A USDA-ERS BRIEFING BOOKLET

United States Department of Agriculture

Economic Research Service

Agriculture Information Bulletin Number 629

August 1991

URBANIZING FARMLAND: DYNAMICS OF LAND USE CHANGE IN FAST-GROWTH COUNTIES

Concern over farmland loss

How large are the losses? Are losses larger than in the past? Where are the losses occurring? What's the effect on food and fiber production? ...On natural resources?

Urbanizing Farmland: Dynamics of Land Use Change in Fast-Growth Counties. By Ralph E. Heimlich, Marlow Vesterby, and Kenneth S. Krupa, Economic Research Service, U.S. Department of Agriculture. Agriculture Information Bulletin No. 629. August 1991.

INTRODUCTION

Despite claims to the contrary, the amount of U.S. rural land--and level of agricultural production--is not threatened by the present rate of urbanization. This report, based on an indepth analysis, shows that urbanization is not paving over the Nation's rural areas any more than in the past. Urbanization is not consuming all of our farmland nor is it taking all the best land out of production.

In fact, the rate of urbanization has not changed in 30 years. Even large percentage gains in urban land area relate to small percentage decreases in farmland because: the original base of cropland and pasture is so much larger than urban land, only a third of land urbanized had been cropland or pasture, and losses to urban uses were replaced from other rural uses, such as range and forests. If present rates of population growth and land conversion continue, cropland area actually would be larger in the year 2000 than in 1980 because of new land brought into production.

Loss of Farmland to Urban Uses Is No Higher Than Earlier

About 740,000 acres were urbanized annually between 1970 and 1980, the most recent period for which ERS data are analyzed. Despite losses to urbanization, cropland has remained nearly constant since World War II. Urban land is only 2.5 percent of U.S. land area, so even a large percentage increase involves little land.

According to our detailed studies of land use change in the fastest growing counties in the 1970's:

- Urban land increased 37 percent, but cropland and pasture decreased only 4 percent.
- Only a third of new urban land was formerly cropland or pasture.
- Additions to cropland and pasture offset 67 percent of the loss to urban uses.
- Prime land was urbanized proportionally to its occurrence: 43 percent of cropland and pasture was Prime, while just 40 percent of that urbanized was Prime.

Land Used by New Residents Has Not Increased

The amount of land urbanized for each new household added in fast-growth counties has remained nearly constant since the 1960's.

- Southeastern and southwestern Sunbelt counties had the largest expansion in urban area and urbanized the most land per household.
- Counties in earlier stages of growth urbanized more land for each new household than more developed counties but accounted for less total land use change.
- Metro counties added 70-90 percent of new urban land. Nonmetro counties added more land per household, but they added fewer households.

This Rate of Loss Poses Little Threat to U.S. Farm Production

While there may be valid reasons for concern about farmland loss, future growth is not expected to significantly reduce U.S. agricultural production. At current urbanization rates, expected household growth would increase urban area 15 percent by the year 2000. Projected urban growth would reduce cropland by only 2 percent from 1990 levels. Conversion of new cropland and increased productivity per acre would offset projected cropland losses to urbanization.

Purpose of the Briefing

This booklet links words with graphics to clarify some of the facts on the urbanization of U.S. farmland. We present those results in a briefing-style format that introduces the principal concepts, graphically displays the results of research, and interprets those results in light of other findings.

This briefing works like a set of slides in a presentation. Each page leads with a headline, followed by a frame for visuals. The visuals are then interpreted with comments and additional information below. Issues discussed include:

Concern over farmland loss. While there are many good reasons to be concerned about farmland loss, reduced food and fiber production may not be a valid concern.

How we use our land. Land use is dynamic; large increases in urban area are consistent with small changes in farmland.

Measuring urban area. Information from other studies was inconsistent and did not measure actual land use changes, so we developed another method.

National land use change. The annual rate of urbanization of rural land is smaller than previously thought. Land often shifts among uses.

Land use change details. Demographic factors affect the rate of rural land conversion to urban uses.

Future land use. Urbanization can be expected to continue at similar rates. The projected urban growth will not impair agricultural production.

Farmland policy. State policies are aimed at local farmland preservation. Federal programs can assist State efforts.

Acknowledgments

This briefing is based on a larger Agricultural Economic Report, "Urbanization of Rural Land in the United States," forthcoming from the Economic Research Service.

The authors wish to thank Katherine Fitzpatrick-Lins, U.S. Geological Survey, and James W. Mergerson, USDA's National Agricultural Statistics Service, for assistance with the sample design; and Kimberly T. Freed and Thomas B. Jones, EarthSat Corporation, for photo interpretation, data collection, and data reviews. Mary Maher, USDA's Economics Management Staff, designed and edited this briefing booklet.

Contents

Farmland Loss Is a Concern Across the Nation, But Not Everyone Agrees It Is a Significant Problem for Agriculture

FARMLAND LOSS

...IS A NATIONAL CONCERN

(Farmland protection is) "...our most pressing environmental issue."

--President
Richard M. Nixon, 1973

"In my lifetime, we've paved over the equivalent of all the cropland in Ohio. Before this century is out, we will pave over an area the size of Indiana...Continued destruction of cropland is wanton, squandering of an irreplaceable resource that invites future tragedy not only nationally, but on a global scale."

--Secretary of Agriculture
Bob Bergland, 1979

"City sprawl, highways and other non-agricultural uses are taking American farmland at an annual rate that could involve acreage equal to the entire state of Missouri by the year 2030."

--Associated Press in
The New York Times, 1987

...BUT IS IT A PROBLEM?

"...agricultural land retention legislation is the wrong thing at the wrong time and for the wrong reasons. The number of people clamoring for enactment and the power of governmental agencies supporting the idea do not alter this basic conclusion."

--Agricultural economist
B. Delworth Gardner, 1977

"Land use policy in urbanizing areas is a valid concern of more immediate concern than the food supply issue, but has often been overlooked because it has been viewed as a 'local' rather than national concern."

--Agricultural economists
Richard Barrows and
Elizabeth Troutt, 1988

"The reporting on American farmlands...has consistently hammered on the false theme of its imminent disappearance and avoided the good news of its ample availability."

--Economist
Julian Simon, 1990

Do we have enough farmland to meet our food and fiber production needs, despite losses to urban uses?

There are Many Reasons for Concern About Farmland Loss

WHY PROTECT FARMLAND?

Good Land Use Planning
- Maintain open space
- Preserve rural lifestyles
- Prevent urban sprawl
- Control infrastructure costs
- Preserve local agricultural economy

Environmental Protection
- Protect watersheds
- Maintain air quality
- Retain natural systems and processes

Natural Resource Conservation
- Conserve prime, unique, and locally important farmland
- Conserve energy

Food and Fiber Production
- Maintain agricultural production capacity
- Promote local self-sufficiency
- Maintain specialty crops

Maintaining food production is just one reason.

