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CORNELL
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STAFF PAPER

**URBAN AGRICULTURE IN THE
UNITED STATES**

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URBAN AGRICULTURE IN THE UNITED STATES*

INTRODUCTION

The policy discussion over farmland in the United States includes concerns about the effect that urbanization has on availability of land for agriculture. That discussion developed after World War II when much population growth spilled over the boundaries of established urban centers to the urban fringe. Some observers contend that the Nation's fixed land base for agriculture, combined with unchecked population growth on the urban fringe on land often well suited to farm use, places the Nation's long-term capacity to produce food and fiber commodities in jeopardy. These concerns intensified in the 1970s when production capacity in U.S. agriculture was tested by burgeoning export demand for food and fiber commodities. Rural population growth also attracted national attention in the 1970s because, for the first time this century, rural counties realized faster rates of population growth than urban counties. State and local governments stepped up their farmland protection efforts, and legislation was proposed in the U.S. Congress to provide Federal funding for stronger measures to protect agricultural land from conversion to a built-up urban use.

Despite much debate and exposure in both the popular press and the scientific community, a national consensus on the need for agricultural land protection did not emerge. Early in the 1980 decade, aggregate export demand for U.S. food and fiber commodities eroded and very substantial acreages of cropland were once again idled under Federal supply management/income maintenance programs. These shifts in market conditions also eroded the public perception of farmland scarcity. And demographers concluded that rural population growth, so prominent in the previous decade, stalled in the 1980s. These developments coincided with the completion of a National Agricultural Lands Study (NALS), which did not provide conclusive evidence on serious conflicts between accommodating new land requirements for urban development and the Nation's aggregate capacity to produce agricultural commodities. The study was also flawed by faulty data on rates of farmland conversion (Fischel). However, the NALS did provide an exhaustive inventory of state and local programs designed to encourage farming and manage land use on the urban fringe and helped document the increased scope of these state-led policy initiatives.

The purpose of this paper is to discuss long-term trends in farmland use in the United States and highlight approaches and techniques state and local governments use to influence farmland conversion to urban use. Major developments in agricultural land use and production capacity for American agriculture since the turn of the century are also summarized, along with available evidence on conversion of farmland to urban or developed uses.

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LONG-TERM TRENDS IN LAND USE AND POPULATION GROWTH

Independence from England, land cessions, land purchases, and settlement of border disputes with other countries generated territorial expansion in the United States until just before the American Civil War during the 1860s. These new lands fell under Federal government ownership and are referred to as the 'public domain'. The public domain initially comprised almost 1.5 billion acres or 76 percent of the land mass of the coterminous U.S. (U.S. Bureau of the Census, 1960).¹

Concerted efforts to dispose of the public domain by transferring land to private ownership was a dominant force in American economic, political, and social life throughout the 1800s. The bulk of this land was turned to farm and ranch use. Opportunities to acquire new land spawned a massive migration from the Eastern seaboard to the Western United States. Land availability for new settlement also helped trigger waves of immigration, primarily from Western and Eastern Europe. Many new immigrants settled in larger American cities for employment in industry; others moved further west to convert virgin forest or grassland to crop and livestock production. Millions of acres were occupied through new settlement during the 19th century.

By the early 1900s, however, new settlement on the American frontier for farming and ranching pursuits was largely complete. Most of the land with the requisite physical and climatic features for farm and ranch use had been transferred to private ownership. A vast public domain still remains in Federal control. Although entries for acquiring public land under Federal homestead legislation in the Western U.S. occurred on a modest scale until the early 1920s, production expansion in American agriculture since the turn of the century has occurred on a virtually stable aggregate land base.

Conversely, urban population growth has continued unabated since early settlement. At the turn of the century, 30.2 million people, or 40 percent of the population, resided in an incorporated place with a population of 2,500 or more and were counted as urban; fueled by waves of immigration during the early 1900s, the 1920 decennial census counted more citizens in urban than in rural places (U.S. Bureau of the Census, 1960).

Major structural adjustments in farming, which greatly reduced agricultural labor requirements, and expansion in the nonfarm economy after World War II have worked together to reinforce the trend toward population concentration in urban areas. Terms like 'suburban,' 'urban fringe' and 'metropolitan' have been used since the 1950s to help describe new settlement on open land in close proximity to large core cities. The Federal definition of urban population was changed in 1950 to acknowledge these demographic changes. The definition was expanded to include unincorporated but densely settled tracts of land in close proximity to municipal boundaries. In 1989, 73 percent of all U.S. citizens resided in census-defined urban areas (U.S. Bureau of the Census, 1990). The Nation's 20 largest metropolitan statistical areas (SMA) -- defined as a county or groups of counties with a core city of 50,000 population or more -- account for about 40 percent (98.6 million) of the total population; the largest 40 SMA have a population of 1 million

¹ To preserve long-term comparability in data series, this discussion omits Alaska and Hawaii. These two states bring total U.S. land area to about 2.3 billion acres (U.S. Bureau of the Census, 1960).

or more and account for slightly more than 50 percent of the total U.S. population (U.S. Dept. of Commerce, 1991). These large SMA are depicted in Figure 1.

