



## Farms and Greenbelts

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### Introduction

Agriculture and suburban development appear to be driven by short-term economic and political goals in the United States. At the farm level during the past 50 years, these forces have resulted in the consolidation of farms into fewer and larger units. This has occurred not only in response to the availability of mechanization, improved production technologies, and increased crop specialization, but also as a result of the agricultural policies of the U. S. government (NAS, 1989).

With these changes has come the extension of urban areas beyond city and town limits onto the surrounding land, including the construction of highway networks to handle the growing number of automobiles and traffic congestion. More than two million acres of U. S. farmland are lost this way each year because of urban sprawl (Moll, 1983; Batie and Taylor, 1990). This means that in a decade an area equivalent in size to the state of Ohio will be covered by buildings and highways.

By large measure, this intrusion and expansion over agricultural lands is caused by population growth, economic development, and more people wanting and being able to afford individual homes and automobiles. In some areas of the country, urban sprawl and linking highways give the environment the perspective of wall-to-wall houses, roads, and automobiles. This is not the view of the environment that most people enjoy or want (Furuseth and Altman, 1991). Despite the desire of people to live in open space, nearly 75% of the U.S. population lives in crowded urban areas, many through no choice of their own (USBC, 1994).

If asked, most people want and appreciate greenbelts or greenways, yet at the same time they want to leave cities, live in individual homes, and prefer automobiles over mass transit. Is it possible to protect agricultural

lands, save space for greenbelts, and still provide individuals with private homes on individual lots? This question is examined based on current trends in population growth, changes in farming practices, changes in urban sprawl, growth in the number of automobiles, and economic development.

### Loss of Family Farms

Since 1950, the general trend in the U.S. has been fewer but larger farms (U.S.D.A., 1993) (Figures 1 and 2). At the same time, productivity on agricultural land has greatly increased.

Farmers have increased crop and livestock yields by adopting new and improved agricultural technologies. From 1945 to date, crop yields per acre have increased three- to four-fold (NAS, 1989). This has worked against farm income, because for each 1% increase in agricultural yield there is an average 4.5% decrease in prices at the farm gate (Sisler, 1987). With less and less income per acre of production, many farmers have had to expand and manage larger and larger acreages to stay in business. From 1950 to date, for example, the size of the average farm grew from 213 acres to 461 acres (Figure 1). At the same time, the number of farms declined nearly 300% (Figure 2).

During the last 50 years, farms have not only grown larger, but have tended to become specialized. Extensive monocultures have become common, and many grain farmers have ceased keeping livestock (NAS, 1989). With livestock removed from the grain farms, manure is wasted and cannot be effectively recycled (NAS, 1989). In addition, the grain farms have become primarily monocultures, thereby increasing the need for fertilizers and pesticides. Worst of all, soil erosion has been intensified on these specialized farms.

## ***Farm Communities***

The trend toward fewer but larger farms (**Figures 1 and 2**) is a major factor in the structural changes taking place in the rural communities of the United States (Buttel, 1988; DuPuis and Geisler, 1988). As recently as the 1940s, when many small farms still existed, the agricultural industry supported farm-supply stores, hardware stores, food stores, and other small shops in rural communities. This structure provided a rich diversity of life and income in the community. The loss of the small farms has caused many rural communities to become economically depressed. The data suggest that each farm that fails eliminates three to five jobs; for every six farms that fail, one rural business fails (Ritchie and Ristau, 1987).

Another interesting trend is that the urban poor are moving into the depressed rural communities because the housing and other expenses are lower than in the cities (Fitchen, 1995). These poor, however, generally remain on food stamps and welfare because there are few or no opportunities for work.

The small farmer and shopkeeper in rural America have made important contributions to the independent nature of this region. Their disappearance is leading to a decline in rural cultural diversity while society becomes increasingly urban. Some people voice the concern that this demographic shift is contributing to the loss of small farm ethics and cultural richness and represents the loss of an important sector of American society.

## ***Loss of Agricultural Lands***

Adequate fertile land is a basic resource for all productive agricultural Systems. U.S. agricultural land is one of the reasons for the greatness of this nation. Currently, the U.S. is the largest food-exporting nation in the world (Giampietro and Pimentel, 1994), exporting about \$40 billion in food annually (USBC, 1994). These food exports help pay for our oil import bill, which now totals \$60 billion per year (USBC, 1994).

