# The Michigan Farmland Preservation Program: An evaluation

Philip D. Gardner and Donald N. Frazier

*ABSTRACT: Michigan's Public Act 116 was the first program to use income tax credits in conjunction with restrictive agreements in an attempt to retain agricultural land and provide farmers with needed tax relief. Questions have been raised about whether the program, now in its fifth year (1979), has met the protection objective. A preliminary analysis of participants by township and county indicates that enrollment under P.A. 116 has occurred primarily in rural areas that are not affected much by demographic and urban factors. Income tax credits may be a useful way to keep agricultural land in production, but these credits must be complemented by other measures. The tax credit mechanism, by itself, appears to be unable to keep land in agriculture.*

MICHIGAN's Farmland and Open Space Preservation Act of 1974 (P.A. 116) introduced what was at the time a distinctive new approach to farmland protection. In return for contracting their development rights to the state, farm owners could benefit from a circuit breaker tax arrangement. This arrangement provided state income tax credits based on a comparison of the farm family's income and the property taxes the family paid to local government. These tax credits gave farmers an incentive to enroll farmland in the program. At the same time, they protected the tax income position of local governments by shifting the incidence of tax revenue losses to the state. It was believed that two goals could be attained through the tax credit mechanism: tax relief for farmland owners and farmland preservation.

More than 1 million acres were enrolled under the program by the end of 1978, prompting many observers to hail the program as a success. However, experiences in other states indicate that total enrollment figures can be deceiving (*1, 4, 8, 10*). Most land protection devices have had no affect on land in the urban fringe. The question in Michigan thus has been: Is P.A. 116 fulfilling the objective of preserving farmland from development in the urban fringe.

## How the Michigan program works

P.A. 116 authorizes qualified owners of farmland to enter into agreements with local governments. Under the program, owners agree to convey development right easements to the state for a minimum of 10 years. To qualify, a farm must exceed 40 acres or generate an annual income from agriculture of $200 or more. In return, the owners can claim a credit against their state income tax for that portion of their property tax levy above seven percent of their household income. If the credit exceeds their income tax liabilities or if no income tax is paid, the state rebates the credit to the farmland owners (*7*). Landowners also are exempt from any special assessments that may be levied during the agreement period.

At the end of the 10-year period, landowners can renew the agreement. Owners who elect not to continue with the agreement are charged a rollback tax equivalent to the amount of tax credits received in the previous seven years and all special assessments. A lien is placed against the property until the rollback tax is paid.

The state can terminate agreements on land needed for a public purpose. Owners, however, cannot terminate their agreements without government approval. With termination, an owner is liable for all back taxes plus interest. Owners who shift land into prohibited uses, violating their agreements, may be enjoined by the state and penalized for damages of up to twice the land's value at the time the agreement was approved.

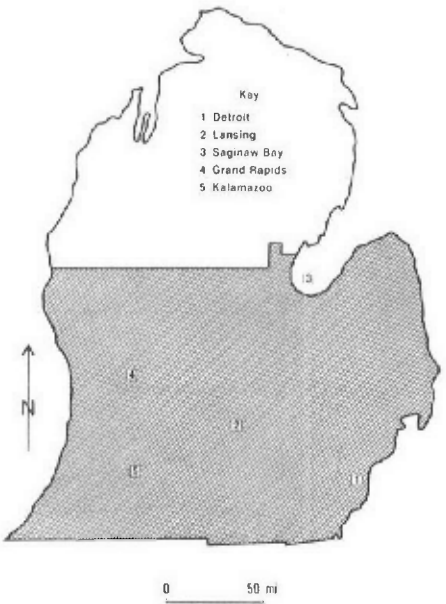


Figure 1. Study area in southern Michigan.

## A program appraisal

About 97 percent of the farmland enrolled under P.A. 116 is in the 41 most southern counties of Michigan. These counties account for 81 percent of the state's farmland and 92 percent of its population. They include the principal agricultural region and the most urbanized parts of the state (Figure 1).

We followed several steps in examining the program's impact on farms in the urban fringes. First, we identified areas subject to major urbanization pressures. Included were three classes of land: (a) incorporated municipalities; (b) a surrounding urbanized zone currently designated as federal aid urban areas; and (c) an outer zone that, with the continuation of past trends, can be expected to experience strong urban growth pressure by the year 2000. The boundaries of the outer zone generally represent townships with considerable suburban populations and 40 percent or more of their land in nonfarm uses. To better define the outer boundaries, we asked county agricultural officials to help identify townships undergoing urban pressures and verify the urban boundaries.

