SAVING SALMON, SUSTAINING AGRICULTURE

Opportunities To Conserve the Environment While Improving The Economic Well-Being of Farms In the Northwest

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Background and Acknowledgments

As we enter the new millennium, the citizens of Washington and Oregon face a number of important environmental challenges. For example, they know that a majority of streams fail to meet water quality standards and that many salmon stocks are listed as threatened or endangered regionwide. In addition, the recently published Oregon State of the Environment Report identified a number of areas where Oregonians can expect continued problems under current policies and programs including: poor water quality, especially in urban and agricultural areas, inadequate water supplies, loss of wetlands, degraded riparian areas, depleted fish stocks, invasion of exotic species, diminished biodiversity, and waste and toxic releases. Similar problems are sure to exist in Washington State.

These types of environmental issues threaten to constrain the economy and quality-of-life of communities throughout the Pacific Northwest. The public and decision makers want to take appropriate steps to resolve these problems, but often hesitate because they fear the economic consequences will be too severe.

In the spring of 1999, The Center for Watershed and Community Health (CWCH), a non-profit research institute affiliated with the Mark O. Hatfield School of Government at Portland State University, initiated a project to help decision makers throughout the region better understand the economic issues and facts associated with developing a more environmentally sustainable economy. The CWCH's aims is to provide accurate, objective, and easy-to-understand information about the potential costs and benefits associated with adopting practices and policies that can resolve pressing problems such as endangered salmon and lead to a more environmentally efficient economy. The CWCH has developed collaborative research partnerships with a number of academic institutions in Washington and Oregon, provides grants to a number of leading economists, and completes its own research, to accomplish this goal. This report is one in a series of reports to be produced as a result of this effort. The project is an integral part of PSU CWCH's focus on developing new, more effective and efficient approaches to environmental governance.

AUTHORS

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Table of Contents

Executive Summary

Environmental and economic issues have been polarized for many years in the Pacific Northwest. From the spotted owl to growth management, resolutions to these issues are typically framed as requiring a choice between jobs or the environment. This pattern seems to be repeating itself today as some farmers in Oregon and Washington respond to the call for improved farming methods to conserve the environment and salmon with a chorus of opposition related to the perceived high costs of these steps.

This report explores the validity of these concerns. It poses the question: do the costs of adopting more environmentally sustainable and salmon friendly agricultural practices outweigh the economic benefits? The result of our research suggests that this is not the case. To the contrary, we assessed the costs and benefits of changes in supply side and demand side farming practices and found that, at a minimum, adopting more environmentally sustainable practices may, at a minimum, have a neutral economic impact on most farms, and may, at best, save many farmers money, lead to increased market share, and for those who market their products as organic or sustainably grown, even increase price margins by 5%-30% or more.

Agriculture is an extremely important component of the economy and culture of the Pacific Northwest. Washington State is one of the 10 largest agricultural producers in the United States generating $5.2 billion in 1998 in agricultural production. Oregon's agricultural production was valued at $3.5 billion in 1999. The jobs and personal and corporate income produced by agriculture are the backbone of many rural communities in the Northwest**.** Given the importance of the industry, **t**he authors of this report believe that finding ways to help farmers adopt a path toward more economically and environmentally sustainable agriculture should be a top regional priority.

We found good news in that regional agricultural practices have improved in a number of ways in the past years and evolving toward more sustainable patterns. Most of today's farmers, with the support of federal and local agencies, are learning about conservation farming. Since conservation in farming reduces the need for water, pesticides, fertilizers, and labor time, farmers are learning how environmental efficiency can reduce costs and improve yields while conserving the environment.

Yet, despite the improvements our research found that environmentally friendly agriculture is still not widely practiced, resulting in unnecessary and costly adverse impacts on the environment and salmon. For example, a recent report indicates that the "Pacific-Region" (which includes the Pacific Northwest) has applied no-till (farming) practices to only 1% of its cropland, a percentage well below the national average of 14.8%. Many common agricultural practices degrade the soil and salmon habitat by generating sediment from excessive soil disturbance and from the removal of riparian

vegetation. Other practices pollute the environment with pesticides and excessive fertilizers. Agricultural production often adversely impacts water flows and quality through diking, draining, filling, and stream channelization. Agriculture often requires excessive stream and groundwater withdrawals for irrigation. Especially in low flow periods, such withdrawals deplete surface and groundwater supplies and harm salmon and salmon habitat.

To address these issues, this report assessed the costs and benefits of adopting environmentally beneficial changes in supply-side and demand-side farm practices. Research shows that supply-side or production changes can minimize impacts on the environment and salmon and simultaneously decrease the costs of production by 5% to 20%. Supply-side farming practices assessed in this report include: a) Conservation Farming, which includes a range of sustainable farming methods known as *conservation tillage systems*--no-till, mulch-till, and ridge-till, which are proven methods for reducing soil erosion; b) Creating riparian buffer zones around streams; c) Integrated Pest Management (IPM) which seeks to maximize the benefits of naturally occurring pest controls including weather, disease agents, predators and parasites and minimizing the use of toxic pesticides and herbicides; and d) Organic Agriculture, which uses natural production methods.

Demand-side farming practices include ways to market a farms environmental performance directly to the consumer. Numerous recent reports show that sales of organic or sustainably produced food are growing rapidly here and abroad and are expected to continue to grow at 20% or more a year. New data and testimonials from farmers show that farmers can receive from 20% to 100% increases in price premiums over conventional products when they market their products as environmentally certified. Demand-side farming practices assessed in this report include: a) Sustainable and Organic Farming Certification; and b) Direct Marketing of products by farms at farmer's markets, farmer owned retail outlets, through community-sustainable agriculture agreements (CSA), selling products on the internet and other strategies.

To assess the overall potential impacts of the adoption of the supply and demand-side farming practices, we examine the potential economic costs and benefits to a hypothetical farm of 100 acres. We assume that the cost of farming is $150/acre for a total of $15,000. We further assume that the return on those 100 acres is $30,000, yielding a net return of $15,000. We found that the adoption of conservation tillage methods, installation of riparian buffers, and application of IPM techniques for pest and weed management could potentially increase profits by up to 20% (increasing profit on 100 acres from $15,000 to $18,050). Annual revenues would be approximately the same even with the conversion of 5 acres into riparian buffer. Net returns due to decreasing costs of production increased from $15,000 to $18,050 a 20% increase.

Of course converting to conservation tillage and IPM would require initial investment costs in equipment and training time. There may also be additional labor costs, and interest and loan costs not accounted for here. Yet, our data suggests that, at a minimum, most farmers often can break even by adopting the supply-side practices, as the 20% increase in

returns will more than cover the investment costs in a reasonable payback period on most farms. It is even probable that many farmers will see a 5%-20% increase in profits.

We then supposed that our hypothetical farm pays $1500 to have its crop and management practices certified by sustainable or organic programs. To be conservative we assume that increased market access or price premiums yield a lower bound of 5% and an upper bound of 10% increase in returns. That is, the 95 acres in crop production (100 acres less 5 acres in riparian buffer) will now yield at the lower bound $315 and the upper bound $330 per acre rather than $300. Certification will increase total annual costs in the most conservative case to $15,750 and the more optimistic case to $13,450. Selling these certified products will increase total revenue from our base case of $30,000 to a lower estimate of $31,425 or a higher estimate of $32,850.

This makes for a total potential profit increase of somewhere between 4.5% to nearly 30% since the beginning of our hypothetical farm's transition to a more environmentally sustainable and salmon friendly farm! It is even possible that an additional 10-50% may be added if the farm sells organically certified products (assuming it includes salmon and stream friendly farming practices as well as organic measures).

