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Agricultural changes and farmland protection in western Washington

Linda R. Klein and John 1? Reganold

Eastern Washington's temperate climate, scenic beauty, proximity to recreation areas, and economic opportunities make it a highly desirable place to live and, therefore, the most rapidly urbanizing and densely populated area of the state. The temperate climatic conditions together with the rich, alluvial soils of the region's river valleys, also create a unique environment conducive for a number agricultural enterprises that contribute a relatively large share to the state's total agricultural sector earnings.

Because of projected population growth rates and accelerated urban expansion, many believe that the stability of the region's agricultural industry is being threatened. Western Washington residents have supported some form of farmland protection legislation since the early

Photo left: Expansion of North Bend city limits onto surrounding farmland in King County, Washington (photo courtesy of King County Resource Land Section of the Water and Land Resource Division)

1970s, evidence of their belief that the land market is not adequately protecting farmland. However, despite continued efforts for protection, several research reports (Northwest Economic Associates 1979; Christensen 1986; Reganold 1986; Thompson, Jr. 1993) have concluded that agricultural resources in western Washington have been and will continue to be under extreme pressure for conversion to nonagricultural uses.

Results from two consecutive surveys (Brand 1981; Christensen 1986) of western Washington county planning departments indicated that the effectiveness of Washington's county farmland protection strategies have been "poor" to "moderate" ac best. Both surveys did recognize that measures of "effectiveness" are relative and often subjective and acknowledged the difficulty in accurately evaluating the "success" of particular strategies due to either the short time frame in which these strategies had been in place or the lack of reliable and consistent monitoring of county farmland changes.

Based partially on reports of the limited success of county farmland protection measures, the Washington State legislature recently enacted the 1990 Washington State Growth Management Act (GMA). The GMA requires the most populated and fastest-growing counties to adopt comprehensive land-use plans, including provisions for the protection of agricultural lands of long-term commercial significance for the production of food or other agricultural products (RCW 36.70A.060). We question the efficacy of implementing a host of farmland protection strategies (regardless of which level of government is enforcing them) when a system for monitoring farmland changes and the causes for those changes is lacking. In fact, as recently *as* March of 1995, several western Washington county planners and U.S. Natural Resource Conservation Service (NRCS) personnel (personal communications) indicated that monitoring farmland resource changes at the county level had still been limited, inconsistent, and of low priority.

Apparent concern for protecting western Washington's agriculture is not a unique situation, but is indicative of other rapidly urbanizing areas of the country. To accurately evaluate the stability of local agricultural industries and the necessity or effectiveness of farmland protection, the character of and changes in agriculture at the county level need to be defined, quantified, and actively monitored. Using western Washington as an example, we use existing county-level data from the Washington State Office of Financial Management, the U.S. Census of Agriculture, and the U.S. Bureau of Economic Analysis to describe population pressures in western Washington and to examine the character and changes in the amount and structure of agriculture in this region between 1974 and 1992. We also report the results of our recent survey of western Washington planning departments which provides insight into local concerns and issues surrounding farmland resources and assesses the effectiveness of farmland protection strategies since 1985.

