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CAN WE PROTECT AGRICULTURAL LAND AND THE SCENIC RURAL LANDSCAPE? The Spatial Effects of Three Land Protection Strategies in the Eastern United States

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In order to assess the efficacy of the three most common types of agricultural land conservation in the United States, this study analyzes the spatial and visual quality of a purchase of development rights program and two regulatory programs ó cluster and the transfer of development rights. The study compares the effectiveness of programs that have been in place for periods of 6 to 18 years, surveying three different communities in the urban fringe:

1. *the transfer of development rights program in Montgomery County, Maryland, in effect since 1981,*
2. *Riverhead, New Yorkís farmland development rights acquisition program, administered by the County, in effect since 1977, and*
3. *Southampton, New Yorkís cluster development program, in effect since 1982.*

These programs are compared to determine the number of acres of land that remains in active farming, in addition to evaluating the spatial configuration in the context of both agricultural business and visual quality of the remaining farmland.

1 INTRODUCTION

The key issue facing the American land use system as we enter the new century, is that of urban sprawl. The flight of homeowners out of the cites to relatively inexpensive land and housing in the urban fringe has placed a tremendous pressure on farmland resources. With the fragmentation of farms in the urban fringe, has come a loss of the traditional farming economic base, and a change in the character of rural communities. To combat this change, many communities in urbanizing areas of the United States are attempting to protect farms, farmland and the rural landscape in the suburban fringe. Since it is the quality and character of the rural landscape that has attracted new residents to the suburban fringe, this desire to protect farms is rooted primarily in the desire to protect the visual quality of the landscape rather than to protect the land for the production of food. Thus, in these areas, the maintenance of active production agriculture is secondary to the spatial and visual effect it has on the landscape.

The primary responses to the loss and fragmentation of agricultural land in the United States have been two pronged - governmental or non-profit agencies either purchase significant tracts of land or local governments impose zoning and other regulatory

requirements on the development of the land. While analysis of the numbers of acres protected by each type of program has been completed in the past, the spatial and visual effects of regulatory and acquisition programs have not been analyzed or compared.

This study examines the effects of the use of three locally based programs, transfer of development rights, purchase of development rights and cluster development, to determine the success of each in preserving agriculture and rural landscape character in three communities - Montgomery County, Maryland, and the Towns of Riverhead and Southampton in New York. The following provides a brief description of each land preservation program, a history of the program in each community and then the results of the spatial analysis of the protected lands.

2 THE PROGRAMS

2.1 Transfer of Development Rights in Montgomery County, Maryland

A transfer of development rights (TDR) program is typically a broad, regional program, which defines an area to be protected from development (sending area) and an area where development will be allowed to occur (receiving area). Since the program allows landowners to transfer the rights to develop one parcel of land to another parcel of land, the parcel from which the development rights are being transferred can no longer be developed, or developed only in a limited way.

In 1981, Montgomery County became one of the first localities in the nation to adopt a countywide TDR program for agriculture preservation through its 1980 master plan (M-NCPPC, 1980). The County articulated a number of public policies underlying the TDR program, among them a desire to control public costs associated with sprawl by channeling growth to existing population centers and setting aside lands for agriculture preservation, a goal of ensuring the continued viability of farming for regional food supplies, and a desire to maintain rural open space and the rural character of the area (M-NCPPC, 1980: 27, 35, 39).

The County delineated an Agricultural Reserve (the sending area), based on soil quality, existing agricultural use, amount of existing development, size of farm parcels, and the threat of projected future development (M-NCPPC, 1980: 48-58) with the goal of preserving a “critical mass” of farmland - approximately 90,000 acres. Within the boundaries of the Reserve, the TDR program was mandatory, and created easement restrictions on property from which development rights were transferred. In establishing the program, the County decreased the allowable development density in the sending area from one dwelling unit per five acres to one unit per twenty-five acres (Montgomery County Code, 1997, Article 28, Sec. 59-C-9.6). The County allotted one development right for every five acres of land (no fractional development rights) - regardless of the quality of land, proximity to existing development, or other factors. Once a landowner transferred the development rights, the County acquired a permanent easement on the land, limiting residential development and restricting that parcel to agricultural uses (M-NCPPC, 1980: 45).

The County created approximately 15,000 development rights on land within the Agriculture Reserve. As of 1997, 6,629 development rights had been severed from the underlying parcels and 5,123 transferred to receiving areas (leaving 1,506 development rights that had been severed, but not transferred). The 6,629 severed development rights preserved 43,993 acres (M-NCPPC, 1997b). Approximately 2,170 development rights remain attached to the underlying land.

2.2 Purchase of Development Rights in the Town of Riverhead, New York

A purchase of development rights program typically uses public funds - tax revenues or municipal or state bonds - to fund the purchase and retirement of development rights on

agricultural land. Unlike neighboring Southampton Town, Riverhead depends primarily upon the Suffolk County Purchase of Development Rights (PDR) program to preserve agricultural land. Though Riverhead has established a Town PDR program, the Town has only purchased the development rights on two agricultural parcels. By contrast, the County PDR program has purchased the development rights on 70 parcels, preserving 3,889 acres to the 61.5 acres preserved through the Town program.

