Prime agricultural land protection: Washington State's experience

By John P. Reganold

WASHINGTON, like many states, is endowed with a highly productive agricultural land base, including a significant proportion of prime farmland. This resource is the foundation of a high-yielding crop production system and a strong agricultural export market.

Despite the importance of agricultural land, the public generally has taken this resource for granted. Typically, agricultural uses are treated as temporary, lasting only until a parcel of land increases in value and is readied for urban or other nonagricultural conversion. Conversion of agricultural land to nonagricultural uses, along with soil erosion, threatens this high-yielding crop production system.

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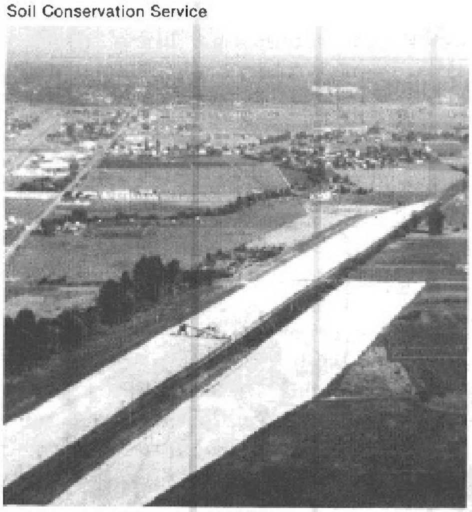
The effects of land conversion and degradation are felt all over the nation, of course, not just in Washington. Over the past 10 years, many states and counties have initiated programs to protect agriculturl resources, which, in many cases, are the base of their largest industry. States face similar prime farmland preservation issues. The various attempts at farmland protection have included property tax relief, zoning, purchase of development rights, and other programs. Experiences in Washington exemplify these issues and how to deal with them.

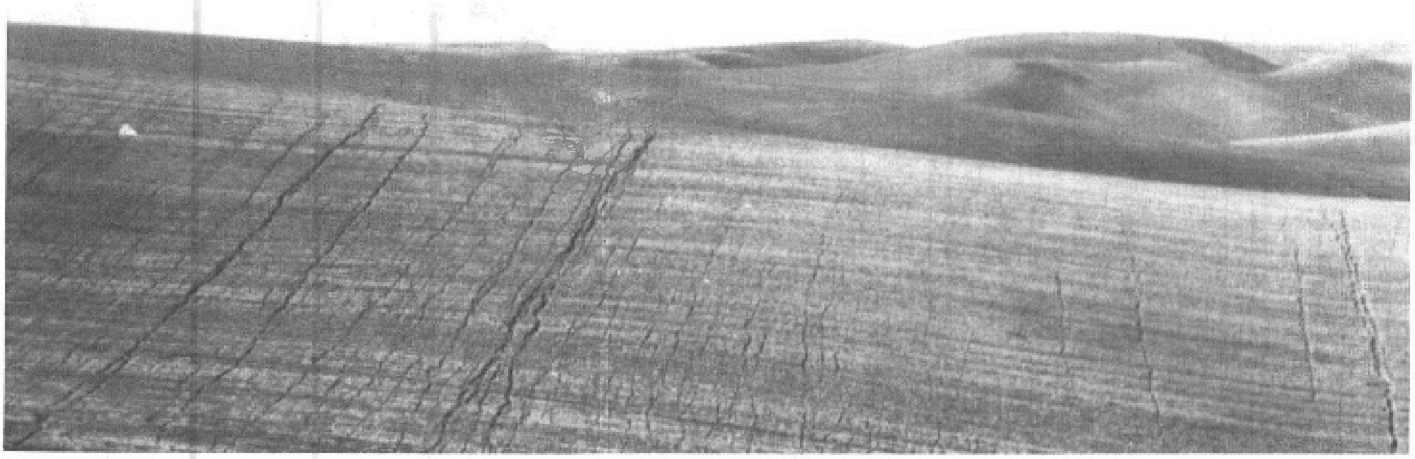
Justifications for preservation

A frequently cited reason for preserving agricultural land is alleviation of world hunger through greater U.S. crop production (*2, 4*). While ending hunger and starvation is more complicated than simply expanding agricultural production, expanded agricultural output will be necessary (*7*). Continued farmland losses, combined with slower rates of productivity increases, could significantly endanger future agricultural output (*2, 11, 16*).