We project that if all cropland in our two-state region could realize **just 25% of the cost savings** that our hypothetical farm did (approximately $7.50/acre in gross savings), the region stands to save ***nearly $23 million annually***. If the agricultural industry can increase **its returns by just 2% through price premiums and increase market share** in the growing sustainable foods market, it stands to ***gain $174 million annually***. These savings and increased returns are impressive.

We fully acknowledge the significant limitations of using a hypothetic farm to extrapolate the potential costs savings regionwide. There is no doubt that each farm regionwide presents unique circumstances that may not allow for the complete adoption of supply and demand side sustainable farming techniques. Despite the hypothetical nature of the example, these findings strongly suggests that, at a minimum, the cost of conserving the environment and saving salmon on most farms will likely be offset by cost savings, increased market access and/or increased profits resulting from the adoption of environmentally sustainable production methods. Hence, adopting these practices may simply be ***a plain good business decision*** that leads to significant economic benefits for many farmers regionwide.

If these conclusions are correct, then the debate about conserving the environment and saving salmon on agricultural lands must be recast as a potential win-win opportunity to ***save salmon and sustain agriculture***. Removing the political, policy and cultural obstacles for the adoption of these practices should become the central focus on the debate. If our conclusions are wrong, we ask for data and facts demonstrating where we have errored.

SAVING SALMON, SUSTAINING AGRICULTURE

Introduction and Purpose

Much of the debate about the future of salmon in the Pacific Northwest is often reduced to concerns about the costs of restoration. Multiple stakeholders' advocate to protect what they believe is their best economic interest. This has created a complex and often conflicting picture of the true costs and benefits of salmon and stream restoration.

One of the most common claims is that conserving the environment and saving salmon will impose a tremendous burden on companies, landowners or communities and to the regional economy as a whole. This message is especially prevalent from the agricultural community. Policies and practices that may alter traditional uses of farming inputs -- water, pesticides, and fertilizers-- or traditional farming techniques -- intensive tillage, and removal of riparian vegetation—are typically viewed only in terms of their cost.

There is no doubt that conserving the environment and saving salmon will cost farmers money. However, from a business and decision-making perspectives, costs are only half the picture. We also need to know whether the costs are worth the benefits? Every business-person knows that investments cannot be evaluated in isolation of the value of expected returns. To answer the question about return on investments, we need to get a better picture of the potential economic benefits of conserving the environment and saving salmon on farms in the Northwest.

This report seeks to explore the validity of the prevailing belief that the costs of agricultural practices and policies that benefit the environment and salmon are too high. The data, case studies and statements from experts assessed here suggest that this view is not accurate. To the contrary, our research found that changes in agricultural practices which benefit the environment and salmon may have, at a minimum, a neutral economic impact to most farms, and may, at best, save many farmers money, lead to increased market share, and, for some, even increase profitability by 5%-30%. If this is true, then the debate about the costs of salmon recovery within agriculture must be recast as a win-win for salmon, farmers and the regional economy. If this is not true - we hope this report stimulates actions to generate data that show us how and why our findings are wrong.

Assumptions and Approach

We begin this study by making some general assumptions.

- The economy in the Pacific Northwest is dependent on a highly productive workforce.

- Maintaining a healthy economy in the Pacific Northwest is dependent on healthy ecosystems and the sustainability of renewable resources including forests, water, soils, and fisheries.
- The economy in the Pacific Northwest is inextricably linked to the global economy. Increasing productivity, flexibility, and innovation will be key in maintaining, if not enhancing, the region's global competitiveness.

Through an extensive search, we gathered recent research and case studies that suggest that sustaining agriculture and sustaining salmon and water quality may not be conflicting goals. The information reveals numerous opportunities to increase the productivity of farming inputs. Enhanced resource productivity would mean lower costs of production and increasing profit margins. In many cases, the data suggests that both the profit interests of the producer and the health of salmon and the environment may be improved through the implementation of cost-effective, sustainable farming practices. For example, we find ample evidence that suggests Northwest farmers can reduce costs by using proven conservation tillage methods and by more aggressively applying integrated pest management (IPM) techniques. We fully acknowledge that precise cost savings are difficult to determine as they will vary substantially from farm to farm, region to region, due to a number of conditions (e.g., climate, soil type, slopes, and crop rotation, to name a few). Nevertheless, the United States Department of Agriculture (USDA), agricultural agencies and experts, and regional farmers indicate that these two production modifications alone often result in net savings for the farm. These experts also state that these two production modifications have not been adequately exploited yet in the Pacific Northwest. If these agencies and experts are wrong – we ask for data that shows us how they have errored.

Moreover, we also found evidence that an increasing number of farmers are taking advantage of new opportunities in handling and marketing their product. The demand side of agriculture is quickly changing. Today, some innovative farmers have taken advantage of increasing opportunities to interact with consumers and retailers. For instance, many farmers are finding that by highlighting and certifying their commitment to the environment, they are often able to differentiate their products which leads to increased market share. In some cases, such as when organic products are certified, they may even command premium prices. Granted, this approach requires innovation and the willingness to break from convention, steps that some farmers may shy from in an unpredictable economic climate. Again, we found it was not possible to precisely quantify these benefits due to the vast number of farm types, crops and changing market conditions. However, case studies and other data seem to indicate that the ability to increase market share of 5-10% due to these practices can lead to substantial new revenue streams. In addition, price premiums of between 5% to 50% or more over conventional farm product prices appear possible for many, especially organic farmers.

Lower costs, enhanced market share and/or higher prices can mean enhanced profitability and competitiveness for many Northwest farmers.

Based on the case examples, data, and comments from agricultural experts described in this report, we use a hypothetical 100-acre farm to illustrate how net returns might increase from between 5% to 30% for many farmers from practices that also benefit the environment and salmon. Using conservative extrapolation we estimate that farmers in the region could save $23 million annually through the adoption of relatively simple farming modifications. Further, should the region take advantage of changes in retail markets, we project that annual net economic gain to farmers in the two-state region could be a minimum of $174 million.

Please note that the estimates of cost savings on our hypothetical farm are just that - hypothetical. We have used conservative assumptions and estimates and tried to develop a realistic scenario. Yet, we also know that farms, farming conditions and farming practices vary widely throughout the region. The type and location of farm determines the cost and economic benefits of adopting practices that conserve salmon and the environment. Some vineyards, for example, may be able to make minor modifications in growing practices and reap significant marketplace benefit. Some dairies, on the other hand, may need to make very significant investments in manure management systems and other practices. We therefore acknowledge the limits of using hypotheticals. Some may argue that no single hypothetical harm can be used to characterize the potential savings from adopting salmon and environment friendly agricultural practices on a regionwide basis. We have nevertheless included our hypothetical farm example as a straw man in the hopes that it either stimulates the generation of data that proves our assessment wrong or stimulates action to assist farmers to adopt sustainable farming practices because they have proven to be cost effective and environmentally beneficial.

We believe the most important finding of this exploratory research report is that changes in agricultural practices and policies that may save salmon and improve water quality may not impose the tremendous financial burdens that many seem to believe. Costs are inevitable, but so are benefits. Saving salmon and water quality may ultimately be a good farming decision, proving to have, at worse, a neutral economic affect on most farmers, and, at best, providing economic returns in excess of investment and operation costs. If this is true, it is in the best economic interests of the agricultural community to adopt these practices. If this is wrong, we ask agricultural experts and farmers to present data that shows us where and how we have eroded.

Agriculture is Very Important to the Pacific Northwest.

