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AN ECONOMIC ANALYSIS OF AGRICULTURAL LAND USE POLICIES FOR SOUTHERN MICHIGAN

By

Cynthia Penner Tinberg

A DISSERTATION

Submitted to
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ABSTRACT

AN ECONOMIC ANALYSIS OF AGRICULTURAL
LAND USE POLICIES FOR SOUTHERN MICHIGAN

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Cynthia Penner Tinberg

The ownership of agricultural land and the corresponding right to determine the use of that land has never been as controversial an issue as in the past few years. The market allocation of farmland, particularly around rural-urban areas, no longer satisfies the majority of people affected by its outcome. People who do not own land increasingly feel they have a right to determine the land's use.

Agricultural land is now viewed as a resource for which there are competing demands. Population growth and dispersion, increased real income, technological change, and the availability of transportation has inevitably led to the conversion of agricultural land to developed uses. Although the loss of farmland is still relatively small compared to the total land base of the United States, controversy stems from the fact that losses of productive land are substantial in certain geographic areas. Also it is often prime farmland that is prone to conversion.

In urbanizing areas the policy issue is over how to maintain a viable agricultural industry while providing land for new homes and recreation, for an expanding urban population. The primary objective of

this study is to provide information prior to the formulation and implementation of new land use policies. Five different and often competing state land use policies are reviewed and evaluated. The results are then used to make policy recommendations for maintaining a viable agricultural industry in southern Michigan's rural-urban fringe area.

The Structure - Conduct - Performance model developed by Edward S. Mason is used to organize information so that the effectiveness of land use policies in retaining land in agricultural production can be tested. Two techniques were used to test for a program effect: interrupted time series with a comparison or control series and questionnaires sent to county extension agents in each test state.

Four of the programs reviewed attempted to control the transfer of land out of agriculture by influencing the farmers decision to sell. In Maryland, California, and Hawaii, the regression tests indicated that the programs do not alter the farmers behavior substantially from what it was before the program. In the states of Vermont and New York, test results indicated that the amount of land transferred out of agricultural use was significantly lower the year the program introduced. However, there are several rival hypotheses which also explain the decrease in land transfer. The existence of strong alternative explanations, as to why land was being retained is agriculture, minimizes the effects which can be attributed to the programs.

From the results of this study and supporting data it can be concluded that there is no evidence to suggest that the programs reviewed showed the transfer of land out of agricultural use. However, in limited circumstances they may have contributed to preferred patterns of development.

Most of the land use programs to date have approached the issue of retaining agricultural land in rural-urban fringe areas as a supply problem. The programs which have resulted from this perspective attempted to change factors which influenced farmers decisions to sell. Effective land use programs must also be structured to alter speculators decisions to buy land. This can be accomplished by substantially changing the structure of benefits inherent in process of transferring land out of agricultural production and into developed uses.

The program recommended for southern Michigan involves: (1) a capital gains tax on the sale of agricultural land, (2) limited provisions of public services to agricultural areas, (3) an educational program which would assist farmers in realistically estimating their future possibilities for an urban sale.

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INTRODUCTION

STUDY PERSPECTIVE

The ownership of land and the corresponding right to determine the use of that land has never been as controversial an issue as in the past few years. The market allocation of farm land, particularly around rural-urban areas, no longer satisfies the majority of people affected by it's outcome. People who do not own land increasing feel they have a right to determine the lands' use. Land use policies are in response to demands for the preservation or orderly development of agricultural land and open space.

The primary purpose of this study is to provide information to states prior to the formulation and implementation of new land use policies. A number of different and often competing land use policies are reviewed and evaluated. The results are then used to make policy recommendations for maintaining a viable agricultural industry in southern Michigan's rural-urban fringe areas.

PROBLEM STATEMENT

Agricultural land resources have always been considered a national asset. The nation's productive farm land has provided plentiful supplies of food and fiber commodities to meet growing national and international demands. However, in recent years, agricultural land has been viewed

as a resource for which there are competing demands.

Population growth and dispersion, increased real income, technological change, and the availability of transportation has inevitably led to the conversion of agricultural land to developed uses. Although the loss in farm land is still relatively small compared to the total land base of the United States, controversy stems from the fact that losses of productive land are substantial in certain geographic areas, in many cases it is prime farm land--land that is best for long-term agricultural production--that is prone to conversion, and often productive farmland is idled by speculation long before it is actually needed for development.

The majority of land converted to urban uses is within standard metropolitan statistical areas (SMSA's).[1] In 90 percent of the SMSA area there is only one person to each 16 acres. A considerable amount of agricultural and much open space is found in SMSA's.[2] Farms in SMSA's account for 14 percent of all U.S. cropland harvested, 60 percent of all vegetables sold, 43 percent of all fruits and nuts sold, 27 percent of dairy income and 24 percent of farm income.[3]

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[1]The definition of an SMSA involves two considerations: first, a city of specified population to constitute the central city; and second, economic and social relationships with contiguous counties which are metropolitan in character, so that the periphery of specific metropolitan area may be identified. SMSA's may cross state lines. SMSA's include most or all the population and the labor force that can properly be associated with an urban center.

[2]U.S. Department of Agriculture, Economic Research Service, Our Land and Water Resources, Miscellaneous Publication No. 1290 (Washington, D.C.: Government Printing Office, 1974), p. 47.

[3]Ibid.

In urbanizing areas the policy issue is over how to maintain a viable agricultural industry while providing land for new homes, recreation, and open space for an expanding urban population. Most land use policies are not designed to stop urban growth in rural areas of SMSA's but to control the pattern of growth and retain agricultural production on land that is years away from development. Two major factors contribute to the idling of farmland before it has development potential: imperfections in the land market, and the taxation policies of local governments.

Uncertainty and the Market for Land

The land market in urbanizing areas is characterized by uncertainty which results in the inefficient allocation of resources.[4] Although the use of land is influenced by access, land quality, and a variety of other specific factors, it is also influenced by the expectations of the participants in the market under conditions of uncertainty. Expectations may vary on two parcels of land even though the quality is identical. Such varied expectations are great in areas of rural-urban transition, where land uses are undergoing drastic change and where the market is quite "thin", i.e. without an adequate volume of transactions to give clear guidance to expectations.[5]

Anyone who owns land on the rural-urban fringe is by force of

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[4]Howard E. Conklin, Maintaining Viable Agriculture in Areas of Urban Expansion. (Office of Planning Services, New York, 1972), p. 30. The findings of the study in Syracuse and Rochester counties indicate that urban expansion has caused a decline in farm productivity over a much larger area of land than has been physically occupied by urban use.

[5]Ibid., p. 5.

events speculating on expectations of future increases in land value. Expectations have a strong influence on the use of agricultural land. Uses change as expectations influence the price of land and influence farmers willingness to undertake the heavy capital investment needed for efficient land use.

Speculation has caused large amounts of land to be held idle, reducing the total output to society. Farmers who suspect their land may be developed in a few years can often maximize their flexibility by holding it out of any use.[6] Because the future pattern of urban growth is uncertain, the amount of land subject to speculative influence is often many times the land area that will actually be needed for urban expansion in the future.[7]

If land is not developed it is difficult to get it back into agricultural production. The suitability of land for farming often is not obvious after it has lain idle for several years. People with the interest and ability to farm decline in number, the agribusiness infrastructure deteriorates, and the policies under which credit is normally extended to farmers make it difficult to rehabilitate run-down farms. The ownership patterns left by a period of speculation also make it difficult to acquire land in suitable units for farming.

Any pattern of urban expansion stimulates some speculation, but scattered expansion greatly increases speculation by influencing many peoples' expectations of large windfall gains. Once speculation is

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[6]Robert G. Healy, Land Use and the States, (Baltimore and London: The John Hopkins University Press, 1976), p. 23.

[7]Conklin, Maintaining Viable Agriculture, p. 27.

underway it is very difficult to contain scattered development by any type of local legislative action.[8] When the opportunity exists for large capital gains, land owners will bitterly oppose action that would remove these opportunities.

Property Tax Influence

The property tax serves a dual purpose. It is the primary source of revenue for local government and it can be used to stimulate or encourage more intensive use of land resources.[9]

Assessments of farmland which are based on their potential as well as actual value, encourage intensive use of land. Farmland with potential value for sub-division purposes can often be pressured into this higher use if it is assessed at its going market value for residential rather than farming purposes.

Historically property tax theories have assumed a relationship between property ownership and ability to pay. However, in rapidly urbanizing areas, while a farmers income will increase, it often does not increase as fast as property taxes. A lack of liquidity may then encourage land owners to convert land to developed uses to meet tax bills without reducing current income.[10]

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[8]Susan Morse, "Canton Hopes to Save Farmland" Detroit Free Press, March 21, 1976, p. 3A.

[9]Raleigh Barlowe, Land Resource Economics: The Economics of Real Property, (New Jersey: Prentice Hall, Inc., 1972), p. 593.

[10]Frederick D. Stocker, "The Impact of Ad Valorem Assessment on the Preservation of Open Space and the Pattern of Urban Growth," Property Tax Incentives for Preservation: Use-Value Assessment and the Preservation of Farmland, Open Space, and Historic Sites (Proceedings of the 1975 Property Tax Forum, June 5-6, Washington, D.C.), p. 29.

Scattering patterns of urban development result in higher tax levies on farm land. Local governments increase tax rates for it takes a larger local budget to provide services to new residents. A non-agricultural population also demand better services than previously provided for a farm community.

Taxes can pressure lands into higher uses when suitable demand exists for these uses and when the land in question qualifies for that use. But when these conditions are not met taxes can have an injurious effect by fostering the waste that comes with premature development and idle land.

In summary, land use policies are formulated in response to conflicts over when and which agricultural lands will be developed around expanding urban centers. These conflicts are exaggerated by uncertainty and resulting speculation in the land market and by property tax pressures on agricultural lands. Both factors discourage a viable agricultural industry and result in land being prematurely taken out of agriculture.

PRESERVATION OF AGRICULTURAL LAND

Agricultural land is a resource for which there are competing and growing demands. The objective of public policies to preserve or control development of agricultural lands are often multidimensional. The most frequently cited objectives of such policies include: the risk of irreversible choices, a fixed supply of prime land, foreign demand and balance of trade, and the environmental amenities associated with agricultural lands.

Irreversible Choices

Arguments can be made for and against policies which would slow urban development of agricultural lands. Those opposed to such policies point out that the nation has a plentiful supply of productive lands and that resource development has contributed to high productivity and opportunities for a good standard of living. Groups supporting the protection of agricultural lands make a case for selective development on the grounds that shifting land out of agriculture to more intensive uses is almost always an irreversible choice.

Irreversible uses of land limits opportunities of adaptation and narrows the potential development of a society.[11]

Recent work by Fisher and Krutilla conclude that a conservative policy with respect to irreversible modification of natural resources is indicated because of inter-generational considerations.[12] That is, if there could be a shift in the vantage point from which an investment plan is evaluated, say from one generation to the next, the result might be a change in the "optimal" plan. The plan could not be implemented, however, if it is in a direction which has been foreclosed by earlier activity.

Fisher and Krutilla also found that if the costs and benefits of alternative uses of natural resources are not known with certainty and if society is risk averse, there will be value in retaining an option to

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[11]S. V. Ciriacy-Wantrup, Resource Conservation Economics and Policies (Berkeley: University of California Press, 1952), Chapter 18.

[12]Anthony Fisher and John Krutilla, "Valuing Long Run Consequences and Irreversibilities," Journal of Environmental Economics and Management, Vol. 1, No. 2, (1974).

use the resource in a way that otherwise could be foreclosed. If society's attitude of one of neutrality toward risk, the same option value will exist if information about the costs and benefits can be developed in an early period, and used to improve the investment decision in a later one.

Even though absolute technical irreversibilities are rare, once farmland is committed to urban and suburban uses it is unlikely that it would ever be economically feasible to return it to its former state. Not investing to preserve agricultural land is essentially irreversible for each parcel developed. If investment is not made within a certain time period, preservation will not be possible and options for alternative use of agricultural land will be foreclosed.

Fixed Supply of Prime Land

One of the more convincing arguments for the protection of prime lands is that the supply of the nation's highly fertile, productive farmland is limited. Prime farmland is the most efficient, energy conserving, environmentally stable land for meeting future food needs. The national loss of prime farmland is estimated to be approximately one million acres per year.[13]

Prime farmland is also prime land for development. The land is flat, the soils are deep, it is well drained, and free of stones. If the land has been farmed it is free of trees and other obstructions and can be purchased in large parcels.

Not only does the development of prime land constitute an irreversible choice, it is also an unnecessary one because most alternative uses

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[13]R. Neil Sampson, "Development on Prime Farmland," Environmental Comment, (January, 1978), p. 4.

of agricultural lands can be accommodated on lands not well adapted for crop production.

Preservations of agricultural land and particularly prime land may become synonymous with energy conservation in the near future. Given the scarcity of fossil fuels and their escalating price, agricultural land is an increasingly viable source of energy. The methods of obtaining fuel energy from land-harvesting biomass and solar collection-are still relatively undeveloped, however, as the costs of conventional energy sources increase energy from agricultural lands will become economically viable.

Foreign Demand for Food

Since 1972, increased foreign demand for food and fiber plus sustained domestic demand has exceeded production and reduced stocks to minimum levels. To increase output, much of the acreage set aside by federal programs was released in 1973 and 1974.[14] New pressures on American agriculture has come from increasing world demands for food exports. Current expectations are that these pressures will persist and the United States and Canada will provide primary sources of food for many countries.

Food export has helped tremendously to equalize the balance of trade in 1974 and 1975. Exports of agricultural products brought in $64 billion in foreign exchange during the 1970-74 period, this represented

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[14]Orville Krause and Dwight Hair, "Trends in Land Use and Competition for Land to Produce Food and Fiber," in Perspectives in Prime Land (Washington, D.C.: Government Printing Office, July 1975), p. 14.

20.8 percent of the nation's exports.[15] A positive trade balance of agricultural products, in 1974 and 1975 of $11.7 and $12 million respectively offset a large negative trade balance of non-agricultural products (Table 1).[16]

Table 1

TRADE BALANCE

Year	Agricultural	Non-Agricultural	Total
	million dollars	million dollars	million dollars
1970	+ 1,125	+ 1,714	+ 2,839
1971	+ 1,925	- 986	+ 939
1972	+ 1,998	- 7,206	- 5,208
1973	+ 5,578	- 9,152	- 3,574
1974	+11,744	- 9,323	+ 2,421
1975	+12,007	-10,187	+ 1,820

With our growing dependence on other countries for oil and other raw materials, increased agricultural production can provide exchange earnings for purchases abroad.

Environmental Amenities

Framing the issues of protection only in terms of productivity misses an important consideration. Agriculture on the urban fringe produces not

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[15]U.S. Department of Agriculture, Economic Research Service, U.S. Foreign Agricultural Trade Statistical Report, Fiscal Year, 1975 (Washington, D.C.: Government Printing Office, 1975), p. 2.

[16]Ibid.

only crops but also provides a valuable natural amenity. People enjoy the scenery and open space provided by well tended farms. In relatively high income economies, as in the United States, the income elasticity of demand for commodities and services related to sustenance is low and declines as income continues to rise, while the income elasticity of demand for environmental amenities is high and increasing.[17] People enjoy and demand the external benefits associated with agricultural land and this demand will increase in the future--even if it is based only on increased population and expanded leisure time.

Many arguments are made for the preservation of agricultural lands. The primary one, however, is that it provides a type of insurance. At this time there exists no way of predicting the full extent of our future dependence on this resource.

RESEARCH OBJECTIVES

The objectives of this study are:

(1) To review theories which can be used in land use research and to incorporate these into a model for land use policy evaluation,

(2) Apply the model to five land use programs that vary in type and institutional setting,

(3) Appraise the potential effect of the five programs on selected performance indicators,

(4) Specify the structure of agriculture in Southern Michigan and identify a land use program which would control development on agricultural land in the study area.

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[17]Vernon W. Reuttan, "The Market Mechanism, Externalities, and Land Economics," Journal of Farm Economics, August, 1965.

REGION OF THE STUDY

The part of Michigan under consideration is the portion south of Bay City across to Muskegon or south of Town Line 16. Soil classifications have shown that most of Michigan's first and second class agricultural land (65 percent) lies in the southern part of the lower peninsula. In this area 85 percent of the land is of high to medium value for agricultural use. Only about one-half is currently (1972) in production.[18]

Between 1940 and 1970 the population in Michigan increased 66 percent, reaching 8.9 million people.[19] The majority of this increase has taken place around existing urban centers and along major highways. These urban centers are all located in the southern part of the lower peninsula. Almost any expansion of an urban area will threaten farmland or open space.

The Michigan Commission on Land Use in its report to the governor plotted some anticipated shifts in location and categories of land between 1970 and 1990. The Commission members estimated that about 80,000 acres per year would be diverted from farmland to other uses--an amount equivalent to nearly 3 1/2 townships.[20] This figure may be too high or low. However, the general conclusions of the Commission

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[18]E. P. Whiteside and Don Schaner, Michigan Agriculture, Agricultural Trends and Future Needs for Agricultural Lands, (Mimeographed, Michigan State University, East Lansing, Michigan, April, 1974), p. 3.

[19]U.S. Department of Commerce, Census of Population, (Washington, D.C.: Government Printing Office), 1970.

[20]State of Michigan, Governor's Special Commission on Land Use Report, (Executive Office, Lansing, Michigan), Appendix A, p. 15.

were that there is enough space around urban centers to accomodate urban growth and agriculture, but the pattern of development should be directed away from good agricultural lands.

FORMAT

Chapter II develops the theoretical bases for government participation in market decisions involving land allocation. It reviews public finance and welfare economies literature exploring the public good characteristics of agricultural land. The model used for land use policy analysis is presented in Chapter III. A basic model for determining performance is modified to take into account social and economic factors relevant in analyzing variables which influence agricultural use of land. Hypothesis are then developed to test the performance of land use programs.

Chapter IV reviews five land use policies within the framework specified by the model. The analytical techniques employed to test for program effects and the empirical results are presented. Chapter V presents a discussion of the structure of agricultural use of land and the factors which influences this use in Southern Michigan. The conclusions of this study and the policy recommendations for Southern Michigan are presented in Chapter VI.

CHAPTER II

THEORETICAL FOUNDATIONS FOR AGRICULTURAL LAND USE POLICY

INTRODUCTION

Debates about policies to control development on agricultural land currently enjoy unprecedented popularity. This growing and sustained interest in land use policies suggests, that for a variety of reasons, many people are not satisfied with the market allocation of agricultural land. Chapter II develops the theoretical basis for government participation in market decisions involving land allocation. It reviews public finance and welfare economics literature, exploring the public good characteristics of agricultural land. All allocative decisions involving public goods have external effects. The objective of land use policies is to direct externalities or determine who gets to choose when there is conflict over land use.

PUBLIC GOODS

The concept of a public good received little attention from economists until it was expanded by Paul Samuelson in 1954.[1] A pure public good is on one end of the continuum of goods. The other bound is comprised of private consumption goods. Private consumption goods have been the traditional objective of economists' concern when referring

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[1]Paul A. Samuelson, "The Pure Theory of Public Expenditure," Review of Economics and Statistics, Vol. 36, (1954), pp. 387-9.

to the allocation of scarce resources among competing demands. Samuelson defined private consumption goods to be those whose total can be parcelled out among two or more persons, with one having more only if another has less.

The demand schedules for private goods are summed horizontally, i.e. one person's use is the denial of use by another. If X_1 is the total amount of the goods available, and X_{11} and X_{12} are the respective private consumption of person one and person two, then the total equals the sum of the separate consumptions or $X_1 = X_{11} + X_{12}$.

Public consumption goods, at the extreme of the continuum, are provided for all people to enjoy or not, according to one's tastes. For example an outdoor circus or national defense is available to all, a person cannot be excluded from the enjoyment or benefit of these goods. Similarly a person cannot exclude themselves if the quantity or quality of the good is not what they would prefer.