We also targeted for examination nonurban lands under pressure from recreation and second-home development, such as the tart cherry region along Lake Michigan.

Enrollment figures are kept and reported on a county basis.[1] However, county data did not match satisfactorily with the township-level urban growth maps. In the second step, we took the legal description and acreage enrolled from the contracts,

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[1]Data used in preparing the maps reflects entries through September 1979. During 1980 and into 1981, there was a substantial number of new entries caused by uncertainty surrounding changes in property tax laws. Unfortunately, the Land Programs Section of the Michigan Department of Natural Resources, being short-handed, has not been able to process all the new contracts, meaning that the new data is not available for analysis. Based on the information that is available, we do not believe our findings have been changed by these new entries.

located the participating farmland on township plat maps, and aggregated the acreage by township. Then we transferred the information to generalized maps for comparison with lands identified by the Soil Conservation Service (SCS) as prime agricultural and specialty crop areas.

Our third step involved interviewing state, county, and local government officials; farm organization leaders; farm advisors; and farmland owners concerning the program's effectiveness in preserving agricultural land. We were particularly interested in why people were either for or against program participation. Because of limited resources, we were unable to survey contract and noncontract farmers.

### Location of enrolled lands

Figure 2 shows that southern Michigan has three areas with a large number of program enrollees. These include townships in a three-county area that borders on Saginaw Bay, townships in a three-county area located east and north of Lansing, and several townships near the Ohio border in southeastern Michigan. Ogden Township in Lenawee County on the Ohio border leads the state with 16,333 acres enrolled. This represents about two-thirds of the township's land area. Four other townships with more than 10,000 acres of enrolled lands are found in Huron and Tuscola Counties southeast of Saginaw Bay. Areas of noticeably low participation include the southeastern counties near Detroit, areas around Grand Rapids and Kalamazoo, and in the counties along Lake Michigan.

### The quality of enrolled land

To discover the extent to which the program protects the most productive farmlands, we superimposed a map of the state's prime agricultural and speciality crop areas on the enrollment map. For the purpose, we accepted the SCS definitions of prime land and specialty crops.[2] Figure 3 identifies the prime and unique agricultural areas in our study region. These areas include the tart cherry region along Lake Michigan; the grain crop areas in the central region of the state; and the vegetable, soybean, and sugar beet areas along Saginaw Bay and southwest of Detroit.

This comparison produced a mixed picture. The three major participation areas along Saginaw Bay, east and north of Lansing, and in southern Lenawee County (southwest of Detroit) contain considerable areas of prime agricultural land. However, we found low participation level in the east central vegetable crop production area, in the corn and soybean areas of southeastern and mid-central Michigan, and in the fruit belt areas of western Michigan. Protection of the fruit belt lands has special significance in that these areas have a high comparative advantage for the production of red tart cherries and other fruit crops.

### Protecting land under urban pressure

To determine what influence the program has had on farmland in the urban fringe, we made a map comparison by superimposing the growth zones over the enrollment map (Figure 4).

This comparison showed that relatively

[2]SCS maps used included drawings 5, S-31, 498 and 5, S-32, 083, 1973. These maps, however, do not include all the essential farmland in the state. At the time of our study, SCS was preparing a more detailed and comprehensive map of prime and essential agricultural lands that would include the lands identified for this study.

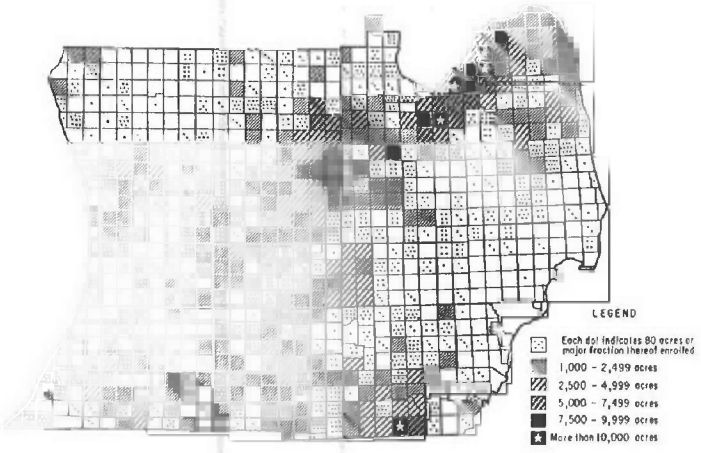


Figure 2 (left). Farmland enrollments, by township, under P.A. 116 in Michigan's 41 southern counties, January 1, 1979.