The County PDR program, the nation's first purchase of development rights program, was implemented in 1977. According to the Suffolk County Planning Department, between 1977 and 1996, $40 million was spent to fund the acquisition of development rights, preserving over 7,000 acres of land in the county. Another $9 million was spent in conjunction with partnerships between Suffolk County, town governments and non-profits to purchase development rights and conservation easements (Suffolk County Planning Department, 2000). The amount of land preserved in Riverhead by the County PDR program represents more than half of the total land preserved in the county through the program.

The County program used five factors in determining where to buy development rights: soils, current land use, contiguity of farmland, development pressure and the price of land, although vistas were included in the point rating system for each parcel (Suffolk County Agricultural Protection Plan. 1996). Highest priority was given to land in designated County Agricultural Districts, parcels over 10 acres in size and those with high-quality agricultural soils. Parcels for participation in the PDR program must have been engaged in active farming for at least two years prior to purchase.

The Town of Riverhead is an historic agricultural community on the eastern end of Long Island. Riverhead is blessed with abundant, high quality agricultural soils and is one of the most important agricultural areas in New York state, although thus far, Riverhead has experienced only a fraction of the tourism and resort economy that has come to define Southampton, located on its eastern border. Of the Town's 46,205 acres, 14,584 acres are zoned for agriculture. Approximately 12,300 acres, or 84% of the agricultural zone, are currently engaged in agricultural production, 3,889 of which are permanently protected via the County PDR program.

2.3 Cluster Program in Southampton, New York

In contrast to the regional focus and planning inherent in transfer and purchase of development rights programs, cluster development programs typically deal with development on a site by site basis. While cluster programs may be mandated in a prescribed geographical area, development and preservation decisions are made on an individual site basis, providing the opportunity for significantly more fragmentation than in transfer or purchase programs. Cluster programs work with the underlying zoning density, reducing minimum lot sizes and mandating that a portion of the site remain as open space. Obviously, the percentage of open space required to be set aside in any cluster program is a major determining factor in the effectiveness of that program, as is whether the program is mandatory or voluntary, and the degree of discretion granted to the statutory review body.

A primary issue for development is the issue of ownership and control of the preserved land after clustering has occurred, and ensuring appropriate care, maintenance, and use of the preserved land. There are typically three types of ownership: 1) The landowner may choose to dedicate an easement, or the land itself, to the local government or a local public or quasi-public land trust; 2) the preserved land may be held by a homeowners association (HOA) made up of the owners of the clustered subdivision lots, who may choose to retain it for the use of the HOA, or lease it to a local farmer; and 3) the farmer developing the property may retain ownership. An important consideration for cluster programs is the status of preserved land.

Fragmentation of the remaining open space into a patchwork that has limited use as agricultural land or habitat is also a critical issue (Whyte, 1964: 78, Arendt, et al., 1994: 252-55, Dramstad et al., 1996: 35). Although it is a very popular tool, clustering is not regarded by farmland protection advocates as a front-line means to protect agricultural land bases (Arendt, 1997: 144; American Farmland Trust, 1998). It is suggested that clustering may be better designed for preserving niche farms on the urban fringe that produce high-value specialty crops for sale to urban areas (Arendt, 1997: 139) and as a means to protect rural character and scenic quality (Daniels, 1997: 132, 136; Arendt, 1991: 30), despite the possibility that clustering may produce results that are incompatible with surrounding land uses (Arendt, 1991: 30).

The Town of Southampton, located on the eastern end of Long Island, has been an agricultural community since its settlement in the late 1600's. By the 1970's, tourism and second home development were beginning to fragment the existing farming areas. Mandated in the 1970 Master Plan for the Town, residential clustering was adopted and substantially revised in the early 1980's. The Town defined an Agricultural Overlay district, that coincided with the concentrations of agricultural land in the Town. By mandating the use of planned residential development (PRD) subdivisions within the Agricultural Overlay District, the Town granted the Planning Board the discretion to require that a subdivision cluster the development units on the portion of the parcel containing the least productive soils. The percentage of open space to be set aside in the subdivision was governed by a sliding scale based on the minimum lot size of the underlying zoning (see Table 1).

Table 1 Prime Agricultural Soil Preservation Guidelines

Zone and Minimum Lot Size Requirements	Required Percentage of Prime Soil Preservation	Required Acreage for Preservation
R-10 (.23 ac)	35%	.08 ac
R-15 (.34 ac)		.12 ac
R-20 (.46 ac)		.16 ac
R-40, CR-40 (.92 ac)		.32 ac
R-60, CR-60 (1.37 ac)		.48 ac
CR-80, R-80 (1.84 ac)	50%	.92 ac
CR-120, R-120 (2.75 ac)	65%	1.79 ac
CR-200 (4.59 ac)		2.98 ac

3 SPATIAL ANALYSIS OF THE THREE PROGRAMS

In order to compare the effectiveness of the three agricultural land preservation programs, each program was assessed according to (1) number of acres protected (see Table 2) ; (2) status of use for agricultural purposes of the protected parcels; (2) average protected parcel size; (3) contiguity with other protected or unprotected land in active farming use; and 4) accessibility of the parcel from existing roads.