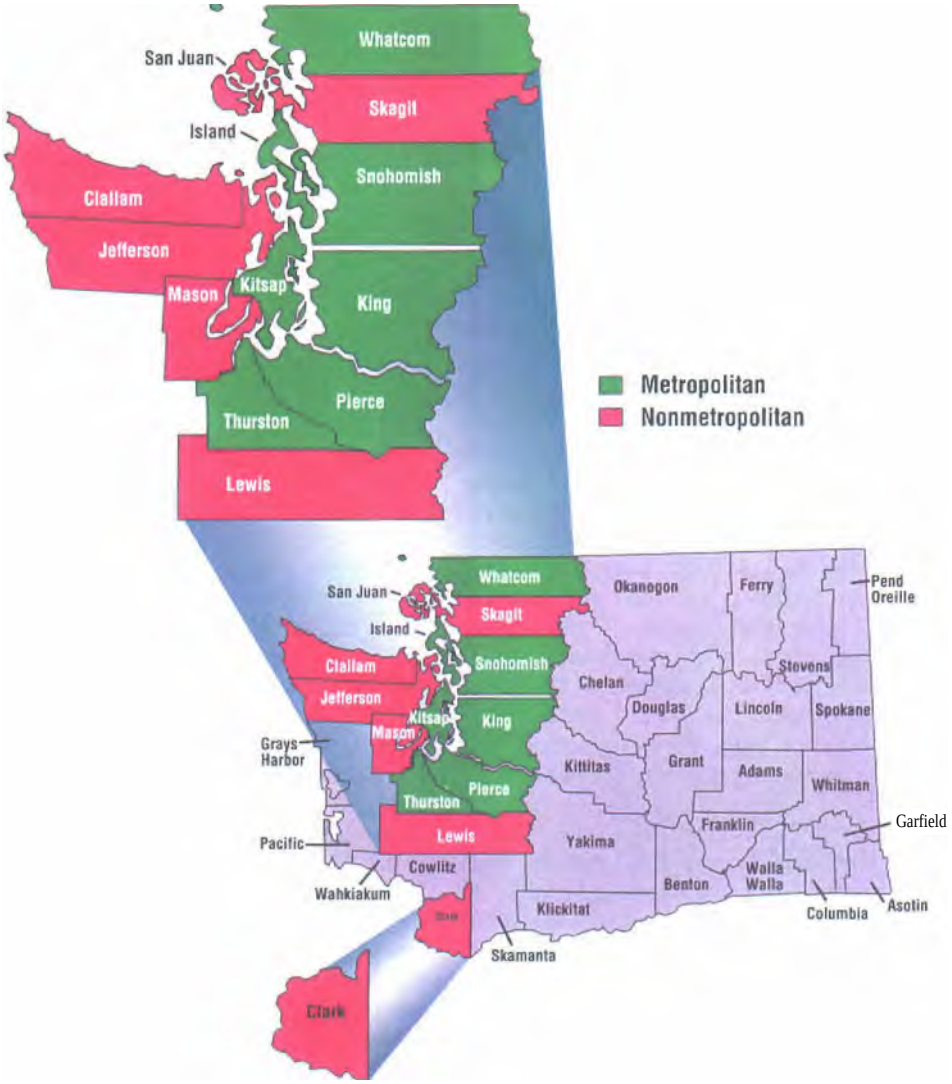

Figure 1. The 14 county western Washington study area divided into metropolitan and nonmetropolitan counties

Background

Study ***area, population pressures, and crop production.*** Washington is divided into distinct eastern and western geographic areas by the Cascade Mountain range. We chose 14 of the 19 counties in western Washington for our study (Figure 1) since they were the most populated or the fastest-growing as defined in the GMA (RCW 36.70A.040.). These 14 counties (hereafter referred to as "western Washington") were most likely to contain farmland under the greatest pressure for conversion to nonfarm uses. They were further divided into eight metropolitan and six nonmetropolitan counties (Figure 1), which allowed us the additional opportunity to study relationships between the degree of urbanization and the amount and structure of agriculture.

Although western Washington encom-

passes less than one-third of the state's total land area, in 1992 this region contained nearly 75 percent of the state's 5.1 million people and had a population density three times that of the state's Soil Conservation Service (SCS), unpublished report, 1989; Office of Financial Management (OFM), 1993a). The aggregate population density in the metropolitan counties was 212 persons/km' (549 persons/me) and in the nonmetropolitan counties 21 persons/km' (55 persons/me).

Between 1974 and 1992, more than 80 percent of the state's total population increase occurred in western Washington, while more than 90 percent of western Washington's population increase occurred in the eight metropolitan counties (OFM 1981, I993a). According to population forecasts, in the 20 years between 1992 and 2012, western Washington should again receive more than 80 percent of the state's total increase and the metropolitan counties should again receive more than 90 percent of western Washington's increase (OFM 1992a, 1993a, 1993b).

In 1992, western Washington comprised only about 5 percent of the state's farmland, but contained more than 33 percent of the state's farms (Bureau of the Census 1994) and contributed nearly 23 percent to the state's total agricultural sector earnings (Klein 1995), indicating that this is an important agricultural region. Collectively, these 14 counties produce a majority of the state's berries, Christmas trees, green peas, lettuce, silage corn, milk, eggs, broiler chickens, and nursery and greenhouse products.