These reasons for conserving local farmland are voiced in communities across the Nation. Many people extend these concerns into worries that the national capacity to produce food and fiber cannot be maintained if more farmland is lost to development--an assertion that is arguable.

Once Farmland Has Been Urbanized, It Is No Longer Available for Food Production

CONVERSION TO URBAN USES RAISES QUESTIONS

- Can new land substitute for the farmland lost to urbanization?
- Is the best farmland lost to urban use?
- Where is most of the farmland loss occurring?
- Is the rate of conversion to urban use accelerating?
- How much will current farmland loss reduce food production?
- Can we sustain future urban growth without impairing agriculture?

Our study found answers to these questions.

Answers to Concerns Over Farmland Loss Require Data About Land Use Changes

THIS REPORT...

Uses a variety of data sources to:

- Show the extent of rural land converted to urban uses (in the context of existing urban and rural land uses)
- Estimate changes to and from each land use

Focuses on counties that grew the most rapidly during 1970-80 to analyze:

- Differences in rural land conversion under different conditions and in different regions
- How much farmland is converted to urban uses and how much is replaced from other rural uses
- How farmland quality is affected by land use shifts

Estimates:

- How much urban land will be needed if population grows as expected
- What impact future urban growth will have on farmland and the production of food and fiber

Previous studies inventoried land uses at different times, but failed to examine changes between uses. We investigated the dynamics of change from rural to urban use and between rural uses.

All U.S. Land Can Be Categorized as Rural or Urban: Urban Land Is a Small Portion

MAJOR USES OF LAND IN THE UNITED STATES

	Million acres
Total U.S. land	2,265
Urban	57
Rural	2,208
Agricultural	1,062
Range	591
Cropland and pasture	464
Farmsteads and roads	7
Forest	731
Other rural land	415

Source: Daugherty, 1991.

Only 2.5 percent of U.S. land is in urban uses.

What land uses are included in urban land?

Residential Use Accounts for More Than Half of Urban Land

MAJOR USES OF LAND IN THE UNITED STATES

	Million acres
Total U.S. land	2,265
Urban	57
Rural	2,208
Agricultural	1,062
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Cropland and pasture	464
Farmsteads and roads	7
Forest	731
Other rural land	415

Source: Daugherty, 1991.

Here's how urban land is used:

	Percent
Residential	59
Commercial	16
Utilities	11
Mixed urban	9
Transitional	5

Note: "Mixed urban" is land on which no single urban use can be discerned, including extensive recreation areas such as golf courses. "Transitional" land is changing from one use to another, such as cleared forest land or bare construction sites. Most transitional land moves to urban uses.

Land use change is tied to population growth. Most land converted to urban uses is used for housing.

How much land does the typical new house use?

The Typical New House Uses Little Land: Most Are Built on Small Lots

LOT SIZE OF NEW SINGLE-FAMILY HOMES SOLD

			Percent
Under 9,000 sq. ft.	=	0.2 acre	52
9,000-21,999 sq. ft.	=	.2-.5 acre	36
Over 22,000 sq. ft.	=	.5 acre	12
*Median lot size:** *8,875 sq. ft.*	=	*.2 acre*	

* Half the houses are situated on smaller lots; half are on larger lots.

Note: Residential uses include single-family homes (and townhouses), multifamily buildings, and mobile homes. These data reflect new single-family homes (and townhouses) sold in 1985. Sales of single-family homes (those reporting lot size) accounted for 26 percent of new privately owned housing units completed in 1985. Multifamily housing and mobile homes use even less land per housing unit than single-family homes.

Source: U.S. Department of Commerce and U.S. Department of Housing and Urban Development, 1986.

While population growth ultimately drives land use change, households make the decisions that affect the majority of land use decisions. Over 50 percent buy homes on lots under a fifth of an acre, while only 12 percent buy on half-acre lots or larger.

On average, how much urban land, including residential and other uses, is used by each household?

Total Urban Land Used Per Household Is Small

CALCULATING ACRES OF LAND USED PER HOUSEHOLD

$$\frac{\text{All urban land}}{\text{All U.S. households}} = \frac{\text{57 million acres}}{\text{89 million households}}$$

Urban land/household = 0.6 acres per household

When streets and roads, shopping centers, office buildings, factories, and urban parks and recreation facilities are added to land needed for housing, on average each household uses less than 1 acre of urban land.

How does this level of urbanization affect farmland?

Less Than Half of All Rural Land Is Farmland

MAJOR USES OF LAND IN THE UNITED STATES

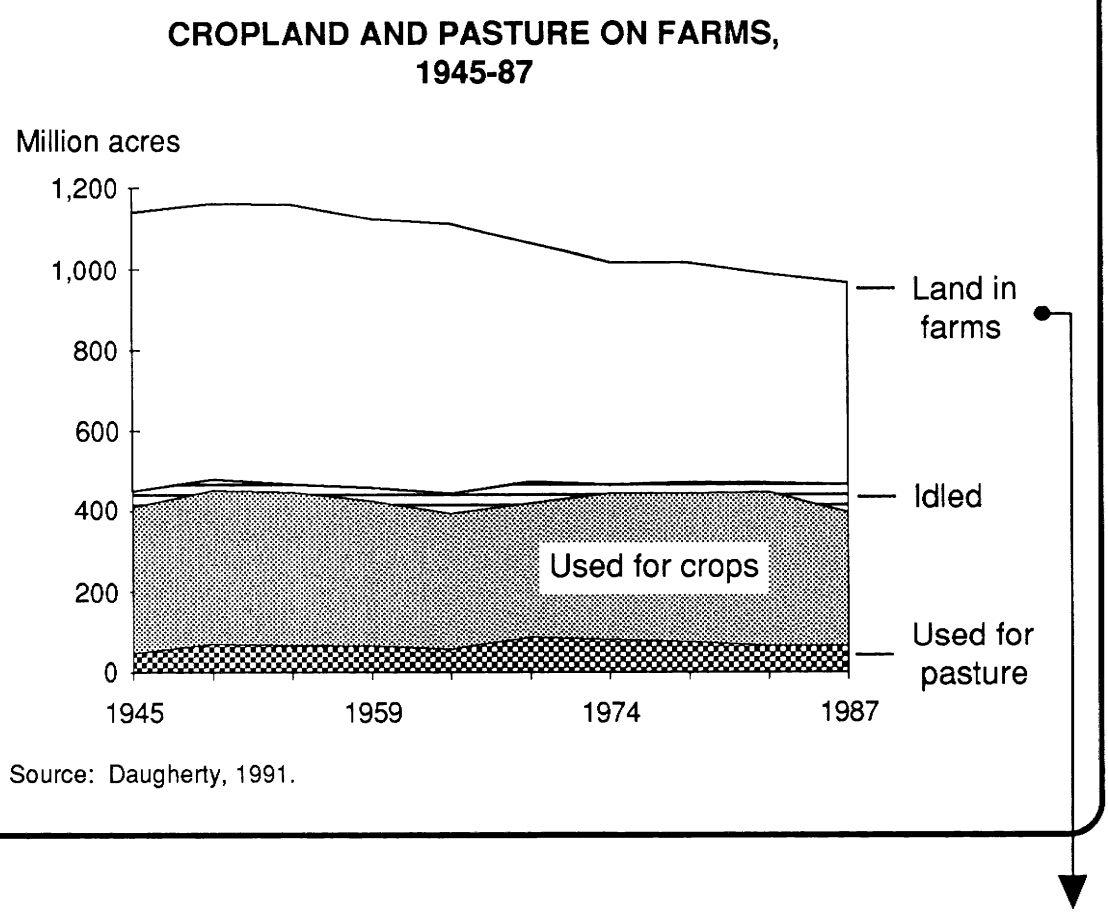
	All land	Land in farms
	Million acres	
Total U.S. land	2,265	
Urban	57	
Rural	2,208	964
Range	591	410
Cropland and pasture	464	443
Farmsteads and roads	7	7
Forest	731	80
Other rural land	415	24