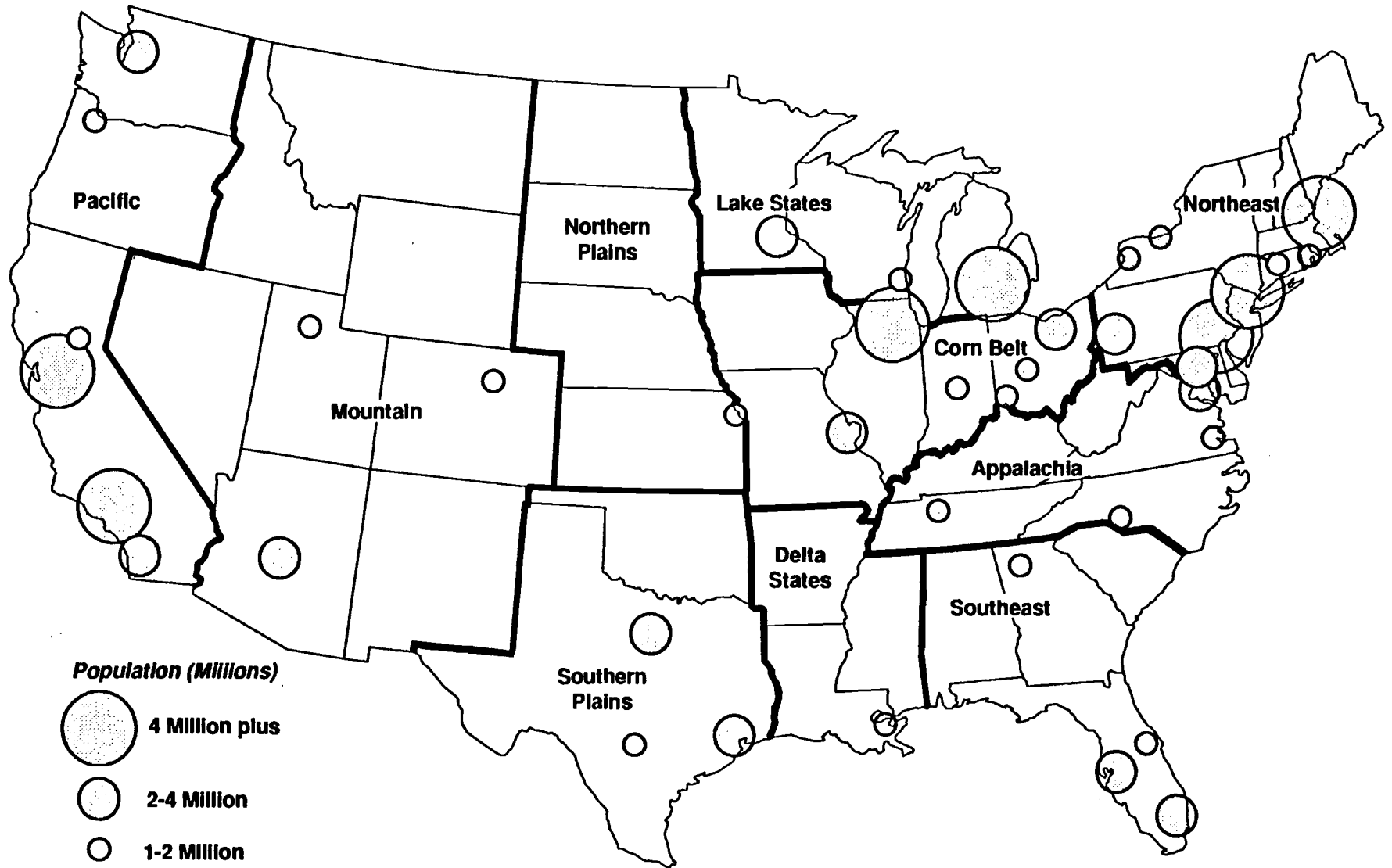
Population growth almost invariably entails conversion of open land to residential, commercial, industrial, and transportation uses. However, as shown in Figure 2, only 3 percent of total U.S. land area is built-up in the sense that it is urban by census definition or classified as rural transportation by the USDA (Daugherty). The USDA estimate of rural transportation areas includes acreage taken up by rural highways and roads, railroads, and airports. Defining built-up land in this fashion is a conservative approach because excluded from this definition are other rural lands in residential, commercial, or industrial uses. The 1987 USDA National Resource Inventory used a more expansive definition and counted 77.4 million acres in developed uses, defined to include all urban and built-up areas of 10 acres or more (USDA, Soil Conservation Service).

Some idea of trend in allocation of land to urban or built-up uses can be gained by looking at changes in land use since 1950 (Figure 3). Changes in built-up land uses are dominated by increases in urban acreage to accommodate new population in urban areas. Urban acreage more than doubled during this span by registering an increase of about 28.5 million acres. Surprisingly, the Nation realized only a small net increase of 2.3 million acres in land devoted to rural transportation uses. This occurred because some very sizeable expansions in rural acreage used for airports, roads, and highway mileage -- including construction of a Federally subsidized interstate highway network beginning in the mid-1950s -- were largely offset by reductions in acreage used to support rail transportation. In part due to more intense competition from motor carriers making use of new highway construction, the Nation abandoned very substantial mileages of railroad lines. These abandoned rail rights-of-way, in turn, often revert to an open land use and offsets the acreage converted to highways or airports.

Trends in conversion of land to built-up uses vary materially from region to region, reflecting demographic trends at work since World War II. Considering USDA multi-state farm production regions (see Figure 1), the largest conversions since 1950, both in relative and absolute terms, have occurred in the "Sunbelt" states of the Southeast and the Southwest (Figure 4). These regions have consistently attracted in-migrants from other U.S. regions over the past four decades. Conversely, the thinly populated Northern Plains states registered a net increase in built-up acreage of only 1 percent over the 1980-87 period. Similarly, the more northerly Corn Belt and Lake states incurred relatively small increases in built-up acreage. The densely populated Northeast states realized the Nation's third largest net increase in built-up acreage -- 5.8 million acres -- which amounted to a 97 percent increase. The rapidly growing Pacific region had a similar rate of increase but from a smaller base of built-up land. Just over 4.3 million acres have been added to built-up acreage in California, Oregon, and Washington since 1950.

After taking these very substantial changes in urban population concentrations into account, the fraction of land classified as built-up in the United States is still very small relative to the total land mass. As noted in Figure 2, urban acreage is presently only 2 percent of all land, while rural acreage used for air, auto, or rail transportation adds another 1 percent on average. That percentage varies materially from one section of the Nation to another (Figure 5). The Northeast is the Nation's most densely populated

Figure 1. Multi-State Farm Production Regions and the 40 Largest Multi-County Standard Metropolitan Areas (SMA)



Source: USDA-ERS, 1991a; U.S. Dept. Commerce, 1991.

