Can Use Value Assessment for Property Taxation of Agricultural Land Protect Environmental Amenities?

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Executive Summary

Retention of agricultural land is a principal goal for Michigan and its local governments. Local governments statewide are seeking options to stem losses of agricultural land. One option being widely consider is Purchase of Development Rights (PDR). This research assesses the willingness of residents in Kent County Michigan to support a PDR program and evaluates the relationship between amenity values associated with farmland and that support. While amenity values are important, with provision of local heritage the most identified amenity, the analysis report here does not show a significant relationship between demand for amenity values and willingness to support a PDR program. Cost is a significant factor, however.

Michigan is the only state which does not have a preferential property tax assessment structure for agricultural land. Statistics show that Michigan farmers pay 50% to 150% more in property tax on agricultural land than do farmers in other midwest states. In theory, high property taxes make the cost of retaining land in agriculture higher, encouraging farmland owners to convert land from agriculture to other uses sooner than they might otherwise. However, results of research on preferential taxation of farmland as an agricultural land preservation tool are mixed. In the second section of the report, the role of use value assessment as a farmland preservation tool is examined. Despite being the only state without use value assessment, farmland conversion in Michigan does not appear to be following a pattern different from states that do tax farmland at use value. However, use value assessment is also viewed as a more equitable way tax agricultural property.

Because of ongoing interest in adoption of use value assessment in Michigan, the impacts of a change from the current system to use value assessment are examined. First, because of changes in land values that are likely if property taxes decline, PDR programs in the state might expect to pay less for development rights when land is taxed at use value. Second, a switch to use value assessment would significantly alter current levels of property tax paid by agricultural land owners. However, the actual change in taxes will depend upon the method used to calculate use value. Third, changing from the current assessment structure to use value could be expected to have significant impacts upon local government revenues. For some local units, use value assessment will mean either a substantial reduction in public services or a very large increase in the tax burden of non-agricultural property owners. The extent to which this is acceptable to the public will ultimately determine whether Michigan lawmakers change the property taxation process in Michigan.

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Introduction

Retention of agricultural land has become a principal goal for Michigan and its local governments. The Michigan legislature passed PA116, the Farmland and Open Space Protection Act, in 1974. Evidence suggests that the program has offered tax relief but has done little to protect agricultural land from conversion to non-agricultural uses. With the passage of Proposal A in 1993, property taxes were reduced 30-40 percent, and weakening the incentive to enroll in the P.A. 116 program. In 2001, the state legislature amended PA116 to make participation in the program more attractive financially. The state is currently administering a Purchase of Development Rights (PDR) program as authorized by PA116, and the state legislature has authorized local governments to develop PDR programs at the local level. Peninsula Township in Grand Traverse County has adopted a locally-funded PDR program. Surveys have indicated that Michigan residents view farmland preservation as an important land use issue (Larson).

Local governments statewide are seeking options to stem losses of agricultural land. Meanwhile, there is considerable interest within Michigan's agricultural and environmental communities in the adoption of use value assessment for property taxation of agricultural land as an approach to slow conversion of farmland to developed uses. Michigan is the only state which does not have a preferential property tax assessment structure for agricultural land. Preferential assessment usually means use-value assessment; agricultural land is assessed for property tax purposes on its agricultural use value, rather than fair market value. Statistics show that Michigan farmers pay 50% to 150% more in property gross tax on agricultural land than do farmers in other midwest states (American Farmland Trust; USDA). However, research

[1] Shawn Bucholtz and Kelly Morrissey, former students in the Department of Agricultural Economics, also provided research assistance.

to date has suggested that use value assessment does not prevent the conversion of agricultural land, although it may delay the conversion of any given parcel of land. Also, local governments have generally opposed use value taxation because of concerns about losses of revenues, shifting of tax burdens, and the transaction costs associated with obtaining unique data on heterogeneous acreages.

Because Michigan is the only state in which local entities do not tax agricultural land at use value, the opportunity exists to evaluate whether farmland protection efforts in Michigan have been hampered. In addition, because Michigan state and local governments are considering other farmland preservation tools, it is important to determine the extent to which the costs of other tools will differ with and without use value assessment. Since use-value taxation is capitalized into land values (Tavernier and Li), one would expect agricultural land values to be higher with use-value assessment. As a result, in the absence of use-value assessment, programs like PDR which base payments on the difference between market value and use value of land may require higher payments to land owners for development rights.

Central questions about the feasibility and acceptability of use-value taxation of agricultural land in Michigan include whether changes in tax revenues, and the local government services which rely on those revenues, will be affected negatively. Also, if changes in services are not acceptable, will the tax increases borne by non-agricultural land owners in order to maintain revenues be acceptable? Some researchers have anticipated that tax burdens of non-agricultural land owners will increase more significantly in rural areas as compared to areas with less agricultural land (Ching and Frick). However, other research has found that, because of the large difference between market value and use value of agricultural land in more urban, fringe areas, it is easier to absorb the shift in tax burden in more rural areas than in more urban communities (Schoeplein and Schoeplein).

Research Objectives

The purpose of this study was to investigate whether use-value taxation could be an effective farmland protection tool in Michigan, thereby protecting environmental

amenities associated with agricultural land uses, and to determine the fiscal and distributional consequences of adopting use-value taxation.

The research questions to be addressed include:

1. What does farmland preservation offer in terms of protecting amenities associated with farmland?
2. What has been the impact of use-value assessment on rates of farmland conversion? Without use value assessment in place, has Michigan lost farmland at a more rapid rate than other states?
3. How are PDR programs affected by use-value assessment? Are costs significantly different?
4. How would a shift to use-value assessment affect local tax revenues and incidence?

Demand for Farmland Preservation

Among the varied reasons for concern about agricultural land losses are importance of agriculture to local economies, maintaining a rural, pastoral community, retaining open space, and controlling costs of public services. Less often verbalized but equally important is the loss of ecological amenities associated with land in agriculture. Research has shown that agricultural crop, pasture and forested acres can serve as vital wildlife habitats, ground water recharge areas, buffers between surface water bodies and more intensive land uses, and other ecological functions. Conversion of agricultural land to more urbanized uses presents possible water quality problems: greater impervious surface area and associated ground water recharge reductions, greater rates of surface water runoff with associated contaminants and flood risks, and larger amounts of municipal and industrial wastewater generation (Olson).

A number of researchers have used contingent valuation methods to measure amenity values of agricultural land in various locations. Beasley, Workman and Williams explored the value of amenities provided by agricultural land at the urban fringe. Bergstrom, Dillman and Stoll assessed the perceived amenity benefits of prime agricultural land in South Carolina. Halstead examined the willingness of residents of Massachusetts to pay to preserve farmland in order to retain the benefits associated

with the farmland. Kline and Wilchelns have argued that public motivation for preserving farmland may have more to do with the demand for environmental and aesthetic amenities than a need to maintain agricultural productivity. In a 1994 study, Lopez et al. developed a model to estimate supply and demand for agricultural land and its amenity values. They concluded that if programs do not consider amenity values and public benefits, "the quantity of land preserved under the existing policies could be quite far from socially optimal."

Surprisingly few empirical studies examine the influence of specific farmland attributes on willingness to support farmland preservation programs. Most studies have assumed a high degree of homogeneity in the attributes of the farmland to be preserved. These studies ask respondents about their willingness to preserve a specific type of land or land in a specific location. However, the extent to which support for farmland preservation varies when the characteristics of the land vary has not been addressed. This study evaluates the relationship between support for farmland preservation and the specific characteristics of farmland that the public believes are important.

The study was conducted in Kent County, Michigan. Kent County contains the Grand Rapids metropolitan area and has traditionally been one of the more important agricultural counties (in terms of gross revenue) in the state. Kent County also contains the "Fruit Ridge", an agricultural area located in the northwestern portion of the county. The location of the Fruit Ridge relative to Lake Michigan and its relatively high altitude have contributed to its capacity for fruit production (mainly apples). To Kent County residents, the label "Fruit Ridge" identifies a particular farming area in the county.

General concern about farmland loss in Kent County has been widely expressed. Farmland acreage has declined by 40,761 acres, or 18%, between 1982 and 1997. Development pressure on farmland acreage continues to increase; population in Kent county has increased by 14% between 1990 and 2000, compared to a growth rate of 7% for the state as a whole. A coalition of urban and rural residents has worked to raise awareness of farmland loss and its implications for the county (United Growth for Kent County). The Kent County government is presently

considering a plan to preserve 50% of the farmland in the county through a purchase of development rights program.

To assess Kent County residents' concerns about the loss of farmland and perceived amenities associated with farmland, a personal interview survey was conducted with a stratified random sample of Kent County households. The survey also asked about respondents willingness to support a program to purchase development rights from agricultural landowners in the county. The survey sample was stratified to insure adequate representation of rural households. Rural areas consisted of census tracts in which 100% of the population was defined as rural by the 1990 census. The area defined as rural contained approximately 10% of the households in Kent County. The remaining 90% of households were defined as urban. The random sample of urban and rural addresses was provided by Survey Sampling, Inc. from a data base of all listed phone numbers.

The total survey population was 205 households. Twelve of the listed households were either not in the county or had addresses that did not exist. Hence, the effective sample was 193 households. The survey response rate was 73% (141 surveys returned). However, several surveys were returned with one or more questions unanswered – 115 useable surveys were available for this analysis.