Definitions. As defined by the Bureau of the Census (1994), a "farm" refers to "any place from which $1,000 or more [gross] of agricultural products were produced and sold, or normally would have been sold, during the census year." A "farm operator" is defined as the person who is in charge of the farm operation, making daily decisions about planting, harvesting, feeding, and marketing. "Farmland" is defined as agricultural land used for crops, pasture, or grazing, and other land in the farm operation not classified as cropland, pastureland, or woodland, including land in house lots, barn lots, ponds, roads, ditches, and wasteland.

Temporal considerations. The study was limited to agricultural census years from 1974 through 1992 for two reasons. First, the definition of a "farm" changed between the 1969 and 1974 U.S. Census of Agriculture but remained consistent thereafter. Second, this time period encompasses the lifespan of a majority of Washington's state and county farmland preservation legislation. This time frame, therefore, presents an opportunity to evaluate the effectiveness of farmland preservation strategies that have been in place for a relatively long period of time with respect to concurrent agricultural changes.

Farm and farm operator characteristics

Farms. The eight metropolitan counties of western Washington contained more than 70 percent of the region's farms in every agricultural census year of the study period. Overall, the number of farms in western Washington increased by 10 percent between 1974 and 1992, with 96 percent of this increase occurring in the metropolitan counties. However, farm numbers began to decline after their highest levels in 1982. Between 1982 and 1992, metropolitan and nonmetropolitan farms experienced similar rates of decline (about 20 percent).

With the region containing about one-third of the state's farms on only 5 percent of the state's Farmland, it is not surprising that many of these farms are relatively small. In 1992, the average-sized western Washington farm was one-seventh that of the state's and has continued to decrease in size. Between 1974 and 1992, the average metropolitan county farm decreased from 31 to 24 hectares (77 to 59 acres) and the average nonmetropolitan county farm decreased from 57 to 40 hectares (141 to 99 acres). The percentage of farms in western Washington less than 4 hectares (10 acres) in size nearly doubled during this same time period, from 12 to 23 percent (Table 1).

Farm operators. Most farm operators in western Washington are considered "hobby farmers." Farm operators can earn an additional income by producing agricultural products as a secondary, part-time business and lower their property taxes by taking advantage of Washington State's Open Space Taxation Act (RCW 84.34). In 1974 and in 1992, almost 60 percent of western Washington farms grossed less than $5,000 in annual sales of agricultural products (Table I).

The average age of western Washington farm operators increased from 51 years in 1978 to to 54 years in 1992. Data also suggest that fewer young people are choosing farming as a career. In 1978, nearly 13 percent of western Washington's farm operators were 34 years or under compared to about 7 percent in 1992 (Table 1).

Farmland area and tenure

Farmland area. In 1992, about 10 percent of western Washington's nonfederal land area was utilized as farmland and more than 60 percent of the region's total farmland area was located in its metropolitan counties (Bureau of the Census 1994; SCS, unpublished report, 1989). During the 18-year study period, western Washington's farmland decreased by 13 percent, a rate two times faster than the state's. Of more concern, perhaps, is that nearly all of this farmland area decline occurred during the most recent 10-year agricultural census period, 1982-1992, when metropolitan county farmland decreased by 15 percent and nonmetropolitan county farmland decreased by 17 percent (Table 2). Compared to Washington State's farmland decline between 1982 and 1992, western Washington's farmland declined at a rate 3.5 times faster.

Farmland tenure. In 1992, 72 percent of all farm operators in western Washington owned all the land they farmed; the

Table 1. Selected farm and farm operator characteristics (source: Bureau of the Census, 1977, 1981, 1994)

	Farms <4 hectares (% of total)		Farms <$5,000 sales' (% of total)		Operators' <34 years (%)	
REGION	1974	1992	1974	1992	1978	1992
Western WA	12.4	23.1	57.5	58.9	12.5	6.6
Metropolitan	14.9	26.3	57.2	59.8	12.5	5.7
Nonmetropoittan	5.8	13.7	58.4	56.1	12.5	6.8

• Values for "sales" are defined as the gross market value (not adjusted for inflation) before taxes and production expenses of all agricultural products sold or removed from a farm for any one census year. but not necessarily crops harvested in that year, regardless of who received the payment.