Agriculture is an extremely important component of the economy and culture of the Pacific Northwest. Washington State is one of the 10 largest agricultural producers in the United States with $5.2 billion (1998) in agricultural production. Oregon's agricultural production was valued at $3.5 billion (1999). According to data presented in the 1997 U.S. Census of Agriculture, Washington farms employed 251,395 persons annually with 39,893 of these working 150 days or more. The farm payroll in Washington amounted to $771 million in 1997. Oregon farms employed 124,420 workers in 1997, with approximately 24,484 of them working 150 days or more. The Oregon farm payroll was estimated at $479 million. These jobs and personal and corporate income produced by agriculture are the backbone of many rural communities in the Northwest**.** ***It is in the interest of everyone in this region to enhance the economic and environmental sustainability of the industry, increasing its competitiveness in local and global markets.*** Stated another way, the authors of this report believe that adopting a path toward economic and environmentally sustainable agriculture should be a regional priority.

That agriculture is an important component of the regional economy and of any salmon conserving efforts can best be understood when we realize that agricultural lands account for 46 percent of Oregon's land base (approximately 40,500 farms) and 39 percent of Washington's (approximately 37,000 farms). Croplands and pasturelands are located primarily on lower elevation valley bottoms and floodplains, historically the most productive fish producing sites. Agricultural lands are often associated with mainstem river systems and streams; watercourses that are essential for salmon rearing and migration.

AGRICULTURAL LAND IN OREGON AND WASHINGTON[3]

	OR		WA	
	Acres	% of Total	Acres	% of Total
Total Land Area	62,126,720	100.0	42,606,080	100.0
Total Cropland	4,347,700	7.0	7,758,100	18.2
Irrigated Land	1,751,500	2.8	1,623,800	3.8
Pasture	1,915,900	3.1	1,420,500	3.3
Rangeland	22,288,200	35.9	7,241,700	17.0
Federal	13,135,800	21.1	1,667,600	3.9
Non Federal	9,152,400	14.7	5,574,100	13.1

The Good News: Agricultural Practices Have Steadily Improved.

Agricultural practices have improved in a number of ways in the past years to the benefit of water quality, streams and public health. Agricultural methods, processes, and

products have been evolving toward sustainable practices. Most of today's farmers, with the support of federal and local agencies, are learning about conservation farming. Since conservation in farming reduces the need for water, pesticides, fertilizers, and labor time, farmers are learning how environmental efficiency can reduce costs and improve yields. The important message that they are learning is that environmental efficiency does not have to come at the cost of production efficiency… conserving the environment and saving salmon, may just be good farming business. Here are three examples showcased at a recent conference:[4]

- In Corvallis, Oregon, owners of the Stahlbush Island Farms have limited their use of herbicides, insecticides and fungicides by using natural systems to their fullest potential. Owners state that they rely on the use of cover crops to naturally grow nitrogen, and on crop rotation to naturally break disease and insect cycles. Owners state, "We have taken some of the best methods from the organic community, as well as advanced science from the conventional agriculture community, and combined them to move toward a lowest-cost farming system."

- Near Moses Lake, Washington, owners of Gies Farms state, "In odd areas of the farm that are hard to cultivate, we have worked to develop wildlife habitat that becomes a breeding ground for beneficial insects. We are always mindful that if we keep our beneficial insects healthy, we rarely have to spray for spider mites, because beneficials will keep them down. Spider mites are way more expensive to get rid of than potato beetles, so with better planning, we can use pest-specific sprays instead of broad-spectrum pesticides, and let the beneficials to their work."

- At the Cascadian Farms in Sedro-Woolley, the owner argues that organic production is not lower yielding. He states that it is the "expertise of growers, not the practice itself, that has the biggest impact on yields." Using organic weed management, he finds that the cost of control averages $20/acre, a substantial savings over the $30/acre for conventional weed control.

Indeed, Northwest states are leading the way in some fields. For example, Oregon ranks 1st among 11 western states in overall performance of its weed biocontrol systems judged by the distribution of control organisms across the weed range, the level of attack on weed, level of control, and the availability of control organisms for redistribution to new areas. [5]

Despite Improvements, Sustainable Agriculture Is Still Not Widely Practiced, Leading to Environmental Problems.

Despite the increase in exemplary farms and farm programs that practice sustainable agriculture, our research found that sustainable agriculture is still not widely practiced, resulting in unnecessary and costly adverse impacts on the environment and salmon. Many common agricultural practices degrade soils and salmon habitat by generating sediment from excessive soil disturbance and from the removal of riparian vegetation. Other practices degrade soils and water quality with the introduction of pollutants from pesticides, fertilizers, and farming equipment. Agricultural production often adversely impacts water flows and quality through diking, draining, filling, and stream channelization. Agriculture often requires excessive stream and groundwater withdrawals for irrigation. Especially in low flow periods, such withdrawals deplete surface and groundwater supplies and harm salmon and salmon habitat.

While recognizing the regional importance of agriculture, officials in both Washington and Oregon have stated that more needs to be done in this sector to promote long-term environmental and economic sustainability. Washington's Joint Natural Resources Cabinet and the Governor's Salmon Recovery Office stated, "While the magnitude of the effects of agricultural practices vary by watershed and stream, overall, associated habitat alterations have reduced or eliminated spawning and rearing habitat, interfered with adult and juvenile migration, and increased predation."[6] The recently released *Oregon State of the Environment Report* (Oregon Progress Board, August, 2000) concluded that agriculture, while having made great strides in conservation over the last 40 years, must still attend to excessive soil erosion, pesticide residue in ground and surface water that exceeds drinking water standards, and water use that is quickly reaching the limits of available resources.[7]

In the balance of this report, we review existing research that reveals several specific farming methods that often result in significant benefits for both the profitability of farms and the environment. By identifying these methods we hope to highlight opportunities for Northwest farmers and also provide a potential focus for future policy development in the areas of environmental conservation and agriculture. The research provides solid evidence that the region can do much better than what is convention. By "better," we mean that it is possible to enhance resource efficiency, minimize environmental impacts *and* increased profitability of farms regionwide.

Saving Resources, Saving Money: The Supply Side Story

Conservation Farming

Sediments are defined as the soil and nutrient load of watercourses. Sedimentation is the transport of sediment from land into rivers, streams, and lakes by water flow, wind, and action of glaciers. Sediment loads in salmon streams adversely impact water quality and alter habitat conditions. Sixty-four percent of sediment found in streams comes from cropland, pasture, and rangeland.[8]

Sedimentation is soil loss and soil is the primary input into agricultural production. Soil loss adversely impacts salmon, but it also adversely impacts farming. Without adequate soil, farmers often find it necessary to supplement nutrients through the application of fertilizers. They also must use more water as poor quality soil does not retain water well. All this is done just to maintain output, not increase it.

According the *Oregon State of the Environment Report*, soil is created at an approximate average annual rate of 1 to 5 tons per acre per year. Soil loss in excess of 5 tons per acre/year then indicates unsustainable soil productivity. In these cases farmers must eventually augment soil with the use of supplements and fertilizers.[9]

Soil data records total annual soil loss for Oregon at 11,744,600 tons. Oregon's per acre losses range from less than 2.5 to 10.6 tons per acre.[10] Soil loss in Washington averages approximately 4 tons per acre annually with higher levels for dryland farming common in eastern Washington.[11] Soil loss is caused by natural weather patterns but is accelerated by overwatering, aggressively tilling the soil, reducing or removing riparian vegetation, and removing large woody debris from streams and rivers. Private and public costs associated with this loss vary across regions. According to one study, each ton of soil lost generated $3 for replacement nutrients, $2 for water loss, and $3 for off-site impacts.[12] Using this

figure, which is admittedly general and does not address any issues unique to the Pacific Northwest, soil erosion generates private and public costs in Oregon of between $20-$85 per acre/year and in Washington averages $32 per acre/year. For a 400-acre farm (approximate average farm size) this amounts to between $8,000 and $34,000 dollars annually. And if you consider all cropland in Oregon and Washington, soil loss costs between $242 million and $1,029 million annually. If soil loss can be prevented through conservation practices, these costs become private and public benefits (costs avoided).