Source: Daugherty, 1991.

Much of rural land available for conversion to urban uses is not farmland and is not used to produce food and fiber.

Note: More than half of all rural land does not qualify as "land in farms," which must generate at least $1,000 in product sales, according to the census definition of a farm. Most cropland and pasture (95 percent) and rangeland (69 percent) and some forestland (11 percent) are included in land in farms. The remaining cropland and pasture is not owned by farmers and is not used in farming operations. Public rangeland grazed on a permit basis and most forestland, for example, are not included in land in farms.

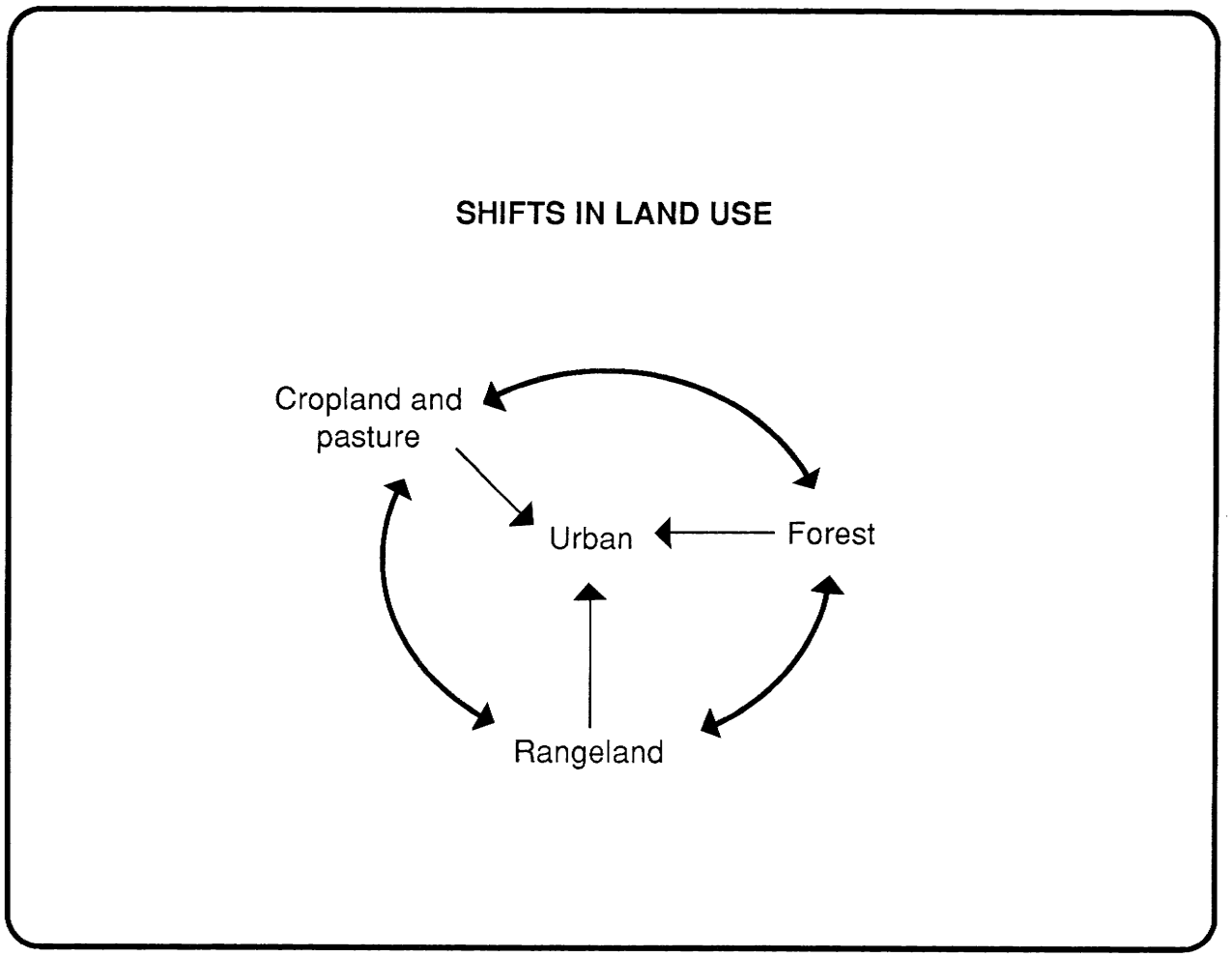
Land in Farms Has Decreased, Yet Total Cropland Has Remained Constant



Most of this decline was in range, woodland, and other farm uses--land not used for crops and pasture.

With a 16-percent decline in land in farms, how could there have been so little change in cropland and pasture acreage in 40 years?

Land Is Dynamic, Moving Among Many Uses During the Same Period



One reason that losses to urban uses have not reduced cropland is because losses were made up from other rural uses, such as forest and rangeland. Movement in both directions can occur during any time period because economic changes favor different land uses. Once converted to urban uses, however, land seldom reverts to another use.