These percentages are based on current dollar values and are not directly comparable without considering the affect of inflation. If adjusted for inflation, the 1992 dollar figures would be worth less in terms of the buying power compared to 1974 dollar figures.

Operator age data only applied to sole proprietorships and family partnerships in the 1974 census year, whereas this characteristic was collected from the senior partner or person in charge on all farms for 1978-1992. Therefore, 1974 data were excluded due to lack of comparability with subsequent census years.

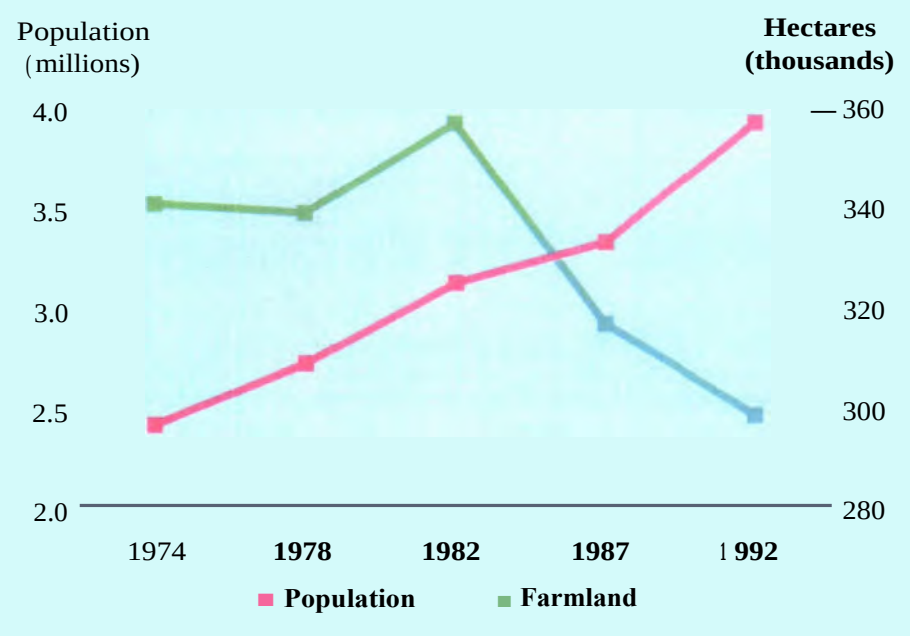

Figure 2. Relationship **between** population growth and farm/and changes in western Washington for each agricultural **census** year from **1974 through 1992 (Sources:** Bureau of the Census. **1977-1989, 1994: OFM, 1992b,** 1993a)

other 28 percent either rented all or a portion of the land they farmed. Although the percentage of farm operators who relied on rented land for part or all of their farming operation remained essentially steady between 1982 and 1992, about 96 percent of the total decrease in farmland area was land owned by farm operators. This large decrease in the amount of farmland owned by farm operators compared to that rented resulted in a small increase in the percentage of rented land from 29 percent in 1982 to 33 percent in 1992 (Table 2). Increasing rented land may signal a future instability of the agricultural resource base; economic conditions may be forcing farm operators to farm additional rented land and landowners may be renting to farm operators while waiting for land prices to increase enough to sell for nonfarm uses.

Agricultural sector earnings

Western Washington's agricultural sector earnings (adjusted for inflation) experienced an overall decline of 18 percent between 1974 and 1992 and became less important relative to other industry shares of total industry earnings (Table 3). In contrast, the region's agricultural sector earnings grew by approximately 50 percent between 1982 and 1992, despite the concurrent 16 percent decrease in farmland area.

Based on percentage contribution to the state's total agricultural sector earnings, the value of western Washington agricultural products increased relative to the value of agricultural products from other parts of the state. For example, Western Washington increased its share of the state total agricultural sector earnings in each agricultural census year ranging from 17 percent in 1974 to 23 percent in 1992 (Table 3). Metropolitan counties contributed more to the region's total agricultural sector earnings than the nonmetropolitan counties, accounting for approximately 70 percent in every census year of the study period.

