Smart Growth Planning Policy and Farmland Preservation in California's Central Valley

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Abstract The Central Valley of California has long played an integral role in food production for the entire country. Reliance on this region has not decreased despite the area's rapidly growing population and resultant urbanization. Conservation of this important farmland is essential for the production of crops as well as for environmental and aesthetic reasons. One approach to farmland preservation is through the use of planning policies, specifically those that can be defined as 'smart growth' policies. Smart growth as a planning theory has gained popularity during the last ten years. It strives to create sustainable growth, meeting the needs of today without infringing upon the rights of the future. This study looks at land-use policies within the 18 counties of the Central Valley and their effect on farmland preservation. Surveys of planning department staff are used in conjunction with analyses of the land use portion of the counties' general plans to establish a 'smart growth score' for each county. This score is then used against US Census and US Department of Agriculture information on population and land use to analyze effect. The data collected suggests that there is no significant relationship between smart growth score and the number of farmland acres lost and a slight correlation between smart growth score and developed acres gained. Through a close comparison of San Joaquin and Merced counties, the suggestion is made that successful preservation policies should involve a focus on the economic factors driving the conversion of agricultural land. The effectiveness of urban growth boundaries is also discussed.

Introduction

During the decade between 1980 and 1990 California's population grew by 9.8% (US Census of Population 1990). In the most recent decade from 1990 to 2000, growth was nearly 14% (US Census of Population 1990, 2000). Beginning after World War II, growing populations have combined with higher incomes and improved mobility to create new demands on land and city growth in the form of urban sprawl (Ackerman 1999). As a result, the issues of sprawl and the subsequent loss of rural farmland have received increasing attention from public officials (Duke & Aull-Hyde 2002, Kline and Alig 1999, Sokolow 1997).

Like much of the rest of the country, California is wrestling with the question of how to accommodate a growing population. The region has the additional challenge of serving as a major area of food production. The state of California ranks as the nation's top agricultural producer (Abrams 1989). It is also the most threatened farming region in the United States, losing 500,000 acres to development in the ten years between 1988 and 1998 (American Farmland Trust 2002). Within California, ten of the top twenty agricultural counties in terms of value of production are found in the Central Valley (Umbach 1997). A major source of food and livelihoods for the country, loss of agricultural land is an especially important issue in the Central Valley.

Reasons for the preservation of agriculture land range from the aesthetic to the practical. There are three major arguments for the importance of farmland preservation, especially near urban areas (Nelson 1992). The first is the production of truck and specialty crops. Truck crops are those that are not processed before being sold, such as fruits and vegetables. This unprocessed state necessitates a short transit time between the field and location of sale. Specialty crops are those that are not eligible for federal subsidies and thus more sensitive to variations in production and market factors. A second reason relates to the provision of public goods. Farmland near urban areas can provide flood control as well as assist in air cleansing (Nelson 1992). A final benefit is open space protection, which helps to spatially define cities. Additional motivations include the retention of what is viewed as the idyllic rural way of life, as well as access to the amenities of the countryside (Bunce 1998).

One proposed method of controlling the conversion of farmland is through land use planning (Kline and Alig 1999, Nicholas 1999, Staley *et al.* 1999). States such as Oregon and Florida have enacted land-use plans that focus on the importance of growth management and the idea of

"smart growth" (Nelson 1999). Smart growth is both environmentally conscious and economically sound and is an important concept of sustainable development.

The idea of sustainable development has gained support since the term was used in the Bruntland Report of the World Commission on Environment and Development. The report defines sustainable development as "development which meets the needs of the present without compromising the ability of future generations to meet their needs".

The effectiveness of growth management is widely debated and evidence supporting claims of success are occasionally weak or even contradictory (Diaz and Green 2001). One controversial instrument of smart growth is the implementation of a boundary around an urban area beyond which development may not occur. These lines are commonly known as urban growth boundaries or UGBs. In addition to or often in place of state mandates, more than one hundred counties and cities have proposed their own management strategies that incorporate a growth boundary (Staley *et al.* 1999). Despite the increased attention towards use of these methods as a tool for protecting rural land from development, few studies done on the subject have used empirical data to analyze the effectiveness of UGBs (Kline and Alig 1999). A substantial amount of data exists on land usage and population dynamics, but little has been done to look at this information in relation to farmland policy, specifically under the umbrella of the relatively new domain of smart growth and sustainable development.