Soil conservation is about keeping the soil you've got. According to the USDA, Natural Resources Conservation Service (NRCS) a range of environmentally efficient and sustainable farming methods known as *conservation tillage systems*--no-till, mulch-till, and ridge-till--are proven methods for reducing soil erosion. The 1996 "Freedom To Farm Bill" finally gave farmers the cropping flexibility needed to develop crop rotations critical to the success of direct seeding systems. For more than 50 years, U.S. farm policy has been a major obstacle to successful no-till and minimum tillage systems in the Northwest. Commodity program restrictions largely locked Northwest dry land growers into short crop rotations in order to maintain their wheat base acreage, and high proven yields for wheat (Oregon State of the Environment Report, Agricultural Chapter).

According the Conservation Technology Information Center (CTIC), conservation tillage has been applied to approximately 37% of U.S. cropland with proven success. Another 27% uses reduced till methods leaving 36 % using intensive till methods.[13] Conservation tillage amounts to techniques that minimize soil disturbance. These techniques rely on direct seeding, planned crop rotation, and leave more "crop residue" (stalks and leaves from former crops) in place as well.

Conservation tillage methods reduce costs in a number of ways. First, according to the CTIC, conservation tillage reduces soil erosion by 50-90% when compared to traditional intensive tillage systems. Second, conservation tillage reduces the number of trips through the field for planting and cultivation, saving producers on labor, time, fuel, and machinery wear while building soil productivity. Finally, irrigation can be reduced as good quality soil provides for better water retention. Since erosion is reduced, water quality impacts are also reduced having a positive impact on salmon in this region.[14]

A recent study of Pacific Northwest Farmers found that no-till farm methods lowered the total cost of growing wheat by an average of 10 percent per bushel. The cost savings come from not having to replace eroded topsoil and less field preparation. The same authors in a later report find that "…no-till production costs can be lower and profitability higher than conventional tillage systems."[15]

Unfortunately, few farmers have yet to adopt these practices. A recent report indicates that the "Pacific-Region" (which includes the Pacific Northwest) has applied no-till practices to only 1% of its cropland, a percentage well below the national average of

14.8%.[16] This is consistent with CTIC data showing that conservation tillage (no-till, mulch-till, and ridge-till) in the "West" has been applied on 29% of cropland compared to the national average of 37%. Direct seed methods are have been successfully used throughout the region, although they are less suited to the Puget Sound area and a few other regions.

The Washington State University Cooperative Extension provides several examples of the economic benefit of no-till or direct seed techniques.[17]

- John Rea of the John Rea Farm in Walla Walla County, Washington has pioneered direct seeding (no-till seeding) in the inland Northwest. He "feels he not only has reduced costs by going to a one-pass seeding system, but he also has increased overall returns by growing a spring crop every year rather than a winter wheat crop every other year." He further states that "The ground is, what I call, more porous. There's more organic matter there…I think the reason why our ground is so good for spring wheat is the fact that the organic matter is higher and we are holding more moisture."

- John Aeschliman of Aeschliman Farm in Whitman County, Washington began no-till farming in 1990 because, "Erosion is very expensive. We not only lose the topsoil, but the water that it takes to move the soil… Also, ditches made by erosion are hard on equipment." Not only has the farm saved by reducing erosion but they also have reduced direct costs associated with cultivation and indirect costs such as farming the erosion ditches. They see increased water infiltration, increased soil life, and less soggy spring conditions. Aeshliman states that yields are "as good or better" with no-till techniques as with conventional methods.

- At the Riggers Farm in Lewis County, Idaho, Steve and Nathan Riggers recently converted their whole farm to no-till. Although it took time to perfect the method, the advantages are "efficiency, efficiency, efficiency." The Riggers state similar benefits as the Rea and Aeschliman, but they also state that "The most notable benefit of direct seeding on our farm has been yield increases in both fall and spring crops." And, "The fact that we direct-seeded isn't going to turn a dry year into a good year, but it may give us a 10% to 20% higher yield. That can make a big difference."

Switching to conservation tillage methods does require investment. The typical farmer finds that he or she must either rent or purchase new seed-drills that are capable of slicing through crop residue. In addition, farmers have to invest the time to learn about equipment and techniques and to experiment with these new techniques to find the specific approach that works best on each unique farm.

Despite the successes of no-till or reduced-till methods, the application rates of all conservation tillage methods have stagnated largely due to lack luster commodity prices that make it difficult to obtain an economic return, thus dampening enthusiasm for trying

new techniques. The fear of crop failure especially with low prices is overwhelming to many producers. It is during these times that farmers tend to stick with what they know best… convention.

This situation presents itself as an area where policy might be designed to protect farmers, while enhancing agricultural production and salmon protection. Policy could be formulated to simultaneously reduce the risk to farmers as they switch to conservation tillage. The same policy could focus on increasing conservation tillage application rates, reducing sedimentation of streams and rivers, and conserving water.

Riparian Buffers

Conservation tillage is one way to reduce soil loss and improve habitat quality for salmon. Creating riparian buffer zones around streams is another complementary means to achieve similar results. Riparian vegetation serves an essential role in the environment. This vegetation zone filters sediments and impurities from runoff. Riparian vegetation provides shade thereby minimizing solar impact on water temperature. Streamside vegetation also provides organic matter and woody debris for juvenile and migrating fish.

Many agricultural producers increase the acreage of land under cultivation by clearing and farming land in the riparian zone. Since agricultural practices in particular involve substantial soil disturbance, the impact on streams with no riparian zone vegetation can be substantial and larger than on non-agricultural lands. While streamside lands can be highly productive for farmers, often they are not. Over time, farmers often pay a price for removing riparian vegetation. These unprotected and destabilized streams are left vulnerable to the action of wind, water and flooding. Eroding and collapsing banks can remove valuable land from production.

The NRCS advocates the installation or maintenance of conservation buffers through their National Conservation Buffer Initiative. These conservation buffers include wind breaks, riparian buffers, living snow fences, grass strips, crosswind trap strips, and shallow water areas. The NRCS states that such buffers improve soil, air, and water quality, enhance wildlife habitat: restore biodiversity and create scenic landscapes. If properly installed riparian buffers can remove up to 50 percent or more of nutrients (phosphorous and nitrate) and pesticides. Buffers also serve to reduce downstream flooding. And although riparian vegetation provides many of us with environmental benefits, farmers can realize economic gains as well. Buffers slow water runoff, leaving more water in the fields. They also trap sediment and reduce the impact of wind, leaving soil in the field where it is of use. If properly installed, buffers can have the capacity to remove up to 75 percent or more of sediment.[18]

Installing riparian buffers usually requires approximately six acres per mile of bank.[19] Typically the buffer is planted with fast growing trees and shrubs at a cost to the

landowner. Additionally buffers remove land from agricultural operation, implying an added cost to the farm in terms of revenue foregone. Buffers would need to be maintained to ensure that weeds do not out-compete new plantings. Maintenance costs would likely decline in subsequent years as vegetation matures. The cost of installing and maintaining a buffer can vary substantially from site to site depending on soil conditions, flood potential, climate, and species planted.

It appears possible to sometimes offset the private cost of riparian buffers by planting harvestable trees such as cottonwood, fast growing poplar hybrids, silver maple, willow and green ash. Over a ten-year period, Northwest farmers could expect an average annual net return of at least $300 per acre from selective harvest of fast growing poplars, according to one study. This study estimated total costs to establish and maintain a hybrid poplar "micro" or mini tree system over a 10-year period would range from $4,000 to $6,000 per acre with tree value between $9,000 and $12,000 per acre.[20] These estimates were not made specifically for riparian buffers, but they do serve to illustrate that shifting to sustainably harvestable riparian buffers may create creative and unique business opportunities.