To assess the visual quality of the protected land, and the program's ability to protect scenic rural character, a visual analysis of all the protected parcels was completed on site. The visual analysis for the three sites was completed from field analysis in the months of June to August, 1999. In order to determine the impact on visual quality and rural scenic quality, each parcel was rated for retention of long views that are key factors in rural scenic quality. By identifying the presence of intrusions into the viewshed in the foreground, middle ground and background, it was possible to determine the level of protection of degradation that each of the three land protection mechanisms had on the viewshed.

Table 2 Comparison of land protection achieved in acres for the three preservation programs.

Program	Date	Total acreage[1]	Protected acreage[2]	% Protected	Average Acres Protected/Year
TDR	1980	90,000	25,608	28%	1,506
PDR	1977	14,584	3,889	26%	177
Cluster	1980	13,093	2,353	18%	131

[1] - Acreage contained within the target protection zone.
[2] - Acreage permanently protected by the program: TDR by 1997, PDR by 1999; cluster by 1998.

3.1 Transfer of Development Rights in Montgomery County

As previously mentioned, approximately 90,000 acres of land make up the Agriculture Reserve. Of this area, 25,608 acres are protected under the TDR program, alongside an additional 16,765 acres of public lands and 12,974 acres of land protected under the County's other four preservation programs. For the purposes of this analysis, only the parcels of land protected under the transfer of development rights program have been included.

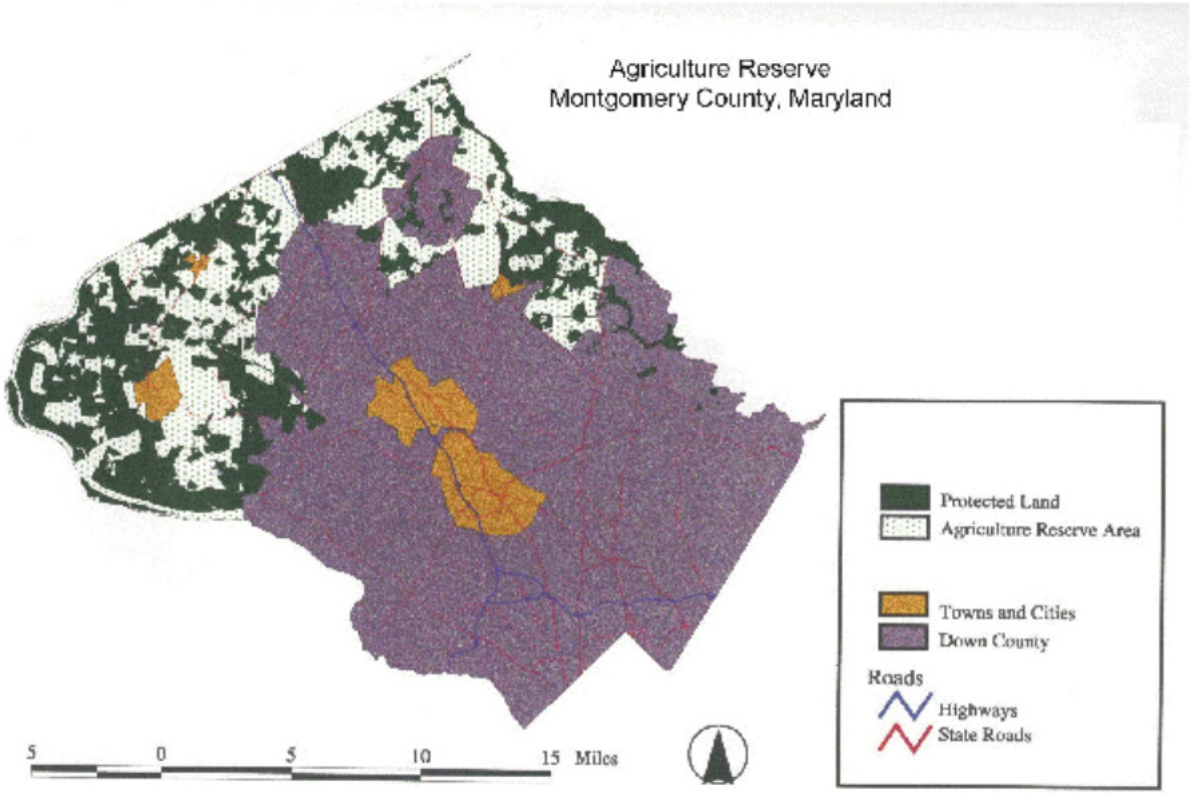

Figure 1 Land protected by the Transfer of Development Rights in Montgomery County, Maryland (Caplan, et.al., 1999).

