ECONOMIC CONSEQUENCES OF MEASURES FOR PRESERVING FARMLAND

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In the Northeast, efforts to preserve farmland have been justified primarily on the basis of shared feelings and values concerning land use as it affects the environment and quality of life. However, attention is increasingly directed toward economic impacts. Although success in preserving rural environments depends upon anticipating the economic consequences of alternative preservation measures, it is easy for inter-ested groups to overlook some economic impacts, while concentrating on others.

This paper provides a framework for comparing major economic im-pacts of the principal preservation measures now in use and of those being considered by State and local governments. These comparisons should be helpful in selecting or designing preservation programs for various regional needs. Within this same framework, issues are also defined concerning the need for flexibility in sharing the costs and benefits associated with restricting use of farmland.

Goals of Programs to Preserve Farmland

How people view transfer of land from farm to more intensive uses depends very much on the type of community being considered. In areas where land use change is occurring rapidly, it may be perceived as an assault on the rural character of the environment. In other areas, urban or residential development of agricultural land may not be viewed as a problem, but measures are needed to direct development in step with public goals. Many communities are still in the process of establishing priorities or weighing consequences of alternative actions (including not taking any action).

Designation of land owned by farmers for preservation almost always serves several purposes at once. An easement along a river may be ob-tained to meet the goal of providing open space, which often possesses characteristics that are suitable for recreation, wildlife habitat, or flood control. Some areas also have unique scenic qualities, perhaps of State or national interest [4]. In selecting these lands for pres-ervation, priorities vary depending on the capabilities of the particu-lar land units under consideration as well as the degree to which the area is experiencing development pressure [10].

Commercial agricultural areas are sometimes affected by disruption of production and marketing brought about by land speculation and conversion of land to non-agricultural uses. The need to sustain enough local farm production to support regional farm input and marketing businesses is closely related to the desire in many areas to preserve the rural character of their environment. As with a number of emerging land use issues, this problem is being weighed by many communities.

Some land preservation goals are conceived at the Federal level. Federal assistance for obtaining land or easements is provided by the Land and Water Conservation Fund Act of 1965. However, these funds are designated for recreation and are not available for the range of environmental and other needs described above. Also, funds are very limited (300 million in 1975).[1] Socially expensive land development has not yet received sufficient attention to generate investment by the Federal government at comparable levels to Federal investment in other environmental programs.[2]

Although preservation goals vary between areas, major economic impacts of preservation on property owners can be evaluated within one model. The next section presents a static model for comparing private economic impacts of both State and local land preservation measures. The model is used to identify development rights and to show ways they can be affected as an instrument of public policy.

Identification of Development Rights

Regardless of whether preservation measures are applied widely or only to strategic locations, their thrust will usually be to restrict or remove the right to develop certain lands. If there is pressure for development in the area, this will encourage new development or more intensive development in another location. Thus, land preservation reduces the supply of land which is available for development and bids up the price of land designated for development. But other economic impacts are not immediately obvious.

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The Fund provides matching funds for states of $180 million. The other $120 million is for acquisition of lands for federally administered recreation areas. The Fund is administered by the Bureau of Outdoor Recreation.

2/

Bruce Ackerman, et. al., emphasize this in the concluding chapters of their recent book entitled The Uncertain Search for Environmental Quality [1]. The authors make an example of spending priorities in the Delaware estuary where hundreds of millions of dollars are being spent for very limited control of water pollution, while threats to the bay's natural areas go unchecked. The study presents evidence that a similar misallocation between preservation and pollution control is occurring on a national scale.

Most measures for preserving farmland involve purchase or restriction of development rights.[3/] In order to conceptualize the impacts of such measures, it is necessary to distinguish between the original demand for farmland and the demand for land which has restrictions on how it may be developed. This distinction is illustrated in Figure 1, where the total demand for farmland, with all of its original rights to develop, is represented by D_t. The demand for farmland without its development rights is D_F. (It is assumed that D_F is more elastic than D_t. Thus, to the right of the intersection of D_F and D_t land is worth just as much without development rights as it is with development rights, and D_t ceases to be relevant.)