FIGURE 2. MAJOR USES OF LAND FOR THE UNITED STATES, 1987*

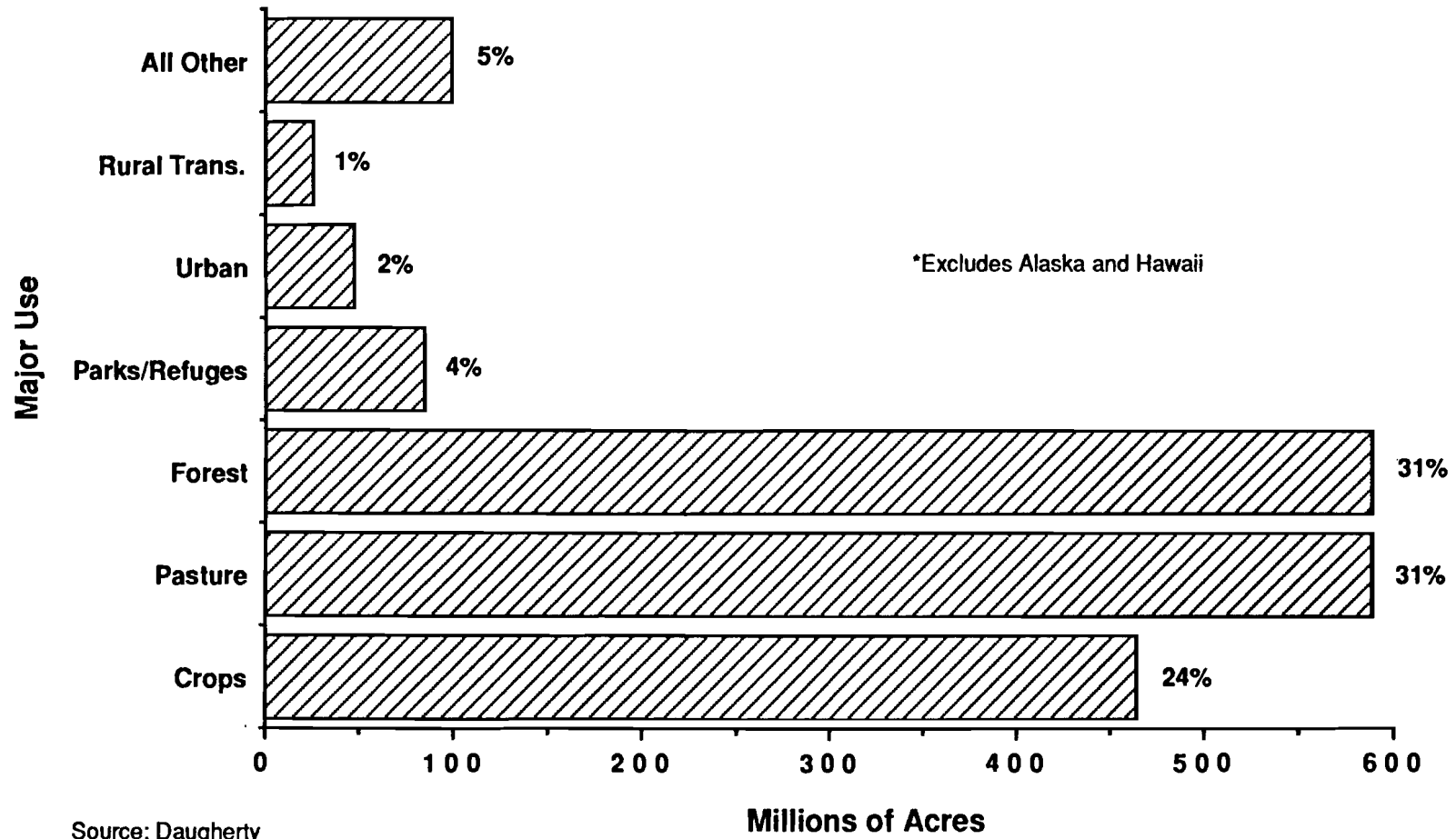
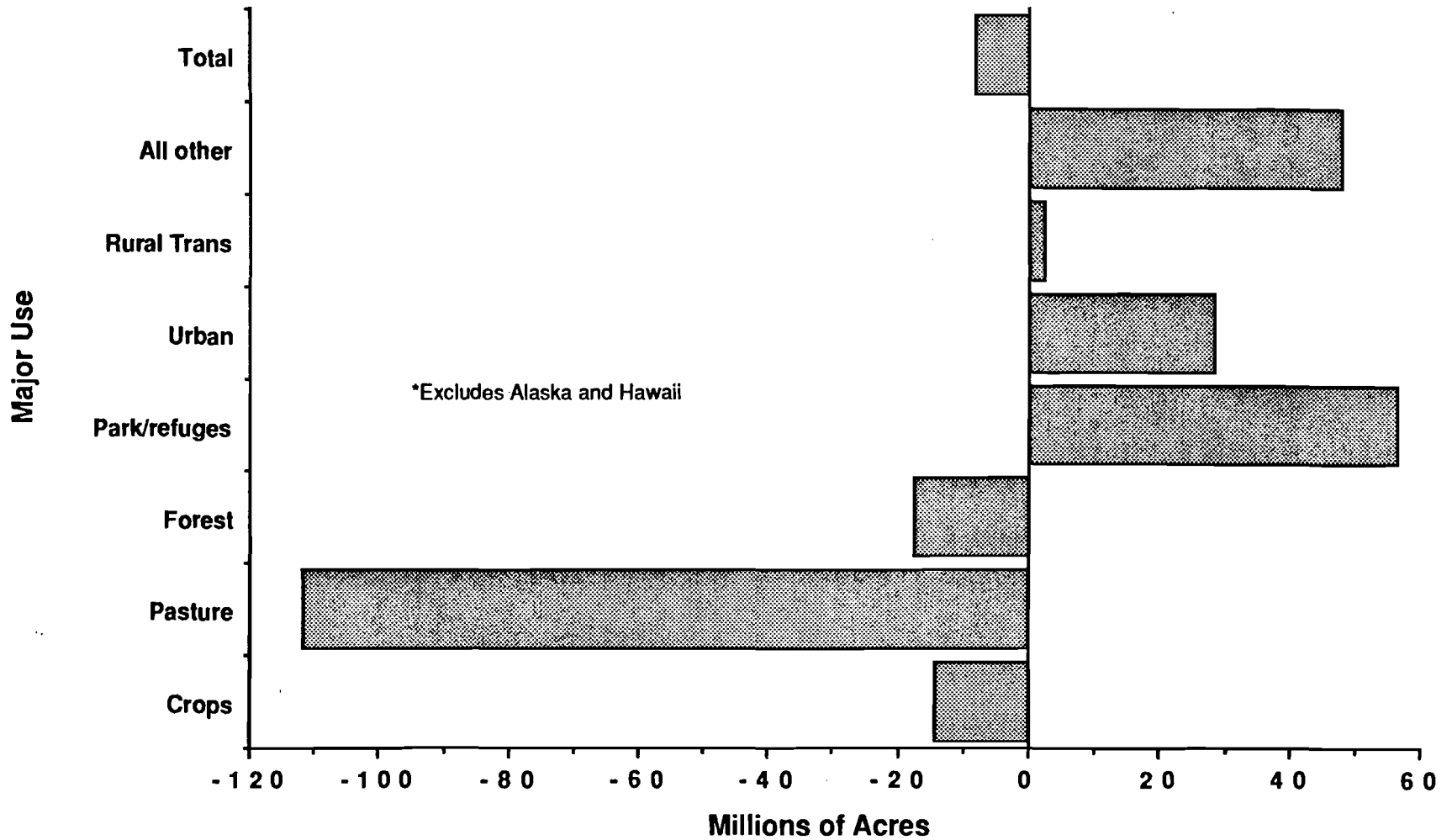
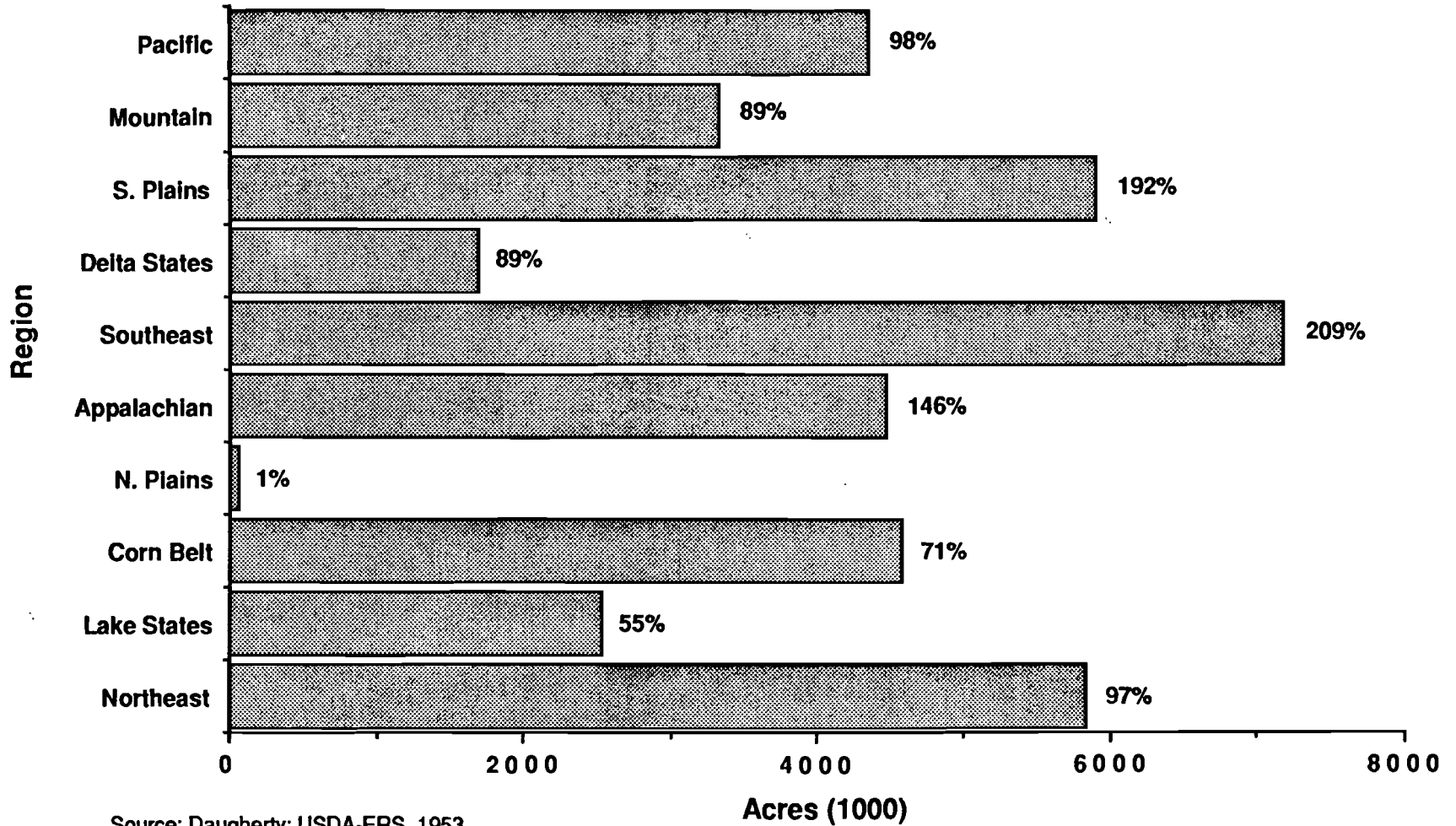