The demand for public goods is summed vertically, i.e., one person's use does not diminish the total supply available to others. Public goods like private goods can be varied in quantity - X_2 will represent the magnitude available. However, it differs from a private good in that each person's consumption, $X_{21} + X_{22}$ is related to the total by a condition of equality rather than summation. Thus by definition $X_{21} = X_2$, and $X_{22} = X_2$.

There are many different definitions and terminologies used to describe public goods.[2] In Peter Steiner's definition "collective goods"

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[2]Many of these are discussed by Peter O. Steiner, "The Public Sector and the Public Interest," Public Expenditure and Policy Analysis, edited by Robert Haveman and Julius Margolis, (Chicago: Markham Publishing Co., 1972), pp. 21-58.

arise whenever some segment of the public collectively wants and is prepared to pay for a different bundle of goods and services than the unhampered market will produce. This definition emphasized the fact that public provision by itself does not create a public good.

Economists' interest in public goods stems from the fact that no decentralized pricing system can serve to determine the optional level of public goods which should be provided. An optional solution does exist but the problem is to "find" it. Some kind of signaling or voting could be tried, however, it is in the selfish interest of each person to give false signals and to pretend to have less interest in a collective consumption activity than he actually has.

Free riders will exist whenever it is costly to prohibit the enjoyment of a public good. They pay little or nothing toward the provision of the good but are still able to derive utility from its production.

When public goods are provided people often can't be excluded; an alternative view is that they also cannot exclude themselves. Whatever level of the good exists, it may be costly to avoid. While the same physical good can enter two or more people's utility, the satisfaction derived may differ greatly. What brings positive utility to one may bring disutility to another. Non-optional public goods are those which cannot be avoided, a person has no choice but to accept the good.[5]

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[3]Ibid., p. 22.

[4]Samuelson, "The Pure Theory of Public Expenditure," p. 387-9.

[5]E. J. Mishan, "The Postwar Literature on Externalities: An Interpretative Essay," Journal of Economic Literature, Vol. 9, No. 1, March, 1971, p. 1-28.

Option Demand

Many distinctions have been made between private and public goods. Some of these distinctions imply the goods represent polar cases. However, Burton Weisbrod points out that a number of commodities exist which are apparently private goods but which also possess characteristics of public goods.[6] When there is (A) infrequency and uncertainty in the purchase of a particular commodity and (B) when the cost (in time or resources) of expanding production once it has been curtailed is prohibitive (i.e., the decision to curtail production is irreversible), the market provision of such a good will be inadequate.

When purchases are infrequent and uncertain, market provision may be less than optimal because of option demand. This demand is characterized as a willingness to pay for retaining an option to use an area or facility that would be difficult or impossible to replace and for which there is no close substitute. Such a demand may exist even though there is no current intention to use the area in question and the option may never be exercised.[7] When such an option exists, there is no means for a private resource owner to appropriate the value of this option for it does not enter his decision framework, and the resulting resource allocation may be questioned.[8]

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[6]Burton A. Weisbrod, "Collective-Consumption Services of Individual-Consumption Goods" Quarterly Journal of Economics, Vol. 78, (1964), p. 471-477.

[7]John Krutilla, "Conservation Reconsidered," American Economic Review, Vol. 157, No. 4, (Sept. 1967), p. 778-86.

[8]Ibid.

There is no mechanism in the private market which can be used to charge non-users for their option. Option demand is automatically satisfied when the good exists, therefore, it will pay potential users to mask preferences in order to minimize private costs. The market price is then an inadequate guide to the total value of the good.

As long as the resource exists in its present state (Weisbrod's example is a park) then the option is a pure public good. As a pure public good it can enter two or more persons' utility irreducibly and the marginal cost of an additional user is zero. But when the resource is to be used for other purposes (thus closing the park) the option is no longer a costless by-product.

When a private good has public good characteristics, (A) the public good may be an external economy from current production, or (B) a privately owned resource may be thought of as producing two outputs: private goods to actual users and options to collective consumption non-users.

Recognition of option demand may dictate continued operation when market demand would indicate otherwise. Option demand is important for resource allocation to the extent that when it is added to user demand it would affect the amount of the product or service supplied.

AGRICULTURAL LAND, PUBLIC GOODS, AND OPTION DEMAND

As Weisbrod pointed out, many private goods have public characteristics. These goods have characteristics which are enjoyed but not consumed, and for which the marginal cost of an additional user is zero. Public good characteristics will result in a market provision of a good which is different in quantity and/or quality than some group wants and

is willing to pay for.

This study explores the possibility that land used for agricultural production has public good characteristics. Land as a resource is considered a private good; one person's use is the denial of use by another. If land is owned by one person and planted in wheat, another cannot plant corn or build a shopping center. He is excluded and has less land available to him because of exclusive ownership.

Agricultural land, however, has public good characteristics which result from (1) external economies associated with agricultural use of land, and (2) the production of two outputs: private goods to actual users and options to collective consumption non-users.

External economies may take the form of a pleasant rural countryside for weekend trips or the enjoyment derived from living in an area with open space. Only half of the land in farms is actually in agricultural production; acreage which is not farmed supports wildlife, it is often open for hunting, and some limited recreational use.

In addition to the external economics associated with private production decisions, agricultural land produces options on future uses of the land. There exists an option demand for a plentiful food supply. Most people would be willing to pay a certain amount to insure there would be an adequate supply of land to meet future food needs. However, there is no way the farmer, a private resource owner, can appropriate the external benefits of the option value when making decisions about retaining land in agriculture.

When agricultural land surrounding the cities was plentiful the option demand on this land was satisfied at no cost to the user. As urban growth has expanded into agricultural regions the option demand

of many has gone unsatisfied.

Markets in options exist for many commodities. However, a private market in agricultural land options will probably not be developed. This is a case where the mere provision of the good satisfies the demand. Exclusion would be impossible. If the good is provided for a few it is provided for many. Potential purchasers of options would be tempted not to reveal their true perceived benefit of the land in agricultural production. Where exclusion costs are high and the benefit group large, free rider behavior is predictable.[9]

If individual preferences could be determined, a market in options still might not exist because of contractual or transaction costs.[10] There is always some cost involved in coming to an agreement with another individual. In some instances the cost of obtaining the agreement may be higher than the value of the good.

A land owner currently has the right to retain land in agriculture, sell to a developer or make other alternative uses of the land. Around many urbanizing areas an option demand often exists to retain land in agriculture to slow development and retain open space. Those who have the option demand will have to pay the land owner the difference between the agricultural value and development value of the land to keep it in agriculture. Actual payment may take several forms, such as preferential assessment and reduced taxation or actual purchase of development rights to the land.

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[9]Allan A. Schmid, Property, Power & Public Choice, unpublished manuscript, Michigan State University, East Lansing, Michigan, p. 91-94.

[10]Ibid., p. 153.

The price of retaining the land in agriculture could be quite high. In such a case an effective bid would have to be made by a group. The cost of organizing a group bid can be considerable when the group is large. The cost of organization alone may offset the funds obtained. Then the land will not be maintained in agricultural use even though each individual option value exceeds the development value paid to the land owner.

Individuals with an option demand for land often are not satisfied with the quantity or quality of land which is being provided through the market process. Pressure for state and federal legislation to retain land in agriculture represents an attempt to affect the market allocation of land so as to consider option demand in land use decisions.

THE POLICY SOLUTION

Even the mere suggestion of land use policies delights some and outrages others. The arguments of those opposed to controls range from attributing objectives to a socialist plot to pointing to the resulting increased housing costs for lower income families. Those in favor of land use controls believe they should have some influence over how agricultural land and open space is used even though they do not directly use or own such land.

Land use policies alter the allocation of rights associated with ownership. They also indicate a preference for one type of use over another and, therefore, those who benefit from these uses. High transactions or contractual costs are a right to those who favor the status quo. Some policies shift the burden of contractual costs from the group with option demand for agriculture to those who wish to use the land for development purposes. If land is zoned for an agricultural region, the

developer must incur the costs of obtaining rights to an alternative use of the land. The existence of contractual costs on both sides of the transaction means that the location of the initial rights affects the eventual use of the resource even where market exchange is allowed. The distribution of income will also be affected by the initial location of rights.[11]

While agricultural land may enter two or more persons utility function, the satisfaction derived may differ greatly. When tastes differ as to the amount or type of land which should remain in agricultural production and open space, there is conflict. When tastes differ over the provision of a public good the disagreeing parties must deal with each other, for there is no independent producer. Land use policies establish by law whose preferences will be reflected in resource allocation.

Mishan has made the distinction between optional and non-optional public goods.[12] Optional goods are ones which although available to all are relatively costless to avoid. One can refrain from looking at a neighbor's well-tended yard or choose not to visit a public park. A non-optional public good is one which cannot be avoided or is very costly to avoid.

Land use policies which are not voluntary are non-optional. Avoidance costs may be very high to owners of farmland or their neighbors who antitipate increases in property values through development. When

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[11]Ronald Coase, "The Problem of Social Cost," Journal of Law and Economics, (Oct. 1960), p. 1-44.

[12]E. G. Mishan, "The Postwar Literature on Externalities: An Interpretative Essay," p. 1-28.

avoidance costs are very high one person's good may be another's bad. The provision of a public good for one group of people can produce an external bad for others. The issue then becomes who gets to choose what will be provided and upon whom will the external affects fall.

EXTERNALITIES: A TRADITIONAL VIEW

The idea of external effects on firms was first presented by Marshall. However, the concept was given little attention until Pigou in the "Economics of Welfare" presents it as one of the chief causes of divergencies between "private net product" and "social net product". Externalities provide the standard exception to the equation of optimality with perfect competition.

Assuming F_1 stands for the level of utility of person 1, and X_i denotes amounts of goods x_1^1, $x_2^1 \ldots$, x_m^1 utilized by 1, and x_n^2, the amount of some good x_n utilized by person 2, then $F_1 = f(x_1^1, x_2^1 \ldots, x_m^1; x_n^2)$ represents an external effect generated by person 2 on 1. External effects arise whenever the value of a production or utility function depends directly upon the activity of others. The essestial feature of the concept of an external effect is that the effect produced is not a deliberate creation but an incidental by-product of some otherwise legitimate activity.[13]

The literature makes a distinction between two types of externalities: technological and pecuniary.[14] A pecuniary externality exists

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[13]E. J. Mishan, "The Postwar Literature on Externalities: An Interpretative Essay," p. 1-28.

[14]James M. Buchanan and William C. Stubblebline, "Externality," Economica, (Nov., 1962), p. 371-384.

when an individual's market decisions affect the price of a commodity. All other purchasers must bear the costs or reap the benefits of this price change. Pecuniary externalities are said to pose no problems for the market economy, for they indicate changing demand and are a result of efficient resource allocation.

Technical externalities refer to more direct effects--other than price changes--that one decision unit might impose on another. Technical externalities involve physical effects. This second category of externalities can prevent the market from operating efficiently and it will not result in a Pareto optimal allocation. In such cases social well-being can be increased, because one person's welfare can be improved while making no one else worse off.

THE PUBLIC CHOICE APPROACH AND LAND USE POLICIES

The concept of externalities employed for the policy analysis of this study is more inclusive than that developed by Pigou. Externalities comprise the injuries and benefits, the costs and gains resulting from choice. All choices involving the use of agricultural lands involve some degree of interdependence. The objective of land use policy is to direct the affects of externalities.

In the "General Paradigm of Choice and Power," Samuels develops a conceptual model useful in conflict situations for analyzing whose preferences will take priority and how this is decided.[15] Samuels first

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[15]Warren J. Samuels, "Welfare Economies, Power, and Property," reprinted in Perspectives of Property, edited by the Institute for Research on Land and Water Resources. The Pennsylvania State University, (1972).

assumes that each individual has an opportunity set which is comprised of alternative lines of action. Each economic actor operates under conditions of scarcity to achieve a constrained maximization. Since society is the totality of all individuals it also operates under scarcity and interdependence. The conduct of one group of individuals has an impact on other groups, the choices of one group changes the range and cost of alternatives open to others.

Samuels differs from traditional economic theory by assuming choices and opportunity sets are interdependent. Social decisions are a function of the structure of opportunity sets as well as of the choices made by individuals from within their opportunity sets.

Individuals or groups can affect others by changing the structure of their opportunity set. The impact of the behavior and choices of others upon the structure or array of one's opportunity set, or upon the scope of one's choice is coercion. The economy is a system of mutual coercion, for the choices of each individual eventually have an impact upon the opportunity set and choices of others.

A final term central to the paradigm is power. This is defined as "the means or capacity with which to exercise choice, with which therefore to coerce." Power is the wherewithal of choice, but it is relative to the power of others.

The opportunity set, or the range of an individual's choice, is a function of the total structure of mutual coercion, grounded upon relative power. There is no absolute freedom of choice, but choice is shaped by the actions of others.

Finally, Samuels' definition of externalities, as developed from this paradigm, is considerably more inclusive than that presented by

Pigou and others. Externalities comprise the substance of coercion, that is, the injuries and benefits, the costs and gains, resulting from choice within the opportunity set. In a world of scarcity and interdependence, externalities are inevitable and ubiquitous. The situation of utility and production functions dependent upon the activity of others is not a special case of potential market failure but is the outcome of individual and societal choice.

In this paradigm no distinction is made between technical and pecuniary externalities. They both affect opportunity sets; to include one and not the other would be a purely subjective decision.

In the most general terms, when interests conflict, one or more of the interests are external and most go unmet. Externalities then are truly ubiquitious. Decisions made with respect to the use of agricultural land have external effects. The objective of land use policies is to direct or change the outcome of externalities associated with individual land use choices.

Land use policies direct externalities, they influence who gets to make a choice when it means foregone opportunities to others. This is done by specifying or redistributing property rights, for property rights determine what effects must be taken into consideration before change can be initiated. As stated by Demsitz, "property rights specify how persons may be benefited, and harmed, and therefore who must pay whom to modify the actions taken by persons. The recognition of this leads easily to the close relationship between property rights and externalities.[16]

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[16]Harold Demsitz, "Toward a Theory of Property Rights," American Economic Review, Papers and Proceedings, Vol. 57, 1967, p. 347.

Land use policies change opportunity sets and individuals' range of choices. They order or give preference to some external affects over others. Samuels presents several "main points" which are significant when considering policy alternatives to change the impact of external effects associated with individual decisions regarding the use of agricultural land. Externality solutions:

1. impose externalities of their own,
2. involve the use of power, the restructuring of power and the redirection of the use of power,
3. involve the restructure of opportunity sets and the redistribution of costs and benefits,
4. create a new decision making structure giving effects to hitherto excluded interests and/or participants.

Land use policies to alter the market allocation of land will not eliminate externalities or resolve conflict, but will establish who has the right to impose external effects of costs on others. Some opportunity sets will be expanded, others contracted. However, the level of government intervention will not benefit or please all individuals.

CHAPTER III

A MODEL FOR LAND USE POLICY ANALYSIS

INTRODUCTION

An analysis of programs to retain land in agriculture cannot proceed without a framework to identify differences in programs, and to evaluate their effects on the use of agricultural land. This chapter presents a model for analyzing land use program alternatives. It offers a method of organizing the information needed to evaluate the effects of government choices on selected indicators.

Before getting into the model, the following sections provide an overview of the concept of property employed in this study and a theoretical review of the type of options available to government to change property rights of land resources.

A CONCEPT OF PROPERTY

Land use programs specify and transfer property rights to land resources. The concept of property and the rights associated with it have continually been redefined as different aspects of property obtain market value.

One of the most significant cases in the evolutionary process of property definition was in 1872 when the Supreme Court of the United States was called upon in the Slaughter House Cases to interpret the

meaning of property as used in the constitution.[1] In this case, the legislature of Louisiana had granted a monopoly to a corporation to maintain slaughtering houses for stock in New Orleans, and had regulated the fees charged to other butchers who used these facilities. Before the court, the butchers contended that the statute deprived them of both their property and liberty without due process. The Supreme Court divided. Justice Miller for the majority held that land retained it's common law meaning of physical things held exclusively for ones own use. Property, according to the Fourteenth Amendment meant use value, not exchange value. The minority of the court, however, contended that a man's "calling," his "occupation," his "trade," his "labor," was property, as well as the physical things he might own.[2]

The minority definition of property began to creep into the constitutional definitions given by the state and federal court. Foregoing cases have used a double meaning of property.[3] The old common law definition of tangible things owned has been supplemented with a definition which includes the expected activities of acquiring, using and disposing of the physical objects. One is material possessions, the other marketable assets. In a legal sense then, property consists not of objects, but rather of ones rights with respect to those objects.

New property rights come into existence when two or more individuals compete for the possession and use of an object and the need develops

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[1]John R. Commons, Legal Foundations of Capitalism (The University of Wisconsin Press, (1968), p. 11.

[2]Ibid, p. 11-12.

[3]Ibid, p. 18.

for the allocation of recognized rights between them.[4] The concept of property is not just a relationship between people and things, but describes relationships between individuals regarding their right to use property and exclude others from its benefits. As discussed by Taylor:[5]

> "My right of property in a thing depends not upon my claim to it, but others readiness to admit my claim as priviledged. It is the radical sense in which all property is a public fact, or it is no fact at all. It is always a reciprocal agreement."

The existence of property rights presuppose two factors: (1) the ability of an individual to possess or appropriate an object to the exclusion of others; and (2) a sovereign power that will if necessary, protect the property rights vested in individuals or groups. The role of the state with respect to property rights is described in some detail by Taylor:[6]

> "Property is an institution of the market, not of the state. The institution of property is authorized in the habit and compartment of the market even where there is no legal community to support it, no civil sanction to defend it, no political arm to enforce it. What the state institutes and attempts in the interest of its citizens is not property, but a normative distribution of it. The institution of property is itself invariable assumed. The state undertakes only to articulate and preserve it, to regulate the procedure under which it is held and alienated."

In summary, the concept of property includes not just the tangible objects owned, but the relationship between two or more people with respect to possession of the right to use that property or resource.

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[4]Raleigh Barlow, Land Resource Economics (Prentice-Hall, Inc., 1972), p. 376.

[5]John F.A. Taylor, The Masks of Society (Meridith Publishing Company, 1968), p. 109.

[6]Ibid, p. 114.

Property rights can be exclusive but not absolute, for these rights are subject to the controls and limitations vested in the state.

TYPES OF CHOICES

The role of the state in the distribution of property is graphically presented in Figure 1. "Inputs" from the political system shape government, its actions, and policies. Interest groups, political parties, and different bodies and officials in government influence governmental decisions by providing support, making demands, and exerting pressure. In this model inputs are brought to bear on government, which reacts and turns inputs into "outputs" of the system. The "government" in this sense would include all formal institutions such as administrative agencies, legislature, and the courts.

In land use issues, where property right transfers are the perogative of government, the pressure, demands and support for certain types of decisions come from farm organizations, planning agencies, conservation groups and associations of home builders and realtors.[7] The government then transforms these "inputs" into a policy decision. Depending upon the political power of the various groups, a specific land use program may be initiated, there may be changes in the property rights associated with land, or the existing allocation of rights may be confirmed.

When the output of government results in a decision to change land use patterns--a policy decision--there are many specific programs which

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[7]Detroit Free Press, Committee Vote Crucial to Land Planning Needs, April 1, 1976, p. 6A.