In addition to awareness at the governmental or academic level, it is necessary that California's citizens are made aware of the importance of and dangers facing the region's farmland. Public awareness and support of smart growth policies looks to be growing across the country. In 1998, 248 smart growth initiatives appeared on ballots, 72 percent passed (AFT 2002). However, while California is the nations' leading agricultural producer, its population is highly urbanized. In 1996, nearly one third of the state's land was devoted to commercial agriculture while less than one in a hundred residents was a farmer or rancher (Coppock & Kreith 1997). This sets up an obvious conflict in land use as well as a situation in which the majority of California residents have little or no connection to or understanding of agricultural production. As a result it is difficult to garner support for policies that favor agricultural land over urban development.

While many Central Valley residents may be unaware of the issue, this is a critical time for the subject of farmland preservation. California's population continues to grow at ever increasing

rates, resulting in continued conversion of rural land. The purpose of this paper is to assess the effectiveness of current planning policy in relation to farmland preservation in the Central Valley. The hypothesis is that counties with planning regulations that encourage smart growth will have greater success with agricultural preservation. Further, it is hypothesized that the presence or absence of a UGB is a deciding factor in the preservation of farmland.

The region under consideration is the 18 county area that comprises California's Central Valley. Data on population size, density, and number of farmland acres are used to determine conservation success. This information is then examined in relation to the planning policies of each county.

In addition, a close comparison of two counties will be undertaken in order to create a more complete understanding of the details involved. From there, an attempt is made to suggest a framework of policies for successful farmland preservation.

Methods

Data Collection This study looks at the counties within California's Central Valley: Butte, Colusa, Fresno, Glenn, Kern, Kings, Madera, Merced, Placer, Sacramento, San Joaquin, Shasta, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba. For each of the 18 counties, one of two methods were used to determine the presence or absence of smart growth planning policies dealing specifically with land use. Smart growth policies include rules, regulations, or stated goals that discourage development on rural land and instead focus that development within urban areas. These can include zoning policies and economic incentives or deterrents, among others.

The first method involved a survey of a member of each county's planning staff. The interviewee was asked to indicate which, if any, of a series of land use policies are present in their county. Each of these policies was given a numerical value of one, two, or three based on the estimated magnitude of its effect on farmland preservation. Those policies that directly effect the conversion of farmland were given a higher value than those that act indirectly on conversion. As an example, presence of an UGB was given 3 points because it directly limits growth while the presence of a minimum density requirement was allotted one point. The sum of these values provided a "smart growth score" for individual counties. (See appendix for the complete survey)

The policies in the survey were chosen to represent a sampling of smart growth policy options and were not intended to be exhaustive. Rather the goal was to create a list of representative policies from every aspect of smart growth. Those included cover a wide range of both physical and economic policies and involve the following: agricultural land parcel size, UGBs, conversion fees, density requirements, establishment of new rural residential areas, conservation easements, extension of services, right-to-farm ordinances, farmland designations, and leapfrog development. For counties that did not respond to the survey the second method, a careful reading and analysis of the land use section of each county's general plan, was used to determine which policies are in place.

Population counts in each of the 18 counties for 1987 and 1997 were gathered from the US Census of Population (www.census.gov). Information on the number of acres devoted to farmland for the same two years, as well as the total area of each county, were taken from the Census of Agriculture conducted through the US Census (www.census.gov). Data on the quantity of developed land in the counties is compiled from the US Department of Agriculture's Natural Resources Conservation Service (www.ca.nrcs.usda.gov/nri/index.html).

The data was then used to determine how land use within each county changed over the ten-year period. The amount of farmland lost per new resident was calculated using the following equation: $(FL_1-FL_2)/(P_2-P_1)$ where FL_1= acres of farmland in 1987, P_1= population in 1987, FL_2= acres of farmland in 1997, P_2= population in 1997. A similar equation with data on developed land replacing that of farmland was used to calculate the number of developed acres gained per new resident.

In addition to the collection and analysis of empirical data, a case study was conducted between San Joaquin and Merced counties. The first has been relatively successful in conservation attempts while the second has not performed as well. This case study consisted of a close reading of each county's land use element of the general plan and an analysis of the similarities and differences.

