

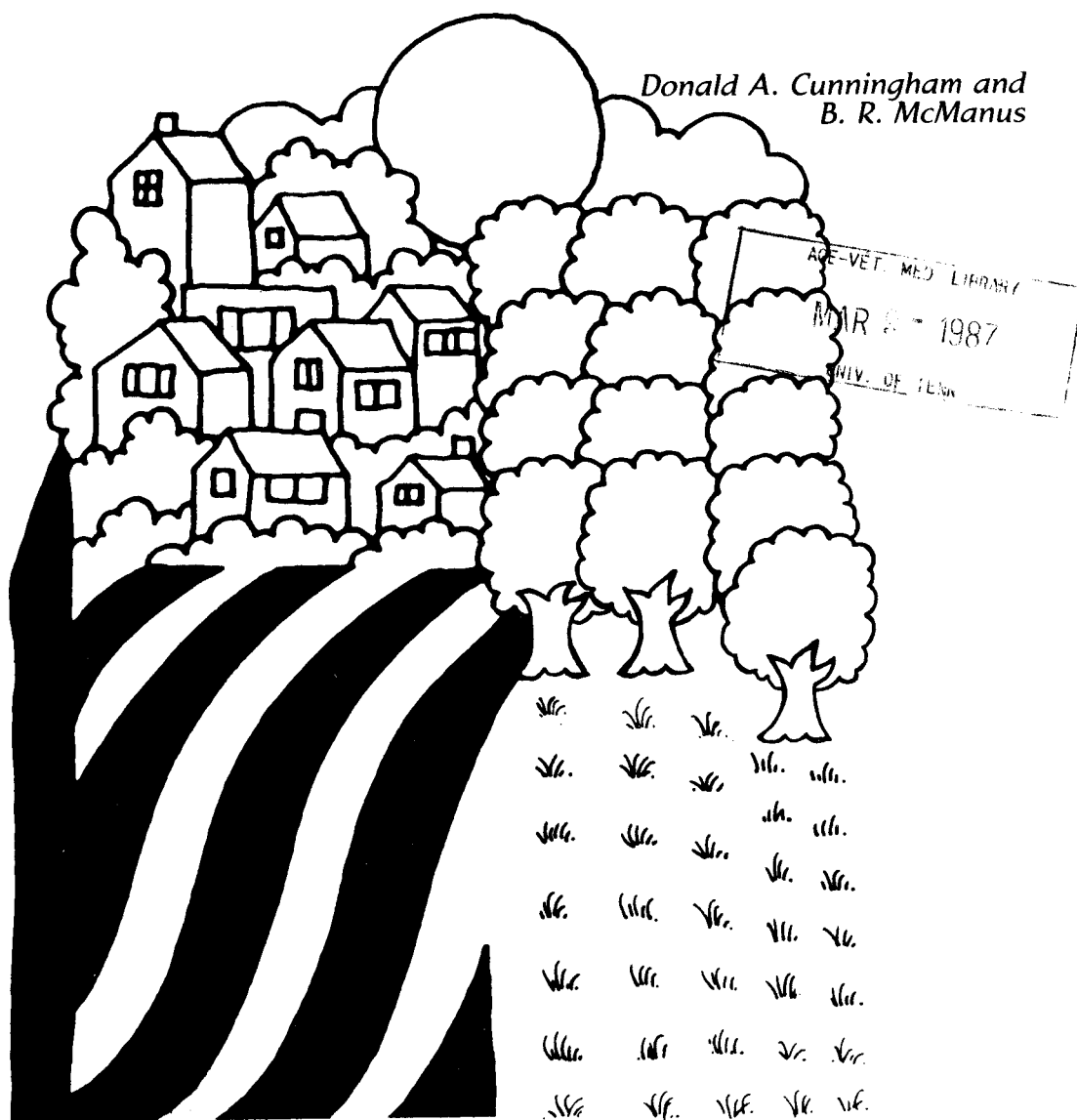
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Preservation of Prime Farmland and Planned Rural Development: A Literature Review

Donald A. Cunningham and
B. R. McManus



Department of Agricultural Economics and Rural Sociology
in cooperation with

Agricultural Institute
Office of Agricultural and Chemical Development
Tennessee Valley Authority
Muscle Shoals, Alabama

PRESERVATION OF PRIME FARMLAND AND PLANNED
RURAL DEVELOPMENT: A LITERATURE REVIEW

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DISCLAIMER

Ideas expressed in this report are based on the referenced articles. The authors attempted to write this report in a readable form which reflected the literature but at no time wished to express bias. The report may seem biased toward farmland preservation, but the available literature was directed primarily toward preservation. The major purpose of this report was to review the available literature and identify problem areas for further research, education, and action programs.

Nevertheless, the authors accept responsibility for the report as a review of literature.

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PRESERVATION OF PRIME FARMLAND AND PLANNED

RURAL DEVELOPMENT: A LITERATURE REVIEW

INTRODUCTION

Dr. Lowdermilk discusses in his bulletin, Conquest of the Land Through 7,000 Years, the vital importance of farmland to both present and future generations (65). He cites many examples where past generations transformed fertile soil into barren land through improper land management. Lowdermilk's bulletin contains descriptions of wastelands and abandoned cities in areas of the Old World which were deserted by mankind. In early times, man, in his trappings, often extinguished the desirable productivity of an area and moved on to other unspoiled fertile areas. Evidence indicates that peoples have continually moved to better areas and often left behind squandered environments. The actions of these people have limited the opportunities of future generations. Man as an ever increasing population cannot continue indefinitely to trample the face of the earth, leaving behind a path of barren land, because land is at best only a quasi-replenishing resource. Present landowner decisions will greatly affect future production capabilities, and for this reason, the need to preserve productive farmland may be extremely important to future generations. These land use decisions lead one to question whether present landowners have a responsibility to future generations which is equal to or greater than the responsibility to their current needs. Should our children be endowed with a resource base equivalent to the present generation?