FIGURE 3. CHANGES IN MAJOR USES OF LAND FOR THE UNITED STATES, 1950-87*



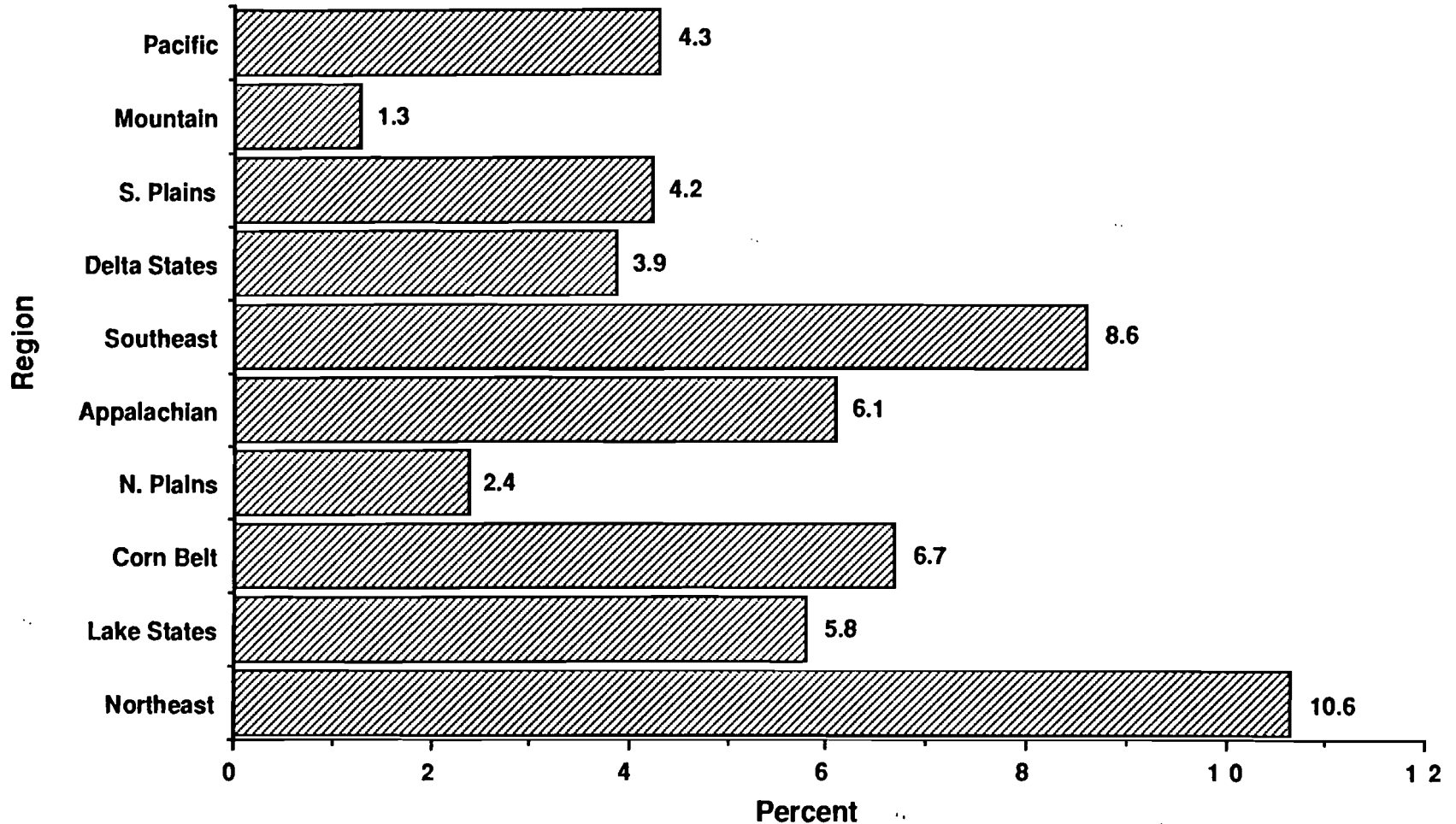
Source: Daugherty: USDA, 1953

**FIGURE 4. CHANGE IN BUILT-UP ACREAGE BY REGION, UNITED STATES, 1959-1987
(INCLUDES URBAN AND RURAL TRANSPORTATION USES)**



Source: Daugherty: USDA-ERS, 1953

FIGURE 5. PERCENTAGE OF TOTAL LAND AREA BUILT-UP IN URBAN AND RURAL TRANSPORTATION USES, FARM PRODUCTION REGION, UNITED STATES, 1987



Source: Daugherty

region, and more than 10 percent of the land base in this area is committed to urban and rural transportation uses.