In addition, several grant programs exist to assist with the cost of riparian buffer revegetation projects, lowing the initial costs and increasing the net benefits. For example, in 1999 the USDA approved $500 million to restore riparian areas in Oregon and Washington. Their target is to restore 200,000 acres, paying 80% of the costs.[21] In some cases, states and some counties have programs to assist with buffer installation and maintenance. Other options may include land swaps, fee title sales, or sales of conservation easements to land trusts.

Integrated Pest Management

Pesticides are used in urban and suburban areas, on farmlands, forests, near roadways and in canals, and lakes. Once applied these pesticides tend to find their way into water -- ground water or streams and rivers. The nature of pesticides and fertilizers is that they are toxins that can impact salmon, and people, close to and far from their location of application. Reducing farm pesticide use is good for streams and fish, and just as importantly, for the health of farmers, farm workers and the general public.

Pesticides and fertilizers are found in many salmon streams and in ground water sources in the Pacific Northwest. A study by the U.S. Geological Survey found pesticides in water drawn from sites in the Puget Sound area, the central Columbia River plateau, the Willamette River Basin, and the Snake River Basin.[22] The *Oregon State of the Environment Report* found that overall, pesticide use does not seem to have changed much over the past 20 years. Use in 1981 was estimated to be 13,800,000 pounds, rising to 16,050,000 in 1987, with an estimated 13,375,056 pounds being applied per annum

between 1990 and 1996. Since 1984, 29 pesticides and pesticide metabolites have been detected in Oregon's groundwater.[23]

Pesticide use in many regions of the United States is given preferential tax treatment. In Washington agricultural pesticide and fertilizer sales are tax-exempt. Oregon has no sales tax. Furthermore, pesticide sales and use have not been tracked so volume, type, and location of pesticide use in the Pacific Northwest is not well understood. This data gap is problematic. If pesticide concentrations in streams are deemed harmful to fish or people, we do not currently have the information necessary for effective and efficient action. On September 1, 1999, Oregon passed a new pesticide tracking law to take effect in 2002. The accuracy of this type of data is essential. Washington should consider following Oregon's lead in establishing monitoring and reporting requirements.

Pesticides and fertilizers are inputs into production. Pesticides in particular are also thought of as a form of crop insurance. By convention, many farmers apply pesticides whether evidence exists indicating a need or not. They do this in order to reduce the probability of crop loss. There is no doubt that crop loss is devastating, especially to the small farmer. Risk-averse behavior encourages regular pesticide use. The fear of crop failure also can explain their caution, if not resistance, to adopting new methods of pest control.

Integrated pest management (IPM) is a farming technique that seeks to maximize the benefits of naturally occurring pest controls including weather, disease agents, predators and parasites. IPM still utilizes various biological, physical, and chemical control, but strives to do so only when necessary rather than for insurance purposes. IPM utilizes scouting techniques, assessing the size of each pest population present, and finding out how those numbers relate to an economic threshold.[24] IPM then dictates the integration of managing fungal diseases with forecast methods, managing insects through crop monitoring, and treatment thresholds. If done properly, ample evidence shows that production costs are reduced by dramatically limiting the need to apply pesticides thereby reducing input costs and application costs. According to a recent study, employing IPM lead to "six fewer insecticide applications and four fewer fungicide applications. There were no differences in yield or fruit quality."[25]

The highly diverse agroecosystems of the Pacific Northwest present numerous challenges to the application of sustainable IPM practices. Numerous commodity crops are grown under many spatial scales and patterns and in a wide variety of combinations. Therefore, IPM strategies will take time to develop. Nevertheless, IMP practices have found to be healthier in terms of sustainable yields, productivity, biodiversity and reduced environmental impact. [26]

Unfortunately, Oregon and Washington do not currently keep records of IPM adoption. According to the Northwest Coalition for Alternatives to Pesticides, it is estimated that

between 60 and 85% of Oregon's vegetable growers use IPM techniques although the extent to which they do so is unknown.[27] Again monitoring and reporting would fill a critical information gap.

One interesting program in the Pacific Northwest is the Codling Moth Area Wide Management Program (CAMP). The program is in its fifth season and incorporates 240 growers. The participating growers agree to follow IPM protocols and keep records of pests and pesticide use. The program thus far has succeeded in an average of 75% reduction in synthetic pesticide use and has saved growers between $180-$335 per acre on the cost of materials.[28]

Given the range of crops and variation in pests and other growing conditions in the Northwest, it is problematic to extend the savings found by the CAMP program to other farms on an absolute basis. However, **if all croplands in Oregon and Washington could realize even just one tenth of these gross savings ($18/acre), the region could save $217 million dollars per year**. To be increasingly conservative, **if farms in the region could save one one-hundredth of these gross savings, ($1.80/acre) the agricultural community could save approximately $22 million dollars per year**.

Organic Farming

Sustainable farming, as defined by the Food Alliance, does not completely forbid the use of pesticides. Pesticides are permitted when no other alternative method can be found. Sustainable agriculture also places emphasis on the continual improvement of the whole farm system, including soil and water conservation techniques such as riparian protection and cover cropping to reduce runoff. By contrast, organic farming prohibits the use of all pesticides. Many organic farmers also apply sustainable farming practices. A growing pool of research has proven that organic farming is as efficient and as economically and financially competitive as conventional farming methods, and better for the soil and the environment. The Rodale Institute, a respected agricultural research organization, in cooperation with the U.S. Department of Agriculture's Agriculture Research Service, recently released a report on their long-term Farming Systems Trial. The experiment compares highly productive intensive corn/soybean systems under conventional and organic management. Looking at the first 15 years of the trial, the report shows that after a transition of about four years, crops grown under organic systems yield as well as, and sometimes better than, those grown conventionally. In years of draught, organic systems can actually outperform conventional systems.

"Organically managed soils achieve better physical structure. Soils in the organic systems gradually become looser and more porous, and absorbed and held water better than conventionally managed soils," authors Cass Peterson, Laurie E. Drinkwater, and Peggy Wagoner wrote. "These improvements in soil quality directly affected yields, helping the organic system maintain high production, even in draught years. For example, they also

enable the organically managed soils to perform their broader ecosystem role more effectively." In addition, the organic soils "had reduced levels of nitrate leaching compared to conventional soils and were more effective as a carbon sink." [29] (It is important to note that not all organic farming translates to salmon or water quality friendly farming. For example, some organic dairies have failed to meet the Oregon Department of Agricultures water quality standards and face enforcement action. Yet, due to their focus on sustaining agroecosystems, organic farms tend to be the most environmentally sustainable of all farming practices).

The validity of the environmental benefits and potential economic savings of sustainable and organic farming can be understood when talking to farmers involved with the methods. Bethel Heights Vineyards in Salem, Oregon, has recently adopted the Low Input Viticulture and Enology (LIVE) program. Ted Casteel, Bethel vineyard manager, thinks there may be cost savings from the program in the long run because of less dependence on expensive chemicals and fertilizers and less moving. For the time being he believes it is cost neutral. He says it has been relatively painless to implement, both practically and economically. [30]

Will Newman, owner of Natural Valley Farm in Canby, Oregon, produces organic fruit and vegetables. He says, "Production costs on our farm are less than conventional farms. When you farm organically you don't have to invest $150,000 in a harvester and other machinery. Our costs are primarily labor. Most conventional farms buy so much machinery they don't even know how much it has cost them over the years."[31]

Summary: Potential Supply-Side Savings on Our Hypothetical Farm

In summary, reviewing the supply side opportunities for enhanced farming practices that benefit the farmer, salmon and the environment, we can examine the potential economic costs and benefits to our hypothetical farm of 100 acres.

- We assume that the cost of farming is $150/acre for a total of $15,000. We further assume that the return on that 100 acres is $30,000, yielding a net return of $15,000.