Analysis of relationships

Degree of ***urbanization and structure of agriculture.*** Our data and calculations revealed that the majority of farms, farmland, and agricultural sector earnings were associated with the metropolitan counties. These findings suggest that farming in these metropolitan areas may offer locational advantages not available in more rural areas. Metropolitan farm operators can take advantage of a larger consumer base, more efficient transportation systems, shorter distances to local markets and shipping facilities for foreign markets, and direct marketing opportunities, all of which tend to result in lower transportation and input costs.

Part-time, small-scale farming operations are common in western Washington. Environmental conditions and plentiful local markets are conducive to the production of high-value crops such as fruits, vegetables, and nursery and greenhouse products, that can he grown profitably on small acreages. In addition, the greater opportunities for off-farm employment in highly urbanized areas, such as the metropolitan counties of western Washington, may increase the prevalence and stability of small, part-time farming operations.

Population pressures and farmland changes. We found that population increases were not always associated with concurrent losses of farmland. For example, during the 1978-1982 period, both farmland and population increased (Figure 2). In addition, the highest population growth rate of any agricultural census period (15 percent between 1987 and 1992) did not correspond with highest rate of farmland decline (10 percent between 1982 and 1987). Furthermore, the metropolitan counties experienced farmland increases with concurrent population increases during two consecutive agricultural census periods, 1974-1978 and 1978-1982. Our data illustrate that agricultural growth or decline in any geographic region is a complicated process and is influenced by other factors in addition to population growth and degree of urbanization, such as general economic conditions, political climate, environmental regulations, or availability of other resource land for nonfarm uses.

Survey results

The 14 western Washington county planning departments indicated *in our* 1995 survey that the protection of agricultural land at the county level was important primarily for the following reasons: maintaining the agribusiness sector, maintaining local food supplies, preserving rural lifestyles, and preserving open space.

Causes of farmland conversion to nonfarm uses. County planning departments reported that the conversion of farmland to nonfarm uses stems from influences of urbanization. All but one of the planning departments (Kitsap) rated the current pressure on farmers to sell their farmland for nonfarm uses due *to* increases in land values and property tax assessments as moderate or high. Planners generally agreed that future population increases will increase the demand for, and therefore the value of, land in nonagricultural uses. All counties reported that there will be moderate or high development pressure to convert agricultural land *to* urban or built-up uses between 1995 and 2012.

A 1985 survey of county planning departments (Christensen 1986) found that

Table 2. Changes in farmland area and farmland tenure
(Source: Bureau of the Census, 1977. 1984. 1994)

	Farmland changes: 1974-82		Farmland changes: 1982-92		Changes in operator-owned vs. rented farmland: 1982-1992		Rented farmland (percentage of total)	
REGION	Hectares	%*	Hectares	"/.'	Owned (Hectares)	Rented (Hectares)	1982 (%)	1992 (.°4,1
Western WA	12,582	3.69	-56,124	-15.86	-53,825	-2,299	28.5	33.1
Metropolitan	13,448	6.42	-34,416	-15.43	-34,622	206	26.8	31.8
Nonmetropolitan	-867	-0.66	-21,708	-16.59	-19,301	-2,407	31.2	35.2

• The absolute change in total farmland from 1974 to 1982, as a fraction of 1974
The absolute change in total farmland from 1982 to 1992, as a fraction of 1982

Table 3. Trends in earnings* from the agricultural sector,
Selected measures of relative importance of these earnings are illustrated as percent of each region's total industry earnings and as percent of state total agricultural sector earnings. (Source: Gary *W.* Smith, *Exrension* Economist. Washington State University, unpublished reports based on s tatistics from the Bureau of Economic Analysis (BEA). 1974-1992, U.S. Department of Commerce)

	Change in ag. sector earnings' (%)	Change in ag, sector earnings' (°/0)	Ag. sector share of total industry earnings (%)		Share of state total ag. sectorearnings (%)	
REGION	1974-1992	1982-1992	1974	1992	1974	1992
Western WA	-17.7	50.3	1.3	0.54	16.7	22.7
Metropolitan	-13.9	50.1	0.96	0.4	11.2	16.0
Nonmetropolitan	-25.6	51.0	7.1	3.6	5.5	6.8

• "Earnings" are reported by place of work and include wages and salaries, other labor income and proprietors' income (does not include property income or transfer payments).
"Agricultural sector" is covered by 1987 Standard Industrial Classification Major Group Numbers 1 and 2: Le., any establishment that produces crops, plants, vines, and trees (except forestry operations) or raises livestock for the sale of livestock or livestock products (includes animal specialties).
Earnings were adjusted for inflation by converting current dollars to 1987 constant dollars using the BEA's Implicit Price Deflator for Personal Consumption.