Cropland Is Large Relative to Urban Area

MAJOR USES OF LAND IN THE UNITED STATES

	Million acres
Total U.S. land	2,265
Urban	57
Rural	2,208
Agricultural	1,062
Range	591
Cropland and pasture	464
Farmsteads and roads	7
Forest	731
Other rural land	415

Source: Daugherty, 1991.

Land area devoted to crops and pasture is over eight times the size of urban area.

Another reason why losses of rural land to urban areas have not significantly reduced cropland is because the abundant cropland base is so much larger than urban area. These two reasons explain why large percentage gains in urban area have a small effect on cropland and farm production.

Existing Data on Urban Area Are Not Adequate for Measuring Urbanization

RECENT MEASURES OF URBAN AREA

- **Urbanized Area**

  The Bureau of the Census defines urban area by population density and contiguous map area in order to count urban and rural populations. To be counted as urban, a place must have at least 2,500 people or a population density of at least 1,000 people per square mile and observe rules for contiguous areas.

- **Conservation Needs & National Resources Inventories (NRI)**

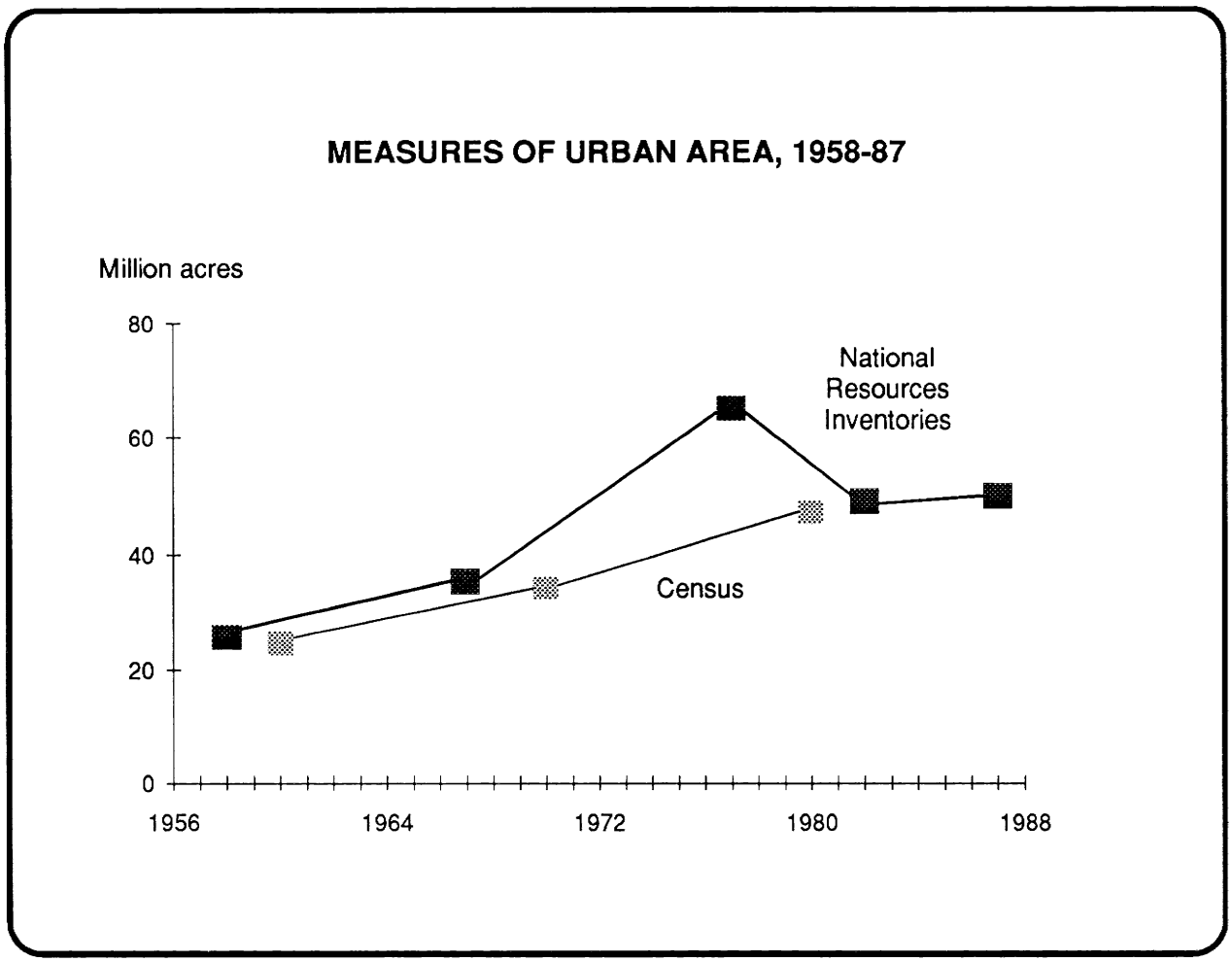
  USDA defined urban areas as delineated on maps (1977) or inventoried at field sample sites (1982) to exclude areas from natural resource inventories of rural non-Federal land. The later method resulted in an estimated 16 million fewer acres of urban, built-up, and rural transportation land than were estimated in 1977. The NRI counted all urban and built-up areas larger than 10 acres, thus capturing more developed area than the census method.

Different agencies measure urban area for different reasons. None of the data were collected to specifically address farmland loss over time.

Problems with existing data sources:

- They do not capture actual land use changes,
- Urban area definitions are not consistent over time,
- They may include pockets of rural uses within mapped urban areas, and
- They may overstate the amount of urban area and the extent of changes over time.

Urban Area Data Give Inconsistent Answers About the Rate of Urbanization



The NRI includes developed uses outside urban areas delineated by the census. Inaccurate mapping of urban boundaries in 1977 resulted in an overestimate of urban area, which was corrected in the 1982 NRI (Lee, 1984).

These problems, and failure to record actual changes in land uses over time, made existing data unusable. USDA's Economic Research Service instead used another technique proven in previous studies that is better suited to studying questions about land use changes.

"Fast-Growth" Counties Are a Good Yardstick for Measuring Urbanization

THE FAST-GROWTH COUNTY DEFINITION HAS TWO PARTS

We focused on those 135 counties with the fastest population growth during 1970-80.

A county was included if:	Reason:
Population increased by more than 25 percent	Eliminates populous counties that grew slowly from a large base
and	
Population increased by more than 25,000 people	Eliminates sparsely populated counties that grew rapidly from a small base

Counties that met both parts of the definition are on the rural-urban fringe, where population grows rapidly from moderate initial population bases.

Different counties met the fast-growth definition in different decades, but fast-growth counties are always on the rural-urban fringe.

Most land use change is expected to occur on the rural-urban fringe.

