)	($55,698)	($59,807)	($7,728)	($8,231)	($8,765)	($9,335)	($9,942)
NET CASH-FLOW	($211,702)	($82,147)	$47,288	$62,609	$65,792	$125,463	$128,297	$130,754	$112,739	$114,974

As you read with your magnifying glass, total gross revenue or cash flow in year 10 is $394,381. The community economic activity in Umatilla County of those revenues is estimated at $534,751, which include the direct expenditures of $394,381, or $53,475 per acre. If a multi-county or statewide estimate was made, it would be larger because the leakages from those economic areas would be less.

Pilot Rock/Pendleton

Umatilla County's southern and eastern portions grow thousands of acres of grain and thousands of head of cattle. It is a rich agriculturally based region. Over the last few years some of the farmers and ranchers have branched out a bit and considered other options.

Blueberries

While blueberries are grown in the Hermiston/Umatilla region, they are not currently grown in the Pilot Rock/Pendleton region, the soils are adequate and with access to water blueberries could be profitably produced on 10-40 acre farms. The enterprise budget in Table 4. Indicates an estimated gross revenue per acre of $14,670 and net revenue of $4,241.81 (Eleveld et. al. 2005). Community economic effects per acre could reach $16,764.

For the last thirty years blueberry plantings have progressed at a fast pace. The acres harvested increased from 498 in 1978, to 1,300 in 1988, to 2,500 in 1998 and 4,777 in 2008. The increased supply has reduced prices statewide. However, plantings east of the Cascades have been very minimal. Blueberries grown in Umatilla County can mature before the Western Oregon blueberries and beat their western competition to market. There also appears to be additional demand u-pick berries in the area of Oregon and Washington.

Sticking with this report's focus on value added products that attain retail rather than wholesale prices, the enterprise budget in Table 4. assumes that the blueberries will be primarily harvested by hand. Hand harvesting relies on labor supply and/or a consistent demand for u-pick blueberries. Given the anticipated long term decline in prices before they stabilize, a potential grower would need to start small so he/she could avoid outpace the regional market and need to compete with the machine harvested berries. At the same time, this enterprise budget was completed for the Willamette Valley conditions. Umatilla County's longer growing season and better control of inputs, if the soil types are right (e.g. pH), may allow the producer to contend with market uncertainties.

Table 4. Enterprise Budget - Blueberries

Table 9.D Estimated costs and returns per acre
Blueberry Full Production (hand-harvested)
Full production years (hand-harvested), Oregon State University

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		dollars		dollars	
INCOME					
Blueberries Fresh	lb.	0.85	16,200.0000	13,770.00	
Blueberries Processed	lb.	0.50	1,800.0000	900.00	
TOTAL INCOME				14,670.00	
DIRECT EXPENSES					
Chemical Spray					
Bordeaux	appl.	6.80	4.0000	27.20	
Fungicide	appl.	3.90	4.0000	15.60	
Fungicide Type #2	appl.	7.90	1.0000	7.90	
Roundup® Appl.	appl.	4.80	1.0000	4.80	
Custom Charges					
Loader Rental #2	acre	700.00	0.3300	231.00	
Bird Control	acre	41.50	1.0000	41.50	
Picking Labor	lb.	0.40	16,200.0000	6,480.00	
Machine Harvest	lb.	0.10	1,800.0000	180.00	
Load and Ship	lb.	0.03	1,800.0000	54.00	
Supplies					
Beehives	hive	30.00	3.0000	90.00	
Irrigation Electrici	set	4.50	23.0000	103.50	
Tissue An. Lab	test	32.50	0.2000	6.50	
Buckets	bkt.	2.50	5.0000	12.50	
General Overhead	acre	20.00	1.0000	20.00	
Sawdust					
Sawdust	unit	40.00	3.6300	145.20	
Fertilizer					
Fertilizer(Sidedress)	ton	138.00	0.3750	51.75	
OPERATOR LABOR					
Tractors	hour	12.00	12.2585	147.10	
Pickup Truck	hour	12.00	8.3325	99.99	
Hand Labor					
Special Labor	hour	10.00	63.3000	633.00	
Overhead Irrigation	hour	10.00	3.0000	30.00	
DIESEL FUEL					
Tractors	gal.	1.10	17.1619	18.88	
GASOLINE					
Pickup Truck	gal.	1.40	16.6650	23.33	
REPAIR & MAINTENANCE					
Implements	acre	18.40	1.0000	18.40	
Tractors	acre	28.27	1.0000	28.27	
Pickup Truck	mile	0.12	250.0000	31.25	
Overhead Irrigation	acre	36.66	1.0000	36.67	
INTEREST ON OP. CAP.	acre	371.16	1.0000	371.16	
TOTAL DIRECT EXPENSES				8,909.50	
RETURNS ABOVE DIRECT EXPENSES				5,760.50	
FIXED EXPENSES					
Implements	acre	40.37	1.0000	40.37	
Tractors	acre	61.68	1.0000	61.68	
Pickup Truck	each	3,197.55	0.0250	79.94	
Overhead Irrigation	each	88.64	1.0000	88.65	
Trellis	each	56.41	1.0000	56.41	
Annual Rent	each	399.99	1.0000	400.00	
Am. Establishment	each	791.63	1.0000	791.64	
TOTAL FIXED EXPENSES				1,518.69	
TOTAL SPECIFIED EXPENSES				10,428.19	
RETURNS ABOVE TOTAL SPECIFIED EXPENSES				4,241.81	

The examples in this section illustrate how well-managed small farms in the 10-40 acre range can provide at least half of a median household income and usually more. Since the community total output effects are based on the gross revenue, the community effects per acre ranged from $4,699 to $53,475. These effects are significantly higher on a per acre basis than the estimated economic effects of an acre of wheat at $450. However there is more to the story.