These aggregate land use trends tend to mask the dynamic process of land use and land conversion evident in the United States. Land is allocated among alternate crop and pasture uses by farm operators in response to economic conditions in commercial agriculture and incentives provided by Federal farm programs. New urban-related demands for land resources often entail the conversion of agricultural land to an irreversible non-farm use as implied in the discussion thus far. Less evident, on the other hand, are additions to the cropland base due to conversions of land in more extensive forest and grazing uses to crop production. Studies based on interpretations of air photos to determine land use on sample land parcels over two time periods shed some light on the relationship between population growth and land conversion to developed uses. For the Eastern U.S., ratios of land urbanized to unit change in population appear to be in the range of 0.2 acre per capita in localities realizing rapid population growth (Table 1). This ratio is amazingly stable across studies, despite widely differing time frames and some differences in study procedures.² Only a fraction of the acreage converted comes from crop and pasture land uses. The USDA estimates that, for the Nation as a whole, crop and pasture land is the prior use of about one-third of the acreage converted to urban use each year in fast-growth counties in the United States (Vesterby). Based on past trends, urban land use is expected to expand from 57 to 66 million acres between 1990 and the year 2000 (USDA-ERS, 1991b).

Table 1. Ratios of land urbanized to change in population, various regions in the Northeastern United States, 1950-1980.

Data source	Region and date	Land urbanized per capita (acres)
Allee, et al.	78 New York towns, 1951-66	0.19
Dill and Otte	Eastern U.S., 1950-60	0.22
Zeimetz, et al.	Northeastern U.S., 1960-70	0.18
Vesterby and Brooks	Eastern U.S., 1970-80	0.22

Despite substantial population increases and attendant conversions of land to urban uses, U.S. agriculture has been dominated by two central trends since the early 1900s: (1) continual increases in food and fiber production, and (2) modest changes in the aggregate quantity of land resources committed to agricultural production (Bills and

² Land consumption per capita is higher in localities experiencing slower growth rates. Vesterby and Brooks estimate that land consumption in slower growing nonmetropolitan counties is in the range of 0.5 acre per capita.

Dideriksen). Based on indices of total farm output, the Nation realized a 170 percent increase in food and fiber production during the 40-year period 1910 to 1950; a 186 percent increase was registered over the 39-year period 1950 through 1989 (USDA-ERS, 1991a).

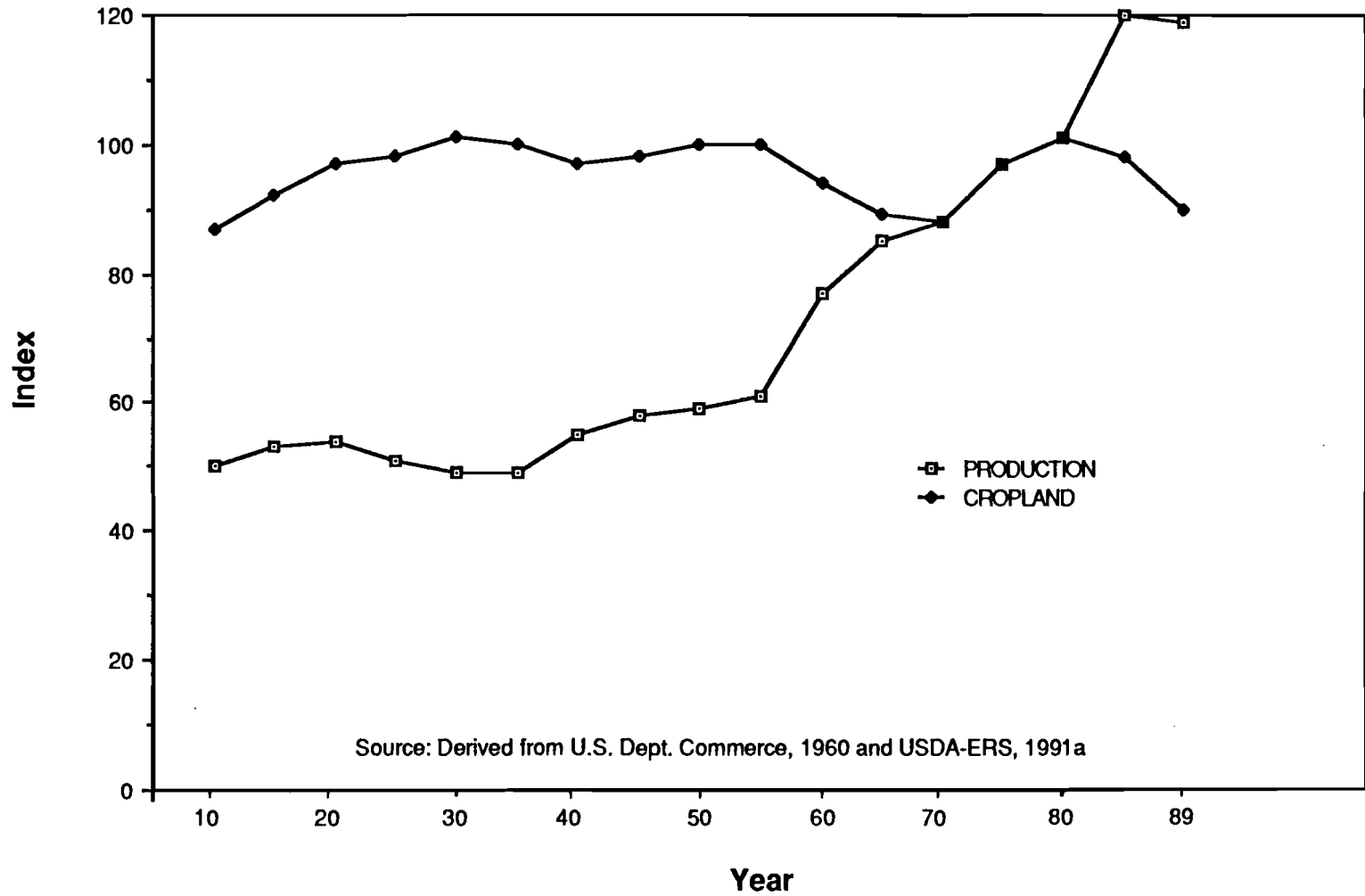
Increases in output have been achieved by increases in farmland productivity. Acreage of land committed to crop production has varied from year to year but shows no real long-term trend since 1900 (see Figure 6). The cropland base increased slightly from 1900 to 1920, primarily as a result of the expansionary stimulus provided by World War I and additional entries under national homestead legislation which transferred public land in the Western U.S. to a private owner for farming purposes. Acreage used for crops has been influenced by Federal farm commodity programs since the 1930s. The details vary from year to year, but Federal programs seek to affect supplies of selected program crops by imposing acreage reduction requirements on recipients of price subsidies. During the mid-1950s, mounting farm surpluses led to retirement of very substantial acreages of cropland under Federal conservation and commodity supply management programs. Cropped acreage rebounded in the 1970s in response to increased export demand for American food grains, feed grains, and oil seed crops. Those export markets eroded in the early 1980s, and in 1990 land used for crops in the United States stood at the same proximate level as 1910.