Based on a field survey of all TDR-protected parcels in April (Caplan, et.al., 1999) and August 1999, it was determined that of the 542 parcels (25,608 acres) protected through the TDR program, 278 parcels (20,616 acres or 80.5% of the TDR-protected acreage) were under active farming. The remaining 264 parcels (4,992 acres or 19.5% of the TDR-protected acreage) were not actively farmed. On average, farmed parcels were larger than non-farmed parcels: the average size of a farmed parcel was 74.2 acres as compared to 18.9 acres for non-farmed parcels. Most of the parcels under active farming were either

large (over 25 acres) or clustered with other protected parcels. The parcels not under active farming, even when clustered, tended to be smaller in size, typically less than 25 acres. Of the protected parcels under 5 acres, 5% were farmed, 46% of the protected parcels between 5 and 25 acres were farmed, 74% of the parcels between 25 and 50 acres were farmed, and 88% of parcels larger than 50 acres were farmed.

Other reviewers have noted that isolated farm parcels that are not contiguous with other farmed parcels often experience negative impacts such as complaints from neighbors and lack of support that negatively affect farming operations (Bryant and Johnston, 1992; Scarfo, 1990). Analysis of the TDR parcels showed that the majority of TDR-protected parcels that were farmed were contiguous with other TDR-protected parcels that were farmed (Caplan, et.al., 1999). Of the TDR-protected parcels that were farmed, 60% were contiguous with other TDR-protected parcels and 87% of all TDR-protected farmed parcels were contiguous with other farmed parcels, indicating that the County has been successful in protecting a critical mass of agricultural land.

In addition to parcel size, the accessibility of parcels from adjacent roads was analyzed (Caplan, et.al., 1999). Within the Agricultural Reserve, lack of accessibility was not found to be a significant factor in agricultural use status. Results showed that 90% of the TDR-protected parcels were adjacent to roads. The analysis also found no significant variation in accessibility between TDR-protected parcels that were being farmed and those that were not being farmed. Specifically, 89% of farmed parcels and 91% of non-farmed parcels were accessible from adjacent roads. Contiguity of farmed parcels was particularly important to those parcels not accessible from a road - 28 of the 30 parcels that were farmed, but not accessible from roads, were contiguous with other farmed parcels, creating accessibility via other farmland.

In visual terms, the existing rural character is of rolling farm fields, alternating between forests, pasture and croplands. Many portions of the farmland parcels are in standing forest, particularly those areas along streams and wetlands. This gives the landscape short to moderate views, with fields and forests in the foreground, midground and background. The clustering of protected parcels in the reserve area (see figure 1) is experienced on the ground as uninterrupted rural landscape (see figure 2). The only intrusions commonly seen in the protected areas are the new homes built on the 25 acre parcels that are developable in the reserve (see figure 3). Although this is not as yet a common trend, the continued development pressure from Metropolitan Washington will tend to exacerbate the problem, as land prices for 25 acre residential developments rise above the real estate value of farmland.

3.2 Analysis of Preserved Lands in Riverhead, New York

Riverhead, Suffolk County's most agricultural town, has 367 parcels totaling 14,584 acres that are zoned as agricultural land. Of these parcels, 325 are actively engaged in agricultural production, and 41 are other uses such as a golf course, camps and private hunting reserves. There are 70 PDR protected parcels amounting to 3,889 acres of permanently preserved land, of which 64 (91.4%) are in active agriculture.

Parcel size has a direct effect on the agricultural status of land in Riverhead. Analysis of the parcels identified that 40% (2 of 5) parcels under five acres are actively farmed, 92% (12 of 13) of parcels between 10-25 acres are farmed and 96% (50 of 52) of parcels larger than 25 acres are being farmed; there are no PDR parcels between five and 10 acres. This analysis indicates that parcel size is a major factor in agricultural status: the larger the preserved parcel, the greater the likelihood it remains in production agriculture.

Figures 2 and 3. Typical views of protected farmland in Montgomery County, showing new residential intrusions in the figure at the bottom.

Accessability and contiguity combine to create an important influence on the agricultural status of a piece of land. Of the 66 PDR parcels that are contiguous with other farmland, 60 are actively farmed and the other six are not engaged in production agriculture. As indicated in the previous case studies, contiguity becomes an important factor in the agricultural status of a parcel when the parcel is not accessible from a road.

In Riverhead, there is no parcel in active agriculture that is neither accessible, nor contiguous to other farmland. Only two PDR parcels are inactive and not contiguous to other farmland. These parcels, however, are accessible from roads. There are only five PDR parcels (7%) that are inaccessible from roads, all of which are contiguous to other farmland and are engaged in active agricultural production. There are no inactive PDR parcels that are inaccessible from roads.