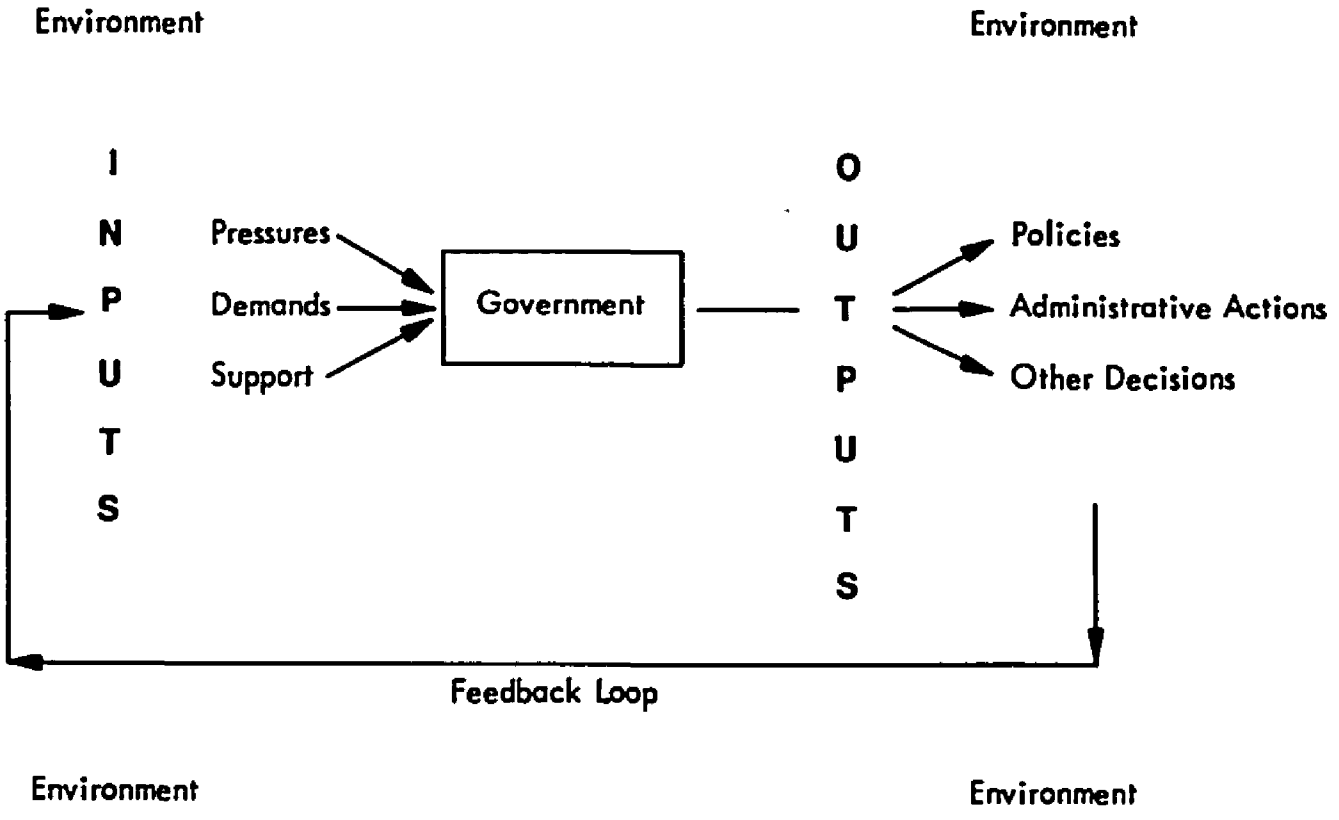

Figure 1 - A Graphical Representation of the Governmental Decision Making Process

Source: David Easton, A Framework for Political Analysis, (Englewood Cliffs, N.J., Prentice Hall, 1965).

may be undertaken to achieve that objective. Such programs involve a transfer of rights associated with land ownership. Two major program categories are briefly described. These categories are identified by the type of relationship which exists between the two parties entering into the exchange or transfer of rights.

The program alternatives presented in this chapter are approached at a conceptual level which allows one to understate the complexity of the subject both theoretically and practically. This simplification is necessary to identify the exchange relationships which exist and the assumptions upon which they are based. The following chapter describes specific programs which lie somewhere in between the extreme cases of administrative, and bargained transfers.

The transfers of interest in this study are not exchanges of things, but of rights. An exchange, will consist of a transfer of titles, of rights which are held, and are commonly admitted to be held by the two parties.[8] An administrative transfer involves a one-way movement of rights. The two trading parties are not equal under law, but are related as superior to inferior.[9] This type of exchange has been referred to as nonmarket or involuntary transfer. The individual in the inferior position may or may not benefit from the exchange. Such transfers are initiated to benefit some third individual or group.[10]

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[8]John F. A. Taylor, The Masks of Society, p. 108.

[9]Allan A. Schmid, Property, Power and Public Choice, unpublished manuscript, Michigan State University, East Lansing, Michigan, p. 24.

[10]Ibid, p. 26.

Examples of administrative transfers between the state and individuals for the benefit of a third group are extensive. Cities and counties exercise planning, zoning, subdivision, building codes and similar activities under the concept of police power--the power to regulate individual activity in the interest of the safety, health, morals and general well-being of the entire population. Courts have generally upheld the exercise of such powers when the purposes to be served were reasonably clear, and the purposes and procedures are in accordance with due process.[11] Hawaii's Land Use Law (Act 187) transfers use rights to agricultural land to a State Land Use Commission, the land owner retains exchange-rights. Nuisance laws are also an example of an administrative transfer of rights.

A bargained transaction involves a transfer of rights between individuals that are legal equals. An important assumption for a bargained transaction is the availability of alternatives for both parties. Bargaining power is affected by the number and type of alternatives facing each party.[12]

The result of a bargained transaction is an agreement to transfer rights for some amount of compensation. There would appear to be few pure bargained transactions between the state and an individual. The state, in land use concerns, is in a position to exercise coercion to obtain a transfer. Even though the power of the two bargaining parties

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[11]Marion Clawson, Suburban Land Conversion in the United States: An Economics and Governmental Process, (Baltimore: John Hopkins Press, 1971), p. 66.

[12]Schmid, Property, Power, and Public Choice, p. 22.

is unequal, several of the programs reviewed in the following chapter possess elements of bargained relationships, in that each party acknowledges the other's property rights and exchanges take place with the agreement of both parties.

In summary, the actual program course assumed by the state, administrative or bargained, will depend upon the political strengths of groups exerting pressure, demands, and giving support to the governmental decision process. The two options presented can be viewed as theoretically polar extremes with the majority of programs lying somewhere in between.

STRUCTURE, CONDUCT, PERFORMANCE MODEL

The model to be used for analyzing the substantive consequences of alternative land use policies was initially developed by Edward S. Mason at Harvard during the 1930's and extended by numerous scholars.[13] The Structure, Conduct, Performance model organizes information so that sets of variables which influence economic performance can be identified. Testable hypothesis can then be developed detailing the nature of the link between the variables and performance. As used by Mason and others the model provides a means of analyzing the effect of market structure on the economic performance of industry. This basic marketing model has been adopted for public policy research.[14]

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[13]F. M. Sherer, Industrial Market Structure and Economic Performance, (Rand McNally and Company, 1973), p. 4.

[14]James D. Shaffer, and A. Allan Schmid, A Framework for Analysis of Community Economic Problems, unpublished manuscript, Michigan State University, East Lansing, Michigan.

Using the framework, a model for analyzing land use policies has been developed. The model is based on the hypothesis that there is a connection between the institutional rules of property rights, people's behavior and the substantive outputs of the economy.

The model is illustrated schematically in Figure 2. The performance of an institutional policy and/or rule depends upon the conduct of the participants affected by that rule. Conduct, in turn is influenced by the institutional structure. Structure and conduct are also influenced by various basic conditions.

As the arrows in Figure 2 suggest, this study is concerned with the causal flow from institutional structure, to conduct, and performance. That is, we seek theories which will permit us to predict ultimate policy performance from the observations of structure, basic conditions, and conduct.

Not all influences flow from basic conditions or market structure toward performance. As with the Easton model, the performance or output in this time period will be part of the basic conditions in the next.

Basic Conditions

There are factors which are external to the study but exert an influence on the outcome of a structural change. These basic conditions are the "given situation" from which policy analysis must start. Basic conditions important in land use analysis are: existing laws and patterns of land ownership, population trends, location of urban centers, type and competitiveness of the agricultural industry, quantity and quality of natural resources, and transportation systems.

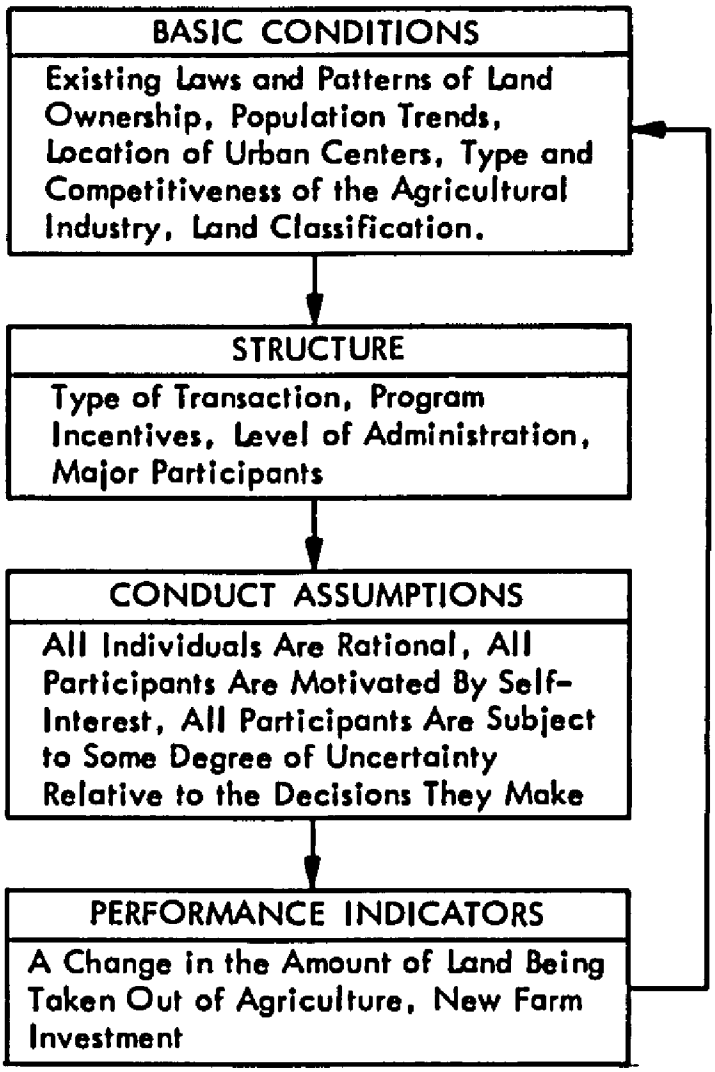

Figure 2 - A Model to Identify the Consequences of Alternative Land Use Policies

Structure

Structure constitutes all the predetermined characteristics of the game and its players, that constrain the players choices.[15] The structure is the system of organization and control of resources. It establishes the opportunity set from which individuals have volitional choice. Structure is a dynamic concept. It is constantly exerting force on the conduct of the participants and the performance of the system. It in turn is also affected by the conduct of those it influences and by the resulting performance.

The dimensions of structure to be considered for land use policy analysis are:

1. Type of Transaction: Because of the bargaining which takes place among the participants in the political decision making process, the program outputs of a government decision will not result in either a pure administrative or bargained transfer. The output will be modified by the strength and interests of each group offering inputs.

The major distinction, however, is the assumptions each approach makes about the rights of the individual or group involved in the transfer. Theoretically, in a bargained transfer each party is free to join or abstain from the transaction. When a transaction does take place it involves a two way transfer of rights. However, the state and the individual are unequal participants in an exchange. The state will recognize the landowners' option to participate in or abstain from a program. The state also has the power to offer a "bad" as well as a

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[15]Schmid, Property Power, and Public Choice, p. 42.

"good" to induce an exchange. For example, if a landowner chooses not to participate in a program which would dedicate his land for agricultural purposes for a determined number of years, he can be subject to higher property taxes, face zoning ordinances which would interfere with farm practices, and increase the risk of having land subject to eminent domain for roads and other public works.

An administrative transaction involves a one-way transfer of rights from an individual in a politically inferior position to one in a superior position of political strength. However, in all cases groups who have found themselves in an inferior position have had enough political power to obtain some benefits in return for the transfer of property rights to land.

In the following chapter, five land use programs are reviewed. Three of these, the New York, California, and Maryland programs, can be classified as bargained transfers. The Vermont and Hawaii programs involve modified administrative transfer of rights.

2. Incentives: Program incentives direct behavior in a manner consistent with program objectives. Specifying the "correct" incentives is an important part of any public program. Research done by Charles Schultz emphasizes the importance of incentives in attaining effective policy:[16]

> "Public program performance depends upon the behavior of a large number of "independent" decision makers, public and private. Actions cannot be commanded. Careful

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[16]Charles L. Schutz, "The Role of Incentive, Penalities, and Rewards in Attaining Effective Policy," Public Expenditure and Policy Analysis edited by Robert Haveman and Julius Margolis, (Markham Publishing Company, 1972), p. 146.

> specification of plans and objectives by a public agency will not suffice to guarantee effective programs. The program must also be explicitly designed to provide incentives or inducements for the relevant decision makers outside the public agency to act in directions which are consistent with program objectives."

As was discussed in the second chapter, agricultural land has certain public good characteristics. Private decisions made with respect to the use of agricultural land have external effects which are not considered by individual land owners. Public programs seek to modify in quality of quantity the outcome of private production and investment decisions. Most land use policies include a modification of the "signals" given and incentives provided by the market so as to induce private action consistent with program objectives.

In a bargained transaction the incentives or benefits must be strong enough to induce both parties to enter into an exchange. To the landowner the cost of giving up certain rights to land must be less than or equal to the benefits received or the costs avoided. Additionally, local governments will have little interest in providing preferential assessment programs for farmlamd if all it does is reduce their tax base.

Removing or modifying current incentive structures can provide problems for bargained and administrative programs. Zoning--an administrative transaction--can be rendered ineffective when there are large gains to be made for a few by rezoning. Where local government is weak zoning cannot stand up against the kind of political pressures that arise in urbanizing areas.[17] On the basis of data on land prices and on estimates of the areas converted annually from rural to urban uses,

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[17]Clawson, Suburban Land Conversion in the United States, p. 68.

the appropriate total annual gain in land prices from converting raw land to sububan residential use may be on the order of $13.5 billion annually.[18] Obtaining these benefits often depend upon rezoning and a change in land use. As stated by Clawson, "with sums of anything like this magnitude at stake, it would be miraculous if owners of and dealers in this land did not seek to influence those public actions which affect the value of their land.[19]

These examples demonstrate the importance of incentives within the structure of the program as well as those external to it.

3. Transaction Costs: Once the type of rights transfers--bargained or administrative--has been determined and the rules of the transfer established, certain costs will follow as a result of these rules. The rules determine what a decision maker takes into account, or establishes who gains and loses from the transfer.

Two types of transaction costs will result from the rules established through a land use program; contractual and informational. The placement of these costs are the costs involved in coming to a decision with another individual.[20] A buyer of land must pay a contractual cost as well as the cost of the property right of the resource. The more people that are involved in a transfer, the higher the transaction costs.[21]

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[18]Clawson, Suburban Land Conversion in the United States, p. 183.

[19]Ibid, p. 183.

[20]Schmid, Property, Power and Public Choice, p. 152.

[21]Ibid, p. 153.

For example, the minority decision in the Slaughter House Cases established there are exchange as well as use rights to land. When a program for a bargain transfer of land rights is initiated it is implicitly assumed by the state that the individual landowner posses both exchange and use rights to the land in question. The existing rights distribution is accepted and a market type exchange will take place if each party believes they will benefit by entering into the exchange.

If the objective of the program is to retain land in agriculture, rules will be established which will allow for the transfer of use rights of land from the individual to the state. The landowner is compensated or receives some benefits from the exchange. Where all rights to land are initially vested with the landowner the state must pay the price of the resource as well as the costs of coming to an agreement on the terms of the exchange. The contractual costs of coming to an agreement with a landowner might include, education programs aimed at informing landowners of program benefits, a staff to process applications and monitor enrollments, and perhaps program revision to appeal to a broader base of landowners.

If an administrative program is the outcome of a political decision process, the allocation of property rights and contractual costs are different than in the first case. An example of an administrative type program is Hawaii's Land Use Law (Act 187). Under this law all the land in the state is zoned into four districts. Landowners in these districts have exchange rights to the land but they cannot alter its use from that specified in the zoning law. When a landowner wants to make use of the land in a manner which is inconsistent with the zoned use, he must incur the costs of coming to an agreement with the state about

altering the use rights to the land.

In this case, where the state has use rights, the landowner must pay the contractual costs of an agreement. To the landowner these costs take the form of public hearings, extending review by the land use commissions, and up to a year's wait for a decision.

The assignment of property rights also has a great deal to do with who has to bear the costs of acquiring information, how large the costs area, and the magnitude of the mistakes.[22] A land use plan may designate areas of critical concern for preservation. However, the outcome will be different if the government has to prove land is critical or if the landowner has to prove it is not. Acquiring information is an expense to one party in an exchange and right to another.

4. Level of Administration: The responsibility for the administration and enforcement of a state land use program may be at the state or local level of government. In some cases this responsibility is shared.

The boundary must be geographically large enough to encompass the land area of interest and it should be determined by the program constituency. A program which depends upon the active participation and committment of a group of people should design the jurisdictional unit so as to enhance the sense of community within this group. Boundary placement should also take into consideration the external effects of decision making at that level.

Land use programs work through transactions--the transfer of rights. Every transaction has effects, which are either internal or external to

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[22]Schmid, Property, Power and Public Choice, p. 164.

the decision making unit. An external effect is a consequence of an act which currently is irrelevant to the individual or organization making the decision, given the existing jurisdictional boundaries.[23] A county program to retain land in agriculture may create external effects by preserving farmland in that county but creating additional developmental pressures in surrounding areas or contributing to a scattered pattern of urban development.

In studying jurisdictional units consideration should also be given to the tax base or revenues of the unit, the professionalism of its staff and the existence of supporting agencies.

5. Major Participants: Identification of the major participants involves knowledge of who is affected by structural change and who in turn can affect or change the structure.

Land use programs have specific benefits and costs, or incentives and disincentives for certain types of behavior. In policy formation it is necessary to know whose actions can influence the program outcome before a system of incentives can be devised. The conduct of the major participants will exert a large influence on the performance of a land use program.

The model presented in Figure 1 will serve as a basis for identifying the major participants. The emphasis of this study is on the output side of the decision process rather than on determining which groups have inputs to the decision process and the impact of their influences. The interest is in determining the effect of the decision or output of the political process on selected indicators.

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[23]Shaffer and Schmid, A Framework for Analysis of Community Economic Problems, p. 10.

The participants of interest are those who will be affected by policy decision. They, in turn, will have access to the decision process and may modify the policy in time. In Figure 3 the Easton model has been extended to incorporate an analysis of program affects. Three possible outcomes may result from a government decision: policies, administrative actions and other decisions. For the purposes of this study, policies are defined as a broad statement of intent or mandate which will stimulate specific programs.

Figure 3 starts with the policy objectives of retaining land in agriculture. The specific program is then operationalized and administered by a bureacracy. Such policies attempt to change market incentives and the conduct of those who buy and sell land. Most policies attempt to influence factors which enter into a farmers decision to sell. A farmers opportunity set is comprised of such factors as property taxes, expectations, land value, and income, which are within the scope of land use policies, as well as those external to influence, such as, education, age and off-farm employment opportunities. Given his opportunity set or options the farmer makes decisions consistent with his goals.

Other land use programs, such as Vermont's attempt to change factors which enter into the speculators opportunity set and influence his decision to buy agricultural land. Again there are factors external, or factors beyond the scope of land use programs which will also have an impact on his decision.