The survey design was developed with the assistance of two focus groups of Kent County residents (one rural and the other urban residents). Pre-testing of the survey involved over twenty door-to-door visits of residents in Kent County. The focus group and door-to-door visits strongly influenced the method by which the final survey was administered. In particular, the survey method needed to allow the respondent to complete the survey at his or her convenience.

The final survey was administered as follows. First, the survey was delivered to the door by an enumerator. If someone was home (a male or female who regarded himself or herself as a head of the household), the enumerator introduced the survey. An introduction to the survey took an average 10-15 minutes and involved describing each section of the survey to the respondent. The respondent was then asked to fill out the survey at his or her convenience, and arrangements were made to pick up the survey sometime that day or during that week. In a few cases the respondent requested

to mail back the survey. In four cases, the survey was read to the respondent and the enumerator filled out the survey as directed by the resident respondent.

If the respondent was not home, the survey was left at the door with a note attached requesting that the survey be filled out and left at a specified place for pick-up the following day. A subsequent visit was made to all homes at which a survey was dropped off. Subsequent visits were of three types: 1) pickups, in which completed surveys were left at a specified place by the respondent and were retrieved by the enumerator; 2) introductions, in which the survey was introduced to the respondent and arrangements were made in a similar manner to the initial visit described in the paragraph above; and 3) mail drops, in which a survey was left with a self-addressed, stamped envelope. Eighty-eight percent of the completed surveys were introduced by an enumerator. The remaining 12 percent of the surveys were split evenly between what is referred to above as pickups and mail drops.

The survey instrument consisted of six major sections (Appendix A). The first section of the survey introduced the respondent to the survey and defined a number of key words that would be used throughout the survey. Respondents were encouraged to refer back to these words as they completed the survey. The second and third sections of the survey asked respondents to indicate, on a Likert scale, opinions about services provided by farmland and attributes of farmland.

The fourth section of the survey described a potential program to preserve farmland in Kent County. The program was described as a Purchase of Conservation Easements (PACE) program[2] and the major components of the program were described and reviewed. The fifth section provided three hypothetical voting scenarios in which the respondent was asked to vote on three different proposals for a PACE program in Kent County.

The referendum descriptions varied by four factors: 1) cost to each household; 3) the location of the farmland to be preserved; 3) the agricultural productivity of the farmland to be preserved; and 4) an environmental quality index for the farmland to be preserved. Quantity of farmland to be preserved was 10% of the county's farmland and

[2] Recent literature has begun referring to PDR programs as PACE programs.

this was described but held constant in the survey design. Each factor varied by three levels. The four factors were explicitly defined in each contingent voting scenario which replicated a referendum situation. The sample survey instrument in Appendix A provides an example of the referendum scenario. Finally the last section of the survey asked respondents to provide basic demographic information.

Demographic characteristics of respondents who returned complete, useable surveys are shown in Table 1. Respondents are compared to Kent County residents and to residents of the state of Michigan. Table 2 reports respondents' opinions about amenities provided by farmland. The amenity most associated with farmland was a sense of heritage, followed closely by open space. Water quality and air quality were associated with farmland by fewer respondents. Over 70% of the respondents agreed or strongly agreed that farmland provides air quality, but only 49% of respondents felt similarly about water quality.

To test the extent to which these variables, and others, impact willingness to support farmland preservation, the following probit model was estimated,

$$Y = \beta_0 X_0 + \beta_i X_i + \epsilon$$

where:

Y = vote on referendum for PACE program

X_1 = cost of program

X_2 - X_7 = opinions about amenities associated with farmland

X_8 = farmland ownership

X_9 - X_{10} = education

X_{11} - X_{12} = urban or residency

X_{13} = age

X_{14} = gender

X_{15} = income

The independent variables, and how they were measured, are described in Table 3.

Table 1. Selected demographics of survey respondents, Kent County, MI and the State of Michigan

	Survey (n=345)	Kent County	Michigan
Education (%)			
Less than college degree	54.7	73.3[1]	76.9[1]
College degree or higher	45.3	26.7	23.1
Age (average in years)	48.8	44.7[2]	46.5
Gender (%)			
Female	37.4	50.8	51.0
Male	62.6	49.2	49.0
Household Income ($)			
Average	$64,435		
Median	$50,000	$46,860[3]	$46,181[4]

[1]Source: U.S. Census Bureau, Census 2000 Supplementary Survey
[2]Average age of population age 20 and above. Source: U.S. Census 2000
[3]1998 model estimate. Source: U.S. Census Bureau, Housing and Household Economic Statistics Division, 2001
[4]Source: U.S. Census Bureau, Current Population Survey, March 1999, 2000, and 2001.

Table 2. Respondents' opinions about farmland (percent responding), from highest to lowest level of agreement

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Farmland provides a sense of local heritage.	44.4	47.8	5.2	2.6	0
Farmland provides open space.	36.5	53.9	7.8	0.9	0.9
Farmland supports the local economy.	34.8	49.6	12.2	3.5	0
Farmland provides scenic beauty.	42.6	40.8	9.6	7.0	0
Farmland prevents urban sprawl.	45.2	37.4	5.2	11.3	0.9
Farmland protects wildlife.	30.4	48.7	12.2	7.8	0.9
Current amount of farmland is needed to provide adequate food supply.	28.7	47.8	13.0	10.4	0
Farmland protects air quality.	23.5	47.8	22.6	5.2	0.9
Farmland protects water quality.	11.3	37.4	28.7	21.7	0.9

Table 3. Variables used in analysis of willingness to support purchase of development rights program to preserve farmland

	Variable	Coded as:	Descriptions:
	Vote (dependent variable)	1 if yes, 0 if no	32.2% yes
X_1	Cost	cost of program on referendum ($10, 20, 50, 100, 300 yearly)	mean = $69.71
X_2	Farmland protects water quality	Scale of 1 to 5, 1= strongly agree, 5=strongly disagree	mean = 2.63
X_3	Farmland provides scenic beauty	Scale of 1 to 5, 1= strongly agree, 5=strongly disagree	mean = 1.81
X_4	Farmland provides open space	Scale of 1 to 5, 1= strongly agree, 5=strongly disagree	mean = 1.76
X_5	Farmland ensures an adequate food supply	Scale of 1 to 5, 1= strongly agree, 5=strongly disagree	mean = 2.05
X_6	Farmland protects wildlife	Scale of 1 to 5, 1= strongly agree, 5=strongly disagree	mean = 2
X_7	Farmland supports the local economy	Scale of 1 to 5, 1= strongly agree, 5=strongly disagree	mean = 1.84
X_8	Owns farmland	1 if yes, 0 if no	14.8%
X_9	College graduate	1 if yes, 0 if no	35.7%
X_{10}	Attained graduate degree	1 if yes, 0 if no	9.6%
X_{11}	Resident of urban area	1 if yes, 0 if no	25.2% urban
X_{12}	Resident of rural area	1 if yes, 0 if no	34.8% rural (40% suburban)
X_{13}	Age	years	mean = 48.8
X_{14}	Gender	1 if female, 0 if male	37.4% female, 62.6% male
X_{15}	Income	dollars	mean = $64,435

Results of the regression are presented in Table 4. Cost of the program was found to negatively impact support for the program; support was less likely as the cost of the program increased. The values of agricultural land that were found to affect willingness to support the program were its provision of open space, its necessity for food supply, and its importance to the local economy. However, agreement that farmland provides open space was found to decrease the likelihood of supporting the PACE program. Agreement about the importance of farmland for food supply and the local economy were found to increase the likelihood of supporting the PACE program.

Owners of farmland were more likely to vote in favor of the program, as were residents of rural areas (as compared to suburban residents). Urban residents were less likely to vote in favor of the program (as compared to suburban residents). Finally, younger voters were found more likely than older voters to support the program, and female voters and higher income voters were found more likely to vote yes.

The probit model correctly predicted almost 86 percent of the no votes and almost 77 percent of the yes votes. The chi-square test indicates that all parameters, collectively, are significantly different from zero, and the alternative R^2 of .505 indicates that almost 51 percent of the variation in the decision to vote in favor of the PACE program is explained by the variables included. Initially variables were included to account for the location, productivity and environmental impact of land to be preserved. None of these factors significantly affected willingness to support the program, and removing them from the model did not affect its predictions.

Conclusions

This research found that the public does perceive that there are important amenity values associated with farmland. However, the statistical analysis did not show a significant relationship between perceived farmland amenities and public willingness to support farmland preservation – specifically a program to purchase development rights for agricultural land. Rather, the food supply and agricultural economic benefits of farmland preservation appeared to be more important. This result is contrary to what was expected. Analyses of the survey data will continue in order to glean additional information about public interest in farmland preservation that is perhaps more subtle than evaluated in this analysis.