Results

Of the 18 surveys sent to members of the planning community, ten were returned. The remaining eight smart growth scores were determined using a close reading of each county's general plan. The average smart growth score was 7.56 out of a possible 15. The average number

of farmland acres lost per new resident was 2.94 with an average number of developed acres gained per new resident of 0.42. A linear regression model was used to analyze the data with the smart growth scores as an independent variable and the number of farmland acres lost or developed acres gained as dependent variables was used to determine significance. No significant relationship was found between smart growth score and the number of farmland acres lost (p-value=0.210) (Fig. 1). A slight correlation was found between smart growth score and acres of developed land gained per new resident (p-value=0.047). (Fig. 2)

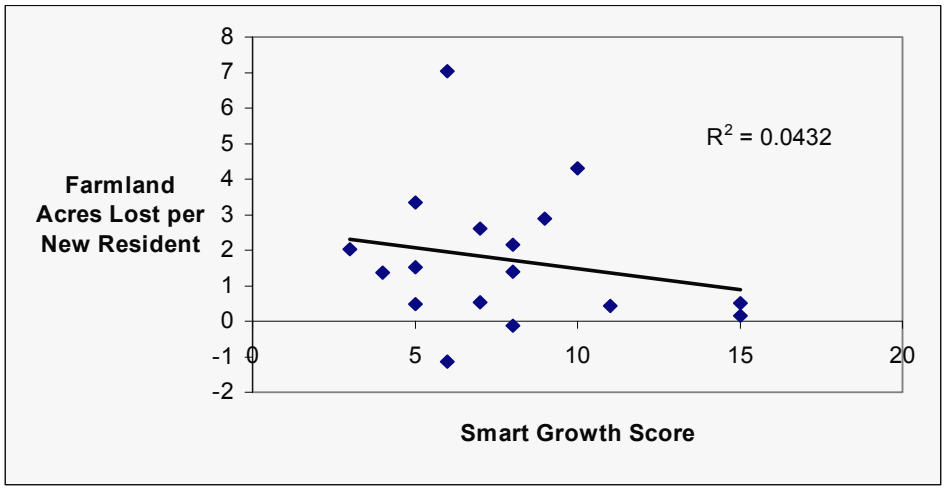

Figure 1 This graph illustrates the relationship between smart growth score and the amount of farmland per new resident over a ten year period. The data point for Tehama county is not included due to its extreme variance from the rest of the data. Statistical analysis was preformed with and without the data point.

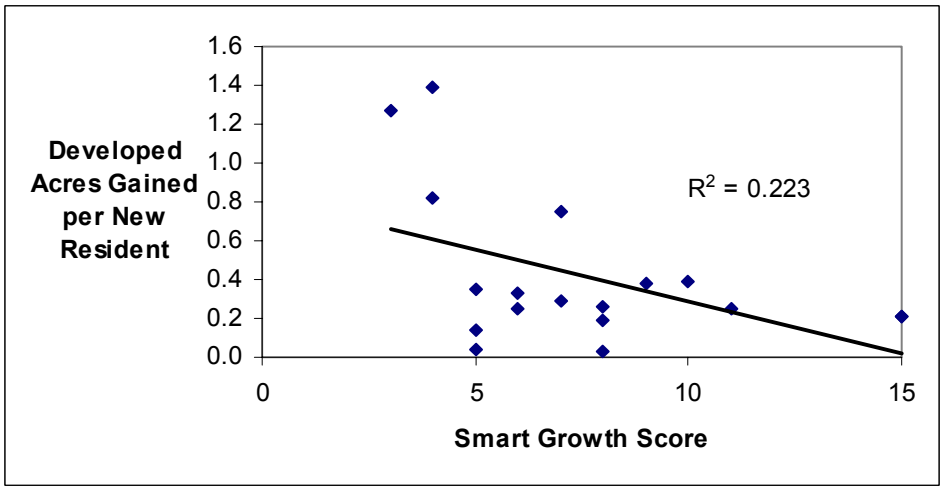

Figure 2 Smart growth score as it relates to a change in the amount of developed land.

Eight of the counties under consideration have an UGB or its equivalent in place. These are Butte, Fresno, Glenn, Merced, Placer, Sacramento, San Joaquin, and Tulare counties. The average smart growth score for these counties was 10.00 with an average of 1.56 farmland acres lost and 0.23 developed acres gained. These compare to non-UGB values of 4.04 farmland acres lost and 0.58 developed acres gained. (Fig. 3) The difference in mean value is not found to be significant (farmland p=0.35, developed land p=0.05).