Although Few in Number, Fast-Growth Counties Had Much of U.S. Population and Household Growth

DEMOGRAPHIC CHARACTERISTICS, 1970-80
(Fast-growth counties)

	1970	1980	Change, 1970-80
		Thousands	
Population:			
U.S.	203,302	226,546	23,244
Fast-growth counties	24,206	35,246	11,040
		Percent	
Fast-growth county share of population growth	11.9	15.6	47.5
		Thousands	
Households:			
U.S.	63,401	80,776	17,375
Fast-growth counties	7,488	12,547	5,059
		Percent	
Fast-growth county share of household growth	11.8	15.5	29.1

The 135 fast-growth counties accounted for only 4 percent of all U.S. counties in 1980, but for almost half the population increase in 1970-80.

This analysis is based largely on these fast-growth counties.

Measuring Urban Area

ERS Used Sampling Techniques To Gather Data From Areas Expected to Show the Most Changes in Land Use

ERS and Earth Satellite Corporation examined aerial photographs of non-Federal land in fast-growth counties...

To interpret land use:

- In 13 urban and rural categories at almost 23,000 sample points on over 16,000 photographs

To record area characteristics:

- Soil quality (soil type, prime/nonprime, land capability classification) for points that changed uses to or from cropland
- Census geographic coding (county or minor civil division) to link with socioeconomic data of the area

...Then developed a full matrix of changes to and from each land use category that indicates the...

- Amount of cropland and other rural land converted to urban uses
- Amount of cropland replaced from other rural uses

...And analyzed rural-to-urban conversion per new household added...

- Under different socioeconomic conditions
- In different regions
- Over time

Results of these analyses enabled an assessment of the current and future impact of urbanization on agriculture. A complete assessment required that we:

- *Extrapolate fast-growth county results to estimate the national urbanization rate*
- *Estimate how much urban land will be needed if population grows as expected*

ERS Compared Aerial Photographs for Actual Changes in Land Use Over Time

WE COMPARED LAND USES OF FAST-GROWTH COUNTIES AT THE SAME POINT ON AERIAL PHOTOGRAPHS TAKEN ON DIFFERENT DATES

In Clackamas County, Oregon, June 25, 1970

In Clackamas County, Oregon, April 30,1980

Point-to-point visual comparison of land use on each photo gives an accurate portrayal of actual changes in land use occurring at each point. This technique avoids consistency problems with inventories taken at different times and allows us to trace changes to and from each land use category.

Note: This technique was used in previous ERS studies of land use during the 1960-70 period: *Dynamics of Land Use in Fast-Growth Areas* (AER-325), *Land Use Change in the Southern Mississippi Valley* (AER-215), *Urbanization of Land in the Northeastern United States* (ERS-485), *and Urbanization of Land in the Western States* (ERS-428).

National Land Use Change

About 740,000 Acres Were Urbanized Annually in the 1970's

ESTIMATED RATES OF U.S. URBANIZATION, 1970's

Study	Period covered	Average annual: Increase in household numbers	Average annual: Expansion in urban area	Net land conversion
		Thousands	*1,000 acres*	*Acres per household*
ERS	1970-80	1,738	740	0.4
Bureau of the Census	1970-80	1,738	1,276	.7
1987 NRI	1982-87	1,190	726	.6
Second Resources Conservation Appraisal[1]	1977-82	1,880	900	.5
National Agricultural Lands Study[2]	1967-75	1,368	2,875	2.1

[1] Based on comparison of 1977-82 NRI and Census urban area data.
[2] Based on 1967-75 Potential Cropland Study.

ERS's actual point-to-point land use changes interpreted from aerial photographs provide more direct evidence than aggregate mapping exercises and inventories done at different times.

This national rate of conversion to urban uses is lower than other studies had previously estimated.

Does this mean the rate of urbanization is decreasing?

Rate of Urbanization Has Remained the Same Since the 1960's

LAND USE AND HOUSEHOLD CHANGE, 1960's AND 1970's
(Fast-growth counties)

Counties identified as fast-growth in each study	Households	Urban area	Net land conversion
	Million	*Million acres*	*Acres per household*
1960's study:			
1960	3.1	2.7	0.9
1970	4.8	3.5	.7
Change, 1960-70	1.7	.8	.5
1970's study:			
1970	7.5	6.5	.9
1980	12.5	8.9	.7
Change, 1970-80	5.1	2.4	.5

1960's study: Zeimetz and others, 1976. 1970's study: based on information contained in this report.

Urban area added for each new household was identical in these studies of fast-growth counties over two decades. Confidence in this result is high because both studies measured similar things using similar methods.

As rapidly growing counties develop, new households use less land and average land consumption declines. How has this affected cropland?

Most Land Uses, Including Cropland and Pasture, Show Little Change

DISTRIBUTION OF LAND USE, 1970-80
(Fast-growth counties)