In summary, the major participants include those who administer the program, farmers who offers agricultural land for sale, and speculators who buy rural land for development purposes. As Figure 3 points out, the decisions to buy and sell land are affected by many factors. Some

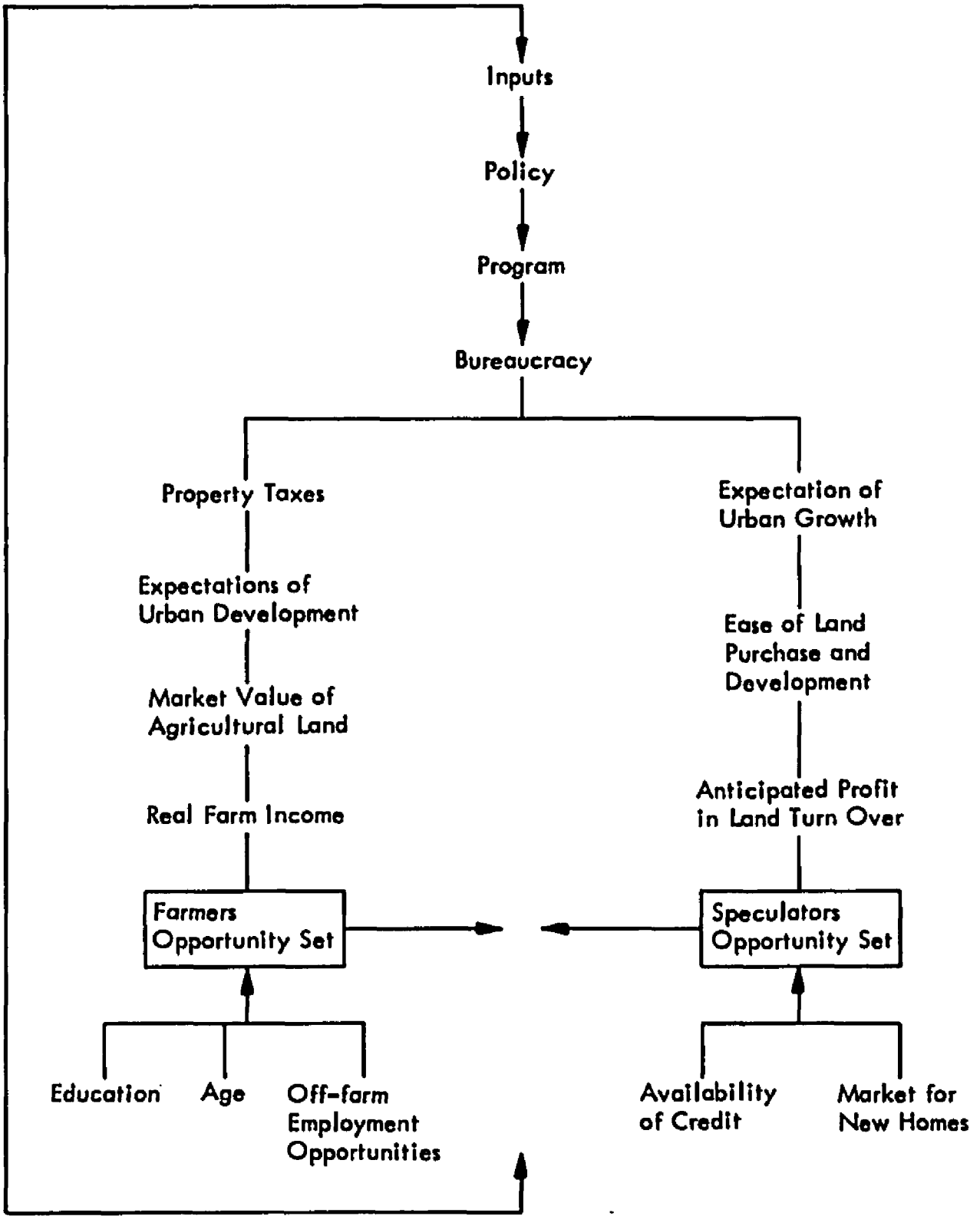

Figure 3 - A Framework for Analyzing Participants Land Use Decisions

of these, such as off-farm employment opportunities, age, and availability credit, are outside the realm of land use policies. Other factors, especially property taxes, and expectations of development time, are program targets which can be altered to change the decision of farmers and speculators.

Conduct

Conduct is the collection of choices, decisions, or strategies adopted by the participants in the political economy given the opportunity set established by the structure.[24] The performance consequence of a change in structure depends upon the conduct of the participants.

Three assumptions are made about the conduct of all the major participants. First, it is assumed that all individuals are rational in their actions and decisions. The assumption of rationality is necessary if any conclusions are to be made about the behavior of the participants. By rational it is meant that the course of action taken by any participant will be an attempt to move closer to, rather than farther away from the attainment of whatever goal the person has chosen.[25] For example, a landowner may have a goal of income maximization and a set of options with respect to the use of her land; it can be sold, rented, left idle, etc. Given a certain set of expectations as to the effects of choosing each option, she will choose the one which she thinks will bring her closest to the goal. Due to uncertainty and a lack of information, an

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[24]Shaffer and Schmid, A Framework for Analysis of Community Economic Problems, p. 24.

[25]Randall Barlett, Economic Foundations of Political Power, (The Free Press, 1973), p. 23.

individual may make an "incorrect" choice; that is, one which would lead them further away from the desired goal. However, as long as the individual expects the choice to be beneficial, the act was rational.

This definition implies no normative connotations regarding the desirability of a specific goal. The assumption of rationality refers to the strategy adopted by each participant in obtaining their objective, it does not apply to the objective itself.

The second assumption is that self-interest underlies all behavior. Self-interest is the basis of a market economy. It results in an allocation of resources determined by effective demand. An assumption of self-interest does not rule out charitable actions, undertaken to benefit a friend or the community. It does however, assume such actions will have nominal distributional consequences, and the person performing the charitable act will receive some utility from the action.

The third assumption is that all participants will suffer from some degree of uncertainty relative to the decisions they make. Uncertainty will exist due to informational shortages. Information will be insufficient when it is extremely costly to obtain. Information in this case is a public good. The cost of obtaining the information exceeds the benefits it would provide to an individual, and once it is obtained, it is available at no additional marginal cost to many. Uncertainly will also exist when information is difficult to understand and where incorrect choices would have serious consequences.[26]

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[26]Otto A. Davis and Morton I. Kamien, "Externalities, Information and Alternative Collective Action," Public Expenditure and Policy Analysis, edited by Robert Haveman and Julius Margolis, (Markham Publishing Company, 1972), Chapter 6.

The existence of uncertainty in the decision making structure has certain costs associated with it. The most obvious cost results from a preference for sure bets which sets uncertain ones at a discount. Placing a lower value on the chance of a desirable result than on the result for sure is completely rational. However, the choices of the appropriate discount for uncertainty is often difficult to determine.

Other costs of uncertainty more pertinent to this study are those that imply deterioration in decision behavior. This deterioration results from confusion and externalizes. As stated by Ruth Mack:[27]

> "The disagreement and confusion that can follow paucity of relevant information deteriorates the ability of the decision maker to deal with the problem even as he sees it. He loses his cool. He suppresses the fact of uncertainty or copes with it improperly."

Uncertainty often narrows the list of alternatives considered; the more uncertain ones may be discarded or not considered. An effort to avoid uncertainty may cause decisions to be made in the context of a restrictive framework. Those which are made may be badly executed due to ineffective follow through. Mack sums up this effect of uncertainty:[28]

> "There is a tendency to overestimate and overreact to uncertainty. This implies that less risky acts tend to be favored relative to more risky ones, the status quo especially tends to pull more than its proper weight. Uncertainty imparts, in other words, a conservative bias to behavior."

The third type of uncertainty costs results from the tendency of uncertainty to exaggerate disadvantageous externalities. It is easier to ignore the impact of a decision to withdraw prime land from

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[27]Ruth P. Mack, Planning on Uncertainty, (John Wiley and Sons, Inc., 1971), p. 5.

[28]Ibid.

agricultural use if the impact of the action is unknown. In such cases the costs are borne by the individual decision maker. However, the total impact of these individual actions may be greater than their simple sum.

The following section, using the assumptions of self-interest, rationality and uncertainty in decision making, further explores the goals and conduct of the participants.

1. Farmers: Land use programs transfer property rights associated with agricultural land. Farm acceptance and participation is an important factor in the success achieved by the programs. Acceptance and cooperation is determined by the compatibility of these programs with the farmers decision framework.

It is assumed that the farmer is rational and his actions are characterized by self-interest. The assumption of self-interest, broadly defined, reflects the fact that he is a profit or income maximizer. The participant has knowledge of alternatives but not perfect knowledge. Uncertainty prevents him from knowing future product and land prices. His actions are based on his expectation of the future.

Programs which involve acquisition or control over land rights are assumed to affect farmer's goals of income generation, wealth assumulation, firm growth, and relative freedom of decision making.[29]

The goal of income generation takes into consideration both: (1) the present needs of income for the farm family; and (2) the management

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[29]Lee A. Christensen, "A Framework for Evaluating Institutional and Socio-Economic Issues of Land Treatment of Waste Water," Journal of Environmental Quality, Vol. 4, No. 2, April-June 1975, p. 149.

objective of maximizing the returns to scare resources. Both the short-term (1 to 3 years) and the long-term (4 years or more) income goals are important. Long-term goals are based on discounted future returns to land resources. The discounted value is computed by a capitalization formula:

$$V = a/r$$

where V is the value of the property
a the expected average annual land rent
r the capitalization interest rate.[30]

There is a close correlation between the concepts of land rent and use-capacity.[31] Land with the highest use-capacity ordinarily has the highest value, the greatest production potential and yields the most land rent. In their choice of enterprises, operators are interested in comparisons of the income producing potential of their various alternatives.

Those uses producing the highest land rent will have the first claim upon the areas with the highest use-capacity. Lower uses will not be able to compete with the more productive ones. They are crowded toward the outskirts to those locations where they can compete successfully with other uses. At any one location, some use can always return a higher land rent than other alternative uses. From the economic

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[30]This is presented in detail in Barlow, Land Resource Economics, Chapter 7.

[31]Land rent is the economic return that accrues or should accrue to land. Use-capacity is the cumulative impact of various factors including location that affects accessibility and items such as soil fertility and drainage that affects land quality.

standpoint of the individual farmer, the use which returns the greatest rent is the maximizing decision.

The goals of wealth accumulation and firm growth reflect the diversion of current income from consumption to investment, and the impact of capital appreciation.[32] Investment will only be forthcoming if the operator can foresee a future in agriculture. If he expects to retire soon and sell the land, or if more wealth can be obtained by the sale of the land to a developer, investment will not be undertaken.

Appreciation of land values is seen by farmers as an earned return to agricultural production. Appreciation may occur because of capital improvements on the land or it may be due to pressure on land from urban expansion. However, earned or accidential the appreciation may be, any land use program which would prevent farmers from reaping the gains from appreciated land values will be strongly resisted. Appreciation in value is clearly an important factor in the farmers' decision process.

Freedom of decision making is highly valued in an agricultural community.[33] In keeping with the paradigm developed in Chapter II, no individual has absolute freedom. Freedom of choice exists only within the opportunity set and is relative to the freedom of others. Land use programs involve trade-offs in freedom of land use decisions for additional real farm income.

One of the most valuable freedoms is the ability of a farmer to sell land and gain through its appreciation. Under certain conditions, farmers

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[32]Christensen, "A Framework for Evaluating Institutional and Socio-Economic Issues of Land Treatment and Waste Water," p. 150.

[33]Dale E. Hathaway, "Agricultural Policy and Farmers' Freedom: A Suggested Framework," Journal of Farm Economics, Vol. XXXV, No. 4, November 1953.

will trade-off some of this freedom for increased farm income. The success of a land use program will depend in part, upon knowing when and to what extent these trade-offs will be made.

An analysis involving marginal rates of substitution between the goals of income generation and freedom of decision making serve to explain why people make different choices at different times.[34] These two goals may conflict when considered in an absolute sense but are complimentary for certain ranges in their margins.

In Figure 4, the horizonal axis represents freedom for the farmer, in land use decision, the vertical axis represents expected farm income. At point CF, the farmer has complete freedom from government interferences in land use decisions, points R_1, R_2, R_3 and R_4 represent successively greater levels of governmental controls on the freedom of the farmer in the use of his land.

A series of indifference curves indicate the pattern of the marginal rates of substitution that a farmer has between freedom in land use decisions and income. A higher level of utility is achieved on I_1, than on I_2 or I_3. However, the level of utility which an individual may attain is determined primarily by forces outside of his control: product prices, the direction of urban development, and the policy decisions of government regarding land use.

At point NP there is no program and the farmer has complete freedom in land use decisions, at point P_1 there are some restrictions and the

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[34]Hathaway, "Agricultural Policy and Farmers' Freedom: A Suggested Framework."

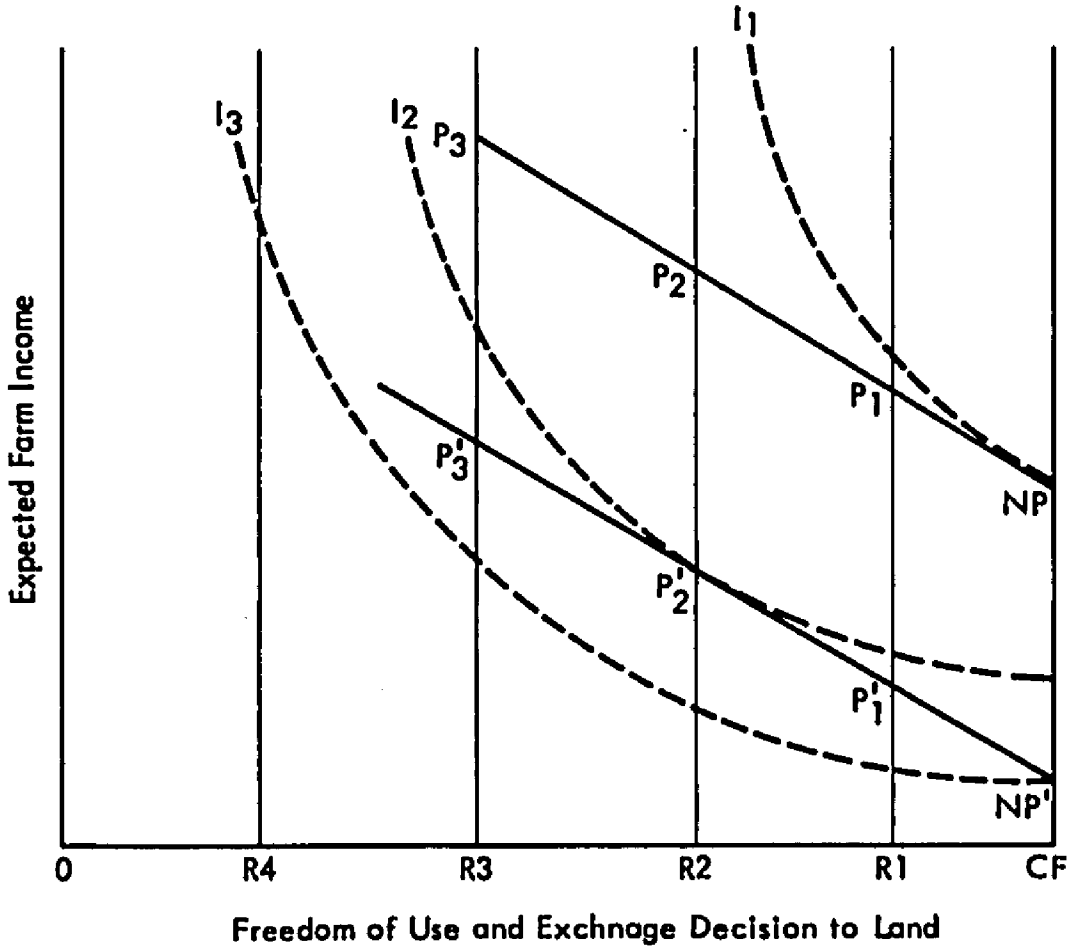

Figure 4 - Analysis of Landowners Willingness to Participate in Land Use Programs

income position is higher, points P_2 and P_3 would represent successively greater losses in freedom and higher incomes. Given the line of attainable combinations just described the farmer would receive the most utility with no government program since he could attain I_1.

An example of this situation exist in rapidly urbanizing agricultural areas, where a farmer may rightly expect his land to sell for several times over its farm value within the next 5 years. Under such conditions no program offered could induce farmers to give up the freedom to determine the use of his land. For the income he could receive from a non-farm sale would outweigh the potential program benefits of increased real yearly income and job security. Given these circumstances, a land use program which relies on voluntary participation will have a negligible effect on the retention of land in agriculture.

If however, the farmer is at I_3, a lower indifference curve, due to low product prices, or no opportunities for an urban sale, he would accept control P_2 which would place him on an indifference curve I_2. Thus, a farmer may participate in a program providing increased farm income to remain in farming, in exchange for decreased freedom in land use decisions. Willing participation will depend upon individual indifference curves and the position of the line of attainable combinations.

Given the line of combinations and the indifference curves for the individual social values, farmers will participate in (or desire) a land use program whenever the line of attainable combinations is tangent to a higher indifference curve for the majority of the farm population than the indifference curve they might attain without such a program. In summary, two conditions could bring about shifts in the farmers' willingness to participate in, or desire for, land use programs. One

would be due to a shift in the attainable combinations line, a result of changing economic conditions, people's preferences for rural living, or changing patterns of urbanization. The second would be due to changes in the indifference curves (marginal rates of substitution). The slope of the indifference curve would change if farmers expectations of a land sale for urban use were altered or if their attitudes toward land use programs were changed by new or more complete information.

2. Speculators: This is a purely descriptive term used to identify the individual who buys land from the farmer. A speculator may develop land but usually sells it in turn to a developer. In few cases do farmers sell directly to developers. This will only happen when the pace of suburbanization has been swift and farming in that area has been reasonally profitable. More commonly the genuine operating farmer has sold out long ago to someone who bought the land in anticipation of future urban development.[35]

There exists then, a spectrum of land holders. At one end are farmers whose primary motive in landownership is the use of the land as an input in a production process. At the other end of the spectrum are homeowners whose motive in land and homeownership is primarily the satisfactions that come from occupancy of the home. Each of these uses have speculative aspects, but the primary motive is the flow of goods and services from production or consumption processes in which land is a critical part. Between these two ends lie a number of landowners whose primary purpose of ownership is the possibility of profit from a rise in the price of land.

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[35]Clawson, Suburban Land Conversion in the United States, p. 62.

These intermediate landowners, as a group, perform a number of useful functions, although few perform all of the following:[36]

a. "They communicate demand signals, from production or consumption sectors which demand land, to present landowners. This is done by bidding up land prices. By bidding up the prices on farm and other land, they facilitate its conversion to other uses."

b. "They help to ration land (in the economic sense of the term) to its highest and most valuable use. They do this by making the land too costly for anyone to use it for less valuable uses."

c. "They may assemble several small tracts into one larger one or divide a large tract into several smaller ones, in each case trying to change an unsuitable landownership pattern into one more suitable for the new use."

d. "The land dealer may bear some risks or some uncertainties involved in suburban land development. The time at which land will be taken into intensive use and the price at which it will be sold for that use are or may be uncertain. The land dealers bid for land, or their willingness to sell can help determine the price."

The speculator is both a buyer and a seller of land. As previously noted, holding land for later urban use inevitably involves a considerable degree of uncertainty as to future demand and price. The greatest asset of the speculator is information which would reduce uncertainty. He will seek to be highly knowledgeable about urban plans and public programs such as sewer and road construction. The speculator will profit primarily by his superior knowledge and by his ability to take advantage of that knowledge.[37] Direct action can in many cases supplement or replace information, as discussed by Clawson.[38]

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[36]Clawson, Suburban Land Conversion in the United States, p. 135-136.

[37]Ibid, p. 102.

[37]Ibid.

> "Members of the landowning group surely try to influence public action. They do not quietly wait for zoning or a new sewer line to drop a plum in their lap but shake the tree vigorously to help that decision drop where and when they want it. It seems reasonable to suppose that they exert influence upon elected public officials through promises of political support, contributions to campaigns, or more direct financial reward. Bribery of elected county officials in land zoning cases is surely not unknown."

We can assume that a speculator will always act in a manner he sees consistent with his self-interest. The speculator seeks profit through the possession of superior information and the passage of time.

3. Administrators: Land use programs may be administered at the state and county level. The specific incentive for certain types of behavior may be different at each level, but the basic conduct assumptions are the same. Administrators, as all other participants, are motivated by self-interest. Self-interest in this case is defined as job security rather than profit maximization.[39] According to Bartlett:[40]

> "Since these individuals remain in the public employ, we must conclude that such a position is the best one available to them in terms of their subjective evaluation of options. If the market offered a better position, the postulate of self-interest would have led them to accept it. Their continued presence in the bureaucracy leads us to the conclusion that a shift in position would involve real costs from their point of view."

Administrators will, therefore, act in the manner which will strengthen their bureau and their particular position. They desire to maximize their own "bureaucractic security."