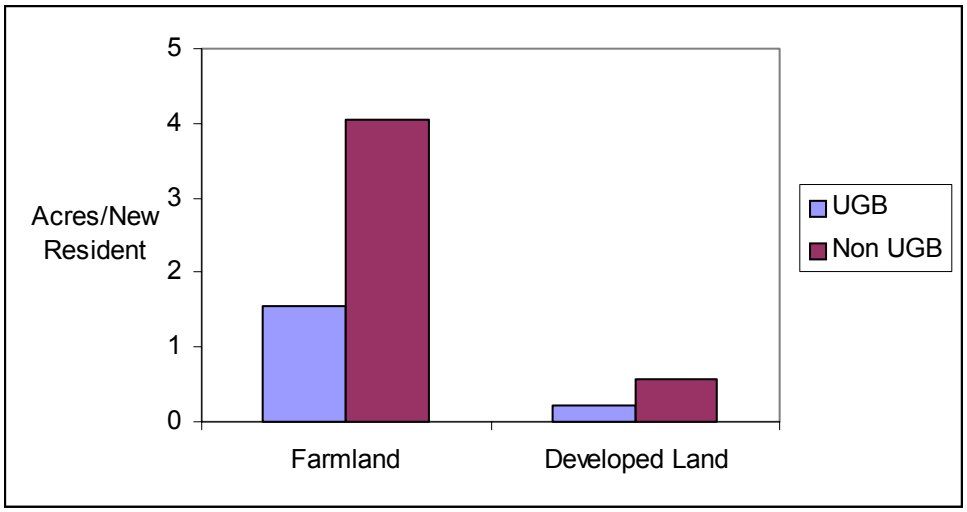

Figure 3 Breakdown of acreage change between those counties with an urban growth boundary and those without. There are eight counties with such a policy and ten without, for a total sample size of 18.

Discussion

The results of this study indicate that smart growth planning policy has no significant effect directly on farmland preservation. No correlation was found between the two. However, there is a slight correlation between presence of smart growth policies and the amount of developed land gained per new resident. This suggests that smart growth policy plays a role in slowing the spread of urban development. Common sense would imply that this in turn would benefit nearby agricultural land, something that is not demonstrated in this study.

There are a number of possible explanations as to why the data on developed land gained and farmland lost do not appear to have a direct relationship. The first is the fact that not all

agricultural land is immediately developed at the time of conversion. The land is lost to agriculture but may now serve a multitude of other roles that are not categorized as developed. Possibilities are as a buffer between urban development and the remaining farmland, recreation space, and rural housing, among others. The land may also simply no longer be suitable for cultivation due to factors such as a decrease in soil quality, water shortages, and the encroachment of development.

There is also the question of economics. The incentive to sell off rural land for the use of future urban or suburban development can be strong. Even before development is to occur on a plot of agricultural land, that land experiences a substantial increase in value due to its potential worth. It becomes more profitable to sell the land for development than it is to continue cultivation. As will be discussed later, different approaches to this factor appear to play a major role in determining the success of farmland preservation efforts.

As the statistical analysis demonstrates, some counties in the study preformed well in terms of the amount of gained urban land, while loosing an above average amount of farmland. An example is Madera county which ranked third out of the 18 counties in the amount of developed land gained (with one being the least amount gained and 18 the most) but came in 15^{th} in terms of farmland lost. The use of smart growth policies has been successful in slowing the expansion of cities, but alone is not enough to insure that farmland is preserved.

Of the policies considered in the survey, urban growth boundaries (or the equivalent urban limit lines and urban service areas) were hypothesized to be major factors in preservation. This hypothesis is not proven as, statistically, chance cannot be ruled out as the source of difference between the average amount of farmland lost or developed land gained in counties with a UGB and in those without a UGB. However, the p-value computed regarding developed land lost was equal to 0.05, nearly in the range of significance. Also, there appears to be a trend visible in the data. While not universally true, many of the counties that have achieved a level of success in farmland preservation have some form of an urban boundary in place. Further tests, with a larger sample size, are necessary to conclusively determine the role UGBs play in limiting the conversion of agricultural land.