## **POPULATION GROWTH**

Population growth in the United States is a major factor affecting the loss of agricultural land. Cities and towns have grown to accommodate more people and have extended into the surrounding areas. Often, the very areas devoted to farming—those needed to supply much of the food for city-dwellers—are affected.

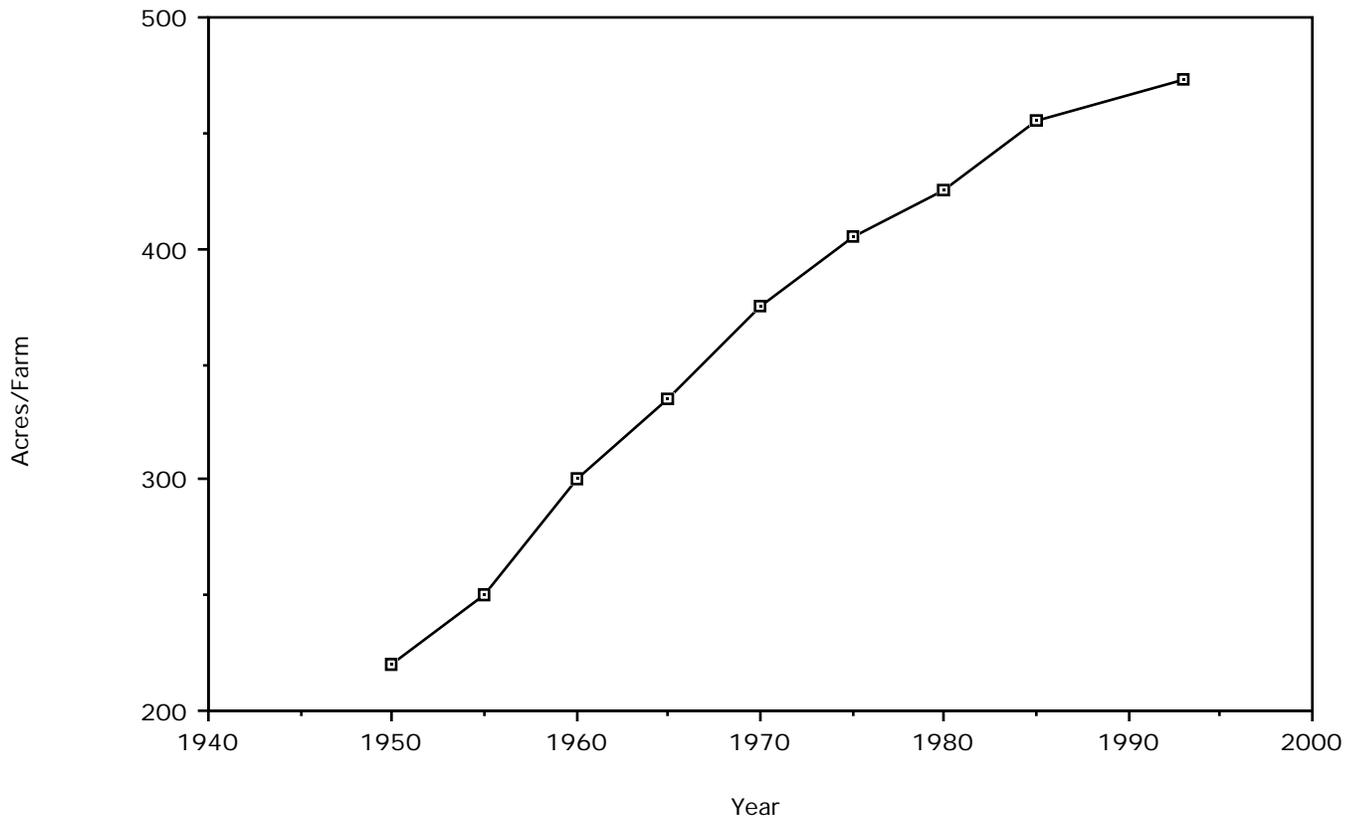
The U.S. population has doubled from about 130 million to 260 million during the past 60 years (NGS, 1995). More alarming is that the population is projected to double again to 520 million in the next 60 years, based on the current rate of increase of 1.1% per year (USBC, 1994) (**Figure 3**). Each person added to the population requires about one acre of land for urbanization and highways (Giampietro and Pimentel, 1994). Thus, with the addition of nearly 3 million people to the U.S. population each year, about 3 million acres of land will be lost to urbanization and highways. More than half of this will come from agricultural lands. Such changes represent a permanent loss for agricultural production.