The third demand curve, D_t', is the demand curve which results from permanent reductions in the supply of developable land through a land preservation program. It represents the upward shift in D_t, which results from broad public knowledge of land preservation as it increases the satisfaction from owning the remaining land.[4/] The shift from D_t to D_t' is therefore due to the removal of potential negative externalities from crowding, scenery destruction, etc.,[5/] or to the higher level of utility associated with owning land in a location where its unique scenic or open space qualities are protected. This demand shift is comparable to the effects of building a public road or park in the area.[6/]

Impacts of Measures for Preserving Farmland

Within this framework, the effects of various preservation measures quickly become apparent. Suppose that use of local police powers results in a reduction in the supply of developable farmland from S_1 to S_2. These measures may include, for example, a variety of conservation zoning ordinances, clustering regulations, measures restricting development by


3/
    A number of authors have recently described programs which involve government purchase or restriction of development rights. Their studies make up most of the references listed at the end of this paper. Reading through the titles listed here indicates some duplication of efforts as they review the same programs, but each source offers some original perspectives.

4/
    There is some empirical evidence to support this theory [9, pp 86-90].

5/
    Local land values do not, however, capture all of these benefits; in many cases visitors from outside the area also enjoy the benefits from maintaining scenic resources.

6/
    Demand curves are drawn as straight lines for convenience; no assumptions are intended as to the distance between lines or where they intersect. Supply curves are drawn under the simplifying assumption of a completely inelastic supply.

Figure 1. Economic Consequences of Preserving Farm Land

$/acre

D_t'