Table 4. Factors influencing respondents' willingness to support Purchase of Development Rights Program to preserve farmland

	Variable	Coefficient (standard error)	Prob(Z>z)	Partial Derivatives
X_1	Cost*	-.0135 (.0027)	.0000	-.0036
X_2	Water Quality	-.0710 (.1107)	.5209	-.0187
X_3	Scenic Value	.0754 (.1345)	.5749	.0199
X_4	Open Space*	.3293 (.1718)	.0552	.0869
X_5	Food Supply*	-.2931 (.1502)	.0509	-.0774
X_6	Wildlife	.0010 (.1393)	.9941	.0003
X_7	Local Economy*	-.3610 (.1795)	.0444	-.0953
X_8	Owns farmland*	.5711 (.3131)	.0682	.1507
X_9	College Graduate	.3153 (.2362)	.1819	.0832
X_{10}	Graduate Degree	.1960 (.3715)	.5979	.0517
X_{11}	Urban resident*	-.7119 (.3374)	.0349	-.1879
X_{12}	Rural resident*	1.803 (.2347)	.0000	.4759
X_{13}	Age*	-.0203 (.0074)	.0062	-.0054
X_{14}	Gender*	.5232 (.2427)	.0311	-.1381
X_{15}	Income*	.000007 (.000002)	.0031	-.000002
	Constant	.8366 (.5787)	.1483	.2208

* Significant at .90 or greater
n=345
χ^2 = 207.16, d.f. = 15
0s correctly predicted = 85.8%
1s correctly predicted = 76.8%
$\hat{R}^2$=.506

Use Value Taxation and Farmland Conversion

A wide array of policy tools exists for pursuing farmland preservation goals. Programs like Purchase of Development Rights (PDR), Transfer of Development Rights (TDR), Agricultural Security Areas or Districts (ASA) and exclusive agricultural zoning are receiving considerable attention. In many areas, the PDR, TDR and ASA are more palatable than zoning approaches because they offer some compensation for restrictions on conversion or development.

One of the earliest policies targeting farmland conversion was preferential assessment of agricultural land – basing property tax assessments on agricultural use value rather than market value of the land. Proponents of preferential assessment of agricultural land pose three arguments in its favor (Bills et al.; American Farmland Trust). First, it is argued, preferential assessment corrects inequities inherent in local property tax systems. Because property taxes are assessed on a per-acre basis, farm owners typically pay much more in taxes than local governments pay to provide them with services, while homeowners typically receive more services than their taxes pay for. Second, there is concern that Michigan farmers, who pay higher property taxes than farmers in other agricultural states, are at a competitive disadvantage. Farm income paid as property taxes is not reinvested in farm businesses and efficiency losses are incurred. Third, high property taxes make the cost of retaining land in agriculture higher, encouraging farmland owners to convert land from agriculture to other uses sooner than they might otherwise.

Results of research on preferential taxation of farmland as an agricultural land preservation tool are mixed. Use-value taxation may slow conversion of agricultural land, especially in fringe areas where the difference between use value and fair market value for land is large (Tavernier and Li; Anderson). Researchers have also reported that use-value taxation is effective for farmland preservation only if it is used in combination with other tools, such as agricultural zoning, restrictive agreements, strict eligibility requirements, and “rollback” penalties for land converted to nonagricultural uses (Knapp and Johnson; Marshall).

This research evaluates the effectiveness of use value taxation as a farmland protection tool using recent Agricultural Census and Census of Population and Housing data. Because Michigan is the only state that does not use preferential assessment, the opportunity exists to evaluate whether land conversion patterns in Michigan have been significantly different than in other states.

Michigan ranked ninth in real estate tax paid per 100 dollars of total land value based on data reported in the 1997 Census of Agriculture.[3] As shown in Table 5, Michigan land owners paid $.69 per $100.00 of total value. Each of the states with higher property taxes assesses agricultural land at its use value. However, in all but 13 of the states that apply use value assessments, land owners may choose whether or not to have their property taxes based on use value. Among those 36 states that make use value assessment an option, 29 require some type of penalty or repayment of tax benefits should the land be converted out of agriculture. The potential penalty may cause fewer than 100% of agricultural landowners to choose use-value assessment, but no comprehensive assessment of participation in each state has been conducted. (Of the states where use value assessment is automatic, Oregon, Montana and Wisconsin require owners to pay back some amount of tax benefits if land is converted out of agriculture.)

Michigan ranks 31st in percent of agricultural land lost between 1974 and 1997. However, this information is somewhat misleading because it does not reflect the absolute differences among states in amount of farmland and amount of farmland lost. Table 6 shows state rankings according to percent farmland loss as well as total amount of farmland in 1997. Michigan ranks 30th in total farmland acreage.

[3]U.S. Census of Agriculture data reports value as total value of land and buildings. Also, property taxes reported by the Census do not distinguish between taxes paid on land and on buildings.

Table 5. Property tax paid per acre and property tax paid per $100 of total land value for agricultural land, 1997

State	Property tax per acre	Property tax per $100 total land value
Alabama	2.52	0.18
Alaska	1.09	0.36
Arizona	0.75	0.19
Arkansas	3.37	0.30
California	13.01	0.52
Colorado	1.67	0.27
Connecticut	32.06	0.55
Delaware	7.37	0.28
Florida	13.05	0.59
Georgia	7.53	0.51
Hawaii	3.61	0.15
Idaho	4.66	0.46
Illinois	7.28	0.35
Indiana	9.16	0.45
Iowa	7.77	0.47
Kansas	2.48	0.43
Kentucky	4.49	0.32
Louisiana	1.92	0.17
Maine	13.21	1.10
Maryland	11.03	0.35
Massachusetts	38.42	0.79
Michigan	11.55	0.69
Minnesota	6.46	0.56
Mississippi	3.43	0.33
Missouri	3.54	0.33
Montana	1.53	0.53

Table 5. (continued) Property tax paid per acre and property tax paid per $100 of total land value for agricultural land, 1997

State	Property tax per acre	Property tax per $100 total land value
Nebraska	4.79	0.75
Nevada	1.26	0.33
New Hampshire	28.77	1.26
New Jersey	36.23	0.56
New Mexico	0.39	0.20
New York	17.81	1.42
North Carolina	7.89	0.39
North Dakota	1.78	0.45
Ohio	7.35	0.36
Oklahoma	2.17	0.36
Oregon	3.56	0.38
Pennsylvania	16.00	0.68
Rhode Island	47.78	0.81
South Carolina	4.17	0.29
South Dakota	2.21	0.64
Tennessee	5.77	0.32
Texas	1.91	0.32
Utah	1.37	0.24
Vermont	15.31	1.03
Virginia	6.91	0.36
Washington	6.36	0.52
West Virginia	2.95	0.27
Wisconsin	14.62	1.18
Wyoming	0.55	0.25

Table 6. States ranked by farmland loss, 1974-1997, and by total farmland acres, 1997

Rank	State	Percent reduction in farmland acres, 1974-1997	State	Farmland acres 1997
1	Alaska	46.05	Texas	131,308,286
2	Nevada	40.73	Montana	58,607,778
3	Hawaii	32.09	Kansas	46,089,268
4	Mississippi	29.20	New Mexico	45,787,108
5	Arizona	29.19	Nebraska	45,525,414
6	Alabama	26.56	South Dakota	44,354,880
7	South Carolina	25.66	North Dakota	39,359,346
8	Vermont	24.31	Wyoming	34,088,692
9	Georgia	23.11	Oklahoma	33,218,677
10	New York	22.88	Colorado	32,634,221
11	Florida	20.80	Iowa	31,166,699
12	Maine	20.48	Missouri	28,826,188
13	North Carolina	18.87	California	27,698,779
14	Connecticut	18.35	Illinois	27,204,780
15	Maryland	18.20	Arizona	26,866,722
16	New Hampshire	18.05	Minnesota	25,994,621
17	California	17.03	Oregon	17,449,293
18	Idaho	16.97	Washington	15,179,710
19	Wisconsin	15.46	Indiana	15,111,022
20	Tennessee	15.12	Wisconsin	14,900,205
21	Virginia	14.98	Arkansas	14,364,955
22	Massachusetts	13.84	Ohio	14,103,085
23	Louisiana	13.76	Kentucky	13,334,234
24	New Jersey	13.40	Utah	12,024,661
25	Pennsylvania	12.44	Idaho	11,830,167

Table 6. (continued) States ranked by farmland loss, 1974-1997, and by total farmland acres, 1997

Rank	State	Percent reduction in farmland acres, 1974-1997	State	Farmland acres 1997
26	Ohio	9.99	Tennessee	11,122,363
27	Indiana	9.97	Georgia	10,671,246
28	Rhode Island	9.52	Florida	10,454,217
29	Colorado	9.10	Mississippi	10,124,822
30	Washington	8.90	Michigan	9,872,812
31	Michigan	8.86	North Carolina	9,122,379
32	Delaware	8.10	Alabama	8,704,385
33	Kentucky	7.60	Virginia	8,228,226
34	North Dakota	7.14	Louisiana	7,876,528
35	Illinois	6.50	New York	7,257,470
36	Minnesota	5.83	Pennsylvania	7,167,906
37	Montana	5.71	Nevada	6,409,288
38	Iowa	5.68	South Carolina	4,593,452
39	Oregon	4.34	West Virginia	3,455,532
40	Kansas	3.87	Maryland	2,154,875
41	South Dakota	3.53	Hawaii	1,439,071
42	Missouri	3.27	Vermont	1,262,155
43	New Mexico	2.58	Maine	1,211,648
44	Texas	2.14	Alaska	881,045
45	Arkansas	1.89	New Jersey	832,600
46	Nebraska	1.40	Delaware	579,545
47	West Virginia	1.17	Massachusetts	518,299
41	Wyoming	0.53	New Hampshire	415,031
49	Oklahoma	+0.41	Connecticut	359,313
50	Utah	+13.33	Rhode Island	55,256

In order to examine the role of taxation in land values and farmland conversion, several regression analyses were conducted using data from the Census of Agriculture and the Census of Population and Housing. Where development pressures are high and non-agricultural demand for land is high, one would expect returns to agriculture (which are affected by the amount of property taxes paid) to have a minimal impact on land values. Also, where non-agricultural demand for land is significant, one might also expect that non-agricultural factors would play a large role in the rate at which agricultural land is converted.