- If the farmer converts the farm to conservation tillage the farm might save $1,250 in costs associated with soil loss (another $750 in public savings).

- If the farmer installs 5 acres of riparian buffer, he may loose 10 years of crop production. The present value of this change will net close to zero if we use the most conservative figures for the costs and benefits of planting a buffer, assume no or very little government assistance, and assume an interest rate of 8 percent. Government assistance in the installation and maintenance of the buffer could create greater net profits for the farm in present value terms in comparison to farming the riparian area.

- If our hypothetical farm aggressively implements IPM, savings could be approximately $1,800 a year, using the conservative figure for cost savings of $18/acre.

Now the total cost of farming our hypothetical 100 acre farm has dropped to $11,950. Annual revenues are approximately the same even with the conversion of 5 acres into riparian buffer. Net returns due to decreasing costs of production have increased from $15,000 to $18,050 a 20% increase. Of course converting to conservation tillage and IPM would require initial investment costs in equipment and training time. There may also be additional labor costs, and costs for loans that may reduce or eat up all of the 20% increase in returns. Yet, it seems probable that the 20% increase in returns will more than cover the investment costs, with a reasonable payback period.

No matter what the exact final cost savings turn out to be, it seems reasonable that adoption of these practices will lead to cost savings for many farmers. The best data available suggests that, at a minimum and after an average pay-back period, farmers would break even when adopting these practices, while taking significant steps to benefit the environment and salmon. This would provide public benefits in excess of private benefits. In the best case they may even see up to 20% increases in returns. Adoption of these practices may also provide the basis for meeting current regulations, such as the Oregon SB 1010 policy that requires farms to develop plans to conserve water quality, and provide a means for fending off the need for additional regulations.

Policy-makers have an opportunity to consider new, or enhance existing incentive programs to induce the conservation measures noted above. Insurance programs to offset risk to farmers, education and technical training, public provision of riparian buffers and maintenance of those buffers, and tracking and perhaps taxing pesticides might increase incentives facing the conventional farmer. The returns from such programs may include increasing competitiveness in the region's agricultural sectors and enhanced salmon habitat and protection of water quality.

Sustaining Agriculture and Salmon - The Demand Side Story

Supply side or production changes can minimize impacts on the environment and salmon and simultaneously decrease the costs of production. Minimizing the costs of production enhances the firm's competitive advantage in all markets, local and global. Some Pacific Northwest producers have benefited substantially from these supply-side changes. But there is still much more these producers can do. There are an increasing number of farmers that are beginning to benefit by marketing their environmental performance directly to the consumer and either maintaining or expanding market share and/or, in some cases, commanding higher price premiums than conventional products. These innovative

producers are finding that such marketing leads to greater market share, higher revenues for products sold, or premiums that consumers are willing to pay for products grown in a sustainable way. Some examples include the following: [32]

- Dab 'O Gold Farms in Walla Walla, Washington, attributes higher prices and more sales to the Food Alliance gold-and-black label on their onions in the Portland and Spokane markets.[33] The Food Alliance certifies sustainable agricultural producers in the Northwest.

- Greentree Naturals, a small farm in Sandpoint, Idaho, grows and markets a wide range of unusual and hard-to-find produce. They focus their marketing at fine restaurants and get top dollar for these unique crops. They also sell their crops at farmer's markets and through a community-support agricultural (CSA) program.

- At the Quinn Farm and Ranch in Big Sandy, Montana, input costs are down 75-85% and their organic products are returning as much as a 30% premium in a good grain year.

- Bethel Heights Vineyard in Salem, Oregon, has been certified by and labels its wine with the "Salmon Safe" label. As a result, with minimal promotion and virtually no label recognition outside of Oregon, Chez Panisse, of Alice Waters' restaurant in Berkeley, California, chose to pour their Pinot Blanc by the glass because of the Salmon Safe certification. Pat Dudley, manager of Bethel Heights Vineyard says, "This is an excellent placement for our wine and has a lot of promotional value to us because she is nationally recognized for her leadership in the sustainable restaurant movement." In addition, Whole Foods stores in several cities put Bethel Heights Vineyard wines on the shelf and gave it a special shelf label because of the Salmon Safe certification. Bethel Heights Vineyard was also invited to participate in the Chefs Collaborative Retreat held in Portland in September, 1999, when the topic was "The Sustainable Restaurant." Chefs from all over the country belong to this organization, and Bethel Heights Vinyard is now on their list of allies, which gives their wine a foot in the door to these restaurants.[34]

- Ron Stewart, owner of Columbia Gorge Organic Fruit Company in Hood River, Oregon, sells organic apples, pears, cherries, and peaches in addition to juices, and some concentrates nationwide. He says, "we get from 50% to 100% more for our fruit than conventional growers."[35]

- Will Newman from Natural Harvest Farms in Canby, Oregon, says he gets between 50% to 100% more for his products than conventional growers. "In the beginning of every year I go to market with strawberries at $4 a pint while conventional growers are getting $1.25 per pint and organic strawberries from California get about $2.25 per pint, and we can't keep up with demand. We also sold free-range Duck eggs from our

organic farm. We wholesaled them at $3 a dozen, they retailed for $4.50 to $5.00 a dozen, while conventional growers were getting $2.25 a dozen."[36]

These comments are consistent with the predictions made by the *Hartman Reports,* issued in 1996 and 1997 and commissioned by The Food Alliance, which said there is "…significant market potential for earth-sustainable products."[37] They contended that these are not just niche markets but rather that it is untapped market potential. The reports assert that environmentally sound food industry is growing by 20% per year, yet currently represents just 2% of overall food sales. The report said, "The market potential is enormous."

A number of recent reports have reaffirm that sales of organically produced food are growing rapidly here and internationally. Sales of organic products grew from $1 billion in 1990 to $3.5 billion nationally in 1996. One recent study indicates that organic food sales in natural-product stores totaled $1.96 billion in 1997, with organic produce and frozen foods accounting for $317.8 million and $198.5 million, respectively.[38] Another study reported survey results showing organic produce sales at natural and mainstream grocery stores topped $670 million. Industry experts predict that the organic foods industry will grow to $6 billion by the year 2000.[39] Natural foods are also making up an increasing segment of conventional grocery industry sales. [40] Nearly one-third of consumers polled in one recent survey had purchased organic fresh produce in a recent six-month period. The highest number of consumers purchasing organic produce was in the west (38%). [41]

The *Hartman Reports* found about 7% of the population are "True Naturals" that will consistently purchase organic foods. It found another 45% of the public that will purchase food produced in an environmentally friendly way under certain conditions. These include convenient locations of food stores, reasonably competitive pricing, and verification of the use of environmentally friendly farm practices by a credible third party (especially independent non-profits). This suggests there is a great deal of potential demand for earth friendly foods, not all of which may be met by organic foods. When "…at least 52% of consumers want to buy earth-sustaining food products," it appears that producers would do well to explore their options and redirect their efforts. The *Hartman Reports* indicated that the primary problem with the market is that producers have not adequately responded to consumers' tastes and preferences. "And not knowing what the consumer wants has been the reason so many green product introductions have failed to maximize results." The reports conclude that consumers want choices and that the producers need to give serious consideration to these increasingly informed and decisive consumers.

The *Hartman Reports* also researched specific issues with which consumers identify. They found that water-related issues and pesticide use are most important to the consumer. Conversely, consumers generally are unaware of soil loss issues. Consumers

care about their childre1n's future, their own health, and personal well-being. While the *Hartman Reports* do not find that all consumer groups are willing to pay large premiums for particular products, they would be willing to substitute those products grown in environmentally sound conditions for those grown under conventional conditions.