This desire will be reflected in the view administrators will have

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[39]William A. Niskanen, "The Peculiar Economics of Bureaucracy," American Economic Review, Vol. LVII, May 1968, p. 293-305.

[40]Bartlett, Economic Foundations of Political Power, p. 21.

toward budgeting allocations.[41] A bureau's worth may easily be determined by examining its budget and rate of growth. A large important bureau will provide job security for its members. The actions of administrators will often reflect an attempt to increase both the size and growth of the agency.

It may also be assumed that public employees desire to do a "good job" as they define it, to earn a reasonable income, and to occupy a respectable place in the social hierarchy of the community.[42] In many situations certain employees, planners or zoning officials may be under considerable pressure to give into some individual or group that wants some public action for its own profit. They will be faced with the trade-offs between doing a good job and the positive or negative results of interest group pressure.

PERFORMANCE

Performance is the flow of consequences from a particular structure, given the conduct of the participants in a system.[43] The consequences may be viewed analytically as a set of benefits and costs.

A useful policy analysis requires the comparison of performance among available alternatives. The following chapter evaluates the performance of land use programs by comparing the consequences which result from one structure with those which result from an alternative structure.

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[41]Aaron Wildausky, The Politics of Budgetary Process (Little, Brown, and Company, 1964).

[42]Clawson, Suburban Land Conversion in the United States, p. 108.

[43]Shaffer and Schmid, A Framework for Analysis of Community Economic Problems, p. 28.

Two hypotheses have been developed to test the performance consequences of land use programs. Both hypotheses test to determine if the program had an affect on selected indicators; land taken out of agricultural use and new farm investment. The hypotheses and brief explanations are enumerated below.

Hypothesis 1: Less land will be taken out of agricultural production after the land use program goes into effect.

The main objective of land use programs is to slow and control the rate at which agricultural land is being developed. The hypothesis was tested to determine if the programs had an effect on land conversion. Two techniques were used to test for a program affect; interrupted time series with a comparison or control series and questionnaires sent to county extension agents in each of the five states.

Hypothesis 2: The existence of land use programs has encouraged new farm investment.

It is important to determine whether the program will have a long-term effect on agriculture in the state. If new farm investment is being undertaken because of the additional security the program provides, the state is more likely to have viable agricultural industry in the future. Investment will not occur if farmers anticipate a non-farm sale in the near future. The information for this hypothesis came from the questionnaires sent to county extension agents in each of the five states. The hypothesis cannot be statistically accepted or rejected, but some conclusions can be made from the relative frequency of the type of answers obtained from the extension agents.

CHAPTER IV

A REVIEW AND EVALUATION OF ALTERNATIVE LAND USE POLICIES

INTRODUCTION

This chapter is divided into two sections, the first reviews five land use policies which employ different structures--bargained or administrative--to retain land in agriculture. The second section of the chapter tests the performance hypotheses to determine if the different land use policies have been effective in reducing agricultural land transfers and promoting new farm investment.

A REVIEW OF THE LAND USE PROGRAMS

Basic Conditions : California

Discontiguous urban and suburban growth in California has had a significant impact upon land use in rural as well as more urbanized areas. Inadequate land use planning at the local level and an almost total absence of planning at the state level have contributed to the conversion of highly productive agricultural land and open space into sprawling residential and industrial developments.[1]

California's land problem centers around population pressure and a decreasing supply of and an increasing demand for land. The value of

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[1]Gregory C. Gustafson and L. T. Wallace, "Differential Assessment as Land Use Policy: The California Case," Journal of the American Institute of Planners, Vol. 41, No. 6, (November 1975), p. 379.

all agricultural land (on a statewide average basis) has doubled in the last decade.[2] In urbanizing counties the increase in value has nearly tripled for the same period.[3] It is expected that land will continue to appreciate in value in response to uncontrolled population pressures of urbanization.

The California Land Conservation Act of 1965 was designed to provide a more stable and favorable economic environment for agricultural land use in California.

Structure of the Law

The Act enables farmers to enter into contracts with their city or county governments to restrict, for a period of at least 10 years, the use of their land to eligible agricultural and compatible open space uses. At the end of each year, another year is automatically added to the contract term unless notice of nonrenewal is served by either the landowner or the local government.

Agricultural preserves may be established by any city or county which has a general plan. The local government must hold a public hearing on the issue and submit the proposal for the preserve to the city or county planning department or planning commission. The planning department or commission then submits a report to the city or county board stating whether the preserve is consistent or inconsistent with the general plan. Contracts are enforceable by both parties in court.

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[2]Herbert Snyder, "A New Program for Agricultural Land Use Stabilization: The California Land Conservation Act of 1965," Land Economics, (February 1966), p. 31.

[3]Ibid.

Preserves may only contain eligible land.[4] All noncontracted land within a preserve must be restricted by zoning or other means within two years of the effective date of the first contract within the preserve. These restrictions need only prevent incompatible use of the noncontract land, with respect to the contract land.

In return for the temporary forfeiture of the right to develop their land, landowners pay property taxes based upon the use-value, rather than market value of their land. Agricultural use value is derived from capitalization of agricultural income. The capitalization rate is determined by adding an interest component, a property tax component, a risk component and a component for amorization of investment in perennials.[5] The act also places restrictions on the use of eminent domain by the state, cities, and counties to locate state or local improvements and utilities in agricultural preserves.

To cancel the contract a notice of non-renewal is given by the landowner. The contract continues for nine more years with the property tax increasing immediately to about 60 percent of that based on market value. The tax increases each year until contract termination, at which time it

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[4]To be eligible the land must meet several qualifications: (1) it must currently produce an agricultural commodity for commercial purposes; (2) it must be located within an area reserved for agricultural and compatible uses (defined as an agricultural preserve) created by local governments after the needs for such a preserve have been established by local property owners and local government; and (3) it must be prime agricultural land.

[5]A more detailed discussion of the capitalization rate can be found in an article by Schwartz, Hansen, and Foin, "Preferential Taxation and the Control of Urban Sprawl: An Analysis of the California Land Conservation Act," Journal of Environmental Economics and Management 2, (1975), p. 120-134.

is computed from full market value. Immediate cancellation is allowed only in special circumstances that are judged by the county or city to be in the "best public interest." The opportunity for a more profitable use of the land is specifically excluded as ground for contract cancellation. A penalty of 12.5 percent of the market value of the land at the time of cancellation is levied against the owner unless the penalty is waived by the local government and approved by the Secretary of the State Resources Agency.

The local governments receive compensation from the state government of one dollar per acre per year for land under contract to pay for administrative and overhead costs of supervising the program.

The amount of acreage enrolled in and removed from Williamston Act contracts is presented in Tables 2 and 3.

Basic Conditions : New York

In 1971, New York's legislature passed the Agricultural Districts Law. The law is designed to encourage and retain a strong agricultural industry. New York's agricultural land has been subject to haphazard and speculative development. Urbanization combined with sprawling development put pressures on agricultural land which forced many people out of agriculture who wished to continue farming.[6]

Structure of the Law

The objective of the agricultural District Law is to retain agriculture in the face of growing urban pressure and speculation. It

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[6]William Bensley, "Agricultural Districts in New York," Conference Proceedings: Toward an Effective Land Use Policy for Michigan, (May 17-18, 1973), Michigan State University, p. 46.

Table 2

ACREAGE UNDER WILLIAMSON ACT CONTRACT

(Millions of Acres)

Fiscal Year	Urban Prime	Other Prime	Non-Prime	Total
1972-73	0.709	2.719	8.012	11.440
1973-74	0.801	3.114	8.804	12.719
1974-75	0.852	3.287	9.602	13.741
1975-76	0.912	3.442	10.075	14.429

Table 3

ACREAGE REMOVED FROM WILLIAMSON ACT CONTRACT

Fiscal Year	Urban Prime	Other Prime	Non-Prime	Total
1972-73	1,450	633	10.925	13,008
1973-74	842	831	15,948	17,621
1974-75	998	890	4,860	6,748
1975-76	443	1,555	10,487	12,485
TOTALS	3,733	3,909	42,220	49,862

seeks to achieve this goal by 1) offering farmers an opportunity to protect themselves from some of the rising costs and governmental actions usually associated with urbanization, and 2) by discouraging residential, industrial, and commercial developments within good agricultural areas.[7]

The process for creating a district is a lengthy one. Districts start with local initiative, but must be reviewed and certified by local and state agencies before they can be legally formed. The following steps summarize the process:

1. Landowners prepare a district proposal and submit it to the county legislative body. A minimum of 500 acres is required.
2. The county legislature appoints an agricultural advisory committee of four farmers, four agribusinessmen, and one county legislator.
3. The county legislature refers to proposal to the agricultural advisory committee and the county planning board for their recommendations.
4. The county legislative body may modify the district proposal in a manner consistent with the recommendations of the agricultural advisory committee and the county planning board or its own judgement.
5. The county legislature holds a public hearing on the proposal and subsequently may adopt it as a plan.
6. If the proposal is adopted as a plan, the county legislature submits the plan to the State Commissioner of Environmental

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[7]W. R. Bryant and H. E. Conklin, Legislation to Permit Agricultural Districts in New York, A.E. Ext. 75-24, Cornell University, Ithaca, New York (1975), p. 1.

Conservation.

7. The Commissioner receives reports from the State Agricultural Resources Commission and the Secretary of State. State inspectors examine each proposed district in the field.
8. The Commissioner may certify the plan or a modification of it as eligible for a district.
9. After certification, the county legislature may hold another public hearing on the plan. If the plan was modified by the Commissioner, the county legislature is required to hold another public hearing.
10. The county legislature may take final action to approve or disapprove the proposal. If no action is taken within 60 days, the district is automatically created.

Every eight years each agricultural district must be reviewed. Another public hearing is held and the district is reexamined at county and state levels. If any portion of the district is in strong demand for nonfarm uses at this time, the district may be modified or terminated. Boundary changes, however, can be made only at these eight-year intervals.

As of September 1975, the Commissioner of Environmental Conservation may create agricultural districts of 2,000 or more acres to encompass "unique and irreplaceable" agricultural lands. The law requires the Agricultural Resources Commission to initiate this action by determining areas of predominantly unique and irreplaceable agriculture. To form these special state districts, the Commissioner must be consistent with state environmental and comprehensive plans and policies and elicit the cooperation of local legislative bodies, planning agencies, and agricultural groups.

Whether created by a county legislature or the Commissioner of Environmental Conservation, all districts are affected by the provisions of the law. The provisions include:

1. Local governments cannot enact local laws or ordinances within an agricultural district that would unreasonably restrict or resulate farm structure or farming practices, unless such restrictions are necessary to protect the public health or safety.
2. It shall be the policy of all state agencies to encourage the maintenance of viable farming in agricultural districts and their administrative regulations and procedures shall be modified to this end.
3. The right of eminent domain is limited in a district. Any agency that would take more than 10 acres from an actively operated farm of more 100 acres within the district must give prior notification of 30 days to the Commission of the State Department of Environmental Conservation that they plan to take the land. If, in the opinion of the Commissioner, the taking should be investigated, a public hearing is held within 60 days. The agency involved would have to prove that alternatives had been considered.
4. No public monies will be put into the agricultural districts to develop sewer or water lines. No special public service district for sewer, water, or lights, or for nonfarm drainage may impose benefit assessments or special ad valorem levies on land uses for agricultural production within an agricultural district on the basis of frontage, acreage, or value, except on a lot not exceeding one-half acre surrounding any dwelling or

nonfarm structure located on said land.

5. Any owner within a district qualifies for use value assessment if he has 10 or more acres of land and has produced an average of $10,000 worth of farm products for the past two years. The owner has to apply and qualify for such assessment annually. If the assessor is satisfied that the applicant is entitled to an agricultural value assessment, he will approve the application and the land will be assessed accordingly.

If the land in a district, or any part of it, is sold for a use other than agriculture, the owner pays a rollback or the difference between the tax based on the agricultural land use assessment and what would have been paid without it for the previous five years. Rollback taxes are levied and collected on the first assessment prepared after the land is converted.

The state will provide assistance to each taxing jurisdiction in an amount equal to one-half of the tax loss that results from the formation of agricultural districts. Any state payment will be reduced by one-half the amount of any rollback levied.

There is a special provision in the law for farm lands not in a district. The owner must have 10 or more acres of land in agricultural production with sales of more than $10,000 in the preceeding years. Agricultural land use assessment is granted in return for an eight-year agreement, renewed annually, to retain land in agricultural use. If part or all of the land is sold out of agriculture, the owner must pay twice the tax load of his whole farm the year following the year of the sale. This amount is added to the taxes levied for that year and will become a tax lien on the land.

The number of farms and acreage in districts is presented in Table 4.

Table 4

STATUS OF AGRICULTURAL DISTRICTS IN NEW YORK

Year	Number of Districts	Number of Farms	Acreage
1972	15	773	117,873
1973	90	2,843	717,835
1974	64	2,303	909,509
1975	75	3,273	1,351,269
1976	26	1,467	581,154

Basic Conditions : Maryland

In 1956, the population of Maryland was increasing rapidly, more land was continuously being taken out of agriculture, and land values were climbing at a rate previously unknown in the state. The combination of higher assessed values for farmland and rising tax rates had increased tax bills to a point where they were seriously reducing profits from farming.[8]

Population growth in Maryland since 1930 has run well ahead of that of the nation as a whole. This trend was accelerated in the 1950's when Maryland gained a third in population between 1950 and 1960, compared with a national increase of about 18 percent. This increase in population

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[8]Peter House, Preferential Assessment of Farmland in the Rural-Urban Fringe of Maryland, (Washington, D.C.: Government Printing Office, 1961), p. 2.

was not taking place in the central cities but in the suburbs and countryside.[9]

Structure of the Law

Maryland's preferential assessment law as enacted in 1956 and amended in 1960 provides that lands which are actively devoted to farm or agricultural use will be assessed on the basis of such use, and shall not be assessed as if subdivided or on any other basis.

Definition and eligibility of land is determined by the state department of assessment and taxation. The following criteria is used to determine whether lands which appears to be in agricultural use are bona fide farms, (1) zoning applicable to the land, (2) review of present and past use of the land, and (3) productivity of the land. Agricultural lands which meet the eligibility requirements will be assessed on the basis of their farm use and not as if subdivided.

Land which has been assessed on the basis of agricultural use may not be developed for nonagricultural use for three years after the last year it received preferential assessment. If the land is developed, the owner must pay twice the difference between the taxes based on agricultural value and the taxes based on full value. Building permits are not issued until the assessor certifies the conditions have been met.

Basic Conditions : Vermont

In the early 1960's the rural state of Vermont was faced with a rapid expansion in ski resorts and second homes. The state's population

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[9]Peter House, Preferential Assessment of Farmland in the Rural-Urban Fringe of Maryland, p. 3.

grew more in the 1960's -- 14.1 percent -- than it had during the previous 50 years.[10]

Large recreational development near small communities placed new demands on local services. Land prices, assessments, and taxes increased dramatically. Farms that 10 years earlier sold for 50 dollars an acre brought $500 or more.[11] Property assessments rose 12 percent in 1968, 16 percent in 1969, and 9 percent in 1970.[12]

Many of the developments created potential environmental problems. Septic tanks were placed over bed rock, and drainage and overflow resulted in downhill contamination of wells and streams. Erosion, the diversion of streams to create artificial lakes, and traffic congestion were some of the problems created by large developments.

Local governments were ill-equipped to limit development or regulate its quality. Vermont's Environmental Control Act was passed in 1970.

Structure of the Law

The Vermont Environmental Control Act (Act 250) provides for direct regional and state control of specified types of development. It sets environmental and other criteria that the developments must meet. Act 250 actually involves three pieces of legislation; the original enabling act passed in 1970; the Land Capability and Development Plan passed in 1973 which strengthened the land use controls and mandated a tax on capital gains from land speculation; and the final portion of Act 250,

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[10]Robert G. Healy, Land Use and the States, (Baltimore: John Hopkins University Press, 1976), p. 26.

[11]Ibid.

[12]Ibid.

the Land Use Plan and Map--a state land use plan setting density guidelines for development--has twice been rejected by the legislature.

The Act created a State Environmental Board of nine members appointed by the Governor with the advice and consent of the Senate. The Environmental Board is an independent regulatory body: all members serve part-time on a per diem basis. Members of the Board serve four-year terms with the exception of the chairman who serves two years. No particular experience or expertise is required of Board members by the law. The Board is charged with the responsibility of administering the Act and of developing rules to interpret and carry out its provisions.

The Board is assisted by seven district environmental commissions, each having three members. The members are appointed by the Governor in the district which they serve; they serve on a per diem basis for four years. The chairman is generally a full-time position of one year duration. Again no qualifications for members are imposed by the law.

Most decisions are made by the district commissions, they receive all applications for development or subdivision and either permit or deny the development proposal. If the applicant is denied a permit to develop, he may submit a revised application within six months. The applicant may appeal the district commission's decision to the State Environmental Board, and if denied a permit by that body, to the State Supreme Court.

The law states that no person can sell or offer for sale any interest in any subdivision located in the state, or commence construction on a subdivision or development without a permit. A subdivision is defined as any residential development (permanent or seasonal homes) including mobile home parks, portioned into 10 or more lots. Development means

the construction of improvements for commercial or industrial purposes on land of 10 or more acres. It also includes improvements for commercial or industrial purposes on more than one acre of land within a municipality which has not developed permanent zoning and subdivision laws. Municipal or state improvements, including highway construction, also require permits. Development does not include construction for farming or forestry below 2,500 feet elevation.

Applicants seeking a permit to subdivide or undertake other development subject to Act 250's jurisdiction must submit an application that describes the property and the type of improvement proposed. The district commission then evaluates the proposal in terms of 10 criteria. Before a district commission may grant a permit, it must find that the development:

1. Will not result in undue water or air pollution.
2. Has sufficient water for its reasonably foreseeable needs.
3. Will not cause an unreasonable burden on existing water supplies, if utilized.
4. Will not cause unreasonable soil erosion or reduce the capacity of the land to hold water.
5. Will not cause unreasonable highway congestion or unsafe highway conditions.
6. Will not cause an unreasonable burden on the ability of the town to provide educational services.
7. Will not place an unreasonable burden on other town services.
8. Will not have an undue adverse effect on the scenic or national beauty of the area, aesthetics, historic sites, or rare and irreplaceable natural areas.

9. Is in conformance with a duly adopted municipal development plan, land use plan, or land capability plan.

10. Is in conformance with duly adopted regional plans.

The burden of proof is on the applicant for 1 through 4, and 9 and 10. Opposing parties must prove their case under criteria 5 through 8. A permit may not be denied solely because it does not meet criteria 5, 6, or 7, however, the commission may impose certain conditions on a developer under these criteria.

District commissions have the power to subponea witnesses and require the production of evidence. The Protection Division of the Agency of Environmental Conservation processes applications and prepares a position paper for the district commission. The Agency paper usually contains recommendations for conditions which the state feels should be imposed upon the development. Special interest groups often provide independent expert testimony in hearings. Adjoining property owners are parties as a matter of right.

The law provides for penalties including fines up to $500 per day and/or two years imprisonment for violation of the provisions of the law. However, it is essentially self-policing, relying on private individuals to report developments which do not come to the attention of the state through applications.

In 1973, Vermont also imposed a special capital gains tax on the profits from land sales. The tax is to paid on all gains from the sale or exchange of land. It includes all land whether improved (developed) or not, but does not include buildings or other structures. Exempt from the law are gains on up to five acres of land on which the taxpayer makes his principle residence. Under this exemption gains on vacation homes

are taxable, but those permanent homes of Vermonters are not.

The amount of the tax is dependent upon the percentage gain received and upon the length of time the seller holds the land. Tax rates (Table 5) are between 60 percent, for sellers who make gains of more than 200 percent in less than one year, to zero for sellers who hold their land more than six years. The actual payment is made by the buyer who withholds 10 percent of the sale and transfers it to the state after the sale is made. The seller then applies to the state for a refund or makes an additional payment depending on his tax liability.