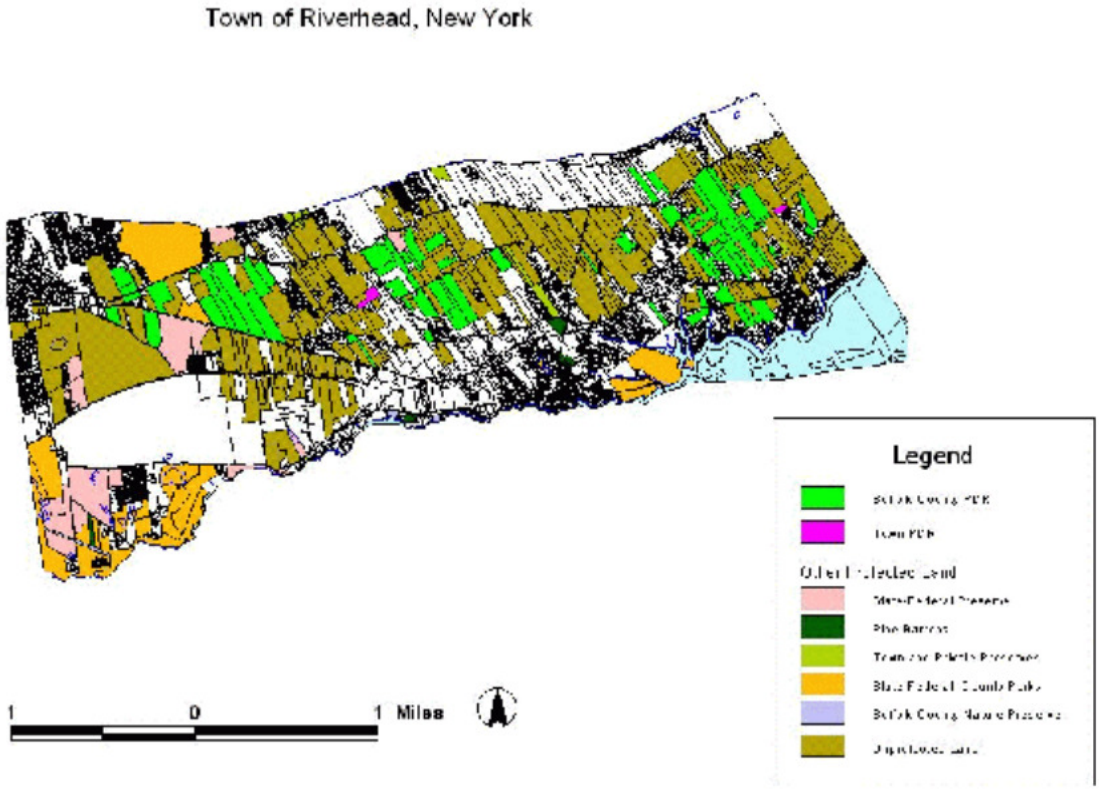

Figure 4: Map of protected land in the Town of Riverhead.

The most significant finding identified in Riverhead is the connection between contiguity and accessibility, which reinforces the results obtained in the Southampton case study. The difference between the active farming status in the two communities is largely due to the design of the Suffolk County PDR program. The County program considers accessibility and visual quality when selecting parcels for development rights purchases. Therefore, the program automatically tends to exclude those properties where accessibility and/or contiguity becomes an impediment to the continued farming of the land.

Riverhead's agricultural land is largely flat, creating long, scenic views across farm fields. Although the Town has a long coastline along Long Island Sound and the Peconic Bay, the quality of soils for agricultural purposes is such that most of the agricultural production takes place on inland parcels. In terms of rural scenic quality, it is the long views across the flat farm fields that are critical to maintaining the rural character and visual quality. In contrast to Montgomery County, forest stands are rare on the protected parcels, probably as a result of the criteria required to prioritize a parcel for PDR acquisition.

In analyzing the effect of the purchase program on the visual quality in Riverhead, it is apparent that the program is very successful in maintaining visual quality. The programmatic focus on acquiring the development rights to parcels that are contiguous to other farmland, have large parcel sizes and the inclusion of vistas in the point rating system, all of which lead to a program that protects visual quality along with viable farmland. As is evident in Figure 1, most protected parcels are located adjacent to other protected parcels, protecting long views across the landscape (see Figures 5 and 6).

Figures 5 and 6 Views across preserved farmland in Riverhead. In the figure at the bottom, the historic farmsteads of the area are the only visible intrusions in the protected landscape.

3.3 Spatial Analysis of Cluster Subdivisions in Southamptonís Agriculture Overlay District

The Agricultural Overlay District (AOD) covers 13,093 acres of the total 105,901 acres in the Town of Southampton. As of 1998, approximately 148 parcels (2,353.4 acres) were protected as either subdivision reserve areas (SRA's) or had development rights severed from the underlying parcels. Preserved land accounts for 18% of total land acreage within the AOD. Unprotected (3,834 acres) and undeveloped but subdivided land (424 acres) accounts for 4,258 acres, or 32.5% of the land within the AOD. The remaining 6,480.5 acres (49.5%) within the AOD are developed.