Beyond idling induced by Federal farm programs, additional crop acreage in some regions of the U.S. is released from crop or pasture purposes each year because cost/return relationships for farm commodity production do not warrant continued use. In New York State, for example, about 80 percent of the crop acreage idled in the last 20 years is due to abandonment rather than participation in Federal farm programs or direct conversion to a built-up use (Bills, 1988). Abandoned cropland in New York and elsewhere in the humid Eastern U.S. eventually reverts to natural forest cover. Forestland is the predominant land cover along the heavily urbanized Eastern seaboard (Daugherty). Much of this acreage was once used for crops before more productive land in the Western U.S. was brought into food and fiber production.

Embedded in these long-term trends are numerous changes in production technology for the American economy. Development of the internal combustion engine released millions of cropland acres for alternate uses. At the turn of the century, more than one-quarter of the U.S. cropland base was used to produce feed for workstock animals in both the farm and nonfarm sector of the economy (USDA-ERS, 1991a). Use of workstock in the U.S. had virtually disappeared by 1950.

Change in power sources has been accompanied by some very abrupt increases in crop yields. Indices of average crop yields have increased systematically since the late 1930s (Figure 6). Increase in land productivity has come from several sources. Important ones are improvements in machinery; increased utilization of commercial fertilizers, pesticides, and herbicides; developments in plant and animal breeding; expanded use of irrigation water; adjustments in the geographic location of crop production as more productive land is substituted for less productive land.

**FIGURE 6. INDEX (1977=100) OF CROPLAND USED FOR CROPS
AND CROP PRODUCTION PER ACRE, UNITED STATES,
SELECTED YEARS, 1910-1989**



FARMLAND PROTECTION POLICY IN THE UNITED STATES

In the national perspective outlined above, the weight of the empirical evidence is tilted toward the argument that conversion of farmland to urban use does not pose an immediate or even a longer-term threat to the Nation's capacity to meet expected food and fiber needs. Considerable farm production, however, is in close proximity to urban population concentrations (Gustafson and Bills; Heimlich and Brooks; Heimlich and Barnard; Otte). Some of this acreage is needed for development. Empirical evidence is limited to highly aggregated regional data, but these data suggest that urban development has claimed about 750,000 acres annually in recent years, with about one-third or 250,000 acres coming from actively cropped farmland (Vesterby; Vesterby and Brooks). This converted acreage is probably irreversibly lost for future farm use and appears large in absolute terms. However, these losses represent only a very small fraction of the available U.S. cropland base. Moreover, most of the diminutions in crop acreage due to urban growth historically have been offset by new cropland additions (Vesterby and Heimlich; Zeimetz, et al.).

Added cropland has come from several diverse sources, such as cropping made possible by drainage improvements on wetlands, deforestation, and tillage for crop rotations on former pasture and grazing lands. Much pasture and grazing land conversion, particularly in the arid Western United States, has been induced by availability of supplemental irrigation water from groundwater aquifers or from publicly financed surface water impoundments. Presently, 51 million acres or 15 percent of the land used for crops receive supplemental irrigation water (USDA-ERS, 1990).

Despite intermittent concerns about food scarcity, the land base for farm and ranch operations in the United States appears adequate for any anticipated future needs. Domestic food and fiber needs are assured. Less than 50 percent of U.S. cropland is presently used to meet domestic requirements (USDA-ERS, 1991a). The remainder is available to service export markets. Several million acres are presently idled each year under Federal income/supply management and conservation programs as the Congress copes with chronic excess capacity to produce food and fiber products. In the recent past, as much as 77 million acres (upwards of 20 percent of total cropland) have been idled under Federal subsidy; currently, over 30 million cropland acres are retired under 10-year contracts in the USDA's Conservation Reserve Program for highly erodible cropland (USDA-ERS, 1990).

Federal Protection Initiatives

Efforts to involve the U.S. Congress in farmland protection programs in a direct way have met with mixed results. After an exhaustive but inconclusive Federal assessment of the farmland protection issue in the late 1970s (National Agricultural Lands Study), the Congress passed the Farmland Protection Policy Act in 1981. This legislation stopped short of providing financial assistance to state or local governments for farmland protection programs. Rather, Federal agencies are required to identify any adverse effects their programs might have on farmland preservation and to minimize the extent to which such programs induce unnecessary farmland conversions. This legislation clearly

can help ward off the most obvious conflicts between Federal policy and state policy, but the direct impact of this legislation on land use and conversion of land to urban use has probably been minimal. Such impacts are more likely to evolve out of direct Treasury expenditures to support state and local farmland protection efforts.

More recently, however, signs of movement in that direction have appeared, signaling a shift in Federal policy on farmland protection. As part of the 1990 omnibus farm legislation, the Congress passed the Farms for the Future Act. Although plans for USDA implementation are incomplete and levels of funding authorized are uncertain, the new 1990 legislation establishes a program to provide Federal loan guarantees and interest rate subsidies to state governments that provide matching monies to operate farmland protection funds. If the Congress establishes administrative guidelines which allow several states to qualify for this assistance and appropriates the necessary monies, then a major shift in Federal policy will have occurred, with the weight of the U.S. Treasury thrown behind state governments. Direct Federal financial assistance could accelerate farmland protection efforts at the state and local level.

This financial assistance would complement longer-lived provisions in the Federal income tax code that provide indirect financial incentives. These incentives are targeted at individual landowners who participate in private farmland protection programs operated by nonprofit organizations (USDA-ERS, 1991b). Specifically, the Federal tax law enables taxpayers to claim deductions for charitable contributions of conservation easements to qualifying private land trusts and conservancies. Conservation easements are legal instruments which restrict the use of land to specified conservation purposes and preclude future conversion to a developed use. Some landowners can be advantaged by such contributions because the resultant tax deduction can reduce income tax liabilities on income earned from other sources.

State and Local Farmland Protection Programs

Regardless of the eventual direction of Federal policy for farmland protection, efforts to influence the allocation of farmland among alternate uses depends on the legal, social, political and cultural parameters established by American society. Although some publicly owned land is leased by farmers and ranchers for agriculture -- mainly forest and pasture used for grazing in the Western U.S. -- decisions on the use of American farmland use reside very firmly in the hands of individual or corporate owners. This privately owned land trades freely in real estate markets and is passed from generation to generation via inheritance. Land markets for sale and lease of farmland are heavily depended upon to ration the finite supply of agricultural land among alternative uses. Under the American system, public authority to intervene in land markets and decisions on the private use and ownership of land largely resides with state and local units of government.

Such authorities are three-fold. First, local governments are empowered to levy an annual property tax on real estate. Property tax revenues are a principal source of revenue for these units of local government, increase the economic costs of owning real estate, and subsequently alter its value. Second, the U.S. constitution delegates direct

powers to regulate land use, commonly referred to as the 'police powers', to state governments. The states, in turn, often further delegate much of the police power to regulate private landowners to lower units of government -- such as counties, cities, villages, and townships. Finally, American land policy is shaped by a constitutional guarantee against the taking of private property without just compensation. This guarantee applies to direct land acquisitions using powers of eminent domain or condemnation. In addition, case law has extended this constitutional protection to other 'takings' which can result from over-zealous efforts by governments to regulate private landowners and the decisions they make on the use of their land.