Table 5

VERMONT TAX RATE ON CAPITAL GAINS FROM LAND SALES

Years Land Held by Transferrer	Increase in Value (%)		
	0-99%	100-199%	200% or More
Less than 1 year	30	45	60
1 year, but less than 2	25	37.5	50
2 years, but less than 3	20	30	40
3 years, but less than 4	15	22.5	30
4 years, but less than 5	10	15	20
5 years, but less than 6	5	7.5	10

Taxes which are not paid constitute a personal debt on the seller. The State of Vermont can take a lien upon all property and rights to property to obtain payment.

Basic Conditions : Hawaii

In the early 1960's, congress had approved statehood for Hawaii and jet travel made the islands an accessible tourist area. These factors stimulated a booming economy in the state which in turn created a concern that development pressures must be kept under control. The city of Honolulu had been gradually expanding into the prime agricultural area of the central valley of Oahu, and the boom threatened to accelerate this growth rapidly. Although Hawaii contains eight islands, more than four-fifths of the population lives on Oahu.[13]

Hawaii is a small state, with a relatively small amount of its land suitable for cultivation. About one and one-half million of the state's four million acres are suitable for agricultural purposes, but approximately three-fourths of this agricultural land is dry land used for grazing, this results in less than 400,000 acres being suitable for crops.[14]

Hawaii's Land-Use Law (Act 187) was adopted in 1961 primarily to preserve the central valley of Oahu and other prime agricultural land and to restrict the growth of the city of Honolulu, avoiding urban sprawl into the agricultural area of the state. A very large percentage of Hawaii's land is owned by a few corporations and estates. These large land owners were influential in persuading the legislature to take strong measures to preserve agricultural lands. Their support along with the absence of an influential group of small farmers who usually resist such

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[13]R. Robert Linowes and Don T. Allensworth, The States and Land-Use Controls, (Praeger Publishers, 1975), p. 63.

[14]Fred Bosselman and David Callies, The Quiet Revolution in Land Use Control, prepared for The Council on Environmental Quality (1971), p. 5.

regulations helped achieve passage of Act 180.[15] Hawaii had been accustomed to a strong centralized territorial government before statehood, so little resistance was offered from local governments.

Structure of the Law

Act 187 gives the state the power to classify and district lands according to four major uses: urban, rural, agricultural, and conservation.

1. Urban districts include land that is developed, or land that can be expected to develop over the next 10 years.
2. Rural districts include land that is in relatively low-density urban uses or that contains smaller farms and land holdings. No rural districts have been mapped on the island of Oahu and the classification has been used sparingly on the other islands.
3. Agricultural districts include land under intensive cultivation or land that is suitable for such farming and that is developed or planned in residential uses of one acre or more. In includes crop and grazing land and processing operations associated with large-scale agriculture on the islands. In addition, lava flows and other land not suitable for agricultural use are included in this district.

Under the land use law, farmland may be decidated to specific agricultural uses, with assessment based on the dedicated use. The agreement can be cancelled by the owner on five years'

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[15]Fred Bosselman and David Calies, The Quiet Revolution in Land Use Control, prepared for The Council on Environmental Quality, (1971), p. 6.

notice after five years of dedication. Failure to retain land in the agreed upon use results in cancellation of reduced assessment, retroactive to the date of dedication with 5 percent interest.

4. The conservation district was originally designated for state-owned forest and water reserve districts. However, power was granted to modify and expand the boundaries of these districts and subsequently added a substantial amount of private land.

A nine-member state Land Use Commission is responsible for administering the Act. Seven members are appointed by the governor, one from each of the six senatorial districts, plus one member at large. The Director of the Department of Land and Natural Resources and the Director of the Department of Planning and Economic Development also serve as members, all have voting privileges. The seven citizen members of the Commission receive no salary and are assisted by a staff consisting only of an executive director and one staff planner. The Commissioners meet from two to four times a month at various locations throughout the state.

In 1964, the Land Use Commission adopted the initial boundaries of the districts. The use of lands in the rural and agricultural districts is governed solely by the regulations adopted by the Commission. Special permits can be issued for other uses in agricultural or rural districts upon the approval of the county planning commission and the Land Use Commission.

Counties exert more influence over urban districts. County zoning regulations determine which uses are permitted in urban districts. In effect both state and county approval are required for development of most urban uses. If the Land Use Commission rezones land for urban use,

the counties can restrict it to an agricultural classification.

An individual or any department or any agency of the state or local government may petition the Land Use Commission for changes in district boundaries or use regulations. A copy of the petition is forwarded to the appropriate county planning commission for its suggestions. The Land Use Commission then holds a public hearing in the county in which the land is located. Six affirmative votes by the Commission are necessary to approve any change in the district boundaries.

In addition to acting on individual applications, the Land Use Commission is required to undertake a comprehensive review of district boundaries every five years. Land in the conservation district is subject to regulation only by the Department of Land and Natural Resources.

The Commission determines the districts. These districts then comprise the state's land use plan. Changes in the districts are changes in the plan. The Commission, however, has a very small staff and virtually no planning capabilities.

PERFORMANCE EVALUATION OF LAND USE PROGRAMS

Hypothesis 1

The first hypothesis tests to determine if the land use programs had an effect on the amount of land retained for agricultural use.

Technique 1

The experimental design employed is an interrupted time series with a comparison or control series. Controls were chosen on the basis of prelaw similarity to the test state. A control series strengthens the confidence one can have in the tests, in that it controls for rival

hypothesis that threaten the internal validity of the experimental design.[16]

Multiple regression with binary variables was used to determine if there was a program effect on the acres of land in farms. To perform the tests, four equations were estimated.

$$(1) \quad L_t = B_1 + B_2 T_t + E$$

where L represents acres of land in farms, and T is a proxy variable incorporating the influence of property taxes, the value of farmland and farm income. The proxy establishes the causal link between the program and farmer's decision to retain land in agriculture. The second equation is of the form:

$$(2) \quad L_t = B_1 + B_2 T_t + \sigma Z_t + E$$

The variables are defined as before, and Z is a binary variable such that:

Z = 1 if t is in the period after the land use program was in effect.

Z = 0 otherwise.

Therefore, we have:

$L_t = (B_1 + \sigma) + B_2 T_t + E$ (existence of program),

$L_t = B_1 + B_2 T_t + E$ (no program).

The intercept measures the estimated mean value of land in farms corresponding to a tax level equal to the mean of all taxes in the data series.

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[16]Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research, (Rand McNally College Publishing Company, Chicago, 1973), p. 5.

A change in intercept is tested by the hypothesis:

$$Ho: \quad \sigma = 0$$

$$Ha: \quad \sigma \neq 0$$

The third estimating equation is used to test for a slope effect. The slope measures the rate of change in land in farms before and after the law. The regression model is:

$$(3) \quad L_t = B_1 + B_2 T_t + \gamma T_t Z_t + E$$

where the variables are defined as before. In this case, we have:

$L_t = B_1 + (B_2 + \gamma) T_t + E$ (existence of program),

$L_t = B_1 + B_2 T_t + E$ (no program).

Again, the hypothesis tested is that γ is zero.

The third possibility is land use programs had both an intercept and slope effect on land in farms. The regression equation would become:

$$(4) \quad L_t = B_1 + B_2 T_t + \sigma Z_t + \gamma T_t Z_t + E$$

The resulting equations are:

$L_t = (B_1 + \sigma) + (B_2 + \gamma) T_t + E$ (existence of program),

$L_t = B_1 + B_2 T_t + E$ (no program).

An F test was used to test the hypotheses that σ and γ are significantly different from zero. It was calculated according to the following form:

$$F = \frac{SSR_Q - SSR_K}{SSE_Q} \quad \frac{N - Q}{Q - K}$$

where SSR_Q and SSE_Q are the sum of squares of the regression and error for the binary equations, and SSR_K is the sum of squares of the regression

for the first equation estimated. N is the number of observations in the time series, and Q and K are the number of B coefficients in the binary and non-binary equations. If the law did have an effect on the slope or intercept, the variance in equation one will be higher than in two, three, or four, for the amount of variation explained in the dependent variable will be higher when the binary variable is included in the equation.

The outlined technique provides more accurate results than a t-test applied to pre- and post-law data. The attribution of an effect to an intervention is not just a matter of comparing pre- and post-intervention means. A time series which drifts steadily upward but shows neither change in level nor in direction of drift coincident with an intervention will show different pre- and post-intervention means. A significant t-test between the two means is irrelevant to the assessment of an intervention effect.

The F-test is used to determine if there was an intercept and/or slope effect as a result of the land use laws. A significant F score on the intercept test is a stronger test of a program effect than evaluating a slope change. The slope of a time series will be affected by many factors and it's difficult not to confound the effects of the program with other events occurring through time.

Results

The results from the F-tests, presented in Table 6, fall into three categories. In New York and Vermont, the results of the intercept tests were significant and positive. The states of Maryland and Hawaii also had significant F scores for the intercept test, but the computed F

Table 6

RESULTS OF TESTS FOR PROGRAM EFFECTS ON LAND IN FARMS

AT THE 95% SIGNIFICANCE LEVEL

State	Test Ho: $\sigma = 0$		Test Ho: $\gamma = 0$		Test Ho: $\sigma = 0$	
	F Statistic	Computed F	F Statistic	Computed F	F Statistic	Computed F
California	4.45	3.57	4.45	.870	3.63	2.97
Control: Washington	4.45	2.60	4.45	6.72	3.63	36.53
Nevada		.97		.006		3.94
Arizona		.80		.95		.447
New York	4.45	6.63	4.45	15.85	3.63	35.08
Control: Pennsylvania	4.45	22.08	4.45	28.76	3.63	27.31
Maryland - 1956	4.30	37.69	4.30	31.28	3.47	21.53
Control: New Jersey	4.30	1.32	4.30	1.13	3.47	.071
Maryland - 1960	4.30	16.66	4.30	3.77	3.47	54.03
Control: New Jersey	4.30	2.24	4.30	.88	3.47	1.48
Vermont	4.45	9.79	4.45	16.73	3.63	9.36
Control: New Hampshire	4.45	15.08	4.45	19.86	3.63	13.49
Hawaii	4.75	16.54	4.75	16.15	3.98	8.48

statistics were negative. In the third case, California, the results of the F-test were insignificant at the 95 percent level.

The equations estimated to test for an intercept and slope effect for New York in 1971 using ordinary least squares estimation and utilizing 20 observations are:

$$(1)\quad L = \underset{(856)}{18.646} - \underset{(246)}{1,533}\,T + \underset{(875)}{2,256}\,Z, \qquad \bar{R}^2 = .7871$$

$$(2)\quad L = \underset{(788)}{19,500} - \underset{(229)}{1,794}\,T + \underset{(124)}{495}\,Z, \qquad \bar{R}^2 = .8468$$

where Z is the binary. An F value for the intercept test of +6.63 indicates that there was a decrease in the amount of land going out of agriculture in that year compared to previous years. Given the estimated equation, the size of the decrease can be determined. In 1971, the tax rate was $5.51 per acre, the estimated acres of land in farm (L) without the program intercept binary is 10,200,000 acres, while the estimated L with the program is 12,456,000 acres. Therefore, the estimated acres of land in farms is 22 percent greater with the program variables included in the equation than would have been without it (Table 7).

The F value computed for a slope effect in New York was also highly significant and had a negative sign. From the second estimated equation, it can be determined that the rate at which land was being transferred out of agriculture decreased 27 percent with the introduction of the program variable in the equation.

Similar results were obtained for Vermont. The estimated equations for intercept and slope effects using 20 observations are:

$$(1)\quad L = \underset{(93)}{3,837} - \underset{(45)}{501}\,T + \underset{(151)}{474}\,Z, \qquad \bar{R}^2 = .9328$$

$$(2)\quad L = \underset{(86)}{3{,}888} - \underset{(42)}{530}\,T + \underset{(29)}{119}\,Z, \qquad \bar{R}^2 = .9502$$

Table 7

PERCENTAGE CHANGE IN THE ACRES OF LAND IN FARMS WITH THE LAND USE PROGRAM

State	Percent Change in Intercept	Percent Change in Slope
New York	+22%	- 27%
Maryland - 1956	- 4%	+164%
Maryland - 1960	- 4%	
Vermont	+26%	- 22%
Hawaii	- 5%	

where Z is the binary. The F value for the intercept test of +9.79 indicates that the average tendency to withdraw land from agricultural use in 1970 has decreased. Given the tax rate of $4.04 per acre, the estimated acres of land in farms without the program is 1,813,000 acres while with the program 2,287,000 acres of land were retained in agriculture. This represents a 26 percent increase in the year of the program.

From the slope equation estimated for Vermont the value of the binary is +119,000 acres. This modifies or slows the rate at which land is being withdrawn from agriculture by 22 percent.

The conclusions which can be drawn from the F tests about the effectiveness of the land use programs in New York and Vermont are modified by the information obtained on the control states. Both Pennsylvania and New Hampshire, the controls the New York and Vermont, respectively,

showed highly significant F scores for both intercept and slope changes, even though no land use programs for agricultural land were initiated in those states in 1971 and 1970. Assuming the controls do account for all other changes in agricultural land except those resulting from the laws in question, it must be concluded that some external factor has influenced land allocation decisions in the four states.

Given the significant F tests in all four states, one must look to rival or alternative hypotheses to explain the land use changes which have taken place. The enactment of a land use program is not in itself an adequate explanation of the behavioral changes in land use decisions.

One possible alternative hypothesis for the decrease in land transfers would be the restrictive national monetary policy which was initiated in 1969 and carried through 1971. The objective of the policy was to slow demand and rising prices by creating tight credit conditions. During the 1970-71 period interest rates on farm real estate loans reached a record high and the demand for land dropped sharply.[17]

In general, the supply of farms offered for sale reamined constant or increased slightly, but there were fewer people buying farms.[18] According to the reporters for the Farm Real Estate Market Developments Situation, there seemed to be a general belief that farm prices would hold steady or decrease. Fewer people were looking at farm land in 1970 than in previous years.[19]

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[17]U.S. Department of Agriculture, Economic Research Service, Farm Real Estate Market Developments, (Washington, D.C.: Government Printing Office, March 1971).

[18]Ibid.

[19]U.S. Department of Agriculture, Economic Research Service, Farm Real Estate Market Developments (Washington, D.C.: Government Printing Office, March 1970).

The New York law went into effect at a time when the population of the state was decreasing, and travel and building costs were rising.[20] Much of the urban pressure on farm land was lessening at the time the Agricultural District Law was passed.[21] These factors along with high credit present a serious threat to attributing a decrease in land transfers to the agricultural land use programs.

The results in Maryland and Hawaii both differ from the previous two states in that the intercept coefficients are negative and the slope positive, which is the opposite of the effects stated or expected in the hypotheses.

The Maryland law was tested for 1956 when the first preferential assessment law was passed and in 1960 when a constitutional amendment was approved after the courts declared sections of the law unconstitutional. The estimated equations using OLS and 25 observations are, for 1956:

$$(1)\quad L = \underset{(23)}{4{,}448} - \underset{(8)}{225}\,T - \underset{(30)}{189}\,Z, \qquad \bar{R}^2 = .9589$$

$$(2)\quad L = \underset{(33)}{4{,}265} - \underset{(31)}{85}\,T - \underset{(25)}{140}\,Z, \qquad \bar{R}^2 = .9482$$

and for 1960:

$$(1)\quad L = \underset{(27)}{4{,}377} - \underset{(12)}{215}\,T - \underset{(42)}{173}\,Z, \qquad \bar{R}^2 = .9782$$

$$(2)\quad L = \underset{(60)}{4{,}310} - \underset{(41)}{177}\,T - \underset{(30)}{58}\,Z, \qquad \bar{R}^2 = .9673$$

where Z again is the binary.

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[20]Conversations with Howard Conklin, Cornell University.

[21]Ibid.

The significant F score on the intercept tests and the negative binary variable indicate that the amount of land in farms decreased significantly in 1956 and 1960. With a tax rate of $1.73 per acre in 1956 and $2.32 per acre in 1960, the decrease was 4 percent in each year.

The F score on the slope test was significant in 1956 and insignificant at the 95 percent level in 1960. A negative binary slope variable suggests the rate at which land is being transferred out of agriculture has increased. This increase is in addition to the downward trend projected before the law.

The Hawaii land use program, due to a shortage of data, was only tested for the 1963 revision in the State Zoning Law (Act 250). Using OLS and 15 observations, the estimated equations:

$$(1)\quad L = \underset{(56)}{2{,}711} - \underset{(40)}{130}\,T - \underset{(34)}{139}\,Z, \qquad \bar{R}^2 = .8007$$

$$(2)\quad L = \underset{(70)}{2{,}572} - \underset{(60)}{18}\,T - \underset{(28)}{112}\,Z, \qquad \bar{R}^2 = .7980$$

The results are similar to those obtained for Maryland. A high F score and a negative coefficient on the intercept binary again suggest the average tendency to transfer land out of agriculture has increased 5 percent in 1963 over previous years. The binary slope coefficient was also significant and negative, indicating that the rate at which land was being taken out of agriculture increased after 1963. However, the standard error on the slope coefficient (18 T) is too high to have any confidence in the percentage rate of increase. We can only note the direction of the change.

New Jersey, the control state for Maryland, did not show significant intercept or slope changes in 1956 or 1960 at the 95 percent level.

Rather than concluding the Maryland law encouraged transfers of land out of agriculture, further tests of the state indicates that statistically significant amounts of land were being taken out of agricultural use every year over a several year period. The preferential assessment law did not alter the rapid conversion process which had been underway since the early 1950's.[22]

No control was available for Hawaii, and the data base was limited; however, on the basis of the results obtained, it appears that the average tendency to transfer land out of agriculture was not altered by Act 250. The State Zoning Law does not remove the incentives which exist for developing agricultural lands.[23]

The final state to be reviewed is California. The results of the F tests for intercept and slope changes were both insignificant at the 95 percent level. From these results it can be concluded that the Williamson Act, as introduced in 1965, was ineffective in retaining land in agriculture.[24] Tax incentives were not sufficient to induce owners to retain land in agricultural production and forego the profits of land

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[22]These conclusions were also reached by Peter House, Preferential Assessment of Farmland, p. 19.

[23]A summary of the land pressures in Hawaii and the profits to be made from development can be found in an article by Leroy F. Aarons, "Hawaii: A Paradise Lost?," The Washington Post, December 29, 1972.

[24]These conclusions are supported by Gustafson and Wallance, Differential Assessment as Land Use Policy, p. 387. They concluded, "There is no evidence to indicate that the Act has affected the allocation of land between uses in the rural-urban fringe. If one views growth management in the rural-urban fringe as the principle objective of the California Land Conservation Act, the arguments for its continued existence are not compelling.

development.[25]

Technique 2

As a second method of testing the first hypothesis, a questionnaire was sent to all the county extension agents in each of the five states. The questionnaire was pre-tested by extension people in the State of Michigan. A copy of the questionnaire is included in Appendix 1, Question 2A provides information relevant to the first hypothesis.

Results

It was expected that the information obtained from the questionnaires would lend additional support to the results of the F tests. However, from Table 8, which presents the relative frequency of each response, it can be seen that most county extension agents believe the land use program in their state has reduced the amount of land being transferred out of agriculture. It should be emphasized that the question asked for their opinion and there is no way of knowing how much information this opinion was based upon.

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[25]David Hansen and S. I. Schwartz, in a study of urban fringe counties, found that no CLCA contracts were accepted by owners expecting development within 10 years, and that only 4 out of 21 who expected development within 10 to 20 years were willing to accept a contract. Where 20-year contracts were offered, more than half of those who would not have accepted a 20-year contract did not expect development before 25 years. Hansen and Schwartz concluded that "these individuals do not appear willing to risk having a CLCA contract restrict their ability to sell their land for development." The study "Landowner Behavior in the Rural-Urban Fringe in Response to Preferential Property Taxation" is found in Land Economics, L14, November 1975, p. 341.