From 1945 to 1975, for instance, an area of agricultural land larger than the state of Ohio was covered with black-top by urbanization and highways (Pimentel et al., 1976) (**Figure 4**). The total land area covered was equivalent to both Ohio and Pennsylvania. This coverage of our agricultural and other lands continues with the rapid population growth (USBC, 1994).

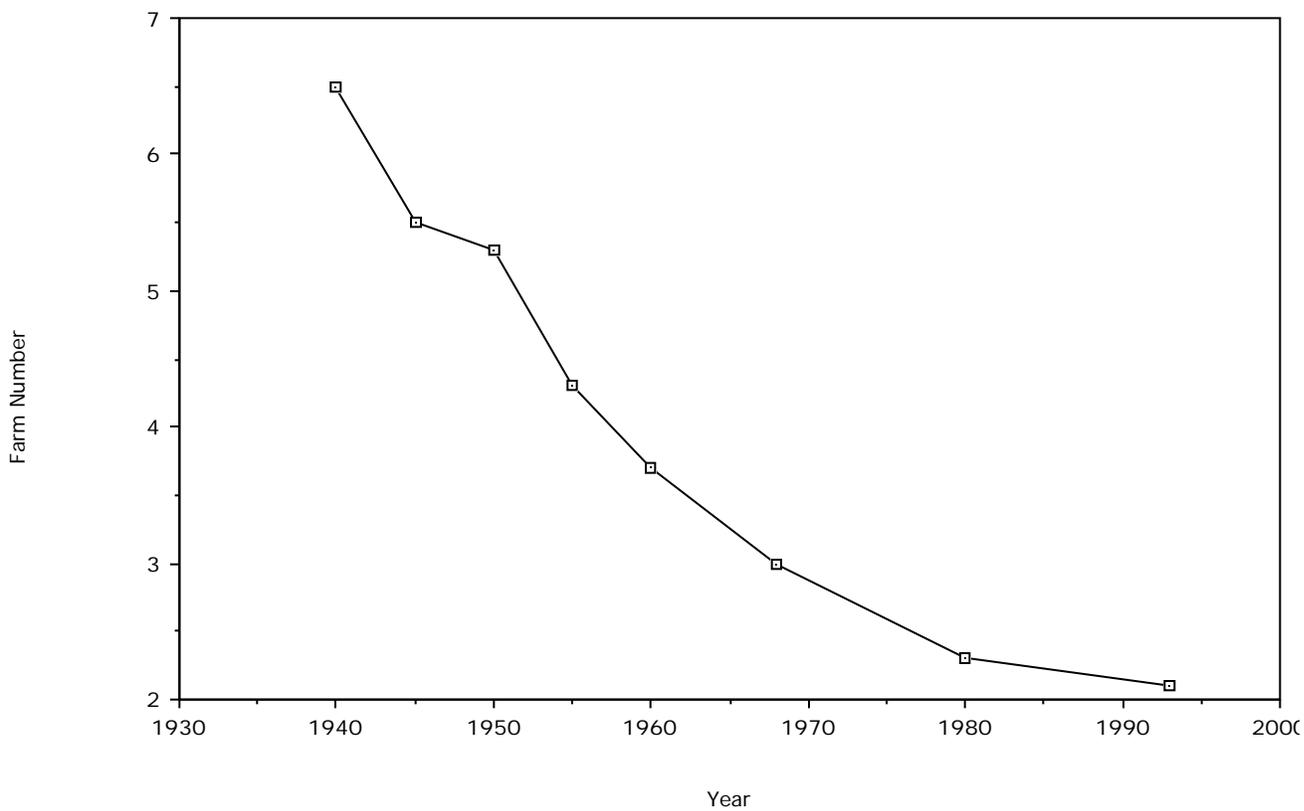
In California, during the five-year period from 1982 to 1987, almost a half-million acres of productive farmland were lost due to the expansion of cities. In fact, suburban sprawl in California and also in Florida is destroying agricultural land faster than in other states. The population growth experienced in California has added six million people since 1980, an increase greater than the total size of many of the other 49 states; it now totals 32 million and is expected to reach 50 million in the next 30 years (Beyond Sprawl, 1995). By then, most of its agricultural land will be urbanized or covered with highways, and its valuable agriculture will no longer exist. A similar situation is developing in Florida, where the population has increased 2.2 times during the past 23 years, with about 200,000 people being added each year (USBC, 1994): In 30 to 50 years, it is expected that most of the agricultural land in Florida will be covered with housing and highways.