The extent to which non-agricultural demand for farmland dominates agricultural demand was evaluated by regressing 1997 per acre farmland values against 2000 population density. As shown in Table 7, population density explains 89.5 percent of the variation in farmland values across the states. The dominance of non-agricultural demand suggests that tax benefits of retaining land in agriculture are likely outweighed by the value of land in non-agricultural uses. To explore this further, the impact of additional factors on farmland value was considered.

To evaluate the impact of additional factors, 1997 per acre farmland value was regressed against: 1) 2000 population density, 2) percent change in population density between 1990 and 2000, 3) average farm size, and 4) average value of sales per farm. While these four variables explained almost 92 percent of the variation in farmland values, only the coefficients for population density and farm size were significantly different from zero (Table 8). Population density was still the dominant factor. As expected, larger farms were associated with a lower value per acre.

Using regression analysis to determine whether farmland taxes affect the rate at which farmland is converted, percent change in farmland acres from 1987 to 1997 were regressed against 1) change in population density from 1990 to 2000, 2) property taxes per acre and 3) per acre value of agricultural products sold. Specifically, three-year

Table 7. Results of test of impact of non-agricultural demand for farmland on farmland values, using population density as measure of demand

Variable	Coefficient	Standard Error	*t* ratio
Constant	668.62	82.17	8.14
2000 population density	5.42	0.27	20.26

Dependent variable is 1997 value of land and buildings
n = 50
R^2 = .895

Table 8. Results of test of impact of agricultural and non-agricultural demand for farmland on farmland values

Variable	Coefficient	Standard error	*t* ratio
Constant	818.19	140.65	5.82
2000 population density	5.06	0.26	19.14
% change, 1990-2000 population density	-2.10	6.32	-0.33
average farm size	-0.26	0.07	-3.40
average value of sales per farm	0.001	0.001	1.02

Dependent variable is 1997 value of land and buildings
n=50
R^2 = .919

average property taxes per acre and average value of sales per acre were calculated for the 1987, 1992 and 1997 agricultural census years. As shown in Table 9, these three factors explained only 25 percent of the variation in farmland loss across the states. Only the coefficient for change in population density was significantly different from zero.

Conclusions

This analysis suggests that non-agricultural demand for land largely explains agricultural land prices across the United States. In addition, the level of agricultural

taxes does not appear to impact the rate at which agricultural land is converted to agricultural use. This research does not evaluate whether landowners' farmland conversion decisions are delayed when taxes are assessed at use value. This type of research could be strengthened if a model of agricultural land use could incorporate an accurate measure of the opportunity cost of retaining land in agriculture. There is no comprehensive data source for non-agricultural land values. The U.S. Census provides data on the value of housing units, but data on values of land in housing, commercial or industrial uses is not available

Use Value Assessment, Land Values and Costs of a Purchase of Development Rights Program

Michigan land values have been assessed annually since 1991 by researchers at Michigan State University. Surveys are mailed to members of the Farm Managers and Rural Appraisers Association, Michigan agricultural lenders, county equalization directors in Michigan, and members of the Michigan Farm Bureau Advisory Committees on feed grains, oil seeds and wheat, and dry beans and sugar beets. Information requested in the survey includes: current agricultural use value of farmland; change in value during the last year; expected change in value during the next year; cash lease rate; information on share rental arrangements; and information on non-agricultural use value of farmland (Hanson and Schwab).

Results of this survey for 2000 are reported in Table 10. The average value for tiled cropland in the southern lower peninsula was $1,839 per acre, while non-tiled cropland averaged $1,536 per acre. In the upper and northern-lower peninsula, the average value for tiled cropland was $1,143 per acre, and the average value for non-tiled cropland was $1,176 per acre. Average market values of land for residential development were $7,423 per acre in the southern lower peninsula and $2,540 per acre in the upper and northern lower peninsula. Average market values of land for commercial/industrial development were $19,495 per acre in the southern lower peninsula and $7,851 per acre in the upper and northern lower peninsula.

Table 9. Results of test of factors influencing reduction in farmland acres, 1987-1997

Variable	Coefficient	Standard Error	*t* ratio
Constant	-2.18	2.37	-0.92
% change, 1990-2000 population density	0.35	0.10	3.62
property tax per acre	0.26	0.18	1.50
value of sales per acre	0.003	0.006	0.48

Dependent variable is percent change in farmland acres, 1987-1997
n=50
R^2 = .247

Table 10. 2000 Agricultural land values, per acre, and residential and commercial/industrial values of undeveloped land, per acre, by MI Agricultural Statistics reporting district and regional average

Region[1]	Agricultural Land			Non-agricultural use value	
	Tiled cropland	Non-tiled cropland	Irrigated cropland	Residential	Commercial and Industrial
Districts 1-4	1,232	1,266	na	2,767	10,323
District 5	1,500	1,192	na	6,129	na
District 6	1,676	1,208	2,044	5,736	20,167
District 7	1,958	1,766	2,450	8,700	21,038
District 8	1,749	1,533	2,360	6,887	18,028
District 9	2,473	1,962	na	10,365	18,831
Southern Lower Peninsula	1,839	1,536	2,271	7,423	19,495
Upper and Northern Lower Peninsula	1,143	1,176	na	2,540	78,152

Source: Hanson and Schwab

[1] District 1 is the upper peninsula. District 2 is the northwest lower peninsula. District 3 is the northeast lower peninsula. District 4 is the west central lower peninsula. District 5 is the central lower peninsula. District 6 is the east central lower peninsula. District 7 is the southwest lower peninsula. District 8 is the south central lower peninsula. District 9 is the southeast lower peninsula.

[2] Average is low because variance of district data is large.

A purchase of development rights program, in the absence of programmatic limits

on payments[4], pays landowners for the development value of their land. The development value is the difference between the market value of the land (which accounts for potential returns from development) and the agricultural use value. Using the results of the 2000 survey by Hanson and Schwab, the potential cost of purchasing development rights for farmland in Michigan are presented in Table 11. In the southern lower peninsula, the potential value of development rights for tiled cropland subject to residential development pressure is $5,584 per acre. The potential per acre value of development rights for tiled cropland subject to commercial or industrial development pressure is $17,656. For the upper and northern lower peninsula, these values are $1,397 and $6,672. These values are based on averages for the regions, so actual values for different parcels will vary. In addition, development values generally reflect some combination of residential and commercial/industrial demand, so the numbers in Table 11 can be viewed as estimates of lower and upper bounds on development rights values.

One potential impact of adopting use value assessment for property taxation of agricultural land is a change in land values. Economic theory suggests that higher property tax rates result in lower property values. For example, the income capitalization theory of land value states that the value of a parcel of land is a function of the future stream of net benefits from the use of that land. In the simplest representation, land value can be described by:

Value = f(future net benefits)

where future net benefits are discounted to present value. For most agricultural land, that stream of future net benefits includes benefits from agricultural use as well as potential benefits from development of the land. If we distinguish between market value and agricultural use value,

Market value = f(future net benefits from agriculture and from development)

and

Use value = f(future net benefits from agriculture).

[4]Michigan's state PDR program caps development rights purchase prices at $5000 per acre.

Table 11. Potential costs, per acre, of purchasing development rights in Michigan, by MI Agricultural Statistics report district and regional average

Region	Residential Development Value			Commercial/Industrial Development Value		
	Tiled Cropland	Non-tiled Cropland	Irrigated Cropland	Tiled Cropland	Non-tiled Cropland	Irrigated Cropland
Districts 1-4	1,535	1,501	na	9,091	9057	na
District 5	4,629	4,937	na	na	na	na
District 6	4,060	4,528	3,692	18,491	18,959	18,123
District 7	6,742	6,934	6,250	19,080	19,272	18,588
District 8	5,138	5,354	4,527	16,279	16,495	15,668
District 9	7,892	8,403	na	16,358	16,869	na
Southern Lower Peninsula	5,584	5,887	5,152	17,656	17,959	17,224
Upper & Northern Lower Peninsula	1,397	1,364	na	6,672	6,639	na

Given that property taxes are a cost associated with owning the land, they necessarily reduce the stream of future net benefits, where net benefits are total returns minus total costs (and costs include property tax). Thus, a change from property taxation based on market value to property taxation based on use value, a decrease in tax burden, could be expected to increase the value of agricultural land. An increase in land value could result in a lower development value associated with the land – meaning a lower cost to purchase the development rights in a PDR program.