The preservation of prime agricultural land and planned rural development are two areas that are critical to the future of farming. Different soils have different agricultural production capabilities, which means some areas are better suited for agricultural purposes than others. If prime agricultural land is taken for nonagricultural uses, only the less productive soils will be left for food production. The use of less productive soils means that farmers will need to cultivate more land to maintain production levels, *ceteris paribus*. With an increasing population, more land will be required for nonfarm purposes; and at the same time, the demand for food and fiber will increase. The time to start planning to meet these growing needs is while the remaining prime farmland is still available for agricultural use.

The primary purpose of this report is to review current literature concerning prime farmland preservation and planned development in rural communities and small towns. Uses and limitations of benefit/cost analysis are considered in relating prime farmland preservation and rural development planning. In addition, high priority action and education and research programs related to prime farmland preservation and planning development are identified.

AVAILABILITY OF FARMLAND

The National Agricultural Lands Study reported there was 1.36 billion acres of nonfederally owned agricultural land in the United States in 1977. Of these 1.36 billion acres, 413 million acres was being cropped and another 127 million acres could have been converted to cropland.

In 1977, the Federal Government owned 500 million acres of agricultural land (99). Cropland accounted for 466,000 of the 500 million acres. Almost 6 million of the 500 million acres could have been converted to cropland. The Federal Government owned about 279 million acres of pastureland and 236 million acres of forests.

The amount of prime farmland in the United States decreased from about 384 million acres in 1975 to about 345 million acres in 1977 (71; 88). In 1975, 250 million acres of prime farmland was being cropped; but in 1977, the cropped land decreased to 230 million acres. From 1967 to 1975, 8 million acres of prime farmland was converted to urban and water uses; urban uses accounted for 6.5 million acres (88).

FACTORS CONTRIBUTING TO FARMLAND LOSS

According to Rudd, Klein, and Prunty, the loss of farmland in the South can be attributed to several factors (53; 75; 83). Rising property values make farmland difficult to buy for farming purposes but more attractive to sell for nonfarm uses. Speculators often purchase farmland with the intent of selling or developing the land because the best cropland usually requires lower development costs. Also, factories are moving to nonurban areas because relatively flat, good farmland is acquired for the factories to lower development costs. Development in rural areas sometimes encourages legislation restricting certain farming practices that are considered nuisances to the residents. Such legislation could effectively force farmers to stop farming. The development of highways consumes land and improves the likelihood of developing the remaining land due to improved accessibility. Tax laws, such as inheritance tax, cause many people to sell land to pay estate taxes. Property taxes also enhance the development of land when the tax is based on the highest and best use of land. A high tax burden on landowners causes them to look for higher returns from the land, which usually leads to developing the land. Various combinations of these factors can contribute to the loss of farmland.

URBAN CONVERSION OF FARMLAND

Improvement or building of highways serves as a catalyst for the conversion of agricultural land to urban uses (26; 101). These highways can cause improved accessibility to the area, creating an increase in employment opportunities and a redistribution of land uses. The effects of urbanization on farmland are both direct and indirect. A study of the upper Midwest and Northeast indicated that for every housing unit built between 1959 and 1969, a half acre of farmland was idled. About half of the reported farmland conversion was due to direct conversion, and the other half was due to indirect effects (85). Another researcher has shown that for every acre of land in Illinois that is urbanized, about 5 to 10 acres are idled due to leapfrogged developments (47). The direct effect of urbanization on farmland is the conversion of farmland to urban uses. This conversion is usually small compared to the total amount of farmland in the area (7).

The indirect effects include: public nuisance legislation, increased property taxes, increased air pollution, damage to the farm, and government use of eminent domain (7; 95). Some farming practices have unfavorable side effects; and as the nonfarming population increases, legislation has been passed to halt certain farming practices. Property taxes in the area will have to be increased so that support services can be provided for the new residents. With an increased population, there will be an increase in the level of air pollution which could reduce food production. Damages may also occur to crops, livestock, and farm machinery from the new suburban residents due to vandalic acts. The government may use the power of eminent domain to take parcels of farmland deemed necessary to provide public services for the new residents.

PRESERVATION OF FARMLAND

Farmland is one limited resource that must be protected for future generations (52; 60). The decisions of the present owners will affect the future uses of the land. Farmland conversions can be either reversible or irreversible, which, to a large extent, will be determined by economic and institutional factors (96). Conversion of farmland to open space can easily be reversed; but once land has been urbanized, it will remain urban (38).

Need of Preservation Programs

Many researchers agree that there is no immediate danger of running out of cropland (11; 76; 91). Sterling Brubaker argues that cropland conversion to urban use is becoming a less important issue because the population is stabilizing, and there is a decrease in the push to live outside the city (11). A study released in 1979 showed that in a 10-year period farmers were able to put into production a half million more acres due to irrigation (72). The study also projected that another 11 million acres could be brought into production if water resources were available. A study in Whatcom County, Washington, concluded that the only significant change in land use from 1966 to 1974 was a decrease in pasture and open idle land (33). As urban areas expanded and consumed cropland, the pasture and idle land was converted to cropland.

Although there is no present danger of running out of farmland, future farmland needs should be considered (76). The future for specialty crops should be considered also. These crops are restricted to particular geographic areas and cannot be easily moved as urban areas grow (91). Results from a study in Washington County, Oregon, indicated that farmers and developers were competing for the same land (35). The study showed that 10,434 acres of agricultural land was converted to urban uses from 1963 to 1973. Class II soil, usually considered prime land, accounted for 76.7 percent of the converted farmland.

Population growth has had a greater impact on land use in rural areas than in metropolitan areas. From 1958 to 1967, about 80 percent of Tennessee Valley land that was converted to urban and building uses came from nonmetropolitan areas (90, pp. 28-29). The population growth from 1960 to 1970 was about the same for both metropolitan and nonmetropolitan areas. Nonmetropolitan areas converted 2.55 acres of land to urban uses per incremental population increase, while metropolitan areas converted only 0.73 acre per incremental population increase for the 1958-67 period. These acreages idled per unit of urbanization will vary for different areas of the United States and will depend on various factors unique to any given location.