## **AUTOMOBILES AND TRAFFIC**

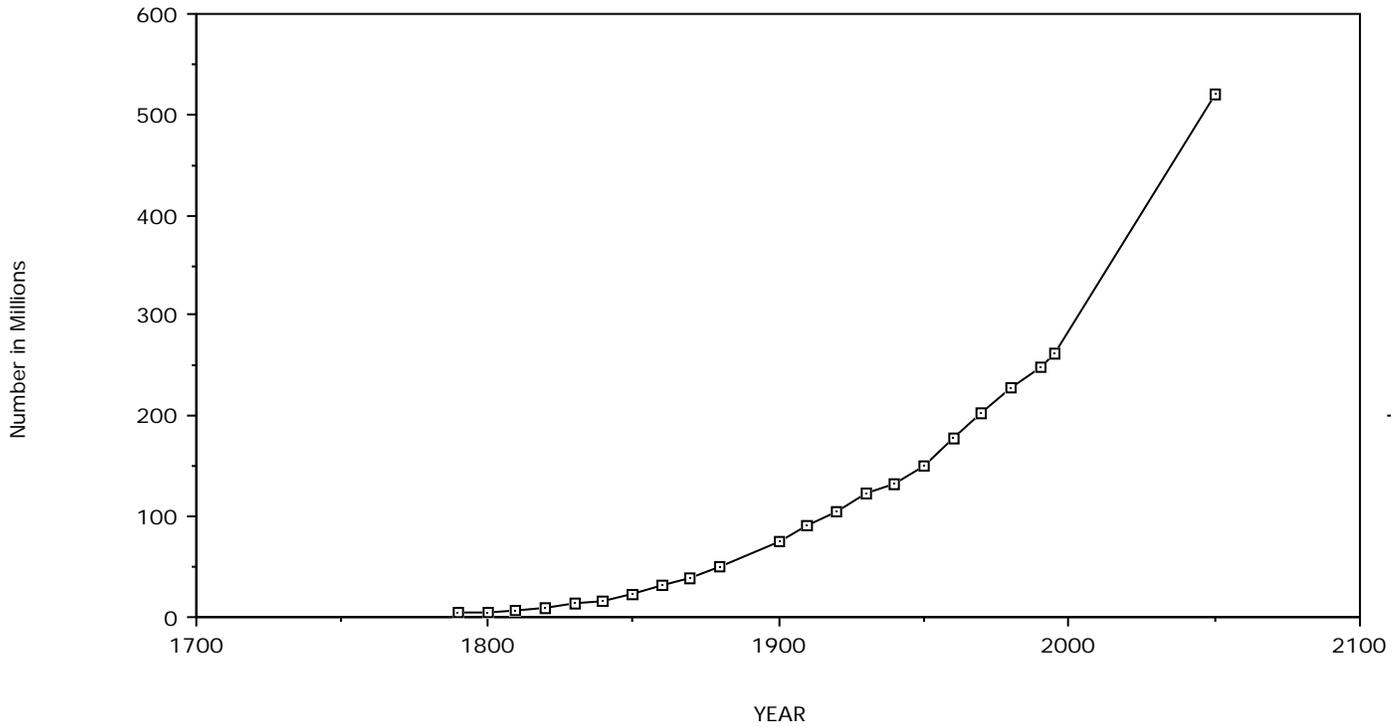
Associated with rapidly growing cities and towns are increases in traffic and highway networks which cover agricultural and other lands. From 1970 to 1990 when California's population grew by 50%, the total number of miles traveled by cars and trucks grew by 100% (Beyond Sprawl, 1995). Although the use of automobiles probably is greater in California than in any other state, this trend is occurring throughout the country. Not only has traffic on the highways increased but working people are spending more time commuting.