The comments from Northwest farmers and the predictions made by the Hartman Reports have been reinforced by a growing pool of research that shows that sustainable and organic farming leads to increased market share, increased price premiums or both (although few studies specifically examined Northwest food prices). For example, the Illinois Stewardship Alliance is in its 6th year of a farming systems comparison study of organic and conventional farming that includes an economic assessment. They found that "For three of the four years the organic system produced the highest net return per acre, and the highest average net return per acre over four years." [42]

Another recent major study which compared the sales of organic versus conventional frozen vegetables found that, "Supermarket sales of conventional frozen broccoli, sweet corn, green beans, and green peas stayed roughly the same or declined slightly from 1991 to 1996, while prices of these products generally stagnated. In contrast, sales of their organic counterparts rose an average 68 percent per year in value during 1991-96. Supermarket sales of both organic and conventional frozen french fries increased during 1994-96, but organic sales grew at a much faster rate. However, organic frozen vegetables, for the most part, accounted for less than 1 percent of supermarket sales in 1996. During 1991-96, the average annual price premium ranged from a low of 96 percent for sweet corn to a high of 231 percent for green peas."[43]

Still another study compared conventional to organic farm prices from 1995-1998 for corn, soybeans, spring wheat and oats in the Northern Great Plains and upper Midwest. It found "that both organic and conventional corn prices have trended downward since the last half of 1996. However, conventional prices fell proportionally more than organic prices. For example, organic corn prices fell by 18 percent (based on annual averages) between 1996 and 1998, whereas conventional U.S. cash prices fell by 38 percent over the same time period." However, "The organic price premium [for soybeans] was 202 percent of conventional prices." The study also found that, "On average, organic wheat sold for about $2.75/bushel over and above the price of conventional wheat in 1997 and for about $2.40-$2.50/bushel more than the price of conventional wheat in 1998," and …"by 1998, organic oat prices averaged 94 percent higher than SD cash prices for conventional oats and 83 percent higher than US cash prices." [44]

For Northwest farmers, this information indicates that sustainable and organic farming is an economic opportunity consistent with conserving the environment and saving salmon. The Coos County, Oregon, Board of Commissions apparently thinks this is true. In this rural, traditionally conservative county on the southwest Oregon coast, support for organic farming would have seemed impossible just a few years ago. Yet, in September,

2000, the commission threw its support behind a countywide effort to increase production of organic food products as a means of economic diversification. The high demand for specialty organic products presents an economic opportunity for Coos County "that could provide employment opportunities in product processing, marketing and distribution," the board decreed. [45] Below we document several of these demand-side opportunities.

Sustainable and Organic Farming Certification Programs

Third-party product certifiers are now available to test products for pesticide residue, to evaluate environmentally conscious growing techniques, and to assess sustainable harvesting methods. There are at least five programs in the Pacific Northwest. These are: The Food Alliance, which promotes sustainable agriculture; Scientific Certification Systems' NutriClean No-Detect-Pesticide-Residue Program and Nutriclean Retail Dock Testing Program; the Pacific Rivers Council's Salmon-Safe program, which certifies stream related land use practices, the Low Input Viticulture and Enology (LIVE) program, which promotes sustainable vineyards, and Oregon and Washington Tilth, which certify organic growers. All these programs establish a set of criteria for certifying clients. Clients pay for certifiers to test food products and evaluate farm management and growing techniques. If farms and products comply, they are certified. If not, the organizations work with producers toward certification. Most of the programs have established criteria to limit the use of pesticides and herbicides. Salmon-Safe and Food Alliance evaluate sustainable farming techniques.[46] See Table 1 for summary of sustainable food labels.

Once certified under these programs, farmers can benefit in three ways. First, some certifying programs assist farmers to gain market access. Some programs also serve as facilitators and matchmakers identifying growers, retail distributors, food processors, and restaurants that wish to take part in the program or purchase the products. Second, producers are often able to increase market share by marketing their certification. Certifying organizations typically assist with marketing and marketing costs by negotiating retail shelf space and advertising opportunities. These two benefits can be substantial. For example, Stahlbush Farms was able to gain access to Fred Meyer stores once they became certified as Salmon Safe.[47]

Finally, in addition to increased market access and market share, some growers are able to receive price premiums. In cooperating outlets, products are clearly identified as certified organic and can garner higher prices than comparable non-certified products. For example, Organic Valley Dairy is the nations largest organic family farm cooperative with 300 farms producing dairy products, meat, eggs and produce 13 states, including Oregon and Washington. Organic Valley has a national marketing and management strategy which is combined with locally produced milk. Theresa Marquez, marketing and sales director for Organic Valley says "We have more than a price premium, we provide stable pricing.

That's unheard of in agriculture. Conventional farmers are getting somewhere between $11 and $13 per hundred weight for Milk. Organic Valley is getting $18 to $20 per hundred weight, easily a 50% premium, and we don't change it, which allows farmers to plan. In our system the farmers also get a larger percentage of the bottom line." [48]

Bethel Heights Vineyard aims to compete at the very top of the international wine market, and they have seen steady progress in this regard. Their wine prices have been going up accordingly. They discontinued making their $12 Pinot noir in 1997. Now all their Pinot noir retails between $22 and $35, and their costs of production have increased only slightly. Pat Dudley, Bethel Heights Vinyard manager says, "I hasten to say that our increased profitability is certainly not the result of marketing to the environmentally conscious consumer only. But here is the really interesting point: at Bethel Heights Vinyard we estimate that 40% of the points we received this year for our LIVE certification were for practices which we would have adopted anyway in order to improve wine quality. In other words, sustainable farming makes better wine that sells for a higher price." She continued on to say, "In recent years the cutting edge of international viticulture in the premium wine category has been moving rapidly in the direction of sustainability because it is now widely believed that there is a direct correlation between wine quality and balanced, healthy soils and vines."[49]

Certification costs growers between $200 and $1500 for a fixed period of time, typically one to three years, depending on the program. There may also be additional annual program fees or some percentage of sales. Retail outlets may be provided a list (usually for a quarterly fee) identifying certified farms, their product, and product availability. These certifying systems encourage environmentally friendly food production. Some also assist in the retailing to local markets.

The certification programs listed above have all reported substantial growth in certified farm acreage. While Oregon Tilth has been around for many years, most of the other programs are less than 5 years old. All of the programs are optimistic about the future of product certification and about the willingness of consumers to pay for certified products.

Direct Marketing and Sales

Direct marketing by regional farms can take many forms. For example, farmers can sell directly to retail outlets. They can sell at "farmer's markets." They can sell their products by share to local community members, a form of marketing referred to as community-sustainable agriculture (CSA). They can form contractual arrangements with other firms or specific consumers. Farmers are even exploring selling products on the Internet.

Small farms, particularly organic and sustainable farms, have long used direct marketing and direct marketing opportunities have increased substantially. For instance, The Food Alliance has developed relationships that allow members to sell directly to independent

food stores such as the Thriftway chain, which has the ability to purchase directly from local growers. Scott Eco, staff member of the Food Alliance says that, "Having the Food Alliance seal has provided growers with the ability to differentiate their products from the big conventional farmers in an exemplary way, and to produce a better product." [50] This allows farmers to increase market share and to control how their products are marketed, all of which puts farmers in a better financial position.

In addition, farmers markets have increased nationwide from fewer than 100 to more than 2600 over the last 25 years. CSA's have grown from 0 to 1000 during the same period. [51] CSAs in the Pacific Northwest number approximately 47, with 28 in Washington and 19 in Oregon.[52] CSAs are either organic or they rigorously employ IPM farming techniques.