According to Benbrook and Hidlebaugh, the loss of cropland can be increasingly expensive to both consumers and producers by the year 2000 (6, pp. 114-120). The Resource Conservation Act (RCA) Study estimated that a net loss of 103 million acres of cropland would increase per capita cost of food and fiber by 120 to 150 percent in the year 2000. According to this study, the 120 to 150 percent increase would raise consumer food costs by \$5.1 to \$6.4 billion in the year 2000. The RCA Study also estimated that total farm production costs in 2000 would increase about \$1,500 for each acre of cropland converted to nonagricultural use. This estimate does not consider the effects of inflation or changes in costs of other farm inputs. This increased cost of production for farm products is an annual and recurring cost which should increase benefits from farmland preservation programs.

Some groups disagree about the amount of farmland being converted to nonfarm uses each year. The National Agricultural Lands Study reported higher losses of farmland than the losses indicated by census data. Dovring, Chicoine, and Braden conducted a study of Illinois and concluded that the National Agricultural Lands Study was a better measure of the loss of farmland in Illinois than was census data (27). They also concluded that the census data overstated the amount of available farmland, leading to an understatement of the loss of farmland.

Other researchers argue against the need for special farmland preservation programs. They report that the market system should be adequate to preserve the desired farmland (26). If consumers want certain products, they should be willing to pay enough for those products to keep the land in production. If the value of the produce is too low to retain the farmland in production, the land will be converted to a more profitable use.

Determining a Prime Farmland Preservation Plan

Legislation can keep an area from being developed, but it cannot keep an area in farm production. A preservation program should not be established until policy implications have been studied and the best use of the land has been determined.

A farmland preservation program should be designed with consideration given to many factors in addition to soil type (105). Mark Lapping discusses five policy issues that should be considered in farmland preservation (56). First, it must be economically feasible to farm the land. While prime soil is critical for a good farm, the location needs to be such that the farmer has the support facilities to be successful. Second, policy goals should concentrate on preservation of agricultural areas instead of individual farms so that the supporting supply and market infrastructures can be provided. Third, since agricultural land without development rights is worth less than developable land, compensation needs to be given to owners of restricted farmland. Fourth, the public investment policies must be coordinated with land use goals to produce a well conceived farmland preservation strategy. Fifth, different areas will need different types of land use plans. One plan will not solve all the problems.

Derr, Small, and Dhillon set forth four criteria to be used in designating agricultural areas for local concern (24). First, according to these writers, the area needs to be economically viable for farming, including positive farmer attitudes and an adequate size region. The farmer needs to be optimistic about the future so he will reinvest in human and capital resources and adopt new technology. For an agricultural community to be viable, it needs to be large enough to support the necessary agribusiness firms and market outlets for purchases

and sales. Second, the existing infrastructures will influence the demand for the land. Land near urban infrastructures (roads, water and sewer lines, etc.) is difficult to preserve for agriculture because of the high residential demand. Third, a land use plan should establish compatible areas to avoid land use conflicts. Conflicts may cause lower revenues and higher costs for farmers. Fourth, society needs open space, both physically and mentally. Open areas help recharge air and water supplies, as well as mentally recharging people who spend much of their time around concrete and steel.

Benefits of Preservation Programs

There are several benefits associated with prime farmland preservation programs (36; 57; 62; 63; 74; 94). Preserving the prime farmland in an area will help maintain a viable agricultural economy. Many areas have certain crops that are unique to that area; the preservation of this land is also the preservation of these specialty crops. Since less energy is required to farm prime farmland, a preservation program is also an energy conservation program. Controlling public costs is another advantage of farmland preservation. Farms are producers of tax returns while sprawl developments are consumers of tax returns. Toner reports that agricultural communities are less affected by national policy decisions than industrial communities, which means that agricultural communities have a greater degree of self-sufficiency (97). Preservation programs are designed to preserve the best land for agricultural production. Consequently, the marginal land can be used for development or agricultural reserves. These marginal lands can remain as they are and retain other natural resources, such as trees, wetlands, and grazing lands. Retention of open spaces is another benefit of preservation programs. Open space provides an aesthetically pleasing environment and helps retain the rural lifestyle that many residents desire. Preservation programs also help prevent sprawl development. If communities can prevent the spread of urban growth into rural areas, the urban areas will become compact developments.

Many of these benefits are results of a well conceived preservation program. The main purpose of a preservation plan is to preserve the prime farmland for agricultural production in viable farming environments (94). If prime farmland preservation is not the primary goal of a preservation plan, other plans should be considered (94).

Cost of Preservation

The cost of a preservation program is a very important consideration when selecting among alternative programs. Some of the costs which should be considered are planning costs and administration

costs, as well as the cost of carrying out the program. These costs will vary with different preservation programs, but usually higher current costs are associated with the more permanent programs. Zoning is a relatively inexpensive preservation program but is also considered a nonpermanent preservation alternative. The purchase of development rights would be a rather expensive project but would be a permanent land preservation program. The residents must decide the intent of their programs and then determine the least expensive means for fulfilling their goals.

The Wisconsin Farmland Preservation Program is one program in which cost studies have been conducted (2; 71, pp. 219-220; 103). In this program, eligible farmers receive income tax credits in exchange for preserving their farmland. Mapping and planning costs were \$1.6 million through fiscal year 1979. Administrative costs were \$114,300 in 1979 and \$110,700 in 1980. The major expense of the program was the tax credits which were \$3.4 million in 1979, a large increase from the 1978 level of \$633,000. The average tax credit has increased through the years. In 1978, the average tax credit was \$870; in 1979, it increased to \$1,117; and in 1980, the average tax credit was \$1,413. The per-acre tax credit in 1979 was \$2.89 for the 1,212,229 acres of farmland in the program. Wisconsin's program seems fairly inexpensive when compared with other programs which have costs up to \$5,000 per acre (103).

King County, Washington, is using a purchase of development rights program to save their farmland (28). In November 1979, the residents passed a proposition which allowed the county to issue \$50 million worth of bonds. The county had hopes of purchasing the development rights from 10,000 to 15,000 acres. The development rights in King County were selling for between \$1,000 to over \$10,000 per acre. The bond issue meant that higher property taxes would be needed for the county to retire the bonds. This increase amounted to about \$9 on a \$50,000 home for 30 years. The administrative costs were high in the beginning; but once the rights were purchased, the costs were very low.