Table 4, **Comparison of the relative effectiveness of** western Washington county farmland protection strategies for slowing the conversion of agricultural land to urban **or built-up uses in 1985 and 1995 and explanatory comments**

County	1985 Christensen Survey	1995 Klein Survey	Survey Comments (1995)
Clallam	no response	low/high	low 1985-1992; high 1992-present due to "clustering" zones
Clark	moderate	low	cluster development caused increased parcelization
Island	moderate	moderate	
Jefferson	n/a	n/a	no farmland protection strategies implemented
King	high	moderate	not all "good" soils are being protected; not all land protected is currently being farmed
Kitsap	low	low	
Lewis	n/a	n/a	no farmland protection strategies implemented
Mason	n/a	no effectiveness	no farmland protection strategies implemented in 1985
Pierce	no effectiveness	no *effectiveness*	new strategies not implemented yet
San Juan	moderate	moderate	
Skagit	moderate	high	eliminated 'loose" policy that created substandard lots in agricultural zones
Snohomish	moderate	moderate	
Thurston	n/a	n/a	no strategies in 1985 and *new* strategies just adopted in 1993 so too early to tell
Whatcom	moderate	moderate to low	a lot of farmed land is not protected so there is nothing to stop conversion to 2-hectare+ homesites

residential development was primarily responsible for the conversion of farmland to urban uses in western Washington. In our 1995 survey, 13 out of the 14 counties also rated some form of residential infrastructure (i.e., residential growth at urban fringes, rural subdivisions, and large-lot zoning) as the primary cause of agricultural land conversion to nonagricultural uses since 1985.

Urban expansion, however, can sometimes be an indirect response to another cause of farmland decline. In some western Washington counties, for example, stringent environmental regulations have resulted in the reduction of land in dairy farms as well as the consolidation of smaller dairies into larger, more efficient operations. These regulations, aimed at protecting ground and surface waters, require expensive and complex measures for livestock waste management which many smaller dairy operators have been financially unable to implement. Nine out of

Table 5. Amounts of long-term commercially significant agricultural land and current and proposed methods for protection as **required by the GMA (Source: Klein, 1995)**

County	Agricultural land of long-term commercial significance'	Total farmland (hectares)	chi of total farmland (hectares)	Methods for protection (current and proposed)
Clallam	**2,954**	**9,815**	30.1	comprehensive planning, promotion of open space taxation, residential clustering in agricultural zones, TDR and PDR (proposed)
Clark	34,480	33,577	102.72	comprehensive planning, large-lot zoning. promotion of open space taxation, TDR (feasibility study)
Island	7,811	**7,902**	**98.8**	comprehensive planning, large-lot zoning, agricultural exclusive zoning, TDR, promotion of open space taxation, right-to-farm ordinances
Jefferson	0	3.886	0	comprehensive planning. 'resource production zones" (1 homesite/2 hectare min. lot size, but not strictly enforced)'
King	**17,402**	17,115	101.71	comprehensive planning, large-lot zoning, agricultural non-exclusive zoning, PDR, purchase and resale or lease with restrictions, promotion of open space taxation, development permit system'
Kitsap	0	4.169	0	comprehensive planning. promotion of open space taxation, right-to-farm ordinances'
Lewis'	n/a	**45,433**	n/a	n/a
Mason	0	4.438	0	comprehensive planning. promotion of open space taxation, exemption from some county environmental regulations'
Pierce	7,097	23,776	**29.8**	comprehensive planning, agricultural non-exclusive zoning, promotion of open space taxation
San Juan	4,381	8,308	52.7	comprehensive planning, large-lot zoning, agricultural non-exclusive zoning, promotion of open space taxation, development permit system
Skagit	38,770	**37,262**	**104.0'**	comprehensive planning, large-lot zoning, agricultural non-exclusive zoning, promotion of open space taxation, development permit system, right-to-farm ordinances
Snohomish	28,208	30,010	94.0	comprehensive planning. large-lot zoning agricultural non-exclusive zoning. promotion of open space taxation
Thurston	4,856	**24,237**	**20.0**	comprehensive planning, agricultural exclusive-use zoning, residential clustering in agricultural zones, promotion of open space taxation, TDR and PDR (proposed)
Whatcom	38,026	47.810	79.5	comprehensive planning, large-lot zoning, agricultural non-exclusive zoning, promotion of open space taxation, hold harmless agreements on plats/subdivisions near farming activities, right-to-farm ordinances, TDR (proposed)
Western WA	**183,985**	**252,305'**	**72.9**	