Other reasons for farmland preservation include maintenance of sufficient commodities for domestic consumption; protection of local, state, and regional econo-

Soil Conservation Service





Prime farmland gives way to freeway development (top left) in King County. Irrigated raspberries (top right), Whatcom County. Rill erosion on wheatland (bottom) in the Palouse River Basin.

mies; maintenance of open space; and increasing exports to balance the U.S. foreign trade deficit (*1, 15, 17*).

Agriculture in Washington is vital to maintaining the supply of commodities for domestic consumption and the state's economy. In 1984, the value of production for Washington farm commodities surpassed $3 billion (*26*). The state ranked first in production of hops, spearmint oil, sweet cherries, and apples and second in apricots, asparagus, prunes and plums, pears, fall potatoes, peppermint oil, carrots for processing, and green peas for processing.

Agricultural land losses

Bureau of the Census data indicate that Washington lost about 23,800 acres of agricultural land annually between 1970 and 1980 (*9*). The Soil Conservation Service national resource inventories produced annual conversion figures of roughly 26,800 acres between 1967 and 1982 (*19, 20*).

Retaining high quality, developed farmland in Washington is a challenge, particularly in fast-growing urban areas. For example, it is estimated that the Puget Sound area may lose between 20 and 27 percent of its agricultural land to urban uses between 1980 and 2000, depending on medium or high population growth projections (*14*). More importantly, irrigated agricultural land will bear the brunt of the urban expansion. This same analysis predicted that the Puget Sound area may lose between 75 and 100 percent of its present irrigated agricultural land—about 45,000 acres—by the year 2000. Other areas of the state that may lose significant irrigated agricultural land in the next 15 years are the Kittitas-Yakima and southwest central areas.

Conversion of agricultural land to urban uses creates problems for future generations, but the mere threat of urbanization or other nonagricultural development produces an atmosphere of uncertainty for farmers near urban centers. This contributes to an unhealthy agricultural economy because of farmers' reduced investments in crop production and the decline in the farm service sector (*8*). High interest rates and ambiguous government policies also compound agricultural production problems.