Development costs are also increased when a preservation program is enacted in an area. These higher costs can be attributed to the use of secondary sites for development. Some of these costs are increases in site preparation, a lower property tax base, higher transportation cost, and, in some cases, the halt of industrial development. A study in South Carolina showed that increases in site preparation alone would raise industrial development costs by 75 to 125 percent (23). This study concluded that the higher production of the prime land alone would not monetarily justify the farmland preservation program when compared to the higher development costs that the program imposes on developers.

Based on the small amount of available cost-related research, the cost of preservation programs is positively related to the area's need and the permanency of the program. As the need for farmland preservation increases, the value of the farmland will also increase. Thus, the farmland owner will require greater incentives to retain the land in exclusive agricultural use. In rural areas, the demand on

farmland for other uses is not as great as near urban development; thus, farmland preservation programs do not need to be as stringent. Preservation programs that call for public ownership of some or all of the rights of farmland require large amounts of capital to operate. On the other end of the spectrum, zoning would require only nominal capital expenditures but is considered a nonpermanent preservation plan.

Private Preservation Techniques

Private individuals have legal rights to assure that their land is not developed after they sell it. These restrictions include easements, covenants, right of reentry, and reverter clauses (30). An easement is a limited-use right someone has in a property in cases where the property is owned by another person. Covenants are restrictions to limit the use of land that stay with the land as title passes. The right of reentry allows the seller of land to place certain conditions on the sale; such that if these conditions are broken, the land will return to the original owner or heirs. A reverter clause places restrictions on land; such that if the land is developed, it reverts back to the original owner or heirs.

A national, nonprofit organization which was created to save agricultural land from nonagricultural uses is the American Farmland Trust (AFT) (10). AFT informs citizens of the farmland depletion problem; undertakes acquisition projects, either by AFT or by one of AFT's affiliates; and makes recommendations for public policy to preserve farmland. AFT acquires their property interest either through direct purchase or by a tax deductible donation by the farmland owner. The amount of property interest owned by AFT ranges from ownership of property restrictions to complete ownership.

An example of private action taken to preserve farmland occurred in Pennsylvania (64). The Amish and Mennonite farmers cooperatively started buying land that was being sold out of farming. The purpose of this purchase was to resell the land to individuals who were interested in farming.

Public Preservation Techniques

Public agencies have several techniques available to preserve farmland for the future. These techniques range from zoning to complete ownership of the land (31). The best method of preservation will depend on the characteristics of the area (22; 24). The more urban pressure on the land, the more stringent the preservation program must be to have results and the more social cost there will likely be as a result of the preservation program.

Fee Simple

In the past, fee simple ownership by the government was a popular method of farmland preservation (22). This method gave the government complete control of the land, and the landowner was not burdened with the loss of property rights (100). The problem with this method is the high cost associated with it (100). Higher taxes are needed to finance the purchase of the land. Also, this method reduces the property tax base, which means increases are needed in the tax system to compensate for the tax loss. The high costs associated with fee simple have led to the use of other methods that do not require complete government ownership.

Zoning

Zoning was derived to separate different urban uses of land, but now it is a commonly used method to separate urban uses from agricultural uses (95). Anderson analyzed the factors that most affected the adoption of zoning in a town (2). His study indicated that high farm revenue, a high percentage of land used for farming, and a high tax burden on farmland would favor the adoption of zoning. A high-quality soil area would be more apt to be zoned. Areas that are far away from Standard Metropolitan Statistical Areas (SMSA's) having low expected population growth and small differences between the farm value of land and the nonfarm value of land would tend to oppose zoning. The effectiveness of zoning will be influenced by the extent of the proportion of the total land zoned. Zoning in one location may shift the loss of prime farmland to unzoned areas.

There are two main advantages associated with zoning (32; 100). Taxpayers are not faced with an additional burden of paying to preserve land. Taxes do not need to be increased, since no compensation is given to the landowners when restrictions are placed on their land. The landowners in the development zones benefit from zoning legislation because their property values will increase. These landowners can receive more for their land because the supply of developable land has been reduced.

Agricultural zoning was designed to restrict the use of farmland to agriculture or agriculture-related uses (12; 54). Agricultural zoning is a frequently used method to preserve farmland, although it is usually combined with other local or state regulations which promote orderly development and reduce certain nuisances. An example is the Oregon Farmland Protection Plan which combines agricultural zoning with state standards and review powers, property tax incentives, urban growth boundaries, strong planning coordination, and citizen involvement (73). This program is considered to be the most restrictive program in the United States. In Latah County, Idaho, and Whitman County, Washington, owners of farmland in agricultural zones are permitted to develop or sell unproductive land, but the farmers are limited to only a few lots (50).

Quarter/quarter zoning is an approach used in Dakota County, Minnesota, to preserve farmland (98). This zoning technique allows the landowner to sell one lot for each 40 acres of farmland with the restriction that the remaining land be retained for agricultural use. This method was designed to help the farmer reap some benefit from escalating land values.

Performance zoning is another technique being used (80). This technique requires 90 percent of the land to remain open while allowing cluster development on the remaining 10 percent. Performance zoning was combined with a transfer of development rights program in the Buckingham Township outside Philadelphia and was estimated to have preserved 92.3 percent of the agricultural land.

Zoning has two major disadvantages (32; 100; 104). Farmers are not compensated for the loss of development rights when their land is restricted for agricultural use. By restricting the possible uses of the land, the farmer's property value will decline. The farmer has to incur the cost of zoning, and the public receives the benefit of open space. Another disadvantage of zoning is that it is a nonpermanent method of land preservation. Zoning laws can be changed at any time, so zoning is only a temporary method of farmland preservation.

Agricultural Districts

Agricultural districts are designed to specify farmland for long-term agricultural use and improve the conditions of farming (54). There are several provisions for agricultural districts, ranging from incentives to security (8; 13; 54; 61). Farmland in agricultural districts is assessed at the agricultural value of the land. This assessment saves the farmer money on property taxes which helps compensate him for not developing the land. Farmers receive protection from local ordinances, which allows the farmer to use normal farming practices as long as the health and safety of the residents are not threatened. State agencies are required to modify legislation to enhance farming. The use of eminent domain by public agencies is restricted on farmland in agricultural districts. The agency must look for land less suitable for farming before it can take farmland. There is a more stringent requirement against the use of public funds to build facilities which would encourage development. This is designed to reduce the pressures of urbanization. Membership in an agricultural district limits the power of special districts from imposing special service tax assessments on the farmland. These provisions are designed to protect the farmer from urban pressure and to discourage nonagricultural development.