D_t

D_F

P_2 .... a — — — g

P_1 .... f — — — b

P_{F2} .... e

P_{F1} .... d — — — c
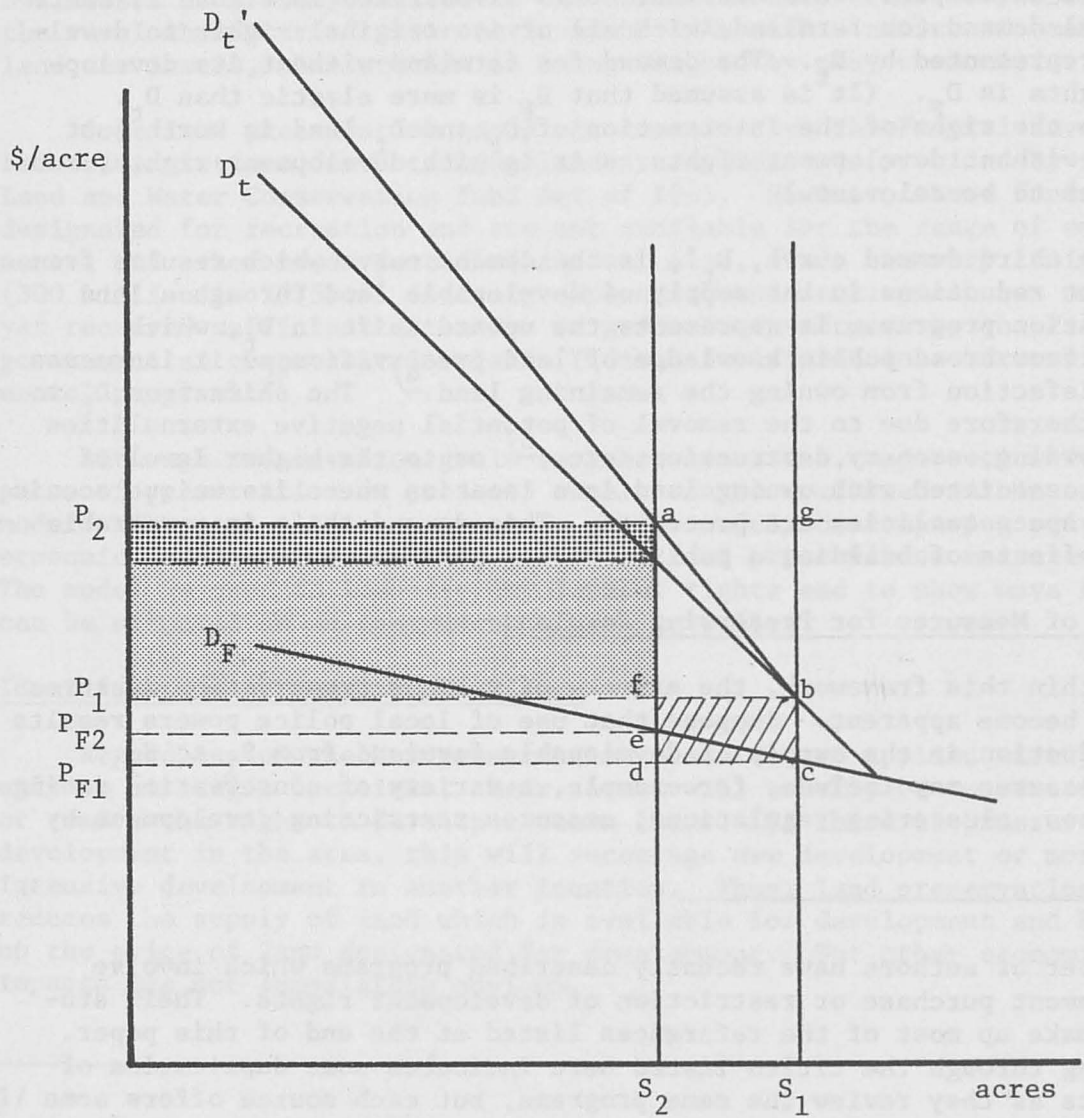
S_2 S_1 acres

D_F=demand for farm land without development rights
D_t=original demand for farm land with all rights to develop
D_t'=final demand for farm land after acres are set aside for
       preservation
S_1=acres of farm land
S_2=supply of farm land remaining for development after land
       is preserved

confining it to lots served by a public sewer system, or a combination of all three.[7] These measures will affect farmland in crop, pasture, or forest uses.

In each case, the price of farmland lying within the restricted area drops from P_1 to P_{F1}. The price of the remaining S_2 acres of farmland increases to P_2. Loss of land values in the restricted area amounts to the cross-hatched area, fbcd. The increase in land value in the rest of the region is equal to P_2afP_1 and, of course, this increase accrues to land outside the restricted area. Increases in land values can be described in two parts: the first is due to movement up the original demand curve (D_t) as the supply of developable land is reduced; this increase is represented by the lightly shaded area. Remaining benefits, represented by the darker shading, are due to the shift in the demand curve from D_t to D_t'. If the demand for development rights ($D_t' - D_f$) is not highly elastic, or if the initial value of development rights ($P_1 - P_{F1}$) is small, local landowners may make substantial net gains in land values as a result of the restrictions on land use.

However, these policing measures do not compensate landowners in the restricted area. While local restrictions may claim political support where the area to be restricted is not physically well suited for development (such as mountain slopes, flood plains, or wetlands), support will probably not be forthcoming in rural areas suitable for development. Except in special circumstances, there may be complex constitutional arguments which could limit the use of zoning restrictions [5].

There are a number of methods for preserving farmland, which compensate landowners in the restricted area. Some are outright purchase of land, purchase of development rights, purchase of transferable development rights, and agricultural use taxes.[8] These land use control alternatives avoid some of the equity drawbacks of using the local police powers. The static model will again be employed to compare economic impacts of these four measures on land prices, and to indicate, in each case, how costs and benefits are shared between landowners and the government.

Outright purchase of $S_1 - S_2$ acres of farmland will again bid up the price of P_2. However, the government's decision to purchase all but

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The mechanics of these are described in some detail in [6,11].

8/

Important variations on these land preservation alternatives continue to be developed. Yet most proposals are based upon one of these described here and have similar economic impacts.

S_2 acres will cause the demand curve (D_t') [9] to bend upward; the new demand curve becomes perfectly elastic beyond S_2. [9] Local owners now enjoy gains amounting to P_2gbP_1 from the increase in the value of their property. However, if the farmland is valuable, purchase of even moderate sized areas represents a substantial investment by local, State, or Federal governments (amounting to agS_1S_2 in this example). These funds are in short supply locally, and Federal funds are limited to very select recreational uses, such as easements for a scenic river. Outright purchase of farmland can, therefore, only be applied to a small portion of the areas designated for preservation. The other three measures avoid part of the expense of public purchase and management of farmland.