"includes the growing capacity, productivity, and soil composition of the land for long-term commercial production. in consideration with the land's proximity to population areas, and the possibility of more intense uses of the land" [RCW 36.70A.030 (10)).
>100% due to land being protected that does not fall into definition of farmland per U.S. Census of Agriculture
Policies exist to encourage farming in rural zones even though no strict agriculture zone designations.
All funds exhausted for PDR or purchase and resale programs
Lewis County's comprehensive plan is in infancy stages because not included in GMA until 1993
Lewis County total farmland excluded

the 14 county planning departments rated the significance of stringent government regulations for influencing the conversion of farmland to nonfarm uses as high or moderate.

Effectiveness of ***farmland protection strategies.*** County planning departments were asked to rate the overall effectiveness of their farmland protection strategies for slowing the conversion of agricultural land to urban or built-up uses since 1985. When we compared our responses to those in the 1985 Christensen survey (Table 4), only one county (Skagit) increased its rating from moderate in 1985 to high in 1995, seven reported the same rating as in 1985, one county (King) dropped from high to moderate, and one county (Clark) dropped from moderate w low. This information suggests that farmland protection strategies in western Washington, such as large-lot zoning, agricultural zoning, promotion of open space taxation, and right-to farm ordinances, are not any more effective and perhaps even less so than they were 10 years ago.

Ten of the 14 counties identified and designated for protection agricultural Land of long-term commercial signifi: cance as required by the GMA [RCW 36.70A.030.(10)] (Table 5). Many of the current and proposed methods, however, are no different than previous strategies (Table 5) and, based on past performance, questionable as to their ability to slow the conversion of agricultural lands or to provide much permanent protection in the future. Most county planning departments believed that the influence of

the state's GMA would result in only slightly greater effectiveness, if any, compared to that of the previous strategies enforced by local jurisdictions alone.

Farmland preservation programs that are voluntary and provide compensation to the landowner for decreases in land value, such as *Purchase of Development* Rights (PDR) or Transfer of Development Rights (TDR), tend to be politically more favorable and to provide permanent protection. We found, however, that counties having proposed TDR and PDR programs (Table 5) are uncertain chat they will receive the necessary financial or political support from county residents to enact these measures. And, despite the *"permanence" of these types of* programs, they are not always able to protect the "best" agricultural soils nor do they guarantee that a current farming operation will continue to be economically viable or that someone will be willing to farm the land in the Future (L. Cerqui, President, King/Pierce County Farm Bureau, personal communication, 1995).

Most planning departments felt that *farm operation* profitability, *farm operator* age, farm operator plans for his/her land at retirement, and farmland tenure were either of high or moderate importance to the future of farming in their counties, yet these four characteristics were rarely used as criteria for designating agricultural land of" long-term commercial significance. The primary criterion used by the counties for designating farmland for protection was if the farmland soils *were* mapped as prime, unique, or locally-important under the Important Farmland Classification System used by the NRCS.

Summary and conclusions

Western Washington agriculture is characterized by a large percentage of small-sized, part-time farming operations specializing in high-value crops, *such as* fresh fruits, vegetables, and nursery and greenhouse products. Although the region comprises only 5 percent of the state's farmland, it contributes a relatively large share (23 percent in 1992) to the state's total agricultural industry earnings. These types of small-scale farming operations may be more stable in metropolitan areas because of locational advantages, larger consumer bases, and greater opportunities for off-farm employment.