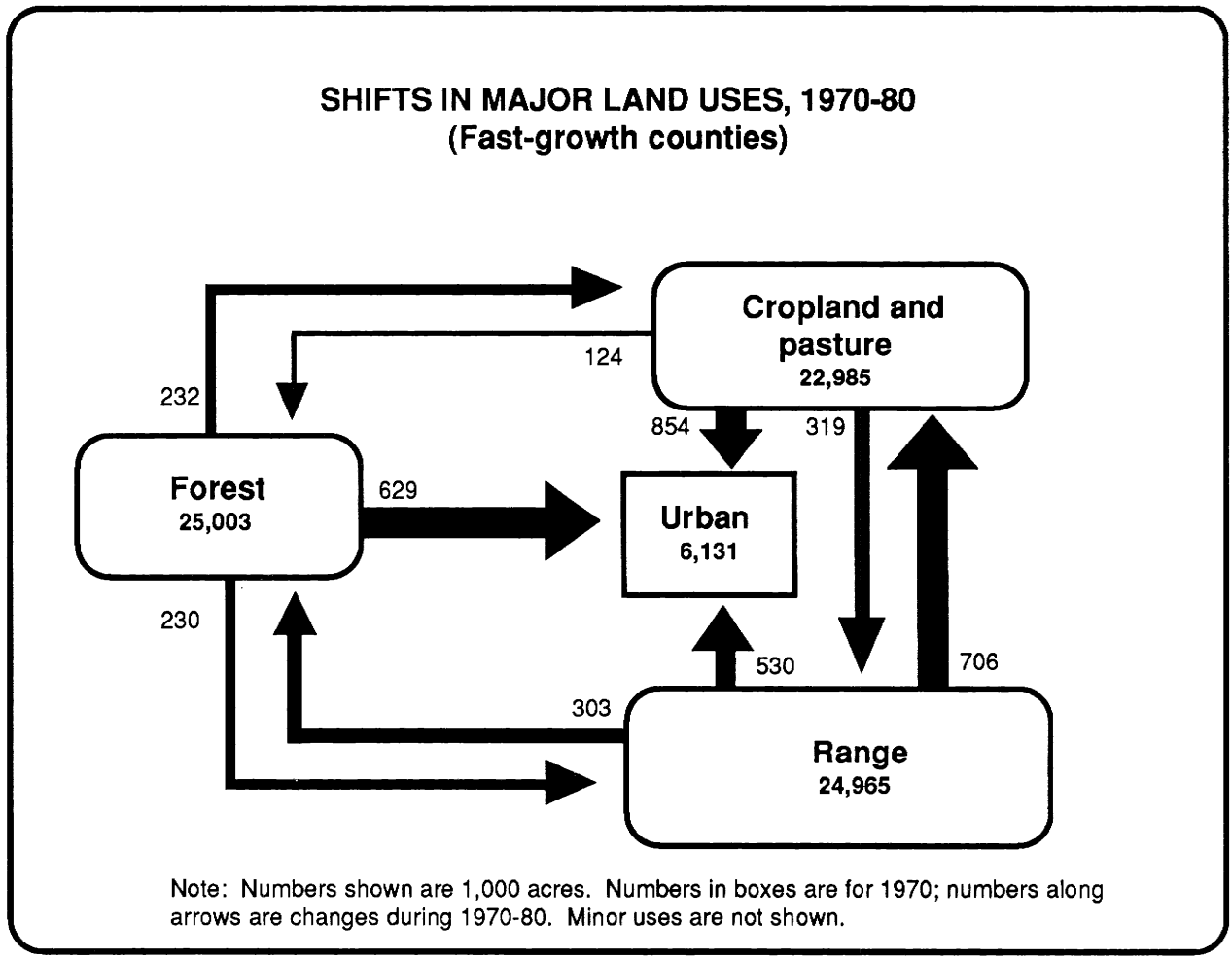
Land use in 1970	Land use in 1980					
	Residential	Other urban	Cropland and pasture	Range	Forest	Other
	Percent of original use					
Residential	99.1	0.6	0	0.3	0	0
Other urban	2.0	97.2	0.2	.4	0.2	0
Cropland and pasture	2.7	1.6	93.4	1.4	.5	0.4
Range	1.5	1.3	2.8	92.5	1.2	.7
Forest	2.2	.9	.8	.9	94.9	.3
Other	.8	1.0	1.4	2.3	.7	93.8

Most land in all land uses (92-99 percent) remained in those uses over the decade. Notice, for example, that almost all land used for crops and pasture in fast-growth counties (93.4 percent) in 1970 remained in that use in 1980.

The largest amount of cropland and pasture converted to another use went to residential and other urban uses. But the amount converted was a small part of land originally used for cropland and pasture. Urbanization's net impact on agriculture is even smaller.

National Land Use Change

Additions to Cropland and Pasture Offset Much of the Loss to Urban Uses



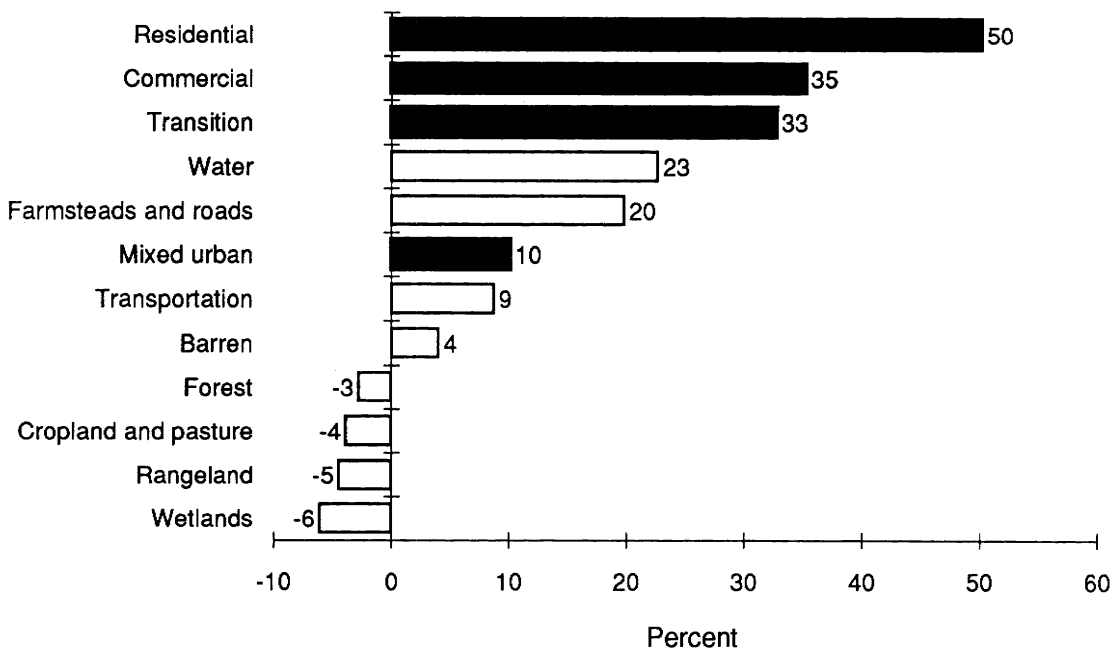
Note: Numbers shown are 1,000 acres. Numbers in boxes are for 1970; numbers along arrows are changes during 1970-80. Minor uses are not shown.

Shifts to cropland and pasture from forest, range, and other uses replaced 574,000 acres (67 percent) of the 854,000 acres of cropland and pasture lost to urban uses.

On average, each new household added in fast-growth counties converted 0.5 acre to urban uses, but the net loss from cropland and pasture was only 0.1 acre.

More additions to cropland occurred outside fast-growth counties to make up for the net losses.