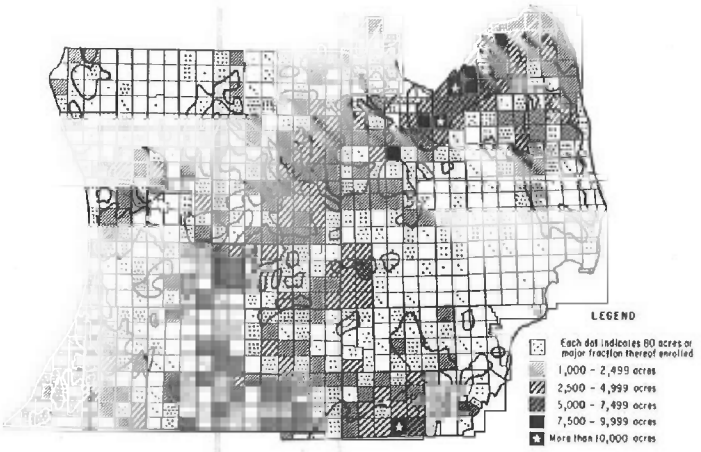


Figure 3 (bottom left). Location of P.A. 116 farmland and prime and unique farmland (within heavy lines) in Michigan's 41 southern counties, January 1, 1979.

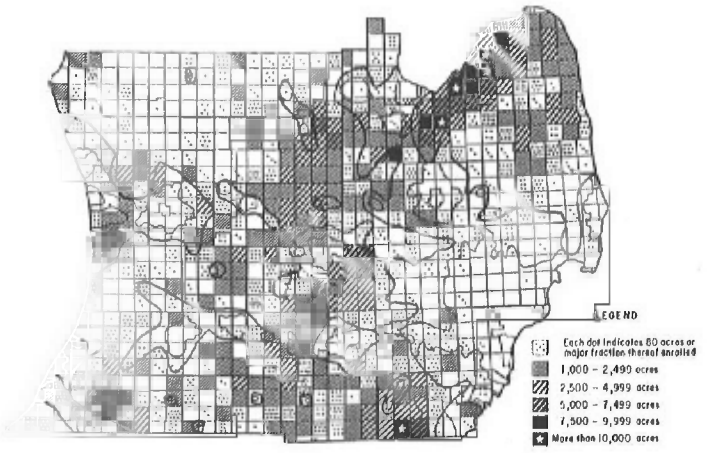


Figure 4 (below). Location of P.A. 116 farmland and principal areas subject to urban development pressures in Michigan's 41 southern counties, January 1, 1979. Light lines delineate federal aid urban boundaries; dark lines define expected growth areas to the year 2000.

little land enrolled at the beginning of 1979 was enrolled within the zones of expected urban pressure. Most of the acreage in the program was located in rural areas, where urbanization pressures were lacking and where the land would remain in farms without a farmland preservation program. Only in a few areas, principally mid-Michigan, was there evidence that urban-impacted lands were entering the program.

This evidence, to a degree, indicated what was happening with enrollments in identified growth areas. However, many factors influence participation, which is voluntary. In addition to the tax savings, these factors include age of owner, affluence, speculation, holding real estate as an inflation hedge, number of heirs, desire to maintain the family farm, and length of contract obligation.

An opinion survey taken one year after initiation of the Michigan program revealed a number of variables that could possibly influence participation (3). Respondents indicated that the primary reason for enrolling their land was to obtain property tax relief (73 percent), followed by a desire to retain their land in agriculture (22 percent).

In our interviews with selected farmers (both enrolled and nonenrolled) and county extension staff members, we were told that the major reason for entering the program was still the property tax credit. Several farmers explained that the credits were simply a means of improving cash flows.[3] On the other hand, nonparticipating farmers indicated that they saw no incentive in the program because it provided them little if any tax credit.