Since 1982, however, our data analyses *show* that significant negative changes have occurred in the region's agricultural resource base, despite the myriad of farmland protection strategies in place across the 14 counties. In just 10 years (1982-1992), the number of farms decreased by approximately 20 percent and farmland declined by nearly 16 percent, a rate 3.5 times faster than the state's. Ninety-six percent of the region's total farmland decline was land that was owned by farm operators and, as a result, the percentage of land rented for crop production increased. Furthermore, the average age of a farm operator increased and fewer young people were choosing farming as a career. Population projections tell us that western Washington, particularly the metropolitan counties, will continue ro *be* under extreme pressure for the conversion of farmland to nonfarm uses.

Western Washington's farmland protection programs have been ineffective and we question the criteria used for designating farmland to be protected. In addition to population pressures, there are economic, political, and social forces that influence a farm operation's profitability or a farm operator's decision to discontinue farming. These factors have been given little, if any, consideration when designating and designing strategies to protect important agricultural lands in western Washington. It makes little sense to protect agricultural land resources based on the presence of high quality soils unless there is someone willing to farm, the farm operation is profitable, and the local community is able and willing to *lend* financial and political support.

REFERENCES CITED

Brandt, T.R. 1981. Agricultural land retention in the Puget Sound region, Washington. M.S. thesis. Department of Geography and Regional Planning, Western Washington University, Bellingham, WA. 157 pp.

Bureau of the Census. 1977. 1974 Census of agriculture. Geographic area series: Washington State and county data. U.S. Department of Commerce. Washington, D.C.

Bureau of the Census. 198]. 1978 Census of agriculture. Geographic area series: Washington State and county data. U.S. Department of Commerce. Washington, D.C.

Bureau of the Census. 1984. 1982 Census of agriculture. Geographic area series: Washington State and county data. U.S. Department of Commerce. Washington, D.C.

Bureau of the Census. 1989. 1987 Census of agriculture. Geographic area series: Washington State and county data. U.S. Department of Commerce. Washington, D.C.

Bureau of the Census. 1994. 1992 Census of agriculture. Geographic area series: Washington State and county data. U.S. Department of Commerce. Washington, D.C.

Bureau of Economic Analysis. 1994. Local area personal income 1969-92. Economics and Statistics Administration. U.S. Department of Commerce. Washington, D. C.

Christensen, G.R. 1986. Protecting agricultural lands in Washington State: Concerns, issues, and effectiveness. M. S. thesis. Department of Environmental Science and Regional Planning, Washington State University, Pullman, *WA.*

ICJein, L.R. 1995. Population influences on agriculture in western Washington from 1974 through 1992. M.S. thesis. Department of Crop and Soil Sciences, Washington State *University,* Pullman, WA.

Northwest Economic Associates. 1979. Report no. 13 of the Northwest Agricultural Development *Project. Vancouver,* WA. 21D *pp.*

Office of Financial Management (OFM). 1981. Population trends for Washington State. Forecasting Division. State of Washington. Olympia, WA.

Office of Financial Management (OFM). 1992a. Washington State county population projections. Forecasting Division. State of Washington. Olympia, WA.

Office of Financial Management (OFM). 1992b. Intercensal estimates of the resident populations and components of population change, by county. State of Washington: 1980 to 1990. Forecasting Division. State of Washington. Olympia, WA.

Office of Financial Management (OFM). 1993a. 1993 population trends for Washington State. Forecasting Division. State of Washington. Olympia, WA.

Office of Financial Management (OFM). 1993b. Forecast of the State population by age and sex: 1990-2020. Forecasting Division. Stare of Washington. Olympia, WA.

Office of Management and Budget. 1987. Standard industrial classification manual 1987. National Technical Information Service. Springfield, VA.

Reganold, J.P. 1986. Prime agricultural land protection: Washington State's experience. Journal of Soil and Water Conservation 41:89-92.

Revised Code Of Washington (RCW). 1991. Title 36. Chapter 36.70A. Growth management - planning by selected counties and cities. West Publishing Co., St. Paul, MN.

Revised Code Of Washington (RCW). 1991. *Title* 84. Chapter 84.34. Open space, agricultural, and timber lands- current use assessment.- conservation futures. West Publishing Co., St. Paul, MN.

Soil Conservation Service. no date. Washington's soil and water: Conditions and trends 1982-1987. U.S. Department of Agriculture. Spokane, WA.

Thompson, Jr., E. 1993. Farming on the edge. National Press Conference Speech. American Farmland Trust. Washington, D.C.