An agricultural district program is an effective preservation technique because it combines flexibility with comprehensiveness for a given location (58). As of March 1980, agricultural districts were in 48 of 57 counties in New York, accounting for over 19 percent of the state's

land area (45). A study of farmers in Erie County, New York, indicated that financial incentives are the most important factors of conversion, and agricultural district programs do not offer large enough incentives to change landowners' decisions (45).

High urban pressure tends to stop agricultural districting (13). The chance of high land prices obtained from the sale of farmland for nonfarm uses is greater than the benefits from agricultural districting. This is a problem with the Maryland Agricultural District Program. Maryland did not supply the necessary incentives and disincentives to make the program work (87).

Preferential Assessment

Preferential assessment is a land preservation technique designed to lower the rate of farmland conversion by giving the landowner a property tax break (19). According to Anderson, Gustafson, and Boxley, there are three main reasons preferential assessment is used as a means of farmland preservation (3). It is hoped that a lower property tax on farmland will prevent a premature conversion to urban use. This method better aligns farm property taxes with farm income. And paying incentives may be more politically acceptable than placing controls on property.

Preferential assessment has two main advantages (100). First, the program will help farmers remain in farming, since taxes are better correlated with farm income. The other big advantage is that taxpayer costs are less than for some of the other preservation programs.

Preferential assessment programs have one major drawback. These programs are not an effective means to retain farmland (100). The benefit that farmers receive from lower property taxes is not enough to offset higher land prices associated with urbanization. The penalties for developing the land are not severe enough to deter landowners from selling the land.

California has developed a preferential assessment program (43). There were three main objectives to the California program. The first was to discourage intermittent development. Retention of open spaces was another objective of the program. And thirdly, the program was to provide an economically viable farming environment that would not be threatened by urbanization.

Montgomery County, Maryland, also uses preferential property assessment to help preserve farmland (39). Landowners must meet three conditions before their land can receive preferential assessment. The land must be located in the lowest density zoning category available. Landowners must live on their farms and provide 25 percent of their incomes from their farms. And thirdly, the land must be included in an agricultural district.

Transfer Fee Plan

A transfer fee plan is a method of land preservation which pays incentives to farmers who keep their land in agricultural uses and charges a fee to landowners who convert their land to nonfarm uses (86). The plan is designed to be self-supporting. Funding for the incentives is provided by the fees imposed on developed land. These fees should be high enough to discourage a change in land use but not high enough to be considered a taking of the land.

Tax Credits

The tax credit program reduces the farmer's total taxes but does not reduce local property tax revenue (54). Eligible farmland owners receive a tax credit against their state income taxes. The amount of the credit is determined on the basis of the farm property taxes and the farmer's income.

Michigan and Wisconsin are two states that use tax credits (1; 5; 37; 49; 103). The Michigan plan allows a tax credit to eligible farmers equal to the amount of property taxes in excess of 7 percent of the farm family income. If the credit is greater than the state income tax liability, the state will send a rebate to the farmer. The Wisconsin program was designed to aid the low and moderate income farmers. Farmers with an income above \$46,000 are ineligible for tax credits.

Land Banking

The land banking program was designed to preserve farmland while helping elder farmers sell their farms at fair prices (22; 68). This method allows the public to simultaneously preserve land and plan for development. The Land Bank Commission purchases the farm and leases it to would-be farmers who cannot afford to buy a farm. This system is effective because the farmers receive long-term leases, usually running until the farmer is 65 years old. At age 65, the farmer is permitted to transfer the lease to his spouse or a direct descendent. A leasing agreement of this type gives the farmer the security needed to use the land in its best use and provide the capital improvement necessary to protect the land. Land banking has been used in Sweden, the Netherlands, and France.

Purchase of Development Rights

A purchase of development rights program is a preservation plan in which the farmer can sell the development rights from farmland to the government (17; 28; 54; 62). The price of the development rights is the difference between the property value with the rights and the value without the development rights. Some programs have the development rights bought by the state, and other programs have the counties buying the rights (17; 28; 62).

A purchase of development rights program has two major advantages (28; 100). The landowners are compensated for their loss of development rights. Farmers can receive fair market value by foregoing the chance to sell their land for future development. The second advantage is the relative permanency of this approach. The government owns the development rights, so the future uses of the land can be controlled by the government for the benefit of the public.

Public purchase of development rights also has disadvantages (28; 100). An increase in taxes is needed for the government to purchase development rights. In urban areas, where farmland preservation is most needed, the development rights are very expensive, which imposes an increased burden on taxpayers. Once the government has purchased the development rights from farmland, the property tax base is lowered because a portion of the tax base is now owned by the government. This lower tax base means the taxpayer's tax burden will again need to rise.

Transfer of Development Rights

A transfer of development rights (TDR) program is very similar to a public purchase of development rights (PDR) program. The big difference between the two is the TDR program uses private capital, and the PDR program uses public capital. TDR programs are designed to adjust for the windfalls and wipeouts that normally occur with zoning (4; 20; 25; 67; 106). Landowners in development zones can buy development rights from landowners in preservation zones and develop their land more intensely. This technique does not change the overall density of an area; it just clusters the development so some of the other land can be preserved.

For a TDR program to be effective, zoning restrictions must be such that developers will desire to intensify development (89). This can be accomplished by making two zoning densities in the residential areas. The lower density zone is without additional development rights, and the higher density zone is with additional development rights. The difference between the two densities should be such that the developer would benefit from the higher density. If the developer feels that the purchase of development rights would be beneficial, a market for development rights will develop.

According to Veseth, the big advantages of a TDR program are basically monetary (100). Landowners receive compensation for their loss of development rights through private developers instead of through taxes. Also, the property tax base does not shrink since the development rights do not leave the tax base. Under this type of program, the taxpayers are not burdened with having to finance farmland preservation. The public receives the benefits associated with preserving farmland without having to pay high taxes to buy the development rights.