Figure 1 illustrates the potential impact of a reduction in property tax burden on land values and development values. Market value of a parcel that may be used for agriculture or developed and that is assessed for property taxation at market value is represented in Figure 1 by the top box – the largest value in this example. The second box represents market value of the parcel if it is assessed for property taxation based on its agricultural use value. While a lower tax should increase land values, this value is negatively affected when use of the property is restricted to agriculture so long as it is assessed at use value and payment of a penalty is required when development occurs. The bottom box

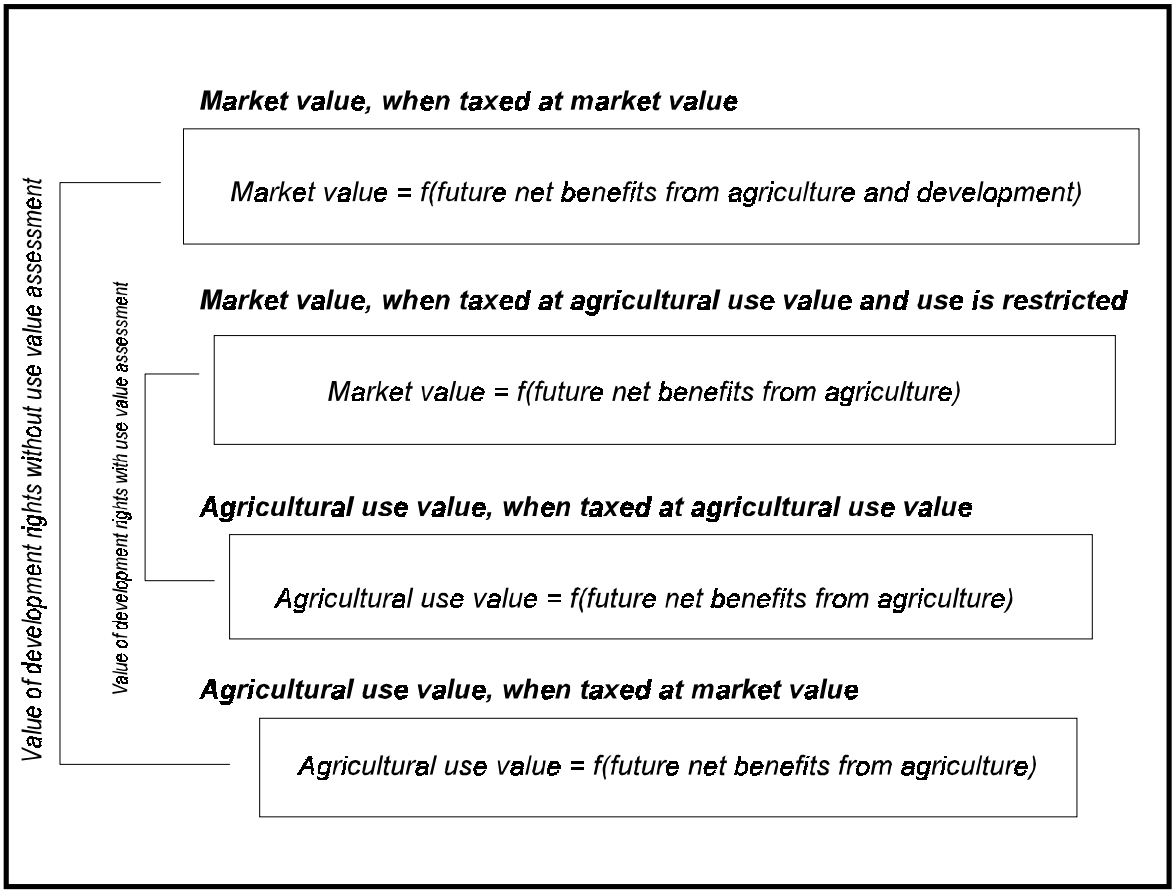


Figure 1. Potential impact of a reduction in property tax burden on market value and use value of agricultural land.

represents the agricultural use value of the parcel if it is assessed at market value. The stream of future net benefits associated with returns to agricultural use only is lower than the stream of benefits with potential returns to development included. Property taxation at market value further reduces the value of the parcel. However, box three illustrates that agricultural use value of the parcel will be higher if it is taxed at a lower rate. The difference between the market value and the agricultural use value, the development rights value, may well be larger when property tax is assessed at market value than when it is assessed at use value.

The results of this illustration for development rights values in Michigan can be examined using the land value data from Hanson and Schwab and information from literature on property taxes and land values. Using specific assumptions about returns from agriculture, interest and inflation rates, planning horizon, and income tax rates, Featherstone calculated land values with various property tax rates under different capital gains taxation structures. His results showed an average 9.8 percent increase in land value resulting from a decrease in property tax from one percent to ½ percent (from $1 per $100 of value to $0.50 per $100 of value).

The agricultural property tax rate in Michigan reported in the 1997 Census of Agriculture was $0.69 per $100 of value. Using Featherstone's assumptions, a reduction of the tax rate by half, to $0.345, would increase average agricultural property values by an average of 9.8 percent. Table 12 illustrates the impact of the reduced tax burden on agricultural land values and, as a result, on development rights values. The change in tax rate, and resulting change in agricultural land values, would result in a reduction of $180 in the average cost per acre of development rights in the southern lower peninsula and a reduction of $112 in the upper and northern lower peninsula.

Table 12. Potential impact on development rights values of a reduction in property tax from $0.69 to $0.345 per $100 of value

Agricultural land assessed at market value	Southern Lower Peninsula	Upper and Northern Lower Peninsula
Residential use value, $0/69	7,423	2,540
Tiled cropland value, $0.69	1,839	1,143
Value of development rights	5,584	1,397
Agricultural land assessed at agricultural use value		
Residential use value, $0.69	7,423	2,540
Tiled cropland value, $0.345	2,019	1,255
Value of development rights	5,404	1,285
Change in value of development rights	180	112

Conclusions

This research suggests that changes in land values associated with a change in property taxation may affect the cost of PDR programs in some areas of the state. The extent to which costs are affected will depend upon the difference in market value and use value of the agricultural land. Thus, a PDR program in a rapidly urbanizing area, where agricultural land is at greatest risk of development, could be less costly if agricultural land were taxed at use value. However, when the PDR program is funded from state revenues, the benefits to such a program of lower development rights costs are shared across a larger population than are the costs associated with a switch to use value taxation. Similarly, where township-by-township impacts of a switch to use value taxation differ widely, benefits to a county-funded PDR program would be shared over a broader population than would the costs of the property tax change.

Use Value Assessment: Techniques and Financial Impacts

Critical to the debate about whether use value assessment would be a positive step for Michigan is an evaluation of how a change in property taxes would affect agricultural landowners and other residents of the state. Specific questions include whether owners of farmland would experience a significant reduction in tax burden and whether taxing authorities would experience a significant reduction in tax revenues.

For this study, an analysis of the impact of use value assessment was conducted by identifying case study counties, townships and farms around the state. First, a set of counties was selected. Next, four townships in each of these counties were identified. Finally, farms in these townships were selected. For a number of reasons, the final analysis conducted did not use all counties or townships initially selected.

Counties were selected to provide a broad representation of farm types, commodities, and land use patterns. The 18 counties selected are listed in Table 13. Next, for each county those townships with the highest and lowest proportion of total State Equalized Value (SEV)[5] in agriculture were identified (up to two of each – Table 13). That list of townships was narrowed by determining which township assessors used the BS&A Equalizer Software, a software which specifically records SEV for land and SEV for buildings separately for agricultural properties. Finally, that list of townships was provided to the MSU Telfarm Program[6] to determine whether any farms located in those townships were participants in Telfarm. Farm level production and income data is available for Telfarm participants. Table 14 provides the final list of counties and townships where case study farms were located. County-wide analysis was conducted for those counties where case study farms were located.

[5] State Equalized Value is ½ of true cash value of the property.

[6] The Telfarm system of farm record keeping is a program available from MSU Extension's Farm Information Resources Management (FIRM) Team. It is an educational and service program designed to assist farmers with their farm financial records and decision making.

Table 13. Selected case study areas and final case study locations

Counties	Townships (with high agricultural SEV)	Townships (with low agricultural SEV)
Allegan	Hopkins	Clyde
	Martin	Saugatuck
Barry	Maple Grove	Rutland
	Carlton	Yankee Springs
Chippewa	Whitefish	
Clinton	Bengel	Bath
	Essex	Dewitt
Eaton	Chester	Eaton
	Sunfield	Delta
Grand Traverse	Grant	Green Lake
	Paradise	Long Lake
Gratiot	North Shade	Elba
Huron	Sigel	Lake
	Sheridan	Caseville
Kent	Bowne	Gaines
	Tyrone	Plainfield
Lapeer	Burnside	Mayfield
	Burlington	Elba
Leelanau		Bingham
		Leelanau
Livingston	Hartland	Green Oak
	Conway	Brighton
Menominee	Meyer	
Oceana	Claybank	Benona
	Hart	Grant
St. Joseph	Florence	Fabius
	Burr Oak	Colon
Sanilac	Maple Valley	Lexington
	Austin	Worth
Tuscola	Elmwood	Millington
	Fairgrove	Indian Fields
Washtenaw	Saline	Pittsfield
	Salem	Ypsilanti