These three features of American land law -- powers to tax and regulate land along with constitutional guarantees against takings of privately held property without just compensation -- mark out the general legal and cultural boundaries of public policy for privately owned land in the Nation. Within this framework, public farmland protection policies have evolved over the past four decades as a blend of regulatory and incentive programs. Primary emphasis has been placed on incentive approaches designed to promote agriculture by affording property owners relief from legal conflicts with adjacent property owners, high property taxes, or by providing compensation to farmland owners who participate in programs which restrict the conversion of their land to a developed use in the future.

Regulatory Programs

In the United States, efforts to regulate the use of farmland are largely manifested in the implementation of zoning laws. Zoning uses the police power to control land use. A zoning law -- typically called a zoning ordinance in the United States -- divides the land area of a jurisdiction into various districts so that land is used for consistent, compatible purposes. Zoning ordinances typically define the allowable property uses, prescribe the intensity of the use -- number of building lots per acre, for example -- and specify the rules to be followed when a structure is placed on the site.

Zoning was first applied in urban settings, but important examples of rural zoning date to the 1930s in a few regions of the U.S. (Salter). Increasing applications of zoning are found on the urban fringe, or in metropolitan counties where land development for urban-related purposes and commercial agriculture can come into close contact. Zoning ordinances are promulgated by some very local levels of government which tailor their regulatory efforts to local conditions. Many localities have zoning laws that are oriented almost exclusively to controlling the development of residential and commercial property. These jurisdictions may have substantial quantities of farmland, but the zoning laws make no explicit provisions for protecting agricultural land from urban encroachment or for its orderly conversion to a future developed use. Weak or ineffective regulation of this sort is often supported by developers and farmland owners who want to eventually sell their farmland or convert it to an intensive urban use with a minimum of interference from local government.

In contrast, rural communities in most states have the option of undertaking either nonexclusive or exclusive agricultural zoning. A nonexclusive ordinance is designed to

include nonfarm development in the farming zone even though farming is the preferred or priority use. An ordinance requiring homeowners to build on a large land parcel -- called large lot zoning -- is a common form of nonexclusive agricultural zoning. Large lots limit the number of nonfarm buildings in the agricultural zone.

Under exclusive agricultural zoning, nonfarm dwellings and buildings are strictly prohibited in the agricultural zone. Government review of a plan to build a farm dwelling in the agricultural zone can also be required. This type of ordinance severely restricts the options for managing land and usually proves to be very unpopular with owners of open, developable land. Also, governments with such ordinances can be vulnerable in legal proceedings where owners seek compensation for a 'taking' of their constitutionally guaranteed property rights.

Because of political and legal problems, few governments pursue exclusive agricultural zoning at the local level. A 1987 inventory showed that only 300 of the several thousand local jurisdictions with farmland have implemented agricultural zoning in the U.S.; the majority were nonexclusive ordinances (NASDA).

Incentive Programs

Very limited and very fragmentary efforts to protect farmland with police power rights to regulate land use reflect the political realities confronting American public policy for farmland. Farmland owners, active farmers in particular, typically voice support for farmland protection objectives but must often endorse programs which are voluntary and provide financial incentives for owners who choose to participate. Consequently, the bulk of state/local farmland protection programs have stressed these two features in program design.

Use-value farmland tax assessment: Initial efforts to alter state farmland policy focused on the local property tax. The property tax is the largest revenue source for local governments. Tax levies increased abruptly after World War II, particularly on the urban fringe where population growth generated greater public service needs. Higher property tax levies on farm real estate are criticized on both tax equity and land use grounds (Tremblay, et al.). Objections on equity grounds trace to concerns about farmers' ability to pay the tax and the possibility that they pay taxes out of proportion to the benefits received from services funded by the tax. Land use concerns flow from the argument that high property taxes induce conversion of farmland to an urban use or reduce the net returns from farming sufficiently to force the termination of farming operations before the land is really needed for a developed use.

Beginning with the state of Maryland in 1956, all state legislatures have made arrangements to grant farmland owners relief from the local property tax (Grillo and Seid). Although administrative arrangements vary widely from state to state, these programs, for the most part, focus on limiting annual tax levies on the land's value in

agricultural use.³ This can result in lower taxes because a levy based on the full market value standard can be circumvented. Differences between market or full value and agricultural value can be especially noticeable in developing urban areas where value of open land begins to reflect the higher income expected from future conversion to a developed use.

Right-to-farm laws: Urban-related growth and development in traditional farming communities can generate complaints from new nonfarm residents about farming practices. Common concerns have to do with dust, odors, noise, vibrations, and use of agricultural chemicals. In some instances, offended neighbors resort to legal action to seek relief in the form of court suits waged against the farm neighbor.

To assist farm operators who may need to ward off such legal actions, legislatures in 48 states have enacted right-to-farm laws (Centner; Hamilton and Bolte). These laws attempt to give farmers a measure of protection from private nuisance suits by modifying common nuisance law. Namely, persons who move in close proximity to an established agricultural activity are limited in their use of nuisance law as a basis for obtaining judicial relief on an objectionable agricultural practice. By eliminating or at least reducing the threat of future lawsuits over standing farming activities, proponents of such laws argue that the chilling effect of legal action is greatly restricted and that farm operators will subsequently make new investments and take other steps needed to promote the viability of their farm business.

Agricultural districts: Agricultural districts are legally recognized geographic entities where farming is recognized as a priority land use. Twelve states have passed enabling legislation for the creation of agricultural districts (Bills and Boisvert). Districts are created for fixed but renewable periods of time and feature a series of pro-farming provisions which attempt to improve conditions for the continuation of farming within the district's boundaries. Pro-farming provisions vary, but can include reduced property taxes (as part of a use-value assessment program discussed above), altered state agency policies to encourage farming, and modification or limitation of practices thought to hinder farming (Boisvert and Bills). These include unduly restrictive local laws on normal farming practices, use of condemnation proceedings (eminent domain) on actively farmed land, and restrictions on publicly funded investments which promote nonfarm development in an agricultural district.

Agricultural districting programs are often popular with farmers because state enabling laws uniformly prescribe that participation in a district is voluntary for each landowner and, once enrolled in a district, the use of farmland is not regulated by local public officials. Similarly, local governments are often receptive to creating agricultural districts because the district program is relatively easy to administer and, to date, not subject to serious legal or constitutional challenges. Finally, districts do not usually entail substantial outlays of public funds.

³ Two states -- Michigan and Wisconsin -- grant property tax relief based on a property tax circuit breaker. This approach ties tax liabilities to amount of annual family income, with credits against state income tax liabilities for excess local property tax payments (Grillo and Seid).

Farmland development rights: Probably the most active area in state and local farmland protection policy today involves efforts to separate the right to develop land from the landowner and transfer it to public or third party ownership. Such policy initiatives explicitly recognize the conflicts generated for active farmers who wish to conduct a farm business but also protect their financial interests in appreciating farmland values. These conflicts are particularly intense in farm communities experiencing pressure to convert land to urban-related uses. Those pressures are manifested in wide differences between market value of land and its value in a farm use.

A farmland development right reflects those differences in land values and refers to the landowner's right to construct nonagricultural structures on the land. Traditionally, this right has been thought of as one of a bundle of rights making up the benefits of land ownership. Development rights programs provide for arrangements to acquire this right from the landowner so that use of the land can be legally restricted into the future. This restriction takes the form of an easement and is recorded with the property deed.