Transfer of development rights, like other preservation programs, has disadvantages along with advantages. Veseth discusses two disadvantages of TDR's (100). The price of development rights may not be the actual value of the rights. If the number of development rights is greater than the desired number of development rights, the price for the rights will be forced down. In this case, the farmer will not receive the actual value for his development loss (100). Another problem is that development may not occur in the desired area. If the residential zone is not a close substitute for the preservation zone, development may shift to another area. In this case, the preservation problem is shifted to another area, and the original area now has a lower tax base due to the preservation zone.

Attitudes Toward Farmland Preservation

A 1979 survey of Iowa farmers revealed that 77 percent of the farmers were in favor of land use planning (15). The survey also showed that farmers were split on the need for a permanent government agency to regulate a preservation program. Of the farmers in favor of a permanent government agency, 73 percent favored the county government providing this agency. The farmers favored the local government directing land use planning and the state government providing education to the public and the funding for the project. Preferential taxation with rollback penalty and agricultural districts were two methods of farmland preservation that farmers approved. A majority of the farmers was opposed to a plan to purchase the development rights from the land.

There are two major reasons that farmers are opposed to land use planning (15). In general, farmers want to retain all their rights of landownership and use their land as they please. Secondly, many farmers plan for future sale of their land for development.

Public concern about the preservation of farmland is growing because approximately 3 million acres of farmland is being converted to nonfarm uses per year, and some states are projected to lose substantial portions of prime farmland by the year 2000 (14). A 1979 study in northern Wisconsin indicated that 83 percent of the respondents favored agricultural zoning by the local governments (48). Also, a vast majority of the respondents favored all phases of zoning by local governments.

Another study in Sumter County, South Carolina, revealed that the respondents felt that land use problems should be a low priority item for government (69). These respondents felt that programs should be enacted to prevent one landowner from harming another, such as restricting bad odors, decreasing property values, avoiding loud noises, and protecting land from such acts as clearing scenic areas and soil erosion.

A comparison study between farmers and urban residents showed that farmers are less concerned with land use planning than urbanites (14). Also, the farmers were not as concerned about government programs as the urban residents. Farmers felt local government should operate land use programs, whereas urbanites felt the state or Federal Government was needed.

Government Responsibility

Which level of government should be responsible for which parts of a farmland preservation program? Reganold and Singer indicated that the state government should set minimum standards, but the local governments should be responsible for defining prime farmland in their respective areas (79). Lemire and Ridenour both reported that the local government should also be responsible for initiating the preservation programs, with the backing of the Federal Government (60; 81). From the National Agricultural Lands Study, the authors concluded that the general public was unaware of the need to retain prime farmland and should be informed of this need. Due to a wide variability in the quality of agricultural lands, states or regions should be responsible for informing the public about farmland preservation (99). Federal agencies should assist state and local agencies by defining prime farmland and providing information about prime farmland (94).

The Federal Government has seen the need for action toward farmland preservation. The Farmland Protection Policy Act was signed by President Reagan on December 22, 1981 (29). The main objectives of this act were to minimize Federal activities that aided in the conversion of farmland and to assist compliance with state and local policies that retain farmland. Under the Federal Protection Policy Act, USDA is required to designate farmland information centers, implement educational programs, and provide technical assistance to state and local governments (29).

PLANNED RURAL DEVELOPMENT

Desire for Rural Living

There is a strong desire for rural living by many rural and nonrural residents (84). This demand is the cause for the movement from suburban to rural living. According to the Real Estate Research Corporation, the two reasons for this movement are aesthetic value and a lower cost of living (78). The openness of rural areas is aesthetically

pleasing to many suburban residents and provides an incentive for them to move to rural areas. Further, according to this report, the cost of living in rural areas is less than the cost of living in suburban areas. This lower cost of living is attractive to many suburban residents even though the rural areas will have fewer services.

Cost of Sprawl

Most rural development has been unplanned, haphazard growth along rural highways (44, pp. 16-26). This type of growth is commonly called sprawl. Considering environmental costs, economic costs, personal costs, and energy consumption, sprawl is more costly to create and operate than planned development (78, p. 7). Land use planning needs to occur but must differ from urban planning in that the rural characteristics of an area should be retained (59). Planning for rural areas combines both protective planning and density planning.

Inefficiencies of Urbanization

According to both Cotner and Clawson, urbanization is usually costly and wasteful (18; 21). As an area urbanizes, the community faces high public service costs, and higher taxes are needed to cover these costs. Wastefulness which accompanied much of the past urban development also caused higher costs of living. Urban developments wasted both land and energy. According to the authors, low floor area ratios, due mainly to ranchhouse style building, large lot sizes, and discontinuous development are three kinds of lavish land uses associated with developing urbanizing areas.

Planned New Community Idea

Because of the wastefulness of sprawl and urbanization, planned new communities are being built. A technique being used for planned new communities is clustering. A cluster plan includes some areas of high density development while other areas remain open (55, p. 8). Cluster developing uses only part of a land area for residential use and saves open spaces to be used for recreation, aesthetic appeal, or other land uses requiring openland. A conventional development would use all the available land for residential use. Both development methods would have the same net density, but the cluster method is a more efficient use of resources.

Cluster development plans have many advantages over conventional developments (9; 16; 40; 59; 66; 93). Since cluster developments are designed with open spaces, the costs of this plan are lower than the costs of conventional developments. The cluster areas that are developed can have more variety since the developer can be more selective in saving natural features which make each area unique. Marginal farmland can be used as the development area, saving the better farmland for production. A cluster plan allows for more usable open space, providing the residents with outdoor recreational facilities.

Cluster developments realize cost savings in services and facilities due to the planned growth of the area. The residential areas can be more efficiently serviced because the residents are in one area instead of being scattered over the entire development. Better road systems can be provided in cluster developments, and fewer roads will be required. Community facilities can also be better located in cluster developments than with conventional developments.