Direct marketing allows farmers to avoid paying middlemen, and to reap the returns for value-added processes. At farmers markets one finds vegetables and fruits, but also jams, honey, and cheese. According to a recent news article, "Farmers markets that sprout each summer throughout the Puget Sound area offer growers a chance to sell their produce directly to customers, in some cases earning three times more money than they would selling to a wholesaler or grocery store."[53]

Table 1

COMPARISON OF SUSTAINABLE FOOD LABELS

Limits On Use of Synthetic Pesticides & Fertilizers	Requirement for Overall Soil Health	Food Testing Requirements for Chemicals	Requirements for Wildlife Habitats
"Organic": Processed in accordance with the California Foods Act of 1990"			
Yes, bans all use	No	No	No
"**Organic": Certified by Oregon Tilth**			
Yes, bans all use	Yes, somewhat	Spot testing only	No
"Organic": Certified by Quality Assurance International (OAI) or Scientific Certification Systems (SCS)			
Yes, bans all use	No	No	No
"Sustainable": Certified by the Northwest Food Alliance			
Yes-extremely limited use	Yes	No	Yes, but limited
"Salmon Safe": Certified by the Pacific Rivers Council			
Yes, somewhat	Yes	No	Yes, but limited

(This chart courtesy of Nik Blosser and The Celilo Group)

Findings and Conclusion: Sustainable Agriculture Is Good for Farmers, Farm Workers, The Public, the Economy and Environment

Many farmers in Oregon and Washington argue that cost cutting is the only way that they can compete internationally. This often becomes an argument against investing in conservation tillage and IPM, for example, or an argument against investing in salmon. Saving salmon and conserving the environment, they say, is just too costly. This report has offered an alternative approach: a method to help farmers "tunnel through the cost barrier" by taking advantage of alternative yet proven environmentally and economically efficient methods of production.[54] From the data and case examples examined in this report, there appears to be ample opportunity for farmers to reduce costs, maintain or increase market share, and even improve profitability by adopting farm practices that conserve salmon and water quality. The health of farmers, farm workers and the general public would also be enhanced.

Let's visit our hypothetical farm again. When we last reviewed the accounts, we noted that adoption of conservation tillage methods, installation of riparian buffers, and application of IPM techniques for pest and weed management could potentially increase profit potential by 20% (increasing profit on 100 acres from $15,000 to $18,050). Here, we will consider that some farms may experience higher costs of converting to conservation tillage and IPM. We will assume that increased profit potential from these changes will fall between a lower bound of 5% and an upper bound of 20%.

Now suppose that our farmer pays $1500 to certify its crop and management practices. To be conservative lets assume that increased market access and/or price premiums yield a lower bound of 5% and an upper bound of 10% increase in returns (which is a very conservative estimate given that data shows many organic farmers are commanding 20% to 100% premiums over conventional products). That is, the 95 acres in crop production will now yield at the lower bound $315 and the upper bound $330 per acre rather than $300. Certification will increase total annual costs in the most conservative case to $15,650 and the more optimistic case to $13,450. Selling these certified products will increase total revenue from our base case of $30,000 to a lower estimate of $31,425 or a higher estimate of $32,850.

This makes for a total potential profit increase of somewhere between 4.5% to nearly 30% since the beginning of our hypothetical farm's transition to a salmon and environment friendly farm! It is even possible that an additional 10-50% may be added if the farm sells organically certified products. Table 2 explains the calculations.

TABLE 2

FINANCIALS FOR HYPOTHETICAL FARM – HIGH END

TYPE OF COST/REVENUE (COST)/BENEFIT	INCREMENTAL (COST)/BENEFIT	TOTAL
Original Production Costs ($150/ac)		
($15,000)		
Potential Cost Savings		
Conservation Tillage ($12.50/ac)	$1,250	
5-Acre Riparian Buffer	0	
IPM ($18/ac)	$1,800	
Certification Cost	($1,500)	
Adjusted Total Cost		**($13,450)**
Original Revenue ($300/ac)		
$30,000		
Potential Revenue Increases		
Increased Market Access/Price Premiums		
(10% Increase)	$2,850	
Adjusted Revenue		**$32,850**
TOTAL NET RETURN (PROFIT)	**$19,400**	
Percentage Increase Over $15,000 Original Net Return	**29.33%**	

FINANCIALS FOR HYPOTHETICAL FARM – LOW END

TYPE OF COST/REVENUE (COST)/BENEFIT	INCREMENTAL (COST)/BENEFIT	TOTAL
Original Production Costs ($150/ac)		
	($15,000)	
Potential Cost Savings		
5% Cost Savings	$750	
Conservation Tillage		
5-Acre Riparian Buffer		
IPM		
Certification Cost	($1,500)	
Adjusted Total Cost		**($15,750)**
Original Revenue ($300/ac)		
$30,000		
Potential Revenue Increases		
Increased Market Access/Price Premiums		
(5% increase)	$1,425	
Adjusted Revenue		**$31,425**

TOTAL NET RETURN (PROFIT) **$15,675**
Percentage Increase Over $15,000 Original Net Return **4.5%**

If all cropland in our two-state region could realize **just 25% of the cost savings** that our hypothetical farm did before certification (approximately $7.50/acre in gross savings), the region stands to save ***nearly $23 million annually***. If the agricultural industry can **increase returns by just 2%** through price premiums and increase market share in the growing sustainable foods market (a very conservative estimate given market trends), farmers stand to ***gain a minimum of $174 million annually***. These savings and increased returns are impressive. We challenge the agricultural community to show us data that demonstrates why this should not be the case.

To reiterate, the estimated increase in profits noted above are purely hypothetical and changes in labor and equipment costs, or the price of money needed to invest in the new practices may lead to lower profits or eliminate any increases. Yet, we believe our hypothetical farm is based on conservative and thus reasonable assumptions. Our financial projections therefore provide a sound starting point for a dialogue about more regional and site-specific costs and benefits. There is no doubt that each farm regionwide presents unique circumstances that may or may not allow for the complete adoption of sustainable or organic farming techniques.

Despite the hypothetical nature of the example, the findings strongly suggests that, at a minimum, **the cost of saving salmon and improving the environment on many farms will likely be offset by long-run cost savings, increased market access and/or increased price premiums resulting from the adoption of environmentally sustainable and salmon friendly production methods**. Hence, adopting these practices may simply be ***just a plain good business decision*** that leads to significant economic benefits for many farmers regionwide.

Ron Stewart from Columbia Gorge Organic Fruit Company in Hood River, Oregon, echoes this view. “That’s absurd,” he said, when asked if the costs of farming practices good for salmon, water quality and the environment are too high for farmers. “Farmers can comply with regulations, cut back on nitrogen and other inputs, rebuild the soil, and still survive. The techniques and the research are all there. We can succeed economically and move towards sustainability.”[55]

Will Newman of Natural Harvest Farms in Canby, Oregon, said it differently, “The costs of sustainable farming are not high in terms of money. It’s high in terms of the change in systems, it requires learning new stuff, doing new work. Those are the real costs.”[56]

If our conclusions are correct, then the debate about saving salmon and improving water quality on agricultural lands must be recast as a potential win-win opportunity to ***conserve the environment, save salmon and sustain agriculture***. Removing the political and policy obstacles for the adoption of these practices should become the central focus

on the debate. Assisting farmers to learn new practices and make the cultural change necessary should be the top priority. If farmers or agricultural organizations believe our conclusions are wrong, we ask for evidence demonstrating the errors in our approach or facts.

All agricultural production, whether conventional or innovative, requires investment in new and depreciating capital. Productive capability into the future depends on a continuum of such investment. In this report, we focused on investments to improve resource productivity (i.e., output per unit of resource). A long history of resource abundance has allowed Northwest agriculture to develop without much consideration of resource productivity. With increasing resource scarcity, however, this region is primed to take advantage of existing investment opportunities to decrease production costs and increase market opportunity through sustainable, salmon safe farming. The return on these environmentally beneficial investments may well be substantial and long-term.

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