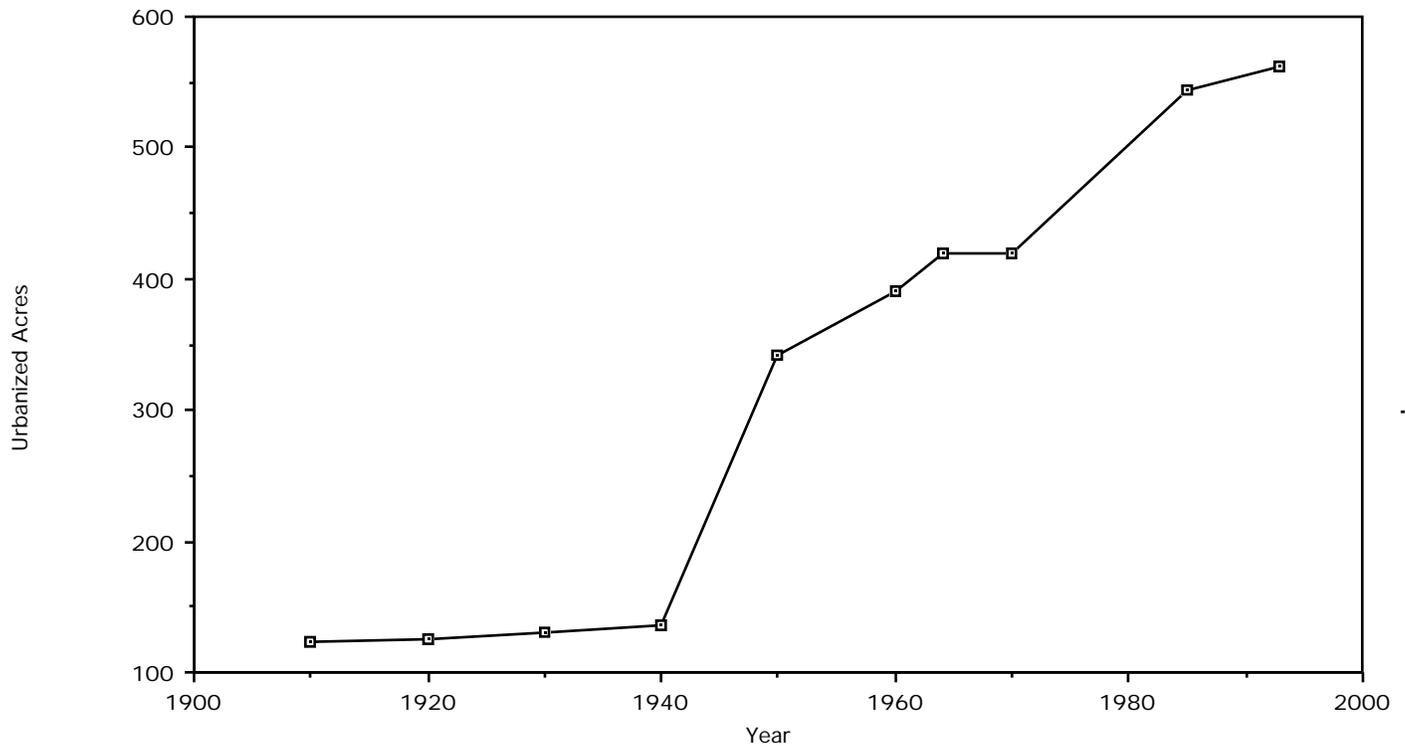
**FIGURE 1. AVERAGE NUMBER OF ACRES PER FARM FROM 1950 TO 1994.**



**FIGURE 2. THE DECLINING NUMBER (IN MILLIONS) OF U.S. FARMS FROM 1940 TO 1994.**



**FIGURE 3. U.S. POPULATION GROWTH FROM 1790 TO 1995 AND PROJECTED TO 2050.** Population is shown in millions. Note that U.S. population has doubled about every 60 years; this trend is projected to continue (USBC, 1994).



**FIGURE 4. MILLIONS OF ACRES THAT HAVE BEEN URBANIZED AND COVERED WITH HIGHWAYS, 1910 TO 1994.**

## **AIR POLLUTION**

The negative impact of the human population and its housing, industry, and transportation systems is intensified because of air pollution created by these activities. The ozone pollution produced is reported to reduce crop yields by as much as 30% and cost California agriculture about \$200 million each year in diminished yields (Beyond Sprawl, 1995).

Air pollution not only affects agriculture but also has associated costs in human health. In the Los Angeles area, air pollution caused primarily by automobiles and trucks costs the area an estimated \$7.4 billion per year, or about \$600 per person per year (Beyond Sprawl, 1995). This is an extremely high cost, considering all the efforts that have been made in the region to reduce air pollution.