Under a PDR program, use of the land is restricted with an easement. In compensation for restricting the use of the land, the owner receives a sum of money equal to the value of the foregone development potential. This value is typically calculated as the fair market value of the land minus its agricultural value. These values are determined by standard real estate appraisal methods.

Easements have long-standing use in American property law, but data on use for land conservation/preservation purposes are very limited. Prospects for tailoring easements to farmland protection objectives were initially discussed in New York, for example, in the early 1960s when the state legislature passed enabling legislation permitting local governments to acquire land rights for the purpose of preserving open space. Suffolk County, located on the densely populated Long Island Sound in New York State, subsequently implemented the first nationally recognized purchase of development rights (PDR) program for farmland in 1975 (Leshner and Eiler). King County, Washington, which contains the city of Seattle, soon followed with PDR acquisitions in the late 1970s (Barkley).

To date, legislatures in nine Northeast states have initiated state-funded PDR programs (Table 2). Some of these programs are administered at both the state and local levels (Williams and Bills). State boards or commissions are appointed to devise procedures for reviewing applications made by owners who want to sell development rights. In some cases, local committees or land preservation boards are established to assist with program administration and selection of land parcels for development right acquisition.

PDR programs are voluntary, and state or local governments who initiate them usually have more applications for easement sale than can be accomplished with available funds. Funding is crucial because easement purchase can be enormously expensive in localities where development potential for open farmland is high. Few governments finance such purchases out of direct appropriations but rely on bonded indebtedness or *ad valorem* taxes on real estate transfers (Williams). Several state-operated programs make explicit provisions for private contributions from third parties -- individual citizens, corporations, or private organizations -- who want to assist in farmland protection efforts (Williams).

Table 2. Status of state PDR programs in the Northeast, March 1990.

	Year of inception	Program size		Expenditures in million dollars
		Farms	Acres	
Connecticut	1978	114	17,313	40.8
Maine	1990	1	330	0.4
Maryland	1977	534	79,482	67.8
Massachusetts	1977	272	25,626	65.0
New Hampshire	1979	26	2,090	3.0
New Jersey	1983	61	8,263	50.0
Pennsylvania	1989	1	174	0.1
Rhode Island	1982	18	1,362	7.5
Vermont	1987	30	9,128	5.1

Source: American Farmland Trust.

More direct third party efforts to protect U.S. farmland are rapidly emerging with a growing private land trust and conservancy movement. Private land trusts and conservancies dedicated to natural resource conservation have been in existence for nearly 100 years. These not-for-profit organizations are usually registered with the U.S. Internal Revenue Service, and individuals or corporations who donate funds or property to support their programs may be in a position to treat the donation as a charitable contribution when filing their income tax return (USDA-ERS, 1991b). Charitable contributions can be deducted in tax calculations and reduce the donor's taxable income and subsequent exposure to income taxes. Income tax reform in the mid-1980s, combined with elevated public concern with rural resource conservation, helped spur new interest in private land trusts at both the national and regional levels.

These third parties are increasingly active in farmland preservation, although many organizations have broad conservation objectives and focus on a variety of natural resources in a county jurisdiction or a region. Over 30 percent of the local and regional organizations contacted in a recent survey for the Northeastern U.S. reported that they currently protect some agricultural land (Bills and Weir). Heavy reliance is placed on easement donations as a protection technique, but other methods include educational and consulting services for landowners and maintenance of working relationships with state legislatures and with public agencies who administer policy for farmland.

DISCUSSION

Programs designed to protect farmland from urban encroachment are a well established feature of the public land policy agenda in the United States. State and local governments throughout the U.S. have initiated policies aimed at, or at least rationalized

in terms of, concerns over the rate and location of urban development on open land suited to farm use. To date, these efforts have proceeded with only limited financial support from the U.S. Congress, in part because of the prevailing view that urban development does not pose a threat to national capacity to produce food and fiber commodities. Conversely, any efforts to promote agricultural land uses or protect land from conversion is viewed as a problem that state and local governments should handle.

This picture of national production capacity is reasonably well borne out by the empirical data. As was shown in this paper, technological change in the farm sector and in the wider nonfarm economy has generated steady increases in farm output from a fixed cropland base. These productivity increases, combined with dramatic decreases in feed requirements for workstock earlier in this century, have steadily increased production capacity in American agriculture. Millions of acres of land once farmed have been converted to irreversible urban-related uses; additional acreage, primarily along the Eastern U.S., has been abandoned by active farmers due to unfavorable cost/price relationships. Some of this abandoned farmland has in turn been converted to a developed use, but very substantial acreages have reverted to natural forest cover. Forested acreage in the Northeastern U.S. has been increasing at a steady rate for many decades. At the other extreme, much land has been transferred from extensive uses -- such as wetlands, forests, or grazing -- to more intensive cropland uses. On net, these dynamic shifts in use have resulted in virtually no net loss in total available cropland acreage during this century.

State and local programs can be generally characterized as regulatory or incentive-based, but a wide variety of techniques are used to alter the environment for farming on the urban fringe. Some of the diversity in technique also probably trace to differing and sometimes conflicting public policy objectives. Among these objectives are achievement of equity in administration of the real estate property tax, deterring development on land parcels deemed to have high social value in open space, and the promotion of active farming operations in urbanizing regions.

Techniques used are also shaped by the political, legal, and fiscal realities faced by public officials at the state and local levels. Protection techniques, such as zoning, which feature land regulation often encounter stiff resistance in legislatures and in the courts as farmland owners attempt to preserve or enhance their options for future use of the land. To date, protection efforts have been tilted toward a wide range of incentive programs, ranging from right-to-farm laws, agricultural districts, and property tax preferences to programs which separate the owner's right to convert a farmland parcel to a developed use. To avoid legal challenges, compensation for lost private rights to develop a farmland is usually arranged. Compensating owners of development-prone land for the loss of their development rights is very expensive. Few, if any, state or local governments can afford to operate such programs on a large scale. In fact, these public costs are large enough in many parts of the U.S. to limit development rights acquisitions on farmland to only academic interest. Large amounts of financial aid from the U.S. Congress would materially bolster these efforts, but substantial Federal expenditures for this purpose seem unlikely in the near term.

Longer-term directions in farmland policy are more difficult to predict. Unforeseen but plausible expansions in export demand for farm commodities, a sudden downturn in improved crop yields through technological development, or both, could very

quickly rekindle widespread national concern about farmland conversions to urban uses in the United States. Perhaps a more likely emerging trend involves growing constraints on moving land from an extensive use to a crop use. Historically, cropland conversions to meet American urban land requirements have been offset by clearing of forests, drainage of wetlands, or plow-outs of grazing or pasture land. Provision of supplemental water to allow production of higher valued agricultural commodities has been pivotal in new cropland expansions in many cases. Many, if not all, of these types of land use changes are coming under closer public scrutiny because of concerns over environmental quality and/or water availability in the arid Western U.S. If these concerns are successfully translated into policies and programs which tend to impede timely augmentations of the aggregate cropland base, urban land conversion will probably become a more widely noticed feature of the American land use scene in the years to come.

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