All Urban Uses of Land in Fast-Growth Counties Increased During the 1970's

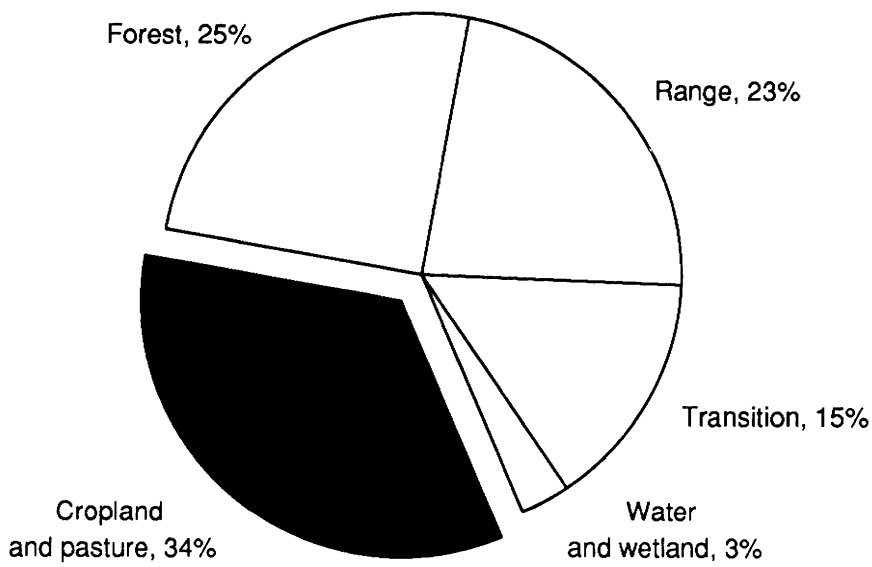


Percentage increases in urban uses (the shaded bars) were large, but the gains were from a small base, accounting for only 8 percent of total land area.

National Land Use Change

Only a Third of New Urban Land Was From Cropland and Pasture

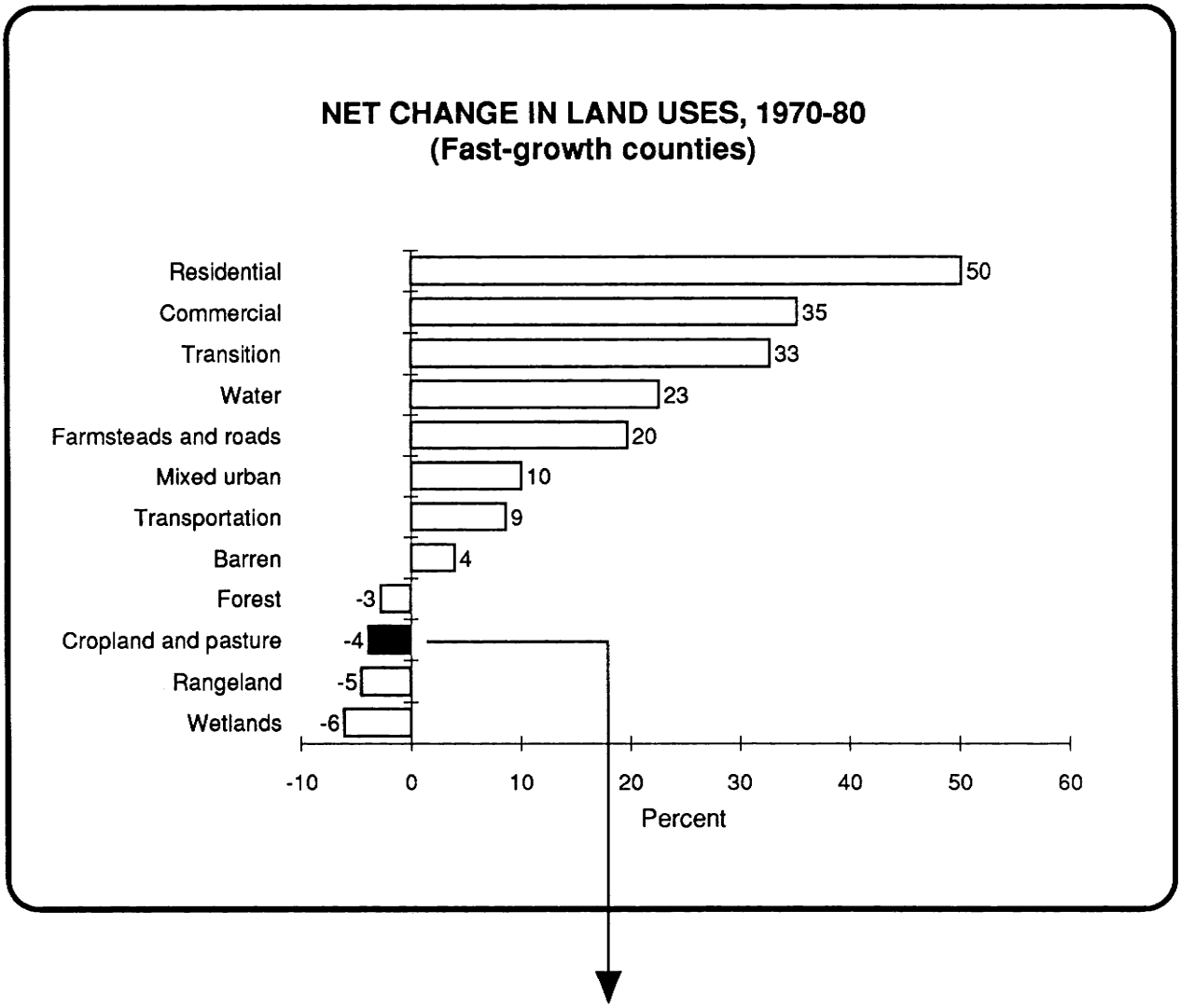
PRIOR USE OF LAND CONVERTED TO URBAN USES, 1970-80
(Fast-growth counties)



Most range and some forest converted to urban uses was probably in farms, but was not used to produce crops.

National Land Use Change

Cropland and Pasture Losses to Urbanization Were Small



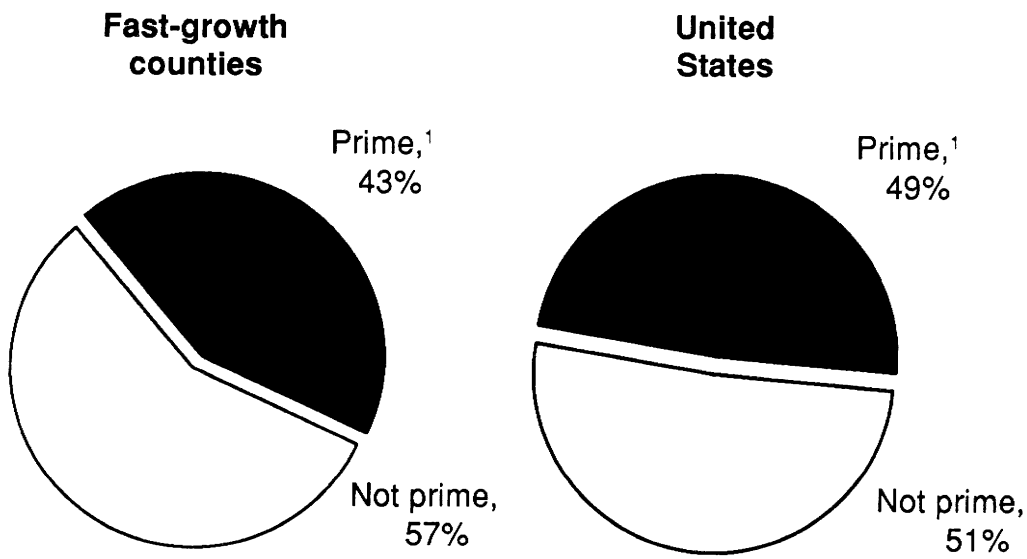
Even though the percentage increase in fast-growth county urban land was large, the percentage decrease in cropland and pasture was small. This is because:

-- The original amount of cropland and pasture was large
-- Only a third of land urbanized had been cropland and pasture
-- Losses to urban uses were replaced from range and forest

Some argue that urbanization takes our best cropland, land that we can ill afford to lose.