If the major reason for participation is the tax credit, household income that serves as a base for computing the credit could well be a determining factor in participation. Because household income is composed of both on-farm and off-farm incomes,[4] off-farm income, location, and participation may be related. We selected 18 counties within the study area to analyze these factors. The counties were chosen because complete township agricultural and income data were available in each. We found that the average total household income derived from off-farm sources ranged from 33 to 84 percent (6). Further comparison showed that six of the seven counties with the lowest percentage of off-farm incomes ranked highest in acreage enrolled in the program.

This comparison did not distinguish among townships by location, urban and rural. A sample of 335 townships from a possible 337 townships (two townships were eliminated because they contained no agricultural land) were separated into two groups, either urban or rural, according to the definitions used to determine the urban pressure zones. Specifically, if 50 percent or more of the township fell within the urban zone, or 40 percent or more of the land was out of agriculture, we classified the township as urban. Using this approach, 142 townships were classified as urban and 193 townships were classified as rural. A simple correlation analysis showed that off-farm income and enrollment related negatively.

There is a strong rationale to support the contention that enrollments are negatively related to off-farm income. Farm owners living in growth areas may enjoy more opportunities for off-farm employment and for benefiting from second-family incomes than owners in more rural areas. With higher nonfarm incomes, they have larger household incomes; using these incomes as a basis for computing possible tax credits reduces their economic incentive for participation (7).

Experiences in other states suggest that the Michigan situation described by the maps and our income analysis might logically be expected. Investigators in California, for example, indicate that agricultural land near the urban fringe has not been brought under contract. Rather, noncontiguous and scattered enrollments near urban areas have encouraged disorderly urban growth and increasingly costly service facilities. However many rural farmers have signed contracts to enroll their land (8, 9).

## The program's future

Michigan's farmland and open space preservation program passed the 1 million-acre enrollment mark in 1978, about one-tenth of the state's farmland. Although much of the land in several important farming areas has been entered, important land in or near identified growth corridors has not been enrolled. As more farmland is enrolled during the next several years, more attention needs to be directed toward that farmland under pressure from nonfarm activities. This seems warranted, given the current economic situation in the state. With limited financial resources, continued support for the program depends upon whether more land in and near growth areas can be retained for agriculture.

The tax credit appears to be an incentive to enroll for some farmers, especially those in rural areas. The incentive structure may have to be altered, however, to attract farmers closer to urban areas.

There are a number of cosmetic changes possible for making the incentive structure more responsive to these farmers. For example, only on-farm income might be used as a basis for determining tax credits. In some cases, this may be more attractive to speculators. To minimize speculation, tax credits could be based on a percentage of off-farm income, say, 25 percent, and on-farm income. This may discourage property owners with large amounts of off-farm income.

Similar options may exist that would encourage participation among farmland owners near the urban fringe. No guarantees exist, however, that farmland owners in urban pressure zones will increase participation. Many factors affect the retention and conversion decision.

A more practical means of achieving the program's objective might be to combine the tax incentive mechanism with another land management tool. Our evidence and that gathered from other states suggests that relying on one mechanism seldom keeps agricultural land in production. A more effective program could be built around a combination of land use controls. For example, Wisconsin's program, which requires mandatory local planning and zoning as a prerequisite for tax relief (2, 5), appears to be well received by farmers, planners, and the public. The key to that program lies in its capacity for tying together an acceptable incentive structure and sound local planning. Other options, such as agricultural districts or agricultural preserves, may be suitable for combination with tax incentives. These options may provide opportunities for strengthening Michigan's preservation program in the future.

[3]State officials estimated that about 90 percent of those enrolled in 1977 received some tax credit, the average being $2,400 per owner. With the low farm income and rising property taxes of that year, around 57 percent of these owners used the circuit breaker features of both P.A. 116 and the state income tax to receive state income tax credits or cash refunds of 100 percent of their property tax.

[4]Household income is defined as all spendable income received by the household (husband and spouse), whether taxable or nontaxable for state or federal purposes during the calendar year. Included as income would be excluded portion of capital gains, social security, retirement benefits, pensions, annuities, and virtually all other forms of income.