The county in the study that placed last both in terms of farmland lost and developed land gained was Tehama. In fact, according to the US Census and USDA data used, Tehama county, which received a smart growth score of four, lost just over 23 acres of farmland for each new

resident over the ten years under consideration, more than 15 acres greater than any other county in the study. One possible explanation for this could be incorrect data from one of the two sources, as the planning official surveyed from Tehama county claimed only .007 percent of all cropland in the county has been converted to non agricultural uses in the last 15 years. However, it should be noted the county has enacted only three of the ten policies included in the survey. Further research is required to determine the true nature of the situation in Tehama.

There are a number of factors in farmland preservation that cannot be considered in an empirical analysis and would be better explored in a close comparison of two counties. One of the reasons for this is the relative newness of smart growth planning. The concepts within smart growth have long been championed by environmentalists, but widespread knowledge and acceptance of the theory as a whole is just building. For this reason the time span considered in this study may be too large to see any significant results.

A comparison of two counties helps address this by allowing for consideration of individual policies and their effects. The counties chosen for comparison are San Joaquin and Merced. San Joaquin received a smart growth score of 15 and Merced a 10. Both scores are above the average, but San Joaquin county was far more successful in terms of farmland preservation, with a rank of three compared to Merced's 16. It should be noted that the population and land size of each of these counties are different. San Joaquin county is a little over 500 square miles smaller than Merced county yet has approximately twice the population and more than three times the population density. These factors would seem to work against San Joaquin, which has had to accommodate greater increases in population in the last ten years. However, this is not the case. An analysis of variation in policy approach may help to elucidate the difference.

The surveyed member of the San Joaquin planning department responded affirmatively to the presence of each of the policies included in the questionnaire. The difference between the two counties must therefore come not from what is present, but rather what policies are not present in the land use element of the Merced general plan. Two of these policies are the levying of fees for the conversion of farmland and the requirement that a developer pay for any extension of services that their construction necessitates. This suggests that a vital part of successful policy involves an understanding that economics plays a role. One way to slow conversion it to make it less attractive as a business proposition. San Joaquin county has done this by creating a system that charges for the loss of farmland.

The first method is a direct fee at the time of conversion, making the sale of such land less appealing. The second is used to make that conversion less attractive to the developer who plans to build on the formerly agricultural land. Because this land is located outside of the city boundaries, the supply of services is frequently insufficient for higher densities. Under the San Joaquin general plan, any developer whose construction necessitates an upgrading of services, such as water or sewer, is at least partially responsible for funding the improvement. The success of the San Joaquin plan provides possible guidance for future preservation efforts.

Smart growth policies can help to slow the expansion of cities. This makes them an important tool for planners when trying to protect California's valuable farmland. Yet these policies alone are not enough. Successful preservation of agricultural land at the urban fringe requires a combination of approaches. The exact mix of these approaches is a more complicated matter than can be addressed here. However, the results of this study suggest that further policies addressing the economic aspect of conversion and possibly the use of an urban growth boundary could both be used to insure that the Central Valley does not lose it's most valuable resource.

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Appendix

Note: Following each question is the value assigned to a "yes" answer. A "no" answer received a value of 0 in each case. This information was not included in the original survey.

The following is a list of policies taken from several California county general plans that can be used to encourage farmland preservation. Please indicate by answering yes or no, which, if any, of the policies are currently present in your county. Include the date enacted if available.

1. Minimum parcel sizes for land designated for agricultural use (Please indicate parcel size and specific land designation) (2)
   Yes or No: Parcel size/land designation:

2. Urban Growth Boundary, Urban Services Area, or Urban Limit Line (3)
   Yes or No:

3. Fees levied for the conversion of agriculture to other uses (1)
   Yes or No:

4. Minimum required population density in residential areas (1)
   Yes or No:

5. No new establishment of rural residential areas (2)
   Yes or No:

6. Policies enabling conservation easements (1)
   Yes or No:

7. Policies requiring the developer to pay for extension of services (1)
   Yes or No:

8. Right to Farm ordinance (1)
   Yes or No:

9. Separate designations and policies for prime farmland (1)
   Yes or No:

10. Policies prohibiting leapfrog development (2)
    Yes or No:

Are there any additional policies not mention above that you feel play an integral role in farmland preservation in your country? Please list and describe.