## **LAND LOSS THROUGH SOIL EROSION**

A major cause of the loss of agricultural land is soil erosion. Particularly valuable topsoil is removed from the land when it is exposed to the energy of wind and rainfall. This problem is intensified when the soil is tilled and row crops like corn and soybeans are planted as major crops (Pimentel et al., 1995). Another problem associated with erosion is the loss of soil nutrients found in the soil. Troeh et al. (1991) estimate that \$20 billion in nutrients are lost each year through erosion. In addition, the offsite environmental effects are estimated to cost the nation \$17 billion each year (Pimentel et al., 1995). These costs include dredging waterways, destroyed aquatic ecosystems and fisheries, and health problems from airborne soil.

On cropland, the average loss of soil caused by erosion is 13 tons per hectare per year. This loss is 13 times faster than the soil formation rate (Pimentel et al., 1995). About one inch of topsoil is lost in just 25 years; however, under agricultural conditions it takes an average of 500 years to reform (Troeh et al., 1991).

An estimated two million acres of U.S. agricultural land must be abandoned each year because they have become unproductive and uneconomical to farm (Pimentel et al., 1995). During the past 100 years or more, erosion has destroyed about 300 million acres of U.S. farmland. Once degraded, it takes many centuries for this land to regenerate and become productive again.

Sound agricultural practices can help control soil erosion and maintain the productivity of agriculture.

Soil and water conservation practices include crop rotations, no-till, ridge-planting, contour planting, grass strips, various mulches including living mulches, strip cropping, terraces, livestock manure, and combinations of these (Pimentel et al., 1995).

## ***Greenbelts, Greenways, and the Preservation of Agricultural Lands***

Carefully planned agricultural and urban development can provide the public with the greenbelts it desires while expanding housing and not destroying agriculture. To accomplish this goal, the public and legislators must join in making plans and passing legislation to conserve the arable land necessary for food production. Well-managed farms amongst urban areas provide greenbelt protection (Kunovsky and Jacobson, 1985).

Under such plans, building lots might have to be diminished and arrangements developed that would make possible an increased density in a given residential area. The use of townhouses, duplex homes, or low-storied apartment houses grouped around open spaces devoted to lawns, gardens shrubs, and trees represent some alternatives (Steiner, 1991).

Apartments might be smaller, but they could be more varied and sited in greenways. With appropriate design and location, they could create a sense of privacy and provide easy access to mass transportation. In one proposed design, apartment units would have a view of farmland and a pond (Steiner, 1991). This would improve conditions for living and give individuals a sense of a pleasant, green environment. At the same time, the value and marketability of this housing would be exceptionally high (Steiner, 1991). This type of development would make mass transit more economical and more efficient; in turn, mass transit can reduce the commuting problem for people and reduce the effect of air pollution on people and agriculture (Steiner, 1991).

The goal for balancing the expansion of housing and providing greenbelts and adequate land areas for agriculture was effectively stated by the Development Commission of Oregon:

Agricultural lands shall be preserved and maintained for farm use, consistent with the existing and future needs for agricultural products, forest, and open space. These lands shall be inventoried and preserved by adopting exclusive farm use zones . . . Such minimum lot sizes as are utilized for any farm use zones shall be

appropriate for the continuation of the existing commercial agricultural enterprise within the area. Conversion of rural agricultural land to urbanizable land shall be based upon consideration of the following factors:

- (1) environment, energy, social, and economic consequences;
- (2) demonstrated need consistent with LCDC goals;
- (3) unavailability of an alternative suitable location for the requested use;
- (4) compatibility of the proposed use with related agricultural land; and
- (5) the retention of Class I, II, III, and IV soils in farm use. (LCDC, 1980, p. 6)

A simple but effective way to incorporate greenbelts is to include trees along streets and roadways where possible. Not only will this enhance the view and air quality, but the presence of trees reduces noise. For example, a 20-foot wide band of trees and shrubs will reduce noise by 25% to 50% depending on the vegetation and its location (Dwyer et al., 1983). Furthermore, such greenways increase the biodiversity in the area which is a great benefit to the environment as well as to people who enjoy nature.

Preserving our agricultural land and its fertile soils is of paramount importance if we are to be able to provide an adequate food supply for our growing population.

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