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# Surface mining and reclamation: Initial changes in soil character

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*ABSTRACT: Five different, newly reconstructed soil units on surface-mined land and three undisturbed (cultivated, but not mined) soil units were defined and characterized. Selected properties of the reclaimed soils were compared with those of nearby undisturbed soils to determine what changes took place during the mining and reclamation operations. The properties of the five constructed soil units were closely related to premining overburden characteristics and method of soil construction. Comparisons of each of the eight soil units emphasized differences between constructed soils and undisturbed soils, between mining sites, and between topsoil and spoil units within each of the mining sites. Compared with the undisturbed soils, the constructed soils had higher bulk densities and lacked structure. Both the undisturbed soils and constructed soils had moderately fine textures. Organic carbon levels were lower for the constructed soils except in the surfaces of the units that had been topsoiled. In general, the pH, exchangeable calcium levels, and exchangeable sodium levels were higher and the exchangeable magnesium levels were equal or higher in the constructed soils than in the natural soils. The properties of the constructed soils reflect premining overburden character and method of soil construction, suggesting that considerable control over postmine soil characteristics can be managed by careful selection of materials and material-handling methods.*

ILLINOIS has the largest known reserves of bituminous coal of any state in the nation (*13*). About 13 percent—6 billion tons (*16*)—of these reserves are strippable (*2*).

A portion of these strippable reserves are overlain by some of the most productive soils in the state. For the past several years, 1,600 to 2,400 hectares (3,953-5,930 acres) per year have been surface mined in Illinois with the total reaching about 81,000 hectares (200,150 acres) in 1977.

To better understand the impact of surface mining on Illinois' soils, we compared the characteristics of soils on surface-mined land with the characteristics of undisturbed soils. Our purpose was to determine what changes took place in the soils during mining and reclamation.

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## Study areas

Our study areas were two surface mines in southern Illinois: River King No. 6 near Marissa in Randolph County and the Eads mine near Belle Rive in Jefferson County. In Randolph County, we sampled three soil units on mined land and two soil units on undisturbed land. In Jefferson County, we sampled two soil units on mined land and one soil unit on undisturbed land.

The eight soil units described in table 1 are the same soil units defined and discussed in an earlier variability study (*8*). We defined the five soil units on surface-mined land as soils that were constructed by similar mining and reclamation methods and from similar materials. The three soil units from the undisturbed landscape are common soil series in southern Illinois. All eight units were cultivated, although the five constructed soils were planted to row crops for the first time when sampled.

## Methods

We chose eight stops within a 0.4-hectare (.99-acre) tract of each soil unit by using random number tables to select coordinates measured from a reference point. At each of the eight stops, we took two soil cores about 1 meter apart. Each was treated as independent observations (*8*).

To collect the cores, we used a hydraulic soil probe mounted on the rear of a pickup truck. While inserting the sampling tube, we carefully watched the probe through a slot in the sampling tube to assure that there was no compression of the sample. The moist cores were 5.4 centimeters (2.13 inches) in diameter and 75 centimeters (29.5 inches) long. Each core was cut into five 15-centimeter (5.9-inch) segments so that the entire 75-centimeter-long (29.5-inch) core be included. Each 15-centimeter segment was stored in a small, labeled paper bag for subsequent analysis. We calculated the bulk density of the segments based upon the volume of a 15-centimeter-long cylinder, the diameter of which was the same as the inside diameter of the hydraulic soil probe bit.

After determining bulk densities, we crushed the samples to pass through a 2-millimeter sieve. Small chunks of coal were excluded from the mined-land soil samples as much as possible.

We used standard procedures to determine pH (*10*) and organic carbon (*1*). We collected neutral 1*N* ammonium acetate soil extracts for exchangeable cation analysis (*7*). Sodium was determined by flame emission, calcium and magnesium by atomic adsorption. Particle size analysis was by the pipette method.

We analyzed only four sample depths: 0-15 centimeters (0-5.9 inches), 15-30 centimeters (5.9-11.8 inches), 45-60 centimeters (17.7-23.6 inches), and 60-75 centimeters (23.6-29.5 inches). We determined bulk density at all depths for both cores taken at each of the eight stops within each soil unit. For analysis of all other properties, we randomly selected five stops from the original eight at the 0-15 centimeter (0-5.9 inch) and 60-75 centimeter (23.6-29.5 inch) depths. At the 15-30 centimeter (5.9-11.8 inch) and 45-60 centimeter (17.7-23.6 inch) depths, we determined pH for samples chosen by randomly selecting five stops from the original eight. For all other properties, we randomly selected two stops from the five.