Table 14. Location and type of operation for case study farms

Farm Number	Township	County	Type of Farm Operation
1	Hopkins	Allegan	Dairy
2	Martin	Allegan	Grains, livestock
3	Essex	Clinton	Dairy
4	Eaton	Eaton	Dairy
5	North Shade	Gratiot	Dairy, grains
6	Caseville	Huron	Dairy, grains
7	Hart	Oceana	Fruits, vegetables, nursery, small grain
8	Colon	St. Joseph	Grains, vegetables
9	Maple Valley	Sanilac	Soybeans, hay, livestock
10	Elmwood	Tuscola	Grains, sugar beets, dry beans
11	Elmwood	Tuscola	Dry beans, sugar beets, grains

Use value assessment techniques

Five different approaches to calculating agricultural use value were applied to the case study farms. The first used the actual Telfarm data for each farm so that use value was calculated based on actual historical net farm income for the farm. A capitalization rate of 6% was used with average net farm income (NFI) for all Telfarm participation years. (Years of participation varied from one to seven. For one farm, only the three most recent years were used because net farm income for several years was negative.) Per acre use value was calculated as:

$$Value = \frac{NFI}{.06}$$

and

$$Value/acre = \frac{Value}{number\ of\ acres}.$$

As shown in Table 15 (column 2), there was a wide disparity across the farms. In particular, there were substantial differences between crop farms and dairy farms. When use value is calculated in this way, factors beyond the productivity of the land in agriculture

are included. Where there are dairy or livestock, net return per acre of land is likely to be higher because the animals add additional value to the crops that are produced on the land. Also, the management skills of the farm owner/operator get included but they do not represent the productivity of the land resource. Finally, while the general productivity of the land is not likely to differ significantly from year to year, net farm income will – because of pest problems, weather problems, or changes in input costs or commodity prices. Use value of agricultural land should account for its income-earning potential, which is a function of input costs, commodity prices, soil type, and general climate. Pest problems, for example, may vary across land areas of similar productivity if management differs.

The second approach used to calculate use value for the case study farms represented an attempt to reduce the disparities caused by income from animals and animal products. For each farm, gross income from crops sales only was determined. For those farms with no income from the sale of crops, an average price was applied to feed crops grown and a gross crop income was estimated. Net income was calculated using an estimate of crop production profit margin (see Figure 2). Then, use value was calculated as above, using a 6% capitalization rate. These values are shown in column three of Table 15. Values were less disparate, although some variability is to be expected because of differences in crops produced, as well as factors like management, weather, pests, etc. In particular, the farm which produced fruits and vegetables had substantially higher income from crops and, as a result, a higher use value per acre as calculated by this approach.

The third technique was the final one which used farm specific data. However, only soils data for each farm was used. All crop income values were county-specific, based on crop production and value of that production for each county. The county-level data was taken from the 1997 Census of agriculture. Once a gross value of crop production for the county was calculated, the state level crop production profit margin (as illustrated in Figure2) was used to determine profit per acre. Again, that value was capitalized at 6% to calculate a county average agricultural use value. To adapt this number to each farm, the county-level value was weighted by the acreage of each soil type on the farm. Profit per acre as calculated above represents an average over all soil types. The value was adjusted upward for higher productivity soils and downward for lower productivity soils.

Annual Calculation, 1990-1999

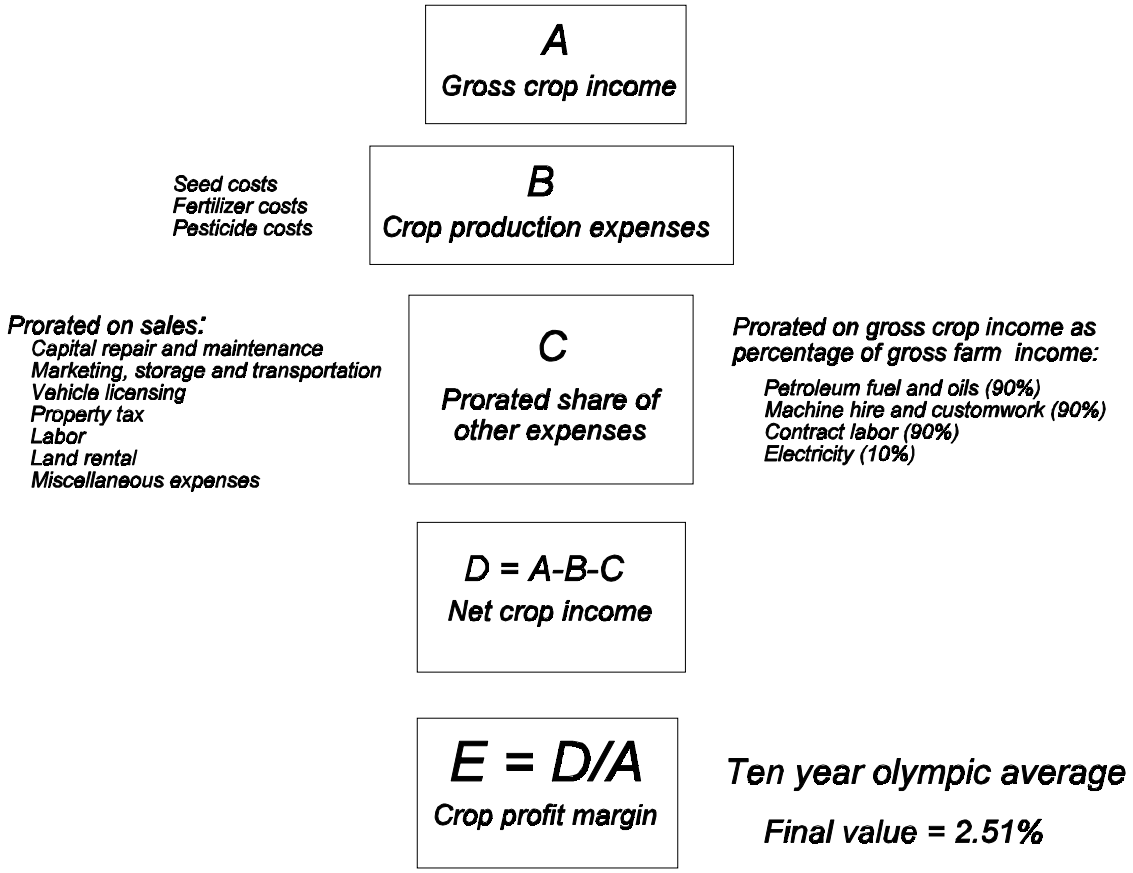


Figure 2. Calculation of crop production profit margin, using 1990-1999 state-level data from Michigan Agricultural Statistics (various issues)

Table 15. Agricultural use value per acre for case study farms, by use value assessment technique, based on actual farm information

1	2	3	4
Farm Number	**Capitalization of Telfarm Income Data[1]**	**Capitalization of Telfarm Crop Income Data[1]**	**Capitalization of Crop Income based on Statewide Returns to Crop Production[1]**
1	$11,234	$156.54	$218.49
2	$432	$89.43	$225.08
3	$2,599	$146.86	$149.69
4	$3,084	$77.70	$142.67
5	$6,760	$80.36	$192.01
6	$3,457	$124.00	na[3]
7	$15,759	$961.88	$391.86
8	$439	$179.25	na[3]
9	$352	$78.76	na[4]
10	$100	$129.81	$225.80
11	$2,498	$139.95	$228.69

[1] Capitalization rate of 6%
[2] Crop income was calculated using county average corn yield, adjusted for soil type on the farm, and a typical corn production budget.
[3] Data for this farm did not include sufficient location information to determine soil types on the farm.
[4] The Sanilac County soil survey did not provide enough detail on productivity of individuals soils to make farm level analysis possible.

(Details on soil productivity were based on soil survey data and are available from the authors.) With this approach, land for each farm was valued based on its ability to produce a *crop.* The results of this approach are shown in column 4 of Table 15. Again, there is less variation in these values across the farms. However, it is clear that the three methods illustrated in Table 15 result in very different use values.

Two additional techniques used county and statewide data, without specific farm-level information. The results from these techniques are shown in Table 16. In column two, the county average agricultural use value per acre is presented. This value is actually the value that was weighted by the farm soil types for approach number three above. Use of this technique would value every acre of farmland in the county equally. The variation across counties represents variation in soil types, climate and types of crops produced among the counties. The values presented in column three represent the county average weighted by soil types in the county. Just as in the approach applied to each farm, the county average was adjusted upward for higher productivity soils and downward for lower productivity soils. The acreage of each soil type was used to calculate a weighted county average agricultural use value per acre. Again, this technique would value every acre of a particular soil in the county equally.

The variation in use value per acre calculated by each approach illustrates how sensitive the property taxes for each case study farm would be to the actual approach used. In Table 17, the use value calculations from each method are compared to the actual SEV for each farm. This comparison shows considerable disparity between the actual SEV of the farms and use value. The farm in St. Joseph County appears to be assessed closer to its use value currently than the other farms in the sample. However, all farms would see a significant change in property tax burden if agricultural use value became the basis for property taxation for agricultural land.