The estimates that we have made in this section are just that estimates. They are calculations of what might happen for an average operation based on lots of assumptions. To paraphrase Garrison Keillor, no farm is average. Still, the enterprise budgets were created by scientists who had nothing to gain from tipping the data in one direction or the other and can provide at least a general sense of what may happen.

Small Adaptive Farm Compatibility with Larger Farms

Umatilla County produces one-third of Oregon's farm gate value of wheat, which well exceeds any other Oregon county (Oregon Wheat Growers League 2009). Special care needs to be taken when wheat is grown in close proximity especially to broadleaf plants due to the potential for drifting herbicide spray from the wheat farm to, in the case of this report, smaller adaptive farms. Also, every one of the examples above relies on irrigation. Even if drip irrigation is used, the water will come from a County with critical ground water concerns.

If conflicting practices jeopardized the wheat industry, it is unlikely that even a very robust adaptive farming sector could offset those losses. As a separate concern, the vertically integrated adaptive farms described in preceding sections would require a significant expansion of local markets. The need to develop markets combined with possible water constraints for adaptive farms warrants a cautious approach that protects the economic contributions from the wheat and other conventional agricultural industries in the County and at the same time encourages a vibrant adaptive farming industry.

In many cases, it seems financially feasible for wheat growers to use spraying techniques (pull-tank vs. aerial) and sprays with low volatility that will reduce the probability of damage from drift. Larger farms can also spray with consideration of the growing cycle of the adaptive crops to minimize the probability of damage from their spray drifting. At the same time, this will be imposing a burden on existing farms that may have been contributing to the local economy for over a century. There are examples of spray drifting for miles so even with very careful practices by larger farms that are adjacent to adaptive farms additional preventative measures are in order and could reasonably be taken by the adaptive farmers. To protect the economic activity of wheat and other larger farms while still encouraging the diversified and high value adaptive farms, adaptive farms could be required to maintain a no-crop buffer maybe in the form of a public easement that surrounds the farm and plant a protective vegetative break or barrier. These steps could minimize private and public transaction costs (arguments and lawsuits) resulting from the establishment 10-40 acre farming operations in areas that have traditionally grown commodities on very large acreages.

While the dependence on the stability of water supply is apparent for irrigated agriculture in Umatilla County, even the dryland wheat farms and certainly the livestock operations are water dependent. All of the examples of crops that could be grown on adaptive farms in this report rely on irrigation. If the water is not available, the adaptive farm is not sustainable. While crops like wine grapes have evapotranspiratioin rates that are similar to spring grain, tree fruits and blueberries are significantly higher than the peas or grains that may have previously been grown on the land proposed as an adaptive farm. Even if rainfall would be sufficient for the adaptive farm, the crops discussed in this report would need the water during the summer when rainfall is minimal. Water rights in Umatilla County are established, yet, the Oregon Water Resources Commission can allow new wells to be drilled. Lower priority water users could currently be receiving sufficient water to farm their land and have that water supply disrupted by development of adaptive farms. While this could be consistent with current water rights and jurisdictional responsibilities of water management agencies, it could significantly affect the projected community benefits of developing adaptive farms. In addition, there may be insufficient knowledge of Umatilla County's groundwater capacity and use of Columbia River water resources may not remain unchanged. Again, so the growth of adaptive farms and their use of water do not diminish the options for existing farms, some quasi judicial body could be established at the County level to address existing producers' concerns about new adaptive farms affecting water resources. This County level review would be in addition to the Oregon Water Resources Commission review.

Conclusion

It is difficult to predict the future profitability and/or persistence of alternative farm types and sizes. Changes in inputs and market outlets over the last thirty years call into question the criteria that have been used in the past Four out of the five crops discussed for adaptive farms in this report could provide net revenues equal to half of the Umatilla County median income on ten acres. Specialty Products required going up to twenty acres for net revenues to support half of a median household income. Our discussion of specialty products is probably too conservative. Even if the criteria is increased to require net revenues that exceed the Umatilla median income of $40,773, specialty crops could meet the criteria on 40 acres, vegetables on 20 acres and the rest on ten acres. If Oregon's gross sales criteria for high value farm land of $80,000 is used, three crops (sweet cherries, grapes/wine, and blueberries) could reach that amount on ten acres, one crop (vegetables) could meet that amount on twenty acres and the fifth crop (specialty products) could meet that amount on 30 acres. Ten to forty acre adaptive farms that capture much of their crops' retail prices can certainly be economically viable.

Careful expansion of Umatilla County's adaptive farming sector could diversify choices for producers and consumers while increasing the contributions of an already successful agricultural sector even more. If the expansion is haphazard and there is a high rate of adaptive farms that fail, the usefulness of their land to larger farmers is questionable and the land may end-up as a "weed patch" to the detriment of surrounding farms.

However, with skilful oversight of the approval process and monitoring of the development of adaptive farms, Umatilla County could foster the resurgence of the small farm, which most people thought was gone forever. Additionally, increasing the adaptive farms with their value added activities may allow Umatilla County to benefit more from the resident and visiting consumers in adjacent markets like Walla Walla and the Tri-Cities. The results will depend on the local energy and will necessary to balance all the competing needs of potential and existing farmers.

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