Types of New Communities

There are basically four types of planned new communities being developed: satellite, add-on, new town in-town, and freestanding (102, p. 5). The most popular of these is the satellite community. A satellite new community is built within a metropolitan area with the purpose of providing an alternative to urban sprawl. The add-on community is built onto an existing city for the purpose of renewing the central city. The new towns in-towns are communities built within or adjacent to an existing city for the purpose of renewing the central city. The freestanding community is a self-sufficient new town built to handle population growth. These four types of planned new communities are similar in three ways: design characteristics, cost-saving alternatives, and directed population location. The major difference among these four types of planned new communities is the size of operation.

The Cash Flow Problem

A drawback of the new community idea is the cash flow problem (9; 34). Large amounts of capital are required at the beginning of development. The returns for the development occur at the end of the project. A developer must have large amounts of capital to last through the beginning years and provide the staying power needed to reap the later returns. Most private developers are rarely able to withstand the initial cash flow deficits and remain in business to reap the benefits near the end of the project. Communities of this nature may have to be funded by entities other than private developers.

COMBINING PRESERVATION AND RURAL DEVELOPMENT

Need for More Than Preservation

Farmland preservation must be more than just preventing development on agricultural land (41; 51). Development needs to be directed to areas that the public wants developed, instead of letting the development occur uncontrolled. A localized farmland preservation program may not stop suburban sprawl (46). Sprawl growth may skip over the preservation zone and continue on the other side, making the costs for local services even more expensive than the previous sprawl. The full impact of preservation programs needs to be considered before a program is enacted. For example, zoning that allows small lot sizes could cause a greater loss of farmland than large minimum lot size zones (42).

Small lot size zoning breaks up farmland and causes land to be idled even though only some of the farmland is actually used for development. Larger lot size zoning deters some rural development since a large lot must be purchased to build a house. Requiring large lots will direct some potential rural developers to urban fringes where smaller lots can be used, saving the rural area for agricultural production because of the total land cost per dwelling site..

The Netherlands Example

An example of a country using the new community ideas to provide both growth and agricultural production is the Netherlands. The Netherlands has both a high density population and a high production of agricultural products (93). Urban growth is coordinated through new communities. This type of expansion is efficient because it saves land and is less expensive to develop. Marginal farmland is used for the urban expansion, so the prime farmland can remain in production. Incorporating planned development and preservation of farmland ideas have proved successful in the Netherlands.

Preservation With Planned Development

Two tentative programs coordinating planned population growth with preservation of farmland are agro-cities and farm colonies (70; 92). Stanford indicated that the agro-city program is designed to have the comfort of a small town with the economic and administrative

advantages of a large city. Waste disposal is usually a problem in cities, but the agro-city is developed with a waste disposal system that is capable of handling all its waste and even some outside waste. The development of large cities alters the area's weather, and, with this in mind, the agro-city was developed so this alteration would benefit the entire city (92). The agro-city is designed to hoard water, both sewage and storm, to be used by the city. Agricultural production is planned from the beginning, providing the city with more food than its residents can consume. Land surrounding the planned development would be improved to increase the soil fertility for agricultural use. Soil and water conservation methods would also be performed for agricultural purposes. The residents of the city would enjoy greater pleasures than past city residents due to the planning of the city. Unlike present residents who use fossil reserves, agro-city residents would use solar energy. This would save natural resources and provide a cleaner environment. Historically, cities have grown too large, but the agro-city is designed to be a stable city.

The farm colony concept is not as technical as the agro-city. According to Nash, the development of nonagricultural land and retention of as much agricultural land as possible for production is the main idea of a farm colony (70). The homeowners' association controls the farmland and hires farm labor, with the produce of the farmland belonging to the residents. Residents get the advantages of living on a farm without having to work the farm. The county benefits from this development by receiving a big tax base. A third benefit of a farm colony is that agricultural land is preserved for future generations.

Benefits and Costs of Preservation

Determining the best method of preserving farmland while planning for the population growth of the area could be a very important consideration for local governments. Benefit/cost analysis could be of limited benefit to determine the profitability of preservation programs because of the peculiar benefits of such a program. However, benefit/cost estimates would be very helpful to governments in deciding on the appropriate preservation plan for their area. Since no one plan can be best for all areas, the local governments need assistance in determining the most efficient means of their preservation needs.

Benefit/Cost Analysis

Benefit/cost analysis is a method used by many firms to decide if a project should be implemented or to select between two projects (77, pp. 285-356). This method compares the present value of estimated costs

to the present value of the expected returns of the project. This type of analysis works well for projects which return monetary benefits, but it has limited applicability for projects with nonmonetary benefits or benefits which occur many years in the future.

Benefit/cost analysis is primarily used to determine the profitability of alternative programs when the project impact is for less than approximately 25 to 50 years. The benefit/cost analysis is a short-term methodology because of two factors: (1) Benefits and costs more than 50 years in the future, discounted to present value, are basically the same as if discounted for only 50 years; and (2) the approach becomes circular conceptually because it assumes that a new endowment of resources will be available for each successive time planning period. Benefit/cost methodology implicitly assumes that future decisions are mostly independent of present decisions and only cover a finite time period. Unfortunately, the land resource takes thousands and thousands of years to genetically regenerate.

A major problem with using benefit/cost analysis for preservation programs is that this method is a monetary calculation and does not make allowances for nonmonetary benefits (82). Farmland preservation costs, internal and external, can range from minimal to very expensive, depending on the needs of the area. These costs can be levied upon both the public and private sectors. The monetary benefits received from the program may not equal the costs of the program, but the future and nonmonetary benefits must also be considered and weighed against the costs. The positive externalities associated with farmland preservation need to be internalized to determine the total benefits of the project. Returns from preservation programs are largely nonmonetary and occur for many generations, which makes benefit/cost analysis have limited usefulness for determining whether or not to preserve farmland.

A short-term analytical approach which assumes a complete replenishing of the resource at the end of each analysis time period is inadequate for evaluating benefit/cost concerning prime farmland preservation. A better approach would be to make the analysis conceptually linear or the evaluation made to infinity or in perpetuity. Preservation of prime farmland needs an analytical approach which uses the concept of time being linear rather than circular. Farmland preservation decisions made today will affect the alternatives available to future generations. Since prime farmland is at best only a weak quasi-self-replenishing resource, future decisions will be constrained by the effects of past decisions. A scientific technique is needed to evaluate programs with linear time spans, such as preservation alternatives. Properly designed farmland preservation programs could reap benefits for the grandchildren of the grandchildren.