Conclusions

This analysis illustrates the differences in property tax assessments that the case study farms might experience with a change to use value assessment. However, potential changes in assessments differ widely depending upon how use value is calculated. If use

value were derived from the average net income of the farm, then property tax

Table 16. Per acre agricultural use values for land in case study counties, by use value assessment technique, based on county-level information

1	2	3
County	**Capitalization of County Average Crop Production Income**	**Capitalization of County Average Crop Production Income Weighted by Soil Types**
Allegan	$245.36	$197.37
Clinton	$126.74	$130.79
Eaton	$142.44	$142.10
Gratiot	$171.36	$170.91
Huron	$164.63	$152.41
Oceana	$432.73	$355.06
St. Joseph	$277.22	$286.68
Sanilac	$231.29	$232.95
Tuscola	$230.95	$213.48[1]

[1] The Sanilac County soil survey provides soil productivity information for soils classes. Classes include several individual soil types. This productivity information was sufficient to calculate a weighted use value, since the use value could be adjusted by soil class, rather than by soil type.

assessments would increase for seven of the 11 case study farms. Alternatively, various methods for assessing property taxes based on the value of the land in terms of crop production showed varied results. With use value calculated based on actual crop production of the farms, eliminating animal and animal products from the equation, only one farm would see an increase in assessment. Use value calculations based on county and state-level crop production and income data would result in a reduction in property tax assessment for all of the farms. However, basing use-value calculations on average county production would favor owners of higher quality land and penalize owners of lower quality land unless soil characteristics are accounted for. Weighting county-level use values by the acreages of different soils in the county would begin to address this concern, but a more precise approach would weight the county-level values by the specific soils on the farms.

Table 17. Comparison of current State Equalized Value for each farm to use value as calculated by alternative techniques

Farm Number	Actual SEV per acre[1]	Method 1	Method 2	Method 3	Method 4	Method 5
1	$1,188	$1,1234	$156.54	$218.49	$245.36	$197.37
2	$568	$432	$89.43	$225.08	$245.36	$197.37
3	$506	$2,599	$146.86	$149.69	$126.74	$130.79
4	$1,238	$3,084	$77.70	$142.67	$142.44	$142.10
5	$638	$6,760	$80.36	$192.01	$171.36	$170.91
6	na[2]	$3,457	$124.00	na	$164.63	$152.41
7	$927	$15,759	$961.88	$391.86	$432.73	$355.06
8	$364	$439	$179.25	na	$277.22	$286.68
9	$782	$352	$78.76	na	$231.29	$232.95
10	$735	$100	$129.81	$225.80	$230.95	$213.48
11	$644	$2498	$139.95	$228.69	$230.95	$213.48

[1] 1999 tax year.
[2] No tax data provided by township assessor

Tax Revenue Changes with Use Value Assessment

Local governments have generally opposed use-value taxation because of concerns about losses of revenues, administrative costs and the shifting of tax burdens. To evaluate how tax revenues would be affected by converting the existing property tax assessment process to a use value assessment process, the agricultural use values calculated were combined with data on actual tax revenues in each county. Changes in SEV and changes in tax revenues were estimated.[7]

[7] In this work, tax revenue changes are calculated as SEV times the millage rate. Since March 1994, property taxes are calculated using taxable value times millage rate, where increase in taxable value is capped annually at the rate of inflation or five percent, whichever is less. The SEV for agricultural land is equal to the taxable value only for the 1994 tax year, unless the land sold after 1994 but before 2001. For most agricultural land, the taxable value is

Table 18 compares current agricultural SEV for each county (as calculated from township assessor data) to total use value as calculated by the last two use value calculation methods described above. The total use values are significantly lower for each county; Oceana County shows the smallest difference.

The percentage reduction in agricultural SEV is shown in Table 19. Also presented is percentage reduction in total SEV for each county. Reduction in agricultural SEV ranges from 32 percent in Oceana County to 85 percent in Huron County. However, actual impact on tax revenues depends upon the reduction in total SEV. Reduction in total SEV ranges from 4 percent in Oceana County to almost 29 percent in Huron County.

Table 18. Total State Equalized Value for agricultural land and total agricultural use value, by county

County	Total Agriculture SEV	Acres of Farmland	Total Use Value (Method 4)	Total Use Value (Method 5)
Allegan	$305,890,990	236,936	$58,134,617	$46,764,058
Clinton	$204,144,735	243,850	$30,905,549	$31,893,141
Eaton	$198,916,800	231,870	$33,027,563	$32,948,727
Gratiot	$245,880,764	276,833	$47,438,103	$47,313,528
Huron	$433,370,445	424,122	$69,823,205	$64,640,434
Oceana	$81,464,675	127,994	$55,386,844	$45,445,550
St. Joseph	$223,964,044	217,345	$60,252,381	$62,308,465
Sanilac	$377,640,272	429,706	$99,386,701	$100,100,013
Tuscola	$323,794,640	333,099	$76,929,214	$71,109,974

less than the SEV. For the purposes of this study, SEV was used to estimate revenue loss at the county level, since taxable value for each farm in the sample counties was not collected. Therefore the estimates of revenue losses may be overestimated.

Table 19. Percentage reduction in total agriculture SEV and total SEV, by county, with use value assessment

County	Percent of Total SEV in Agriculture	Percent Reduction in Agriculture SEV		Percent Reduction in Total SEV[1]	
		Method 4	Method 5	Method 4	Method 5
Allegan	14.54	80.99	84.71	11.78	12.32
Clinton	16.83	84.86	84.38	14.07	13.99
Eaton	10.48	83.40	83.44	8.74	8.75
Gratiot	32.68	80.71	80.76	26.38	26.39
Huron	33.68	83.89	85.08	28.25	28.66
Oceana	12.15	32.01	44.21	3.89	5.37
St. Joseph	20.94	73.10	72.18	15.31	15.11
Sanilac	37.09	73.68	73.49	27.33	27.26
Tuscola	30.09	76.24	78.04	22.94	23.48

[1] This total SEV is the sum of SEV totals for each township in the county. Cities and villages are excluded.

These results can provide answers to several important questions regarding a change to use value assessment. First, townships in Oceana County appear to be assessing agricultural land at a level closer to market value than townships in the other counties.[8] This may be because use value is very close to market value because of few alternative or developed uses of the land. As a result the change in agricultural SEV in smaller for Oceana County than for the other counties. However, agriculture represents only 12 percent of total SEV in the county, so the smaller difference between market and use value translates to a smaller yet reduction in total SEV for the county.

Second, after Oceana County, Allegan, Clinton and Eaton Counties have the smallest percentage of total SEV represented by agriculture. One might expect this to

[8] This analysis does not distinguish between township-by-township differences in SEV or assessment. The use value calculations were done using county averages, so the comparisons are to county average SEV data.

mean that they would be affected less significantly by a change to use value assessment. However, a very wide difference between current agricultural SEV and use value would mean a larger impact from the change. Townships in these counties appear to be assessing farmland at a level far in excess of agricultural use value – quite likely reflective of development pressures in the counties. As a result, a change to use value taxation would reduce current agricultural SEV by 80-85% in each county. Total SEV would be reduce by only 9-14%, however, because agriculture is a small percentage of total SEV.

Gratiot and Huron appear to be the two counties in the sample that would be most affected by a change from current assessment to use value assessment. Each county has a significant percentage of total SEV from agricultural land (33 and 34 percent, respectively). This situation is magnified by the very large difference between current assessment and use value assessment in each county; a change to use value assessment would reduce agricultural SEV by 81 percent in Gratiot County and as much as 85 percent in Huron County. This would mean a 26 percent reduction in total SEV for Gratiot County and a 28 percent reduction in total SEV for Huron County. The results for St. Joseph, Sanilac and Tuscola counties follow a similar pattern to those for Gratiot and Huron, but the changes are considerably smaller in magnitude, either because the difference between current assessment and use value assessment is smaller, or because agriculture is a smaller percentage of total SEV.

The percentage reduction in total SEV is equal to the percentage reduction in total revenues, assuming total revenues are calculated by multiplying SEV by millage. Given the estimated reduction in total SEV for each county, the needed millage increases to maintain current tax revenue levels were calculated. This information is presented in Table 20. Using either use value assessment method, the increase in millage rates necessary to retain tax revenues at their current levels ranges from 1.58 mills in Oceana County to 13.38 mills in Huron County. These needed increases would put average millage in Huron and Sanilac Counties at approximately 46 mills -- very close to 50, which is the state mandated limit for non-charter townships and counties.

Conclusions

This analysis suggests that some areas will experience significant reductions in total tax revenues should a change to use value assessment be made in Michigan. Whether use value assessment is an acceptable policy will depend upon the extent to which residents of these areas are willing to experience a reduction in public services. Alternatively, the acceptability of use value assessment will depend upon the extent to which owners of non-agricultural land are willing to pay higher property taxes in order to make up for the reductions resulting from use value assessment.