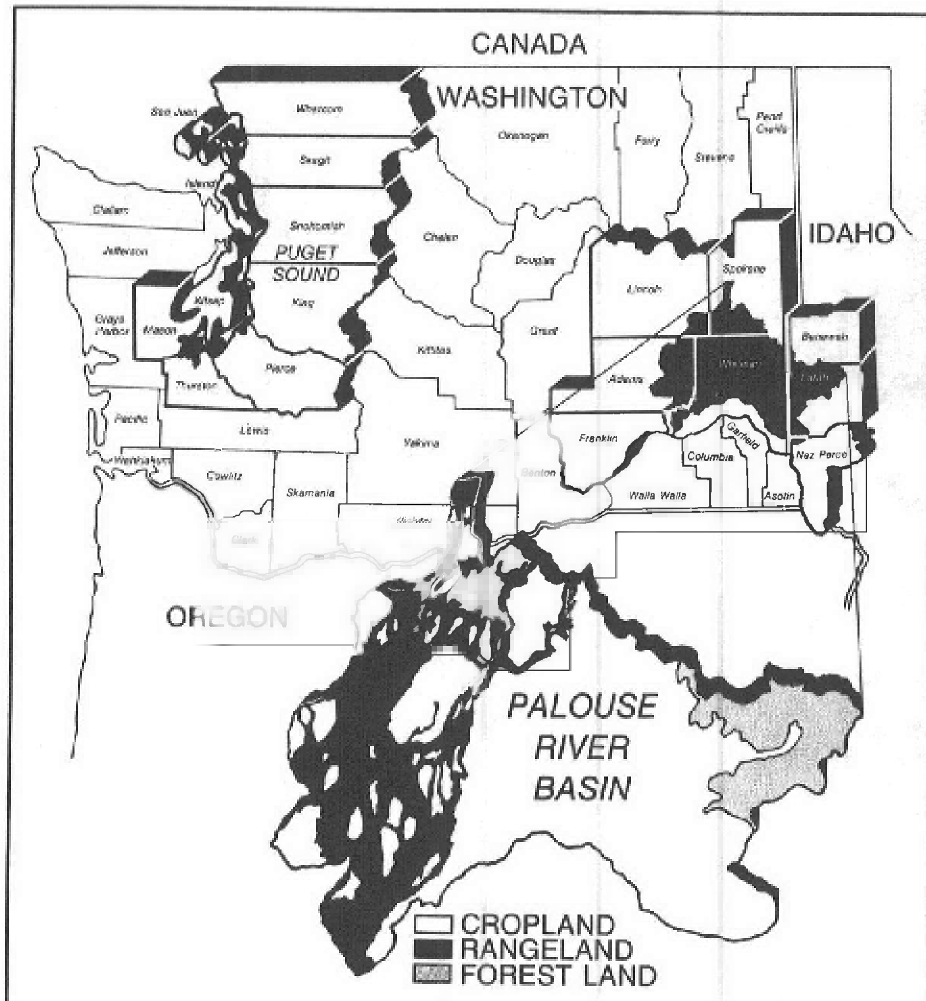
Soil erosion and the accompanying decline in soil fertility also contribute to agricultural land loss. Technological advances have masked much of this decline in soil fertility (*3, 25*). Studying the relationship between winter wheat yields and topsoil depths in the Palouse region, researchers concluded that technological progress increased yield damage from erosion when yield damage was appropriately measured as the reduction in potential yields (*25, 29*). In other words, how much higher would yields have been with today's improved technology if there had been no topsoil erosion?

Improved plant varieties and cultural practices have the greatest potential for increasing winter wheat yields on deep, relatively uneroded topsoils in the Palouse (*29*). Uncontrolled erosion can substantially stunt this technological payoff. Technological progress in the past, measured in yields, also may create a false sense of security about future yield trends. At some point the increasing yield reduction from erosion can exceed the diminishing yield boost from technical progress. Such forecasts reinforce the economic justification for soil conservation.

D. J. Walker and D. L. Young plotted projected future winter wheat yield trends versus 1980 topsoil depths of 6, 12, and 18 inches in the Palouse (*25*). The two researchers assumed an annual growth yield rate of one percent per year under a conventional tillage system that permits an annual average soil loss of 27 tons per acre. The average rate of soil erosion due to wind and water on cropland in the Palouse is 14 tons per acre each year (*21*). This rate, which excludes gully and tillage erosion, is almost three times the maximum tolerance value of five tons per acre per year. In addition, the 27-ton-per-acre figure easily falls within the range of erosion rates in the Palouse, where rates of 20 to 30 tons per acre are common and losses of 100 to 200 tons per acre occur occasionally on some steep slopes (*21*).

Walker and Young found that yields top out and begin to decline after 64, 34, and 4 years on the successively shallower soils. Projected yield trends were terminated at the point at which the subsoil was reached because little is known about the impact of continuing technical progress and erosion on land from which all topsoil has been removed (*25*). With proper soil conservation

Puget Sound and Palouse River Basin areas of Washington State.



practices and protection of prime farmlands, which generally have thicker topsoils, from conversion, future crop yields will benefit more from advances in general agricultural technology.

Soil loss is only one aspect of the soil erosion and farmland loss relationship. Evidence also suggests that as prime farmlands are converted to other uses marginal lands, which are more susceptible to erosion, are brought into production. Consequently, topsoil loss increases.