Purchase of development rights for $S_1 - S_2$ involves a smaller government expenditure than outright purchase of land, resulting in a savings of P_{F1} $(S_1 - S_2)$, out of the cost of outright purchase. The price of the developable land still increases to P_2, though farms acquiring land for farming purposes (without development rights) pay only P_{F1}. [10] Per acre savings in acquisition costs from purchasing just development rights will be highest in communities where there is not any great pressure to convert land to urban uses, or where the objective is to channel modest development needs onto the most suitable lands. These are the areas where the initial value of development rights $(P_1 - P_{F1})$ is small relative to the total cost of purchasing land. Condemnation and purchase of development rights has been used in limited areas to obtain easements for roads, parks, or scenic rivers. Large programs of voluntary sale of rights to the State have been proposed in Connecticut, New Jersey, and other states [6].

A transferable development rights program (TDR), involving the same reduction in the supply of developable land, will have the same price raising effects as government purchase of development rights. Benefits to property owners are reduced, however, by the absence of government demand for land, or by the removal of area $agbf$ from total benefits. Net benefits under TDR are thus the same as those indicated in the previous discussion of use restrictions imposed by police power. (Net benefits equal the total shaded area minus the crosshatched area.)

The contribution of TDR is its provision for sharing costs and benefits. This is accomplished by assigning development rights, which

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Since the reduction in land available for development is achieved through an increase in demand, no shift in the supply curve is indicated.

10/

The price of farmland, without development rights, will remain at P_{F1}. P_{F2} would apply only if $S_1 - S_2$ were taken out of production.

can then be marketed.[11]/ However, the farmer who has lost the right to develop part of his own land may be concerned as to the value of the development rights which he receives in exchange. In the real world, different acreages have different locational and environmental advantages (unlike the theoretical model used here), so there is no assurance the farmer's share of the "new" development rights will be worth the same as the rights for the preserved area which he owned previously. Thus, this technique's advantage from avoiding public investment in land preservation must be weighted against the greater equity and the relative administrative simplicity of the above three methods.

Agricultural use taxes are widely used and provide partial incentives to maintain land in agricultural uses by basing property tax assessments on its value in agricultural production and by requiring the payment of additional back taxes if the land is later sold for development.[12]/ But unlike the other measures, tax measures generally do not assure even temporary preservation of any publicly designated area. This is the main difference between use taxes and the control alternatives which were compared using Figure 1.[13]

Implementation of Land Preservation Measures

If every acre of farmland really was equally suitable for development or for preservation, there would not be large difficulties in implementing any of the four programs described above. Although the price of land and development rights would be bid up as the government competed with private developers for the use of land, there would be only one price for land at any point in time, and it would be known by all. The bidding up of the price of land makes it difficult for authorities to anticipate how much an acquisition program will cost, but negotiation of prices (or, alternatively, the assessment of condemned land) is a simple matter under the competitive model.

11/
   See [7] for detailed descriptions of three alternative systems for implementing transfers of development rights. This article also describes examples of State transfer of development rights programs that have been considered for implementation.

12/
   The New York State Agricultural District law is one of the more important tax deferral laws. A recent article by Nelson Bills describes how this voluntary program is being used by farmers in the State of New York [3].

13/
   Since use taxes shift the supply curve upward, their effectiveness varies depending on the slope of the supply curve. Under Figure 1 assumptions of zero supply elasticity and homogeneous land acres, use taxes are completly ineffective in preserving land.

Unfortunately, this competitive model ignores very substantial problems in implementing programs to preserve either small designated areas or large tracts of farmland. Real estate is a highly differentiable commodity and knowledge of land values is itself a scarce and expensive commodity. As the government enters the land market the resulting increase in the demand for developable land or development rights complicates the situation. On the one hand, private owners may attempt to profit from inside information about government intentions; alternatively, the government's uncertainty about what constitutes a fair mix of police powers and easement acquisition techniques may appear to slight private owners in the bargaining process. The more ambitious plans, such as a Connecticut proposal to purchase development rights on 70 percent of the State's farmland [8], would obviously face the most severe obstacles to implementation.