The 47 Planned Residential Development subdivisions in the AOD, including their associated Subdivision Reserve Areas, account for 1,685 of the 13,093 acres or 12.8 % of land in the AOD.

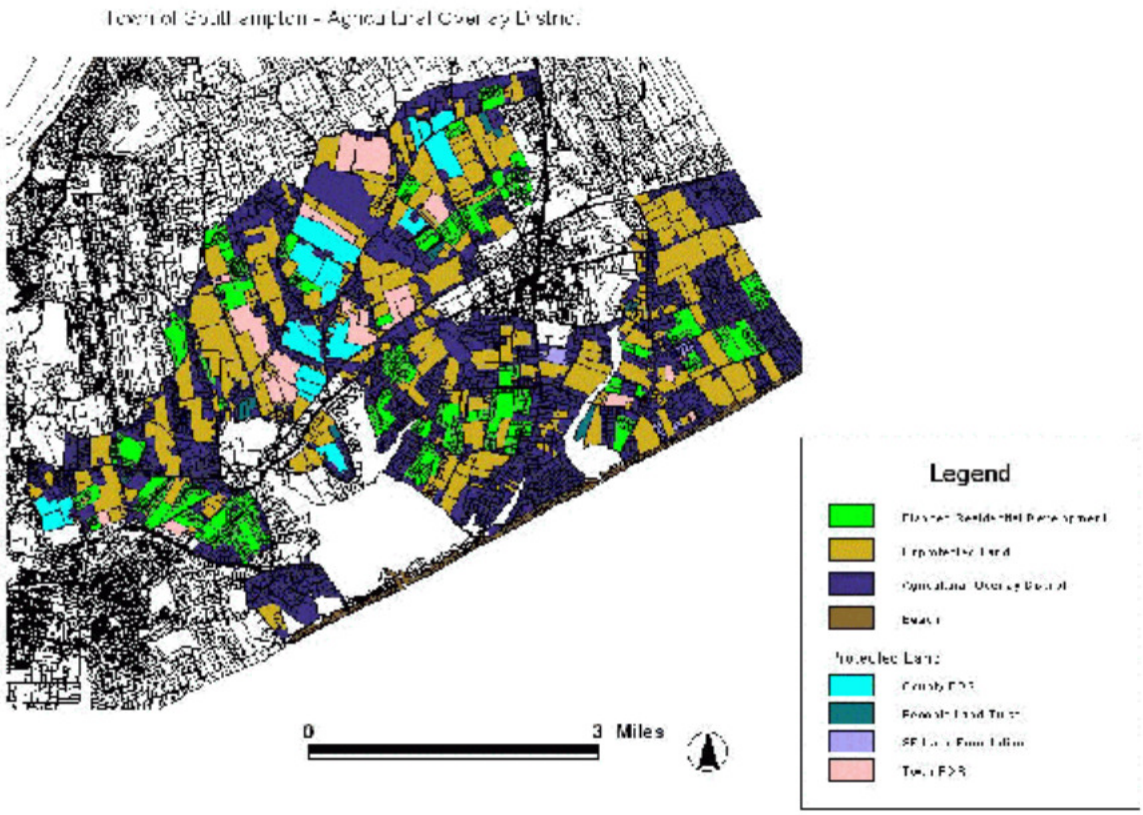

Figure 7 The Agricultural Overlay district in Southampton.

There are 58 SRAs that are associated with PRDs - these reserve areas account for 778 acres of preserved land - 47.6% of the land in PRD subdivisions, 33% of all protected land within the AOD, and 6% of the entire AOD. The average PRD subdivision size (including associated SRAs) is 36.6 acres, with an average SRA size of 13.8 acres (37% of the average total PRD area) and an average residential development size of 22.8 acres (64% of the average total PRD area).

Field observations performed in April and July 1999 found that 91% (709 acres) of SRA acreage was actively farmed. For the purposes of this study, land in agricultural production includes equestrian land (153 acres), land used by commercial nurseries and orchards (45 acres), and farmland producing row or specialty crops (511 acres). The status of two SRA parcels (11.5 acres) was undeterminable due to the visual and/or physical inaccessibility of the lots from public property.

The analysis shows that out of 58 SRA parcels totaling 798 acres, 512 acres (64.2%) are in active agricultural production. Although the program may preserve this agricultural land from development, if the goal of the PRD program is to protect active farming and the farming industry, the PRD program alone is failing nearly one third of the time. It is important to note that there is an increasing trend to use SRA land as horse farms and wildflower meadows. While, for the purpose of this study, equestrian land uses are considered active agriculture, they take land from agricultural production and convert prime agricultural soils to recreation areas and turfgrass ground cover.