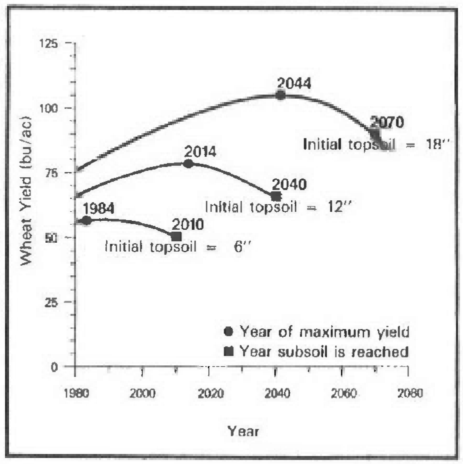
Preservation options

While evidence supports the need to protect prime agricultural lands, there are alternative and supplementary preservation strategies. Such strategies include increasing production intensity on the land available, expanding production on more marginal land, conducting research into new agricultural systems, and changing food consumption habits.

All are possible. But each has a number of constraints, and feasibility in some cases remains questionable. The most controversial option is increasing crop yields on land now under cultivation. Some researchers (*18*) report favorable trends in the rate at which world agricultural output has grown and suggest positive growth rates. Others (*3*) report a recent decrease in crop yield growth rates and warn of continuing declines in the future.

Productivity increases are reflected in historical crop yields and yield trends, which in turn are useful for forecasting future production trends. One analysis of yield trends for dry beans, dry peas, lentils, wheat, and barley from 1950 to 1981 revealed that wheat yields showed a significant upward trend (*10*). But growth trends for wheat slowed during the past decade compared to the 1950s and 1960s. Barley and dry pea yield rates increased significantly during all three decades. Yields of dry beans and lentils showed no significant growth rates. And what do these data suggest? That reliance only on biotechnology is risky. Soil conservation and prime farmland preservation provide healthy insurance.

Expanding agricultural production on more marginal lands may have serious constraints: less productive soils, fewer developed resources, greater distances to markets, and increased soil erosion (*17*). Also, the uncertainties and controversies surrounding development of new irrigation facilities and allocating water for newly converted land reduce the prospect for compensating prime farmland loss with new irrigated lands.



Wheat yield trends under conventional tillage on Palouse farmland with varying initial topsoil depths.

In a 1981 report on new irrigation development in the Pacific Northwest, Washington State University researchers concluded that "the expected economic value of the increased crop production due to irrigation at this time is less, in nearly all cases, than the economic value of the land, labor, capital, water, and energy that must be used to build and operate the irrigation system and farm the land" (*28*). They also found that further irrigation development would require substantial amounts of additional thermal power to offset the hydropower lost because of streamflow depletions and to provide the power needed to lift and pressurize irrigation water supplies. In addition, a large share of the costs of additional irrigation development would be sustained by present agriculture through increased electricity costs and possible reduced crop prices due to increased production.

Seeking new forms of agriculture has its constraints. New systems require implementation of technology that has not been proven on a large scale. Such technologies include fish culture and kelp farming (*13, 27*).

Changing food consumption habits of Americans would require major sociological transformations. And large areas of land now producing feed grains would have to be converted to grains for people (*12*). Most Americans are accustomed to consuming red meat products, so this change would occur slowly.

Farmland protection methods

Proponents of prime farmland protection believe that specific programs are needed near growing urban centers because it is here that agricultural land losses are the greatest. Such areas are closer to markets and thus less vulnerable to increasing transportation costs. Proponents argue that such programs should assign priority to agricultural uses while recognizing the need to coordinate agricultural and other land use policies.

Several agricultural land preservation approaches have been adopted in Washington. For example, Clark, Skagit, Whitman, and Yakima Counties have enacted farmland protection progams based on agricultural zoning (*23*). But their programs are quite dissimilar. Clark County allows the most residential dwellings in agricultural zones, while Whitman County prohibits nonfarm residences in agricultural zones, except on poor soils adjacent to roads. Skagit and Yakima counties require large minimum lot sizes for homes in agricultural areas.