These results do not provide clear evidence about whether rural areas would be be more or less affected by a change to use value assessment than would more urbanizing areas. This is due, in large part, to the fact that the townships in largely rural counties appear to be assessing agricultural land at a level far in excess of use value. This suggests that development pressures may be high in these areas, even though a large

Table 20. Current average millage rates and average millage increases necessary to maintain tax revenues, by county

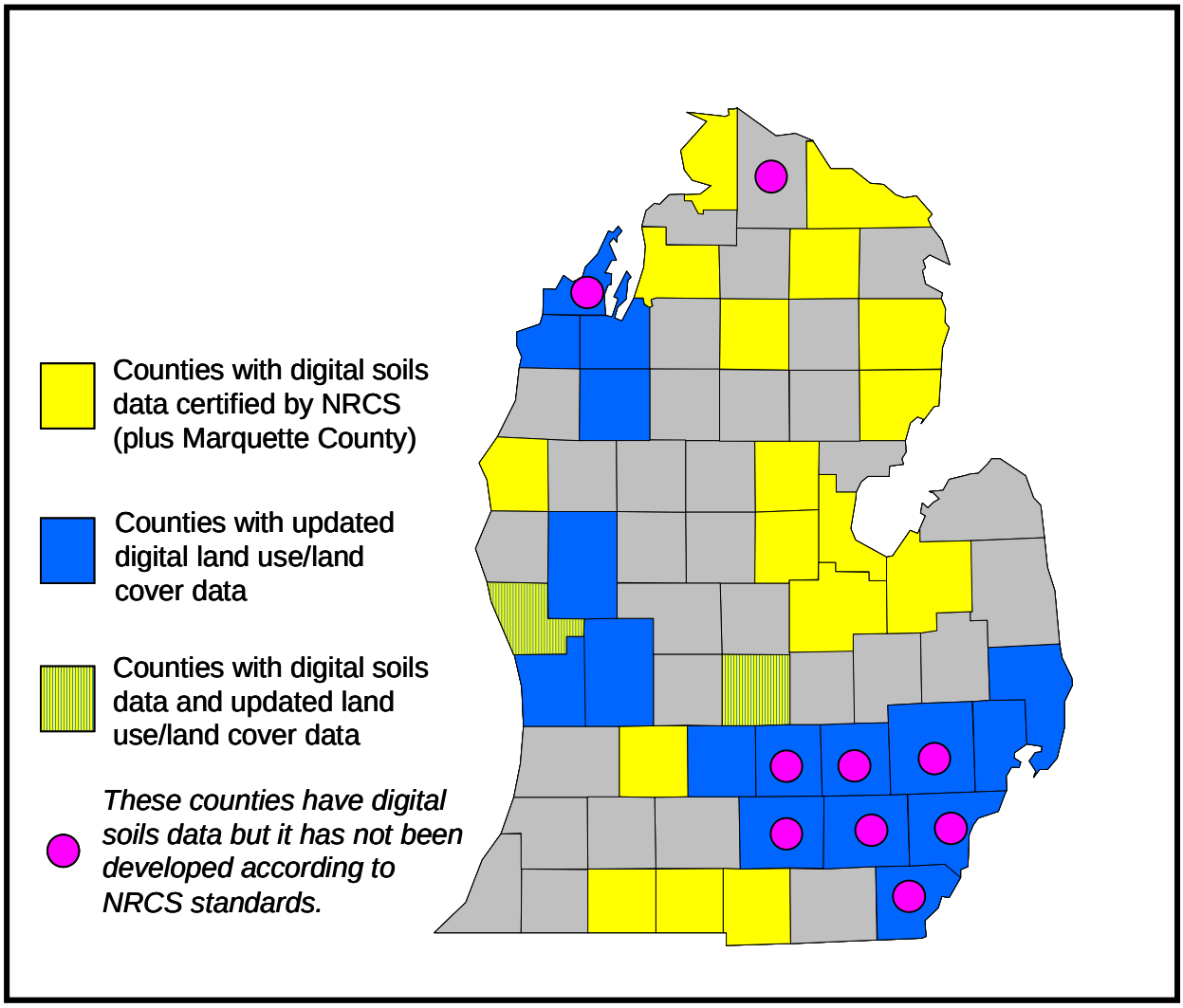
County	Current average millage	Millage Increase to Maintain Current Revenues	
		Method 4	Method 5
Allegan	36.39	3.40	3.57
Clinton	33.99	4.43	4.40
Eaton	38.12	2.89	2.89
Gratiot	31.62	11.33	11.34
Huron	33.31	13.12	13.38
Oceana	38.02	1.45	2.03
St. Joseph	33.72	4.44	4.38
Sanilac	35.94	9.86	9.83
Tuscola	32.23	9.10	9.38

percentage of current SEV is in agricultural land. Also, Oceana County, which does appear to have a current assessment of agricultural land close to use value, has a very small percentage of total SEV in agriculture. As a result, we cannot conclude that areas with a large percentage SEV in agricultural land are those with less development pressure and, thus, current assessments close to use value.

Using Digital Spatial Data and Geographic Information Systems to Facilitate Use Value Assessment

A major concern of township assessors is that use value assessment will represent a significant cost to townships because of the need to obtain the data necessary for these assessments and to update the data to reflect changes in agricultural production and market situations (i.e. commodity prices). In addition, the heterogeneity among farms within each township is viewed as a factor that would make individual assessments for each farm complicated and costly. One option for reducing the costs associated with a farm-by-farm assessment is to compile a digital spatial database and use a Geographic Information System to combine the needed information for each farm. For example, a GIS would allow the combining of land use data, soils data, and parcel data so that agricultural areas and their physical characteristics could be easily assessed. Then, county-level crop production and income data could be determined, and the farm-level weighting by soil type would be simplified by the GIS.

The downside to this approach is that few townships, especially in rural areas, are equipped with this technology. Some rural counties have invested in the technology and the data resources, but townships generally do not have their tax records in a form that is easily compatible with the GIS. However, even if the technology were readily accessible to each township, obtaining the data is still a problem. Only 19 counties in Michigan have updated digital land use data. Only 20 counties in Michigan have digital soils data available. Only two counties have **both** updated digital land use data and digital soils data available (Figure 3).



[1] USDA, Natural Resource Conservation Service (NRCS) certifies digital soils data as ortho-rectified (meaning the data is corrected for curvature of the earth), which makes the data more accurate.

Figure 3. Counties with digital soils data[1] and updated digital land use/land cover data

The lack of this data statewide precludes the use of GIS, at this point, to evaluate statewide impacts on local governments of a change to use value taxation. The county-level use value numbers, based on county average crop production and crop income, could be calculated fairly easily. In addition, a total agricultural use value could be calculated for each county and compared to current agricultural SEV, in order to determine the potential impact, at the county level, on total tax revenues. However, because assessment is done at the township level, a township-level use value based on township average crop production and crop income would be more appropriate. Currently, agricultural census information is not made available at the township level. In addition, without current soils data in a digital form, calculating a use value weighted by soil type and acreage is not feasible.

Toward the end of this research, both updated land use data and digital soil data became available for Clinton County. As a result, research is continuing to examine the extent to which more precise data on soil types and land use, for each township, will enable more precise calculations of differences in assessments for individual farms and for individual townships.

At this juncture, use value assessment at the township level could be facilitated by making available the county-level use value based on average county crop production and crop income. Where townships have included soils data in their assessor record keeping, use values could be calculated for individual farms by weighting the county-level use value by productivity and acres of each soil type. Figure 4 provides an example of an Excel spreadsheet that a township could use to simplify the use value calculations. The spreadsheet provides the necessary information on the relative productivity of each soil type. It also includes the formulas necessary to calculate use value (red print on Figure 4). Each township would need a unique spreadsheet with productivity information for the specific soils in the township. Once this template was made available, townships would need to enter total acreage of the parcel and acres of each soil type and the county-level use value for the tax year (highlighted numbers in Figure 4).

Figure 5 illustrates the parcel report that would be generated using the spreadsheet. Use value for each soil type and for the parcel is automatically calculated (shown in red in

Figure 5). Initial costs of developing the spreadsheet for each township would be substantial, but the relative productivity of the soils is not likely to change over time. Costs to assessors include determining the acreage of individual soils on a parcel and updating this information as parcelization changes. The calculation of county level use values and the appropriate adjustments for each soil would be needed; this would require a concerted research effort. Also, the county-level crop production data is only available in agricultural census years (every five years). The agricultural statistics agencies in some states (Pennsylvania, for example) compile this data annually, rather than relying upon the national census.

If the county-level use values are used without accurate soils data, owners of less productive land will potentially be assessed at levels in excess of the land's true use value, while owners of more productive land will potentially be assessed at levels below the land's true use value. The extent to which this is acceptable to the agricultural community, and to policy makers, will determine how prepared the agricultural community is to make a change to use value assessment before better data is available.

Parcel #:	xx-xxx-x							
Total acres:	350							
	Adjusted				ENTER	COUNTY LEVEL VALUE HERE		
Soil Type	Value	Acres				265.34		
A	G7*0.8	17.5						
B	G7*1	52.5						
C	G7*1.1	0						
D	G7*0.9	227.5						
E	G7*0.95	17.5						
F	G7*0.9	35						
Parcel value	((B8*C8)+(B9*C9)+(B10*C10)+(B11*C11)+(B12*C12)+(B13*C13))/B3							
	(weighted by soil type)							

Figure 4. Sample Excel worksheet for calculating use value for a 350 acre parcel with five soil types, using county level use value as the base value.

Parcel #:	xx-xxx-x							
Total acres:	350							
	Adjusted				ENTER	COUNTY LEVEL VALUE HERE		
Soil Type	Value	Acres				265.34		
A	212.272	17.5						
B	265.34	52.5						
C	291.874	0						
D	238.806	227.5						
E	252.073	17.5						
F	238.806	35						
Parcel value	242.12275							
	(weighted by soil type)							

Figure 5. Use value of a 350 acre parce3l with 5 soil types, using county level use value as the base value (calculation formulas in Figure 4)

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