No trends were evident indicating that contiguity with active farmland is a significant factor in the agricultural status of a preserved parcel. Only nine SRA parcels were not contiguous with other farm fields (15.5% of all SRAs), and of those nine, only one was not actively farmed. Of the parcels that are actively farmed and inaccessible from roads, 100 percent were contiguous with at least one other parcel of farmland. The data provided no indication that the adjacent farmland must be protected for a parcel to be farmed, as there were 14 actively farmed SRA parcels contiguous only with unprotected agricultural lands, 17 actively farmed parcels contiguous only with protected agricultural land, and seven actively farmed parcels contiguous to a combination of protected and unprotected farmland.

Larger parcels are more likely to be farmed than smaller parcels in Southampton. Half (2 of 4) of parcels under 5 acres were actively farmed; 91% (11 of 12) of parcels 5 to 10 acres were farmed; 79% (19 of 24) of parcels 10 to 20 acres were farmed; and 100% of parcels larger than 20 acres were farmed (12 of 12). One hypothesis for the dip in percentage of parcels being farmed in the 10 to 20 acre category is that 10 acres may be too large to be leased for efficient truck farming and 20 acres too small to support efficient row crop production.

In Southampton, only parcels that are accessible from a road or another contiguous farm field were farmed. However, the Town's PRD program has not resulted in any parcels that are not accessible either by road or a contiguous farm; 62% of all SRAs are accessible via roads, providing access for farm machinery, and 38% are not accessible from a road. The analysis also found that 50% of the SRAs that are not farmed are not immediately accessible from a road, compared to only 25% for SRAs that are farmed. The only road in the Agricultural Overlay District that presents a problem for farm equipment accessibility is Highway 27 (it is a major highway, unsuitable for travel by farm machinery), which affects only two SRAs.

Since clustering is not mandatory in the AOD, the amount of land protection has not achieved the target goals established in the original ordinance, and a large percentage of the original agricultural land base has converted to residential land uses. The Town Planning Board has the discretion to require implementation of any level of land conservation less than the figures recommended in the ordinance, regardless of the site's soil type, recommendations of the Planning Division staff, or other criteria a in the ordinance. Since 1982 (when the program effectively began) the Planning Board waived the required percentages for 29 of the 37 or 79% of all PRD subdivisions approved during this period (Caplan, et.al., 1999).

The visual quality and rural character of Southampton varies widely from Montgomery County and even its neighbor, Riverhead. In contrast to the rolling hills of Montgomery County, the farmland in Southampton is largely flat to slightly rolling. There are very few tree stands, and with the exception of hedgerows, none on SRA protected lands. As in Riverhead, the primary agricultural use is field crops such as potatoes and truck farming, however more SRA parcels are converting to equestrian and nursery uses than is common in Riverhead.

Regardless of the differences in cropping and use patterns, the rural character and visual quality is still largely dependent on the long views across farm fields. In addition, views south to the Atlantic Ocean are also key. Due to the smaller size of the pre-development parcels in Southampton as compared to Riverhead, the impact of subdivision of the lot is critical to the visual quality (see figures 8 and 9). None of the subdivision parcels are large enough, nor are the SRAs effectively contiguous enough to prevent major intrusions into the viewshed. All of the SRAs showed new residential development in the middle ground of the view, with many showing intrusions in the foreground as well. The result of this fragmentation of the parcels is the loss of the characteristic long views of the Town and the erosion of the rural character of the Town.

Figures 8 and 9 Typical farmland views in the Southampton subdivision reserve areas. Note the residential building intrusions in the middle ground of the photos, and the development approved for the foreground of the bottom photo.

4 CONCLUSIONS

When looking strictly at the numbers of acres of farmland protected by the three programs, transfer of development rights appears to be the most successful method for achieving agricultural land protection. Particularly when the $25 million cost of the purchase of development rights program in Riverhead is factored into the analysis, Montgomery County's transfer of development rights program resulted in a higher rate and more cost effective land protection program - 28% of the land base in Montgomery County, compared to 26% in Riverhead (see table 3).

However, the number of acres protected provides only a partial indication of the success of either of the three programs. It is misleading to infer that the Montgomery County parcels have been entirely preserved. While the purchase of development rights program protects 100% of the original parcel, the Montgomery County parcels retain development rights at the rate of one unit per 25 acres, even after the remaining development rights have been transferred. In addition, the purchase of development rights program resulted in 98.6% of the preserved parcels in active agricultural production, compared to 80.5% for the transfer of development rights program. This is due at least in part to the remaining development rights that allow for further subdivision of the land into residential estates in the metropolitan real estate market. Even in Southampton, where the parcel sizes are much smaller, the active agricultural use is 91%, underscoring the importance of severing all future development rights from the protected parcel.

The most significant weakness in the cluster program is the issue of preservation of the agricultural land base. In Southampton only 18% of the original agricultural land base has been protected through the use of clustering, and only an average of 37% of an original parcel is protected under the requirements of the program (see table 3). Thus, the effect of the cluster program is increasing fragmentation and loss of the agricultural land base.

Table 3: Summary of land protection for the three programs.