Table 8

RELATIVE FREQUENCY OF EXTENSION AGENTS' RESPONSES TO PROGRAM EFFECTIVENESS IN RETAINING LAND IN FARMS

State	Yes	No	No Answer	Questionnaire Response Rate
	----------	(%)	----------	
California	68.6	25.7	5.7	66%
New York	47.8	41.4	10.8	82%
Maryland	60.0	40.0	0	62%
Vermont	50.0	50.0	0	71%
Hawaii	80.0	20.0	0	41%

In all states, with the exception of Hawaii, the response rate was quite high, well over 50 percent of the agents returned the questionnaire. Responses that the programs had no effect on retaining land in agriculture were highest, around 50 percent, in New York, Maryland, and Vermont. In California and Hawaii only about 20 percent of the extension agents felt the program had no effects on land transfers.

Some of the most interesting information, particularly from California, was in letters the agents returned with the questionnaires. Eighty percent of those who wrote letters felt the program was ineffective. The extension agents who wrote provided additional information about the program and farmers' responses to the benefits it provides. Excerpts from two California letters reflect the opinions expressed in most of the agents' letters:

> "The Williamson Act has been the best tool available to prevent helter skelter development and it has helped provide for more orderly development. In addition, the Williamson Act has helped farmers be taxed on the basis of the value of their land for farming rather than on its potential development value.
>
> However, the Williamson Act has not been an effective tool for long-term preservation of farmland in our area. Because of our excellent climate and nearness to the Los Angeles megalopolis, development pressure is intense. Our best farmland, some of the most unique in the country, is being developed in spite of the owner's participation in the Williamson Act. Prime irrigated farmland is worth about $20,000 to $30,000 per acre if developed (housing and shopping centers, etc.) with some land worth up to $80,000 to $100,000 for these purposes.
>
> Obviously, a farmer can make more money be selling the land and putting the money in a savings account than the expected earnings on keeping the land in farming. Thus farmers have used the Williamson Act as a holding action, waiting until development is approaching their doorstep and then opting to withdraw their land from Williamson tax rates, so they can reap the benefits from land sales. The growers don't mind paying the higher taxes for a 10-year period following their notice of withdrawal due to the high land values."

An economist from Riverside gave essentially the same view:

> "Amoung the counties implementing the Act, only a minimum amount of acreage--perhaps a few thousand acres--has been precluded from early conversion to nonagricultural use. Most of the acreage--nearly 15 million--is under contract in order to receive use value rather than fair market assessment, pressure to urbanize was not a major factor. For the land under urban pressure with concomitant values, the incentives were apparently not sufficient to landowners to prompt signing restrictive contracts under the Act."

Although it is difficult to draw precise conclusions on the effectiveness of these programs in retaining land in agricultural use, the majority of the evidence indicated that they have had little or no effect in slowing the transfer of farmland to developed uses.

To draw conclusions as to why these laws have not been effective in reducing the transfer of land out of agriculture, it is necessary to reconsider the assumptions upon which the laws are based and the

pressures on agricultural land in these states.

The Maryland and California programs, according to the classifications developed in Chapter III, are bargained transactions. Each acknowledges the right of the land owner to join or abstain from a transaction. Both programs provide preferential assessment benefits to farmers in return for retaining land in agriculture.

The results obtained from testing hypothesis 1 would suggest that the benefits available through the programs are not strong enough to alter farmers' decisions to transfer land out of agriculture, when presented with an opportunity for a nonfarm sale. Other factors have a more significant impact on farmers' decision making than the benefits provided by these two programs.

A landowner's response or decision can be analyzed in the context of Figure 4 presented in Chapter III. Since the programs have not slowed the transfer of land out of agriculture, it can be assumed that a landowner will reach a higher indifference curve I_1, by selling land to a developer rather than retaining it in agricultural use and obtaining the program benefits. Landowners who even anticipate a sale are unlikely to give up rights to sell land for the program benefits.

All of the programs considered have attempted to alter the landowner's conduct regarding decisions to sell land. From the results obtained in the New York and Vermont analysis, factors which influenced buyers' decisions to purchase land did have an impact on the amount of land transferred out of agriculture. When the cost of obtaining agricultural land for the buyer was increased by higher interest rates, and higher transportation and building costs, the demand for, and consequently the amount of, land going out of agriculture decreased.

The five land use laws analyzed approach retaining land as a supply problem. Actually the amount of land offered for sale is fairly consistent from year to year.[26] A farm is normally offered for sale when the owner is in poor health or reaching retirement age.[27] In general, this is the only case in which a farmer will actively seek a sale. Other farmland sales are a result of demand pressures on land.[28]

Demand pressure on land is a result of several factors. One of these is that farmland is a good investment. Its value has been rising significantly faster than the stock market or most other forms of real estate.[29] A productive farm can provide both an annual income and capital appreciation. If it loses money, it can become a tax shelter.

Reducing the demand pressure on land would involve identifying and changing factors which encourage investor to buy land. Investors and speculators are obviously only interested in purchasing farmland when it provides a better rate of return than they could obtain from an alternative investment. The rate of return on farmland speculation could be decreased by capital gains tax on land transfers. The attractiveness of farmland for development would also be reduced if services such as water and sewer lines, and roads were not provided by the city or county, thereby increasing the costs to the developer.

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[26]U.S. Department of Agriculture, Economic Research Service, Farm Real Estate Market Developments, March 1970.

[27]Ibid.

[28]This is not to say that farmers do not anticipate and plan on a sale for development prices, however, they do not actively seek such a sale but wait until an offer is made.

[29]Morton C. Paulson, "Profits From Plowshares," National Observer, September 12, 1976.

In summary, the results of this section indicate that the land use programs reviewed have had little or no success in retaining land in agriculture. In all cases, the incentives which influence farmer's decisions to sell or speculators' decisions to buy have not been sufficiently altered. To retain land in agriculture in developing areas either (1) larger benefits will have to be paid to farmers so that the decision to continue farming land will be as profitable as the decision to sell, or (2) the incentives which determine the buyer's decision to purchase land must be altered.

Hypothesis 2

The objective of the second hypothesis was to obtain information which would indicate if new farm investment has been encouraged as a result of the land use program. If the existence of the program has encouraged new investment, the state is more likely to retain a viable agricultural industry in the future. The information on new farm investment is taken from the questionnaire sent to the county extension agents in the five states.

Results

The results from the questionnaires cannot confirm or reject the hypothesis that land use programs encourage new farm investment. Rather, they "probe" the hypothesis. Varying degrees of "confirmation" may then be conferred upon the theory.

The results of the questionnaires are presented in Table 9. It can be seen that Vermont is the only state in which extension agents felt the existence of the program had not increased farm investment. In all the other states well over 50 percent of those who responded felt the

program had encouraged investment.

Again it must be recognized that these are opinions, there are no figures available on new farm investment at the county or state level. This survey assumes the county agents are knowledgeable of the new investment taking place in their county and also know what percentage of this investment to attribute to the land use program.

Table 9

RELATIVE FREQUENCY OF EXTENSION AGENTS' RESPONSES TO PROGRAM EFFECTS ON NEW FARM INVESTMENT

State	Yes	No	No Answer
	----------	------(%)-------	----------
California	68.6	20.0	11.4
New York	68.9	26.7	4.4
Maryland	80.0	13.3	6.7
Vermont	20.0	80.0	0
Hawaii	80.0	20.0	0

It is assumed that investment will not take place when farmers anticipate a sale for nonagricultural purposes in the near future. Investment in fixed assets implies a long-term commitment to farming. If new investment is taking place, the land use program may have some long-term effects on the viability of agriculture in the state.

New investment may result from a program if it reduces the amount of speculative pressure on the land. Reducing the demand pressure on

land would lower farmers' expectations of a nonfarm sale and encourage investment to retain a profitable enterprise. Decreased taxes may also provide incentives to invest, according to one California extension agent:

> "Since the land is being assessed on its production value rather than some higher and better use, the owners can justify making an investment in some agricultural pursuit."

CHAPTER V

TRENDS IN AGRICULTURAL LAND USE IN SOUTHERN MICHIGAN

INTRODUCTION

The changing structure of agricultural land use in Michigan is documented in this chapter. Current land use issues are a result of structural change in the agricultural resources of the state and land owners responses to these changes. Indications of future as well as current land use problems can be identified from information on the structure.

AGRICULTURAL LAND USE*

In 1969 the agricultural census reported there were about 12 million acres of land in farms in Michigan. Out of that total 9.5 million acres are located in the southern part of the state. Ten counties located in the Thumb, Saginaw Valley, and in the central and southern parts of the state contain 29 percent of the state's total farmland. Each county has from 279 to 461 thousand acres of land in farms.

The land in farms in the state has decreased steadily from 14.8 to 12.4 million acres or 16 percent during the time 1961-63 to 1971-73.[1] There was a similar decrease of 16 percent in the preceding decade.

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*Refer to Appendix 2.

[1]K. T. Wright, Michigan's Agriculture, Extension Bulletin 785, (October 1974), p. 1-4.

From 1964 to 1969 there was a decrease of 1.7 million acres or 12 percent, this was faster than in the three previous 5-year periods. The average rate of decrease in the southern part of the state was 10 percent, although there was considerable variation among counties. Six of the nine counties showing the greatest acreage decrease were in the Detroit fringe area, St. Clair 62,000 acres, Sanilac 58,000 acres, Lapeer 47,000 acres, Macomb 39,000 acres, Livingston 39,000 acres, and Washtenaw 36,000 acres. Two counties in central Michigan also showed substantial decreases, Eaton 38,000 acres, and Isabella 44,000 acres.

Of the 12 million acres of land in farms reported in the census only 8.6 million was cropland. Approximately one half of the cropland, 4.8 million acres, is located in the southern part of the state. Ten counties located in the Thumb, Saginaw Valley and Southeastern region contain 37 percent of the total cropland.

From 1964 to 1969 cropland harvested declined 18 percent, or nearly three times as fast as in the previous three 5-year periods. The greatest acreage decrease, one-fourth of total decrease, was in the southeast district.

Southern Michigan has little class I land, the Conservation Needs Inventory of 1968 reported a total of 104,000 acres.[2] The largest

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[2]Class I soils have few limitations that restrict their use. Soils in this class are suited to a wide range of plants and may be used safely for cultivated crops, pasture, woodland or wildlife. These soils are productive and suited to intensive cropping. The local climate must be favorable for growing many of the common field crops. The soils are nearly level and erosion hazard is low. They are deep, generally well drained, and easily worked.

Class II soils have some limitations that reduce the choice of plants or require moderate conservation practices. Soils in Class II require careful soil management, including conservation practices to

sections of class I land are found in three counties, Sanilac 18,000 acres, Livingston 16,00 acres, and Lenawee 13,000 acres. Most of the land in farms is of class II or III.

In every region but the southeast the Conservation Inventory acres of class I-IV land are less than the land in farms reported by the census. The lands harvested, however, are less than the land found in classes I-IV for every region.

The southeastern region contained 2,116,000 acres of class I-IV lands, 1,975,000 acres are in farms and 141,000 acres can be cultivated but are not in agricultural use. In every county but three, Genesee, Lapeer, and Lenawee, the inventoried acres exceed the acres in farms.

FARM DATA

The average rate of tenancy for southern Michigan is 5.9 percent, this is slightly higher than the state average of 5.4 percent. The rate of tenancy varies considerably amoung districts and counties. The southeastern region has the highest average of 8.3 percent, while the

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prevent deterioration or to improve air and water relations when the soils are cultivated. The limitations are few and the practices are easy to apply.

Class III have severe limitations that reduce the choice of plants or require special conservation practices, or both. Limitations of soils in Class III restrict the amount of clean cultivation; timing of planting, tillage, and harvesting; choice of crops or some combination of these limitations. Conservation practices for Class III soils are more difficult to apply and to maintain than those specified for Class II soils.

Class IV soils have very severe limitations that restricts the choice of plants, require very careful management or both. When these soils are cultivated, more careful management is required and conservation practices are more difficult to maintain. Soils in Class IV may be well suited to only two or three of the common crops or the harvest produced may be low in relation to inputs over a long period of time.

southern region is relatively low at 4.2 percent. County variation is even greater, in Monroe County 13.2 percent of the farmers are tenants and in Mecosta the rate is 2.5 percent.

The rate of tenancy indicates what percent of the total amount of farmers rent all the land they farm. According to the census definition a part time farmer also rents some of the land he farms. The percent of farmers who rent land would then be higher than is indicated by these figures.

The value of farm land and buildings, and machinery is calculated on a per acre basis for farms with sales of $2,500 and over (economic classes I-V). Wayne County has the highest value in land and building per acre, for this figure also reflects the market value of land. Mecosta County has the lowest value per acre in land and buildings.

Almost 25 percent of all the land in farms in the state is not in class I-V farms; 1.8 million acres are in part-time farms, .6 million acres are held by retired farmers whose average age is 72, and 14 million acres are in class VI farms. In southern Michigan 2,091,000 acres, almost one-fourth of the land in farms, is also in one of these three categories. The southern region has the highest per county average of land held by other than class I-V farms, or 67,000 acres, the southeastern region had the lowest average at 45,000 acres per county.

POPULATION TRENDS

There are 16 counties in Southern Michigan with more than 200 persons per square mile, these counties are classified by the census as urban. Twenty-one counties can be described as densely settled agricultural areas with 50-200 persons per square mile. There are two

moderately settled agricultural acres, Huron and Sanilac, the population density is between 25 to 50 people per square mile.

Thirty percent of all farmers are in the 16 urban counties and 45 percent in the 21 densely populated agricultural counties. The average size of a farm is inversely related to population density, with the average size in the sparsely populated counties almost double that in urban counties.[3]

STATE LAWS AFFECTING AGRICULTURAL USE OF LAND IN MICHIGAN

The Farmland and Open Space Preservation Act was signed into law by the governor on May 23, 1974. The act enables a land owner to enter into a development rights agreement (for farmland) or a development rights easement (for open space) with the state. These agreements or easements are designed to ensure that the land remains in a particular use or uses for a minimum time of ten years. In return for maintaining the land in a particular use, the land owner is entitled to certain income or tax benefits.

There are two general classes of land eligibility established by the Act: farmland and open space. Farmland eligibility is governed by the size of the farm and in two cases by the income from the farm; a farm of 40 or more acres, a farm of from 5 to 40 acres with a minimum per acre income of $200 per year or a speciality farm with gross annual income of $2,000 or more.

Open space land has been divided into two categories under the Act.

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[3]K. T. Wright, Michigan's Agriculture, p. 48-49.

The first category deals with historic, riverfront and shoreland areas. These lands must be recognized or designated by law to be eligible. The second category of open space land is more general in definition and includes lands which conserve natural or scenic resources, enhance recreation opportunities, preserve historic sites and idle potential farmland of not less than 40 acres. The designation of open space is primarily the responsibility of the local governing body.

The exact benefits of the program, under a farmland development rights agreement, would depend upon the property tax assessed against the property and the income of the land owner. The land owner is entitled to claim as a credit on his Michigan Income Tax the amount by which the property taxes on the farmland covered by the agreement exceed 7 percent of his income. For lands under an open space easement the benefit is in the form of lower taxes actually paid by the owner. All lands that quality are also exempt from special assessment. There are penalties associated with the early termination of an agreement or easement.

The main purpose of the Soil Erosion and Sedimentation Control Act 347 of 1972 is to provide for the "control of soil erosion and to protect the waters of the state from sedimentation." The State Department of Agriculture is responsible for identifying lands governed by the act and for establishing guidelines and specifications for these lands which will help prevent sedimentation of state waters. Normal agricultural practices are exempt from this law until 1979.

The administration and enforcement of the law is at the county level. A designated county agency is responsible for approving soil conservation plans and issuing permits for earth changes. Any earth

change, other than those exempt by the act must be conducted in such a manner which will "effectively reduce accelerated soil erosion and resulting sedimentation." To ensure these standards are met a "soil erosion and sedimentation control plan" must be submitted to the Water Resource Commission of the Department of Natural Resources or with its local enforcing agency.

The Air Pollution Act 384 of 1965 creates an air pollution control commission within the Department of Natural Resources. The Commission is responsible for establishing standards for ambient air quality and for emissions. The act specifically states that "ordinary" animal odors associated with agricultural pursuits and located in zoned agricultural areas shall not be considered air pollution if the "number of animals and method of operation are in keeping with normal animal husbandry practices for the area."

The Commission will investigate husbandry operations if it receives a written complaint or believes there is a violation of the act. After an investigation the Commission has the responsibility of determining if the method and size of operation emitting the odors are "normal" for the area. If a violation is found to exist the Commission attempts to enter into a voluntary agreement or performance contract with those involved. When the terms of the contract or agreement are not met voluntarily the Commission can enforce the contract or agreement by a court order. There have been no legal charges brought against a farmer for non-compliance with the act. Voluntary agreements have been effective in correcting subnormal practices.

Public Act No. 250 was also passed in 1965; it provides for the exemption of air pollution control facilities from certain taxes. A

certificate of tax exemption is issued if a facility is designed and operated primarily for the control, capture and removal of pollutants from the air, and is suitable, reasonably adequate, and meets the intent and purposes of Act. No. 384.

The State of Michigan has delegated zoning power to counties and townships as well as cities and villages. Counties and townships can develop and adopt an agricultural zoning ordinance. Agricultural zoning refers to land use regulations which restrict land to agricultural and related uses, either through exclusive use limitations or large acreage requirements for family homes (10 acres or more). Only lands which are located in the unincorporated areas of a county or township can be affected by agricultural zoning.

The use of agricultural land can also be regulated by "nuisance" laws.[4] The existence of a "nuisance" is based on the premise that all persons have the basic right that they are not to be interferred with in the reasonable enjoyment of their property. Any unreasonable interference with such enjoyment is legally a "nuisance."

Plaintiffs may seek several courses of action when an agricultural operation is considered to be a nuisance. The complaining party may seek (1) an injunction; (2) damages (actual and/or punitive), or (3) both an injunction and damages. The specifics of each case determine what type of legal action a plaintiff brings as well as the outcone of a suit.

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[4]Cooperative Extension Service, Michigan State University, Environmental Quality Legal Consideration, Extension Bulletin E-732, Farm Science Service, (December 1971), p. 6.

When filing for "actual damages," the plaintiff seeks to be reinbursed for expenses and property losses incurred as a result of the actions of the defendant. This includes health problems and discomforts to the plaintiff. The main legal issue in actual damages is whether the polluter caused the damages allegedly suffered by the plaintiff. It is not necessary to determine whether intent or negligence was involved in order to establish liability. Proof of causation is sufficient.

FEDERAL LAWS AFFECTING AGRICULTURAL USE OF LAND

On October 18, 1972, the Congress of the United States passed the Federal Water Pollution Control Act, Public Law 92-500. The primary aim of the act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The Environmental Protection Agency established effluent limitations to be achieved by "point" sources of waste discharge into navigable waters and tributaries. Feedlots are included in the point source category making them subject to the National Pollution Discharge Elimination System (NPDES).

The NPDES is the mechanism used to achieve control of discharge from all point sources. Point sources must obtain a permit. The permit recipient is issued a compliance schedule which requires a step-by-step reduction in pollutants over a specific time interval.

A two level program of effluent limitation for existing point sources was adopted. The first level is identified as a technology referred to as the "best practicable technology currently available" to be instituted by July 1, 1977. The second level is some technology identified as the "best available technology economically achievable" to be enforced by July 1, 1983 for industry.

Feedlots subject to this law are those with one-time capacity in excess of 1,000 head.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947 was substantially amended on October 21, 1972 by the Federal Environmental Pesticide Control Act (FIPCA).

The FIFRA as amended, strengthens and expands the authority provided by the old law. It extends federal registration and regulation to all pesticides including those distributed or used with a single state.

It requires the proper application of pesticides to ensure greater protection of man and the environment. The use of any registered pesticide in a manner inconsistent with labelling is prohibited. It authorizes classification of pesticides into "general use" or "restricted use" categories by October 1, 1976.

Federal standards are specified for certification of individuals who are permitted to use "restricted use" pesticides. These standards will serve as guidelines for the development of state programs for the training and certification of pesticide application. State standards must be completed by 1978. People using the "restricted use" pesticides must "show competence" before being certified.

The Pesticide Control Act also requires that pesticide manufacturing plants must be registered with the Environmental Protection Agency if they produce pesticides for interstate commerce, or export, or if they import pesticides solely for intra-state commerce.