Sharing Economic Costs and Benefits from Preserving Farmland

Local government involvement in selecting areas for preservation has an important role in distributing the economic benefits from environmental programs. However, local responses to State or regional land preservation programs may vary widely.

In some areas, local governments have committed themselves to spending millions of local dollars to preserve open spaces or maintain scenic areas for recreation.[14] Other communities, which have fragile environmental resources, express no interest in competing for Federal and State subsidies which are potentially available to them.

It may be hypothesized that the apparent difference in environmentally-oriented activity between communities is due, not to vastly different community values, but rather to different economic impact of any particular preservation technique. The present analysis has shown that local landowners benefit most from land preservation where the demand for developable land is inelastic. In addition, it is apparent that local net benefits will be larger where there is considerable valuable property already developed. This explains some of the preservationist enthusiasm in Suffolk County, New York, where much of the benefit from county purchase of development rights will accrue to local property owners in the form of higher values for their land (as described in fig. 1), and also, from increases in home values.

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Suffolk County, New York, provides a dramatic example of this with its program to purchase development rights on most of the farmland in the county [6]. Part of the objective here is to provide open space since some of the proposed easement areas are not of exceptional scenic or recreational value.

More rural communities generally view land preservation quite differ-
ently from urban fringe areas, like the Suffolk County example. In rural
communities, threats to the environment in some locations may be serious,
but much of the benefit from land preservation accrues to travelers. In
addition, it may be hypothesized that local economic benefits in the more
rural areas are smaller, since these communities are probably out on the
more elastic portion of their demand curve for developable land.

Problems in designing preservation programs which are attractive to
rural communities as well as those on the urban fringe can be identified,
therefore, from the economic model described above and from economic
considerations not included in the model. The model suggested the
hypothesis that preservation benefits are lower for landowners in the
more rural areas. But it is apparent that combined benefits to home
owners are also smaller in these areas. In addition, rural communities
sometimes lack adequate incentives to protect scenic resources enjoyed
by travelers from outside the community.

There is one other major problem concerning preservation incentives
in rural areas which is particularly relevant. It is believed that land
preservation may reduce local investment in housing and related services.
This impact is often the crucial issue because of the resulting loss of
jobs and tax revenues. Although one can argue that preservation of
strategic land resources attracts desirable development to adjacent
lands, these measures have rarely been viewed as a plus factor by local
business groups.

In many areas with modest development pressure, but where a State
has an interest in preserving key scenic resources, it is evident that
present practices leave quite a wide range of preservation incentives
between communities. Often those areas having the lowest local interest
in preservation possess the most valuable of the State's land resources.
If land use decisions continue to be made at the local level, States
will be searching for programs which bring local land use incentives
more in line with the State interest in maintaining attractive rural
environments and in providing scenic and recreational resources for
highly mobile residents.

The Role of Easement Acquisition in Environmental Programs

The discussion of economic impacts of alternative preservation
measures emphasized that each alternative offered economic benefits.
Preservation measures tend to bid up property values in areas designated
for development, both by reducing the supply of land available for
development and by making land more secure and attractive for residential
development. Private economic benefits are highest under easement pur-
chase or land purchase alternatives, where the public bears the cost.
However, all measures provide some private economic benefits. Additional
local benefits from land preservation may include reducing the cost of
providing community services, maintaining the competitiveness of an area

for tourism, and attracting people with professional skills.

That there is a theoretical basis for anticipating substantial local economic benefits from preserving farmland offers some basis for optimism in the search for environmental quality. The frequent failure to develop effective local plans for preserving rural landscapes and natural areas may be due to the difficulty of creating imaginative measures for State and local sharing of costs and benefits, rather than because of an excessive acquisition cost burden. If this hypothesis is valid, it would be particularly heartening at the present time when environmental programs in other areas, such as programs dealing with water and air pollution, have become discouragingly expensive. It is also relevant that preservation of valuable land resources is considered the most crucial and the most neglected of the environmental concerns [1]. The search for equitable preservation techniques holds a promise of breakthroughs in maintaining quality rural environments.

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