Program	Total Acres Protected	Percent of Land Base Protected	Average Size of Agricultural Parcel (acres)	Percent of Original Parcel Preserved	Average Protected Parcel Size (acres)	% of Protected Parcels in Active Agriculture
TDR	25,608	28%	--	--[1]	47.3	80.5%
PDR	3,889	26%	48.0	100%	51.1	98.6%
Cluster	2,353	18%	36.6	37%	13.8	91.0%

[1] - In the TDR program, the land parcel retains development rights at the rate of 1 unit per 25 acres after transfer.

When factoring in the additional criteria of scenic quality and the retention of visual character, the transfer of development rights program shows evidence of additional negative issues. While the protected lands are generally clustered in large blocks, the retained development rights have the potential of causing significant change to the rural character and scenic quality of the area. However, the effect of the cluster program on visual quality is even more significant than the effect of the transfer of development rights. Preserved parcel size, coupled with lack of attention to viewshed issues in the prioritization of the subdivision reserve areas significantly impacted the rural character and visual quality of Southampton agricultural land (see table 4).

Further research and comparison between programs is certainly needed, however, this analysis illustrates key criteria for a successful program. Critical are an emphasis on large parcel sizes, contiguity of parcels creating large blocks of protected land, severing all development rights from the protected parcel, and incorporating viewshed analysis in the evaluation criteria of the program. In cluster programs, effectiveness is also influenced by the amount of review discretion granted to the site plan approval board, and the threshold of open space protection required in the ordinance. Finally, the analysis and comparison of the three land preservation programs reinforces the importance of incorporating specific, mandatory criteria in the protection program.

Table 4: Comparison of the effectiveness of the three land protection programs.

Program	% of Protected Acres in Active Agriculture	Average Parcel Size of Protected Land in Active Agriculture (acres)	Integrity of Rural Scenic Quality
TDR	80.0%	74.2	Moderate - Intrusions of 25 acre residential lots
PDR	98.4%	51.1	High - No to few visual intrusions in the background
Cluster	91.0%[1]	17.7	Low - residential development intrusions in the foreground and middle ground

[1] - Equestrian facilities make up 12% of the total in active agricultural use.

5 REFERENCES

American Farmland Trust. The Farmland Protection Toolbox Factsheet, 1998. http://farm.fic.niu.edu/fic-ta/tafs-fptool.html, March 20, 1999.

Arendt, Randall, 1997. Basing Cluster Techniques on Development Densities Appropriate to the Area. Journal of American Planning Association, 63,1: 137.

Arendt, Randall, 1991. Cluster Development: A Profitable Way to Save Open Space. Land Development (1991): 26-30.

Arendt, Randall, Elizabeth A. Brabec, Harry L. Dodson, Christine Reid, and Robert D. Yaro, 1994. Rural by Design: Maintaining Small Town Character. American Planning Association, Chicago.

Bryant, Christopher and Thomas Johnston, 1992. Agriculture in the City's Countryside. Belhaven Press, London.

Caplan, Richard, Christopher Holben, Johns Hopkins, Matthew Kowalski, Jason Navota, Chip Smith, 1999. An Evaluation of Land Preservation Programs: Cluster Development in the Town of Southampton, New York and Transferable Development Rights in Montgomery County, Maryland. Master's Thesis, University of Michigan.

Daniels, Thomas L., 1997. Where Does Cluster Zoning Fit in Farmland Protection? Journal of American Planning Association, 63: 129-37.

Dramstad, Wenche E, James D. Olson, and Richard T.T. Forman, 1996. Landscape Ecology Principles in Landscape Architecture and Land-Use Planning. Boston, Massachusetts: Harvard University Graduate School of Design, Island Press, and the American Society of Landscape Architects,Boston.

Maryland-National Capital Park and Planning Commission, 1980. Functional Master Plan for the Preservation of Agriculture and Rural Open Space in Montgomery County. Maryland -National Capital Park and Planning Commission, Silver Spring, Maryland.

Maryland-National Capital Park and Planning Commission, 1997. Transfer of Development Rights Program Status Report. Maryland-National Capital Park and Planning Commission, Silver Spring, Maryland.

Montgomery County, Maryland, 1997. Montgomery County Code. American Legal Publishing Corporation, Cincinnati.

Scarfo, Robert A., 1990. Cultivating Agriculture: A Report of Current Trends and Future Viability of Farming in Maryland's Metropolitan Fringe. Maryland Office of Planning and The University of Maryland.

Suffolk County Planning Department Homepage 2000. URL:http://co.suffolk.ny.us/planning/acq_progrs.htm-l, March 29, 2000.

Town of Southampton, 1997. 1997 Comprehensive Plan - Southampton Tomorrow. Volumes 1, 1.A, 2 ed. Town of Southampton, New York.

Town of Southampton, 1989. Code of the Town of Southampton. General Code Publishers Corp., Rochester, New York.

Town of Southampton, 1998. Strategy for Farm and Farmland Preservation. Town of Southampton, New York.

Whyte, William H., 1964. Cluster Development. American Conservation Association, New York.