POLICY IMPLICATIONS OF MICHIGAN'S AGRICULTURAL LAND USE STRUCTURE

In summary, the study area, the southern part of Michigan, includes 80 percent of all the land in farms in the state. Seventy-five percent

of all the farmers in the study area are located in urban or urban-fringe counties. The highest rates of decrease in land in farms are in these urbanizing counties.

The urban and densely settled agricultural counties have the highest rate of tenancy. This represents land which may go out of agriculture in the near future. Speculators often buy farmland and rent it to neighboring farmers and retired farmers may rent out their land while waiting for a non-farm sale.

For a land use program to be effective in retaining land in agriculture in Michigan, it must be directed toward maintaining a viable agricultural industry in the urban-fringe areas.

CHAPTER VI

CONCLUSIONS AND POLICY RECOMMENDATIONS FOR MICHIGAN

INTRODUCTION

The objective of reviewing land use laws in other states was to evaluate their effectiveness in retaining land in agriculture and promoting a viable agricultural industry in southern Michigan. The programs chosen for review represent a spectrum of policy alternatives open to state and local governments to control development of agricultural land. Examples of both bargained and administrative transfers of property rights were included in the five programs. The results of the evaluation are then used to make policy suggestions for maintaining a viable agricultural industry in southern Michigan.

Multiple regression analysis with binary variables was used to test for a program effect on the amount of land in farms in five states. Program effects were indicated by significant changes in intercept or slope binaries in the year the program was introduced. A significant change in the intercept was a stronger test of a program effect than a slope change. Questionnaires were also sent to county extension agents in each state to obtain their opinion of the effectiveness of the land use program in retaining land in agriculture and encouraging new farm development.

PARTICIPANTS RESPONSE TO LAND USE PROGRAMS

As shown in Figure 3 there are two major participants involved in the transfer of land out of agricultural use: the farmer and speculator or developer. Each makes the decision to sell or buy and on the basis of their opportunity set. The farmers' opportunity set is influenced by many factors including: property taxes, expectations of urban development, market value of agricultural land, real farm income, and off-farm employment opportunities. A speculators opportunity set is comprised of such factors as: anticipated profit in land turn over, ease of land purchase and development, expectation or urban growth, availability of credit, and the market for new homes.

The programs reviewed attempted to control the transfer of land out of agriculture by altering the farmers opportunity set and influencing his decision to sell. In Maryland, California, and Hawaii, the regression tests indicated that the programs do not alter the farmers behavior substantially from what it was before the program. In the states of Vermont and New York, results of tests indicated that the amount of land transferred out of agriculture was significantly lower the year the program was introduced. However, there are several rival hypotheses which also can explain the decrease in land transfer. The land use programs in both states were introduced when interest rates were high, limited funds were available for new home loans, building and transportation costs were increasing, and the population in New York was decreasing. The existence of such strong alternative explanations, as to why land was being retained in agriculture, minimizes the effects which can be attributed to the programs.

All of the programs with the exception of Vermont, provide differential or use value assessment of agricultural land. These laws are based on the principle that farmland should be valued for property tax purposes according to its value in current use, rather than its market value. Also implicit in the legislation is the assumption that increased property tax reductions will increase landowners participation. Thus, given the opportunity, farmers facing sharply increasing property taxes would readily participate in such programs. The results of this study do not support that assumption.

Similar conclusions were also reached in a recent study of the California program by Hoy F. Carmen.[1] His analysis states:

> "Counties with the largest per acre tax reductions tended, other things being equal, to have lower rates and levels of acceptance of use value assessment. It is likely that landowners in these counties view nonagricultural development as offering significant opportunities for realizing large capital gains.
>
> Reduced assessed values and taxes are necessary to induce landowners to temporarily forfeit nonagricultural development opportunities. It appears, however, that the overriding considerations in the enrollment decision is the landowner's development expectations. Many California landowners, given a choice, prefer to speculate on conversion of their land to nonagricultural use."

From the results of this study and with supporting data it can be concluded that there is no evidence to suggest the programs reviewed had any overall effect in influencing farmers' decisions to sell land and therefore, had no effect in slowing the transfer of land out of agricultural use. In limited circumstances the programs may have contributed to a preferred pattern of development but they did not meet

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[1]Hoy F. Carmen, "California Landowner's Adoption of a Use-Value Assessment Program," Land Economics, Vol. 53, No. 3, (August 1977), p. 286.

the objectives of having a noticable impact on farmers' decisions to sell land.

The programs are primarily an income transfer to farmers. The additional real income and other benefits provided by the land use programs may help some farmers who want to keep their land in agricultural production do so. However, the benefits of the programs are not substantial enough to compensate a farmer for not selling. Property tax breaks to farmers may be justified on the basis of comparing the amount of taxes they pay to the services they receive. However, it is not justified as a method of inducing farmers to retain land in agricultural production. The incentives in the programs, regardless of the structure of the rights transfer of the law, are not beneficial enough to farmers to change their expectations or plans for a non-farm sale.

The land use issue in Michigan, as in California, New York, Maryland and Hawaii, is the development of farmland in the ruran-urban fringe areas. Most of the land use programs to date have approached the issue of retaining agriculture in these areas as a supply problem. The programs which have resulted from this perspective attempt to change factors which influence farmers decisions to sell.

Few of the programs attempted to influence the behavior of individuals buying farmland. The demand aspect of land transfers has been ignored as a policy instrument. As was noted in Chapter IV, the supply of agricultural land offered for sale is fairly constant from year to year. The results of this study indicate that demand pressure on agricultural land is a significant factor in determining which and how much

agricultural land is developed.[2]

Effective land use programs must be structured to alter the buyers or speculators decisions. A speculator buys agricultural land because it is a superior investment. Agricultural land yields a high return because of the urban demand for that land.

URBAN DEMAND FOR AGRICULTURAL LAND IN SOUTHERN MICHIGAN

Nationally since World War I there has been an influx of people to cities from rural areas. As cities developed into large metropolitan areas they have expanded outward or disaggreated. This process of urban growth and expansion generates an urban demand for agricultural land.

In Michigan the rural non-farm population has been steadily rising.[3] Around the urban areas of the state the cities and country physically blend as the urban population moves from the center of the cities to the periphery. Future growth in Michigan will take place as it has in the past in the cities and suburbs. The urban demand for agricultural land in the state is influenced by this process of population growth in centralized locations and dispersion.

The urban demand for agricultural land is a derived demand resulting from population growth and redistribution. Major components include the demand for housing and commercial building sites, recreation facilities, and transportation. Only a very small percentage of urban land is actually

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[2]This was also the conclusion of the study done by Howard Conklin and Richard Dymsza on Syracuse and Rochester counties in New York. Conklin and Dymsza, "Maintaining Viable Agriculture in Areas of Urban Expansion," p. 8.

[3]U.S. Department of Commerce, Census of Population, (Washington, D.D.: Government Printing Office (1974).

used for transportation. However, its availability leads to the development of an area for recreation and housing. Transportation facilities influences urban growth and responds to it.

The single largest user of urban land is housing. In a city, one-third of the total area is devoted to residential use.[4] Major factors which influence the demand for housing are family size, income, and the availability of credit.[5]

As income and leisure time have increased so has the demand for recreational facilities and its importance on the rural-urban landscape. Recreational facilities are varied in the amount of land they require. These facilities, may be in the form of golf courses, swimming pools, and summer houses, or more resource based facilities such as woods and lakes.

In summary the urban demand for rural land is determined primarily by three factors: the pattern and rate of urban growth that accompanies population increases, increasing income and credit availability for new homes and recreation, and transportation facilities from the city to rural areas.

IDENTIFYING POLICY INSTRUMENTS

From this brief review of factors which contribute to the urban demand for agricultural land, policy instruments can be identified and used to reduce demand pressure on farmland in the ruran-urban fringe

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[4]Clawson, Suburban Land Conversion in the United States, p. 79.

[5]For a more detailed discussion of the urban demand for land see Clawson, Suburban Land Conversion in the United States, Chapter 7.

areas of Michigan.

Many of the factors of primary importance to urban expansion such as population growth, and family income are beyond the scope of influence of land use policies and will be determined by national and regional socioeconomic conditions. However, several policy variables can be identified and used to control the pattern and rate of farmland development.

The majority of land taken out of agriculture for urban development will be used for housing. The transition from farmland to a subdivision usually takes place over several years and involves numerous land owners. This transitional process is initiated by a speculators decision to buy farmland.

To curb urban demand pressures on agricultural land, factors which comprise the speculators opportunity set and result in his decision to buy land must be altered. The incentives in the land conversion process are primarily the tremendous gains that can be made by a few.[6]

It was previously assumed that speculators actions are characterized by self-interest, or profit maximization. His decision by buy land is based on its profit potential in a future sale. Policy instruments available to reduce demand pressure on farmland are those which will result in greatly reduced profits for speculators.

POLICY SUGGESTIONS FOR MICHIGAN

For a land use program to be effective in retaining land in agriculture in the rural-urban fringe areas of Michigan it must substantially

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[6]For a more detailed discussion of the urban demand for land see Clawson, Suburban Land Conversion in the United States, Chapter 7.

change the structure of benefits inherent in the process of transferring land out of agricultural production and into developed uses. Programs that only make marginal changes in the incentives to convert land out of agriculture will have a very neglible total effect.

In making policy recommendations there are numerous alternatives from which to choose. Rather than discussion all of these options, one specific three part program is presented. The objective of the program suggested for Michigan is to discourage both the sale of and speculative investment in agricultural land.

The three components of the recommend program are (1) a capital gains tax on the sale of agricultural land, (2) limited provision of public services to agricultural areas, and (3) an educational program which would assist farmers in realistically estimating their future possibilities for an urban sale. This program takes into consideration both demand and supply components of land sales, but the emphasis is on curbing speculative demand pressure.

The capital gains tax would be administered by the state. The tax could take two forms, the first, similar to that in Vermont, would be based on the amount of time the land is held and the percentage of gain received from a sale. The second form of the tax would be a flat percent of all gains from agricultural land sales irrespective of the amount of gain or the length of ownership.

Both forms of the tax would decrease speculators profits and the attractiveness of agricultural land as an investment. Each type would also have different implications for farmers. In the second case farmers and speculators would be taxes equally at the time of a sale.

The first form of the tax suggested would be a decreasing function of the amount of time over which the land was held and the amount of gain. Under this system speculators would usually be taxed more than an actual farmer. A person who had farmed for many years and was approaching retirement would pay very little or no additional tax for the sale under this system.

This first form of the tax would be politically more acceptable than the flat rate tax. It also would not discourage the sale of land for agricultural uses. The farmers' conduct would not be altered by the tax if he does not actively seek a sale. However, his opportunity for a sale at development prices is greatly reduced.

A decreasing capital gains tax would primarily effect speculators decisions to purchase agricultural land. It would reduce its profitability as an investment and decrease demand pressure on rural land.

The second part of the suggested program would limit the amount of new water and sewer lines, and roads provided to agricultural areas. The areas could be defined by the state and the provision of services supervised by counties and cities. Limited provision of public services would increase development costs. This would decrease the speculators profits and possibly discourage future homeowners or developers from buying in the area.

The provision of new roads and utilities, as with zoning changes, can mean windfall gains to some. The potential for bribery and coercion could be quite high. The approach would not be effective in retaining land in agriculture unless it's combined with the capital gains tax and a provision for review of decisions, at the county and city level, to expand services.

The first two components of the program are aimed at reducing speculative demand pressure in the rural-urban fringe areas of Michigan. The third part of the program deals directly with farmers' plans for and expectations of a sale at development prices.

Lack of knowledge on the part of farmers contributes to speculative demand. Few landowners can accurately predict the rate and direction of future urban expansion.

Where there are expectations of farmland sales for developed uses the investment in permanent improvements that are necessary for viable farm businesses is discouraged. These improvements seldom increase the sale price of a farm for urban purposes, and will not be undertaken if the owner believes a sale is imminent.

To increase farmers' knowledge about the actual demand for rural land, information relating to prospective demands for land could be publicized.[7] Reports on current land transactions could be made available. Educational programs, carried out by local units of government, could aid farmers in estimating whether or not they will be able to sell their land for urban uses at prices above their value for farming.

An educational program in conjunction with the programs to reduce demand pressure will help maintain the viability of agriculture production on land that is many years away from being developed.

LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

One of the major limitations of the study is the information which was used to test for program effects. The data on the acres of land in

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[7]Conklin and Dymsza, Maintaining Viable Agriculture in Areas of Urban Expansion, p. 70.

farms is from the U.S. Census of Agriculture and it may be too insensitive to pick up slight changes in land use trends.

Data on new farm investment is needed to determine the success of the program in encouraging capital investment. Investment will only take place if farmers have a long-term commitment to farming. A viable agricultural industry in rural-urban areas is dependent upon continued investment to update and maintain capital facilities.

The study indicates many areas of future research which would lead to the design and implementation of more effective land use laws.

The results of the study indicate that influencing speculators decisions to buy agricultural land will have a stronger impact on retaining land in agriculture than attempting to alter farmers decisions to sell land. However, there has been very little descriptive work done on those individuals who buy land from farmers. For better policy design it is necessary to descriptively identify this group of land purchasers and determine what shapes their opportunity set and influences their decisions to buy land.

The results of the study point out the need for educational programs. Such programs may be carried out by the extension service or the county level of government. Research needs to be undertaken which would develop a method which could be used by farmers to easily determine the actual development of their land so that realistic decisions could be made about future farm investments.

The type of land use laws which results from a governmental decision determined by the support, demands, and pressures different groups can bring to bear on the political system. Future research should also be directed toward exploring which groups have input to the political system,

how this access is determined and what effect it has on the final policy outcome.

APPENDIX A

Questionnaire Used for the Survey of County Extension Agents

to Determine the Effectiveness of Land Use Legislation

1. How would you categorize this county?

_____ (a) Rural. Few urban pressures, farming and other extensive activites are the primary uses of land. Farmland seldom sells for nonfarm purposes.

_____ (b) Semi-rural. Urban pressures are an important part of the physical setting. The nonfarm population out numbers the farm population by more than 10 to 1. Some farmland will sell for nonfarm uses, with much land speculation present. Many landowners hope to sell their farmland for nonfarm uses, but most will be unable to do so within the next 5 years.

_____ (c) Semi-suburban. The nonfarm population out numbers the the farm population by more than 30 to 1. Farmland often sells for nonfarm uses, and landowners have high expectations about the possibility of selling farmland for nonfarm use. There is a good possibility that much of the farmland will be taken out of agricultural uses within the next 7 years.

_____ (d) Suburban. Mostly residential, few fulltime commercial farms. Practically no land sold for farm purposes.

_____ (e) Other. (Please define)

2. In your opinion, has more land been retained in agricultural uses than would have been without this legislation?

_____ (a) Yes

_____ (b) No

If yes, has the act:

_____ (a) definitely been effective in retaining land in agriculture?

_____ (b) had some degree of effectiveness?

_____ (c) had a very small effect?

3. Has the availability of this program encouraged farmers to make needed investments in their agricultural enterprises?

_____ (a) Yes

_____ (b) No

If yes, then has the availability of the program:

_____ (a) definitely encouraged investment where needed to retain a viable enterprise?

_____ (b) made some contribution to encouraging investment?

_____ (c) had a very small effect on investment decisions?

4. In terms of number of class one and two farms, and agricultural sales, rank this county compared to other counties in the state.

_____ (a) would be in the top third.

_____ (b) middle third.

_____ (c) lower third.

5. From the most current data, please indicate the:

(a) number of acres enrolled in the program. _____

(b) number of acres eligible for enrollment. _____

(c) number of farms enrolled._____

APPENDIX B

APPENDIX B

AGRICULTURAL TRENDS IN SOUTHERN MICHIGAN BY MAJOR REGIONS

	Land in Farms (thous A.)	Cropland Harvested (thous A.)	Percent of Tenancy	Value per acre of Land & Buildings	Value per acre of Machinery	Land in Class VI (thous A.)	Persons/ Sq. Mile	Land by Capability Class (thous A.) Class I	Class II	Class III	Class IV
1. Central Region	1033	517	AV. 5.2	AV. 258	AV. 60	228		2	497	364	76
Gratiot	302	192	-7.3	351	64	41	69.3	0	202	51	5
Esabella	209	103	-4.8	248	61	44	78.0	0	111	63	13
Mecosta	151	50	-2.5	161	46	43	50.0	2	39	64	36
Midland	101	51	-6.1	328	66	26	123.0	0	55	42	9
Montcalm	270	121	-3.4	202	64	74	55.7	0	90	144	13
2. E. Central Region	1871	1184	AV. 6.8	AV. 363	AV. 76	336		17	950	294	70
Arenac	92	42	-2.5	236	65	21	30.0	1	33	37	10
Bay	185	128	+9.6	453	99	27	262.0	0	137	42	3
Huron	426	274	-7.5	315	69	49	41.6	3	313	70	8
Saginaw	348	238	+8.0	451	79	52	270.0	1	207	12	24
Sanilac	461	263	-4.8	267	72	79	36.3	12	5	62	9
Tuscola	359	239	+8.6	439	77	54	59.6	0	255	71	16
3. Southwest Region	1598	739	AV. 4.2	AV. 372	AV. 80	383		12	677	556	280
Allegan	276	133	+3.7	323	74	43	80.6	3	108	103	71
Berrien	216	112	-4.4	498	99	44	222.0	4	89	68	57
Cass	206	89	+7.8	280	54	44	88.2	0	97	67	20
Kalamazoo	185	83	-4.0	388	55	46	35.9	0	111	52	15
Kent	241	111	-4.0	379	79	61	480.0	4	102	95	35
Ottawa	177	85	-3.2	401	95	40	228.0	0	55	84	16
Van Buren	225	95	+3.6	377	86	54	93.2	1	87	92	51
Muskegon	72	31	+3.2	331	82	21	314.0	0	28	15	15

APPENDIX B CONTINUED

	Land in Farms (thous A.)	Cropland Harvested (thous A.)	Percent of Tenancy	Value per acre of Land & Buildings	Value per acre of Machinery	Land in Class VI (thous A.)	Persons/ Sq. Mile	Land by Capability Class Class I (thous A.)	Class II	Class III	Class IV
4. Southern Region	2840	1298	AV. 4.9	AV. 295	AV. 59	690		16	1552	732	174
Barry	198	79	-4.2	239	54	56	68.9	0	68	52	34
Branch	263	120	-5.6	258	52	59	75.9	0	157	61	1
Calhoun	289	120	-4.0	255	55	75	200.0	0	164	86	10
Clinton	287	146	-5.1	317	64	63	84.8	3	192	57	12
Eaton	260	109	-4.3	287	56	68	121.0	4	161	56	16
Hillsdale	279	127	-5.8	271	56	79	62.0	1	122	65	26
Ingham	231	101	-5.2	390	71	68	467.0	2	139	75	10
Ionia	280	139	-4.5	275	63	49	79.7	5	144	67	12
Jackson	258	101	-3.4	285	58	77	265.0	0	131	56	22
St. Joseph	237	114	-6.5	265	48	46	93.7	0	80	103	24
Shiawassee	258	142	-5.9	453	66	56	117.0	1	194	54	7
5. Southeast Region	1976	999	AV. 8.3	AV. 533	AV. 72	448		48	1345	597	145
Genesee	171	83	-7.7	527	66	49	692.0	1	118	30	8
Lapeer	246	111	-4.9	421	80	67	79.5	3	161	67	18
Lenawee	404	241	-10.4	441	65	55	108.0	13	222	101	18
Livingston	174	72	-4.0	451	64	45	103.0	16	90	68	17
Macomb	97	47	-6.6	917	108	25	1303.0	2	76	36	19
Monroe	254	163	-13.2	561	93	44	213.0	2	214	32	16
Oakland	102	33	-8.1	966	70	29	1047.0	2	66	47	17
St. Clair	218	97	-6.6	388	75	18	164.0	4	221	82	11
Washenaw	260	126	-8.5	481	68	52	329.0	5	134	108	20
Wayne	50	26	+12.5	1396	96	14	4408.0	0	43	8	3

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