Benefits of Combining Preservation and Planned Development

When preservation programs are combined with the planned new community cluster ideas, farmers, developers, and the general public all receive some benefits. The farmer gets to remain in agricultural production; but more importantly, he receives the security that his farm will remain in production for many years. This security is necessary for farmers to make the capital improvements which are needed for a farm to remain productive. Farmers also retain the use of their best land which makes production more efficient and less costly.

Developers in some ways benefit by providing a better product at a lower cost. The planned new community idea can provide residents with city services in a rural surrounding. Clustering will allow services to be economically feasible in areas where the absence of cluster development would mean that these services would be too expensive to provide. Added services will make the development more attractive to prospective buyers. At the same time, the developer can lower development costs of the project by intensively developing the land. Since the area of the development project is reduced, developers will save on road construction, land clearing, and the installation of service lines.

The general public will also benefit from this combination of preservation and planned development. One public benefit is the presence of open areas in the form of farms, natural features, and recreational areas. These open areas will provide beauty, recreation, food and fiber, and income to the area. Another public benefit is that the population growth is required to fill in the existing residential areas. Facilities can be better provided to the general public due to the concentration of the population. It is extremely difficult to assign monetary values to some of these benefits. The amount of pleasure received from open space will differ with different people. Some citizens would not care for recreational areas, while others would greatly benefit from such an amenity. The future value of farmland is also hard to predict, since it is dependent upon the scarcity of farmland and the value of farm products.

SUMMARY AND RECOMMENDATIONS

Summary

Farmland preservation and planned community development have been major concerns for many years. Zoning was the first policy action used to separate farmland from development land. This method was a temporary detainer that resulted in windfall gains and uncompensated losses to landowners. More permanent preservation methods that would compensate farmers for their loss of development rights were desired.

Some of the more popular methods being used today are agricultural districting, tax credits, transfer of development rights, and purchase of development rights. These methods provide incentives to farmers for preserving farmland and are more permanent than zoning. For local governments, the cost of administering these preservation programs is higher than the cost of zoning.

The benefits and costs of a program must be weighed in determining which preservation method is best for a given area. Costs associated with farmland preservation increase as the amount of public control increases. The greater the permanence of a preservation plan, the higher the initial costs will be. Urban areas need greater farmland protection than rural areas, so the cost of preservation in urban areas will be higher than that of rural areas.

Local governments can offset some of the cost of farmland preservation by incorporating the new community ideas with the preservation plan. By directing development, the government can more economically provide services to its residents. The additional cost of enacting a preservation program would be partially offset by the savings associated with cluster development. A combination plan would provide an economical development area and preserve the farming development.

Recommendations

Research Needed

More cost-related research needs to be conducted. At this time, there is limited available research concerning the total costs of prime farmland preservation programs. Predominantly, research has been concerned with the mechanics of preservation programs rather than the associated costs. Research that has addressed costs mainly referred only to specific costs of the program. Subsequent costs of preservation programs are also very important and need to be researched. The total cost of implementing a farmland preservation program will influence decisions of the local government officials. Public political support is essential in effective preservation programs.

Additional research is needed concerning the comparison of the savings of clustering and the costs of preservation. Will the combination of planned development and farmland preservation be a monetary benefit or a liability to the public in the shortrun and longrun? If this combination does result in a liability on the public, will the nonmonetary benefits to the public be worth this burden?

Education

Farmland near urban areas is in critical danger of being developed and needs proper evaluation through the entire evaluative process, with the end result being the interest of society. The leaders in these areas need to be aware of preservation plans enacted in areas with similar circumstances and the successes and failures of these plans. Plans need to do more than retain the openness of the land; they should retain the agricultural environment. To accomplish this, the preservation planners need to be informed of the effects other plans have had on preserving farmland.

Rural areas have lower pressure on farmland for development uses than urban areas. This is the main reason that preservation programs in rural areas do not need to be as drastic as those in urban areas. Rural planners need to establish preservation programs that control urban sprawl to preserve the agricultural environment. Sprawl growth is the biggest enemy of farmland in rural areas, as it slowly consumes the land and eventually destroys the farm environment. Local rural government officials need to be better informed of the consequences of not planning for the future, as well as the costs and benefits of farmland protection.

The future of farmland preservation is dependent upon public political support. The general public needs to be aware of the benefits and costs of preserving farmland; for without their support, preservation programs will be of limited effectiveness. Informed leaders are needed to derive preservation plans that will fit their areas and that can be financed and costs paid for by the benefactors. Local citizens also need to know the consequences of taking no action in the control of sprawl and farmland preservation.

Action

If Federal and state governments deem farmland preservation necessary, they will need to encourage local government officials to enact preservation programs. Some areas may need legislative persuasion before they will seriously attempt to enact preservation plans. This legislation should be general in order to give local officials the freedom to choose the plan best suited for their jurisdiction. Preservation legislation should provide guidelines for local governments to use in deriving the best programs for their areas. Nevertheless, action programs need to be based on adequate information concerning each respective situation.

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Other Possible Relevant Literature

At the time of this study, other universities were also conducting research in land use planning. Some of the most relevant projects to this study were found through the Current Research Information System, U.S. Department of Agriculture. Four projects closely related to this study were being conducted in California, Colorado, New York, and Virginia. The University of California at Davis was conducting a literature review of current land use controls and planned to complete a case study of northern California cities and counties with respect to their land use controls. Colorado State University at Fort Collins, Colorado, had research in progress to analyze the present alternatives to improve the information available about land use planning and rural development to aid planners, policy makers, and private citizens. Research was under way at Cornell University, Ithaca, New York, to review the loss of farmland, evaluate the consequences of this loss, and evaluate the present retention methods being used. Virginia Polytechnic Institute at Blacksburg, Virginia, was conducting land use research with the objectives of developing an economic model of farmland conversion, estimating conversion and supply-demand forces, and evaluating present policies to reduce farmland conversion.