Zoning programs, while a start toward protecting farmland, are vulnerable to local political changes. As F. R. Steiner and his associates warn, "as growth pressures build or as new governmental officials take office, the existing agricultural zoning program may be weakened or changed" (*23*).

King County has initiated the purchase of development rights to control farmland conversion (*22*). That ordinance divides eligible farmlands into three purchase priorities. First priority lands are those most threatened by development and thus fit in the first purchase round, and so on. Development rights' values are determined by subtracting the appraised value of the property as farmland from its appraised value for its "highest and best use." Although purchase of development rights may be a permanent solution to retaining farmland, such programs may be too expensive to protect much farmland.

In addition to county farmland protection programs, Washington's Open Space Taxation Act seeks to keep farmland in agricultural uses (*5*). This deferred taxation program provides for preferential assessment of eligible rural lands. Some or all of the property tax relief, however, must be paid back when the land is withdrawn from the program. For example, if a landowner withdraws from the program before the 10-year minimum period expires and/or without the necessary two-year notification prior to withdrawal, a rollback tax plus a penalty equal to 20 percent of the rollback tax is assessed (*5*).

Washington's program has been in operation for only a short time. Examinations of older, similar programs in other states, however, reveal that, because the rollback tax is frequently less than the property tax the landowner has saved, the landowner will not pay more than he would have had he never participated in the program (6). Thus, deferred taxation programs may not prevent landowners from selling property.

Whitman County was one of 12 counties selected in 1981 for a nationwide pilot program to evaluate farmland being considered for conversion (24). The program, undertaken by the Soil Conservation Service, used the land evaluation and site assessment (LESA) system to weigh agricultural capability with site-specific characteristics for a given area. The first opportunity to test LESA in Whitman County occurred when the Washington Water Power Company sought to locate a substation near the town of Albion. Four possible locations for siting the substation were reviewed and ranked using LESA. Although the power company chose the recommended site—that with the lowest LESA rating—in the end its construction was not warranted due to lack of energy demand.

The LESA system is a comprehensive and useful system for local land use decision-making. The system provides a reasonable and straightforward method for evaluating agricultural viability. It can also be used in conjunction with several other farmland protection policies.

Farmland protection programs, in Washington and elsewhere in the country, are not by themselves a panacea for protecting important farmlands. Such programs deal with only a part of the overall problem. Most farmland protection programs have a short history, and their long-term effectiveness still faces difficult tests. But they do help farmers to continue in farming and nonfarmers to enjoy the fruits of the farmers' labor and the resulting open space.

An eye to the future

As Washington's population expands, a shrinking cropland area and continued soil erosion will combine to reduce steadily the topsoil available for food production. It is important that Washington residents become aware of how both conversion and erosion influence important local, state, national, and international agricultural issues.

Land conversion data must be updated at the state level to get a more accurate estimate of the rate of agricultural land conversion and to include degradation of agricultural lands because of soil erosion. More reliable data could be gathered using aerial photographs or Landsat data on a county-by-county basis. A tracking system could be designed to predict future agricultural land losses and land use changes. Such a tracking system would allow local governments to plan for land use changes, to allocate less productive or nonprime farmland for nonagricultural uses, and to initiate conservation practices on slowly eroding farmlands that might otherwise become unproductive in the future.

Prime farmland protection analyses need to consider the ecological, social, and economic impacts of pursuing and implementing alternative strategies in addition to or in lieu of protecting agricultural lands.

Finally, existing methods of preserving agricultural land—those in Washington and in other states—must be evaluated to determine their effectiveness. Agricultural land retention programs must be tailored to specific counties. Landowners near population centers, who are most susceptible to development and conversion pressures, need to be educated to participate in such programs.

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