Fast-Growth Counties Have a Smaller Proportion of the Best Cropland and Pasture Than the Nation as a Whole

QUALITY OF CROPLAND AND PASTURE, 1982
(Fast-growth counties and U.S. total)



[1] USDA defines Prime farmland as "...best suited to producing food and fiber...." Prime farmland "...has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops economically when treated and managed...according to modern farming methods." U.S. Department of Agriculture, Soil Conservation Service, 1975.

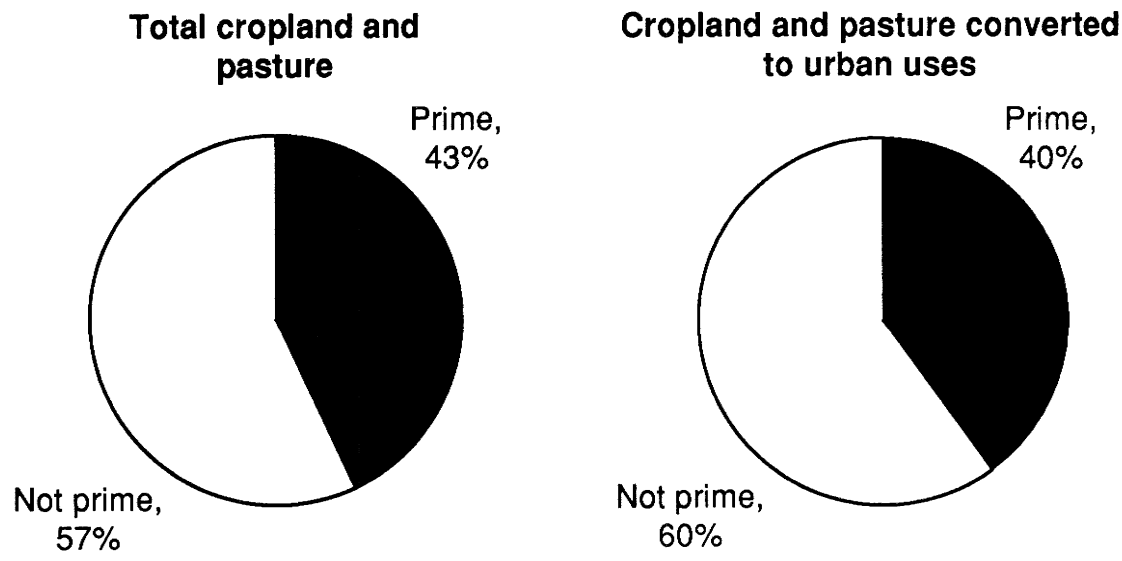
Source: 1982 National Resources Inventory.

Only 43 percent of cropland and pasture in fast-growth counties is considered "Prime" land, compared with almost half of total U.S. cropland and pasture.

How much Prime land was converted to urban uses?

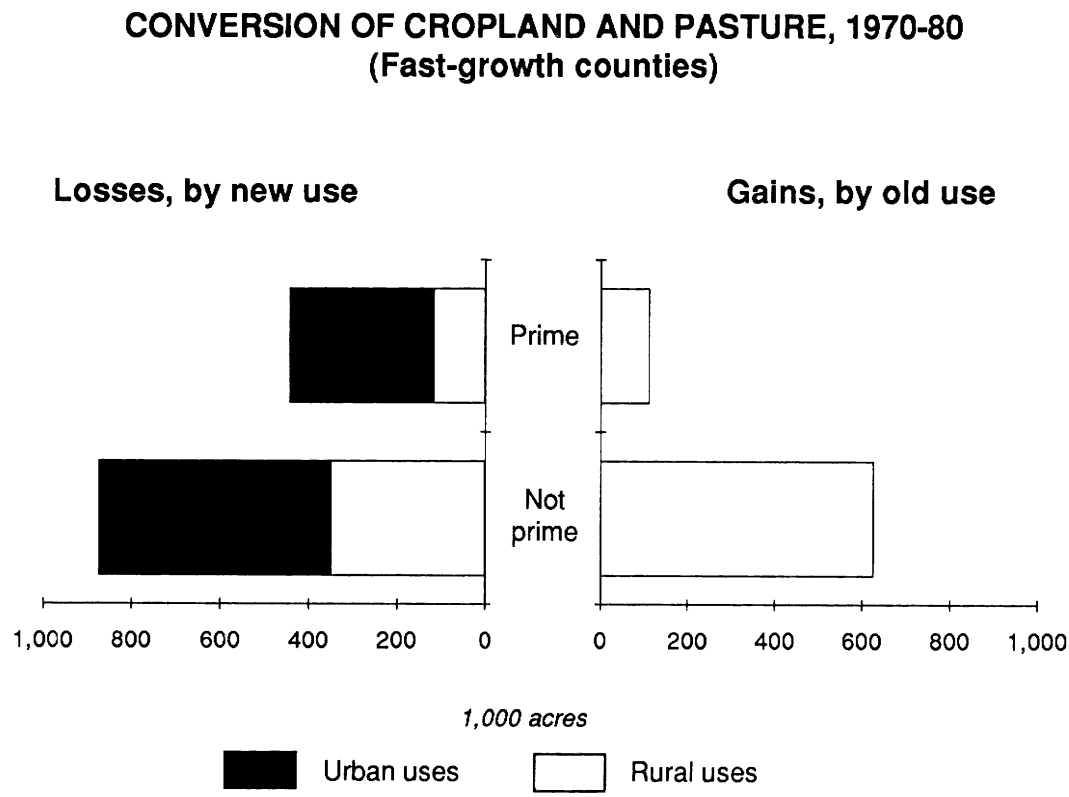
Urban Land Uses Took No More Than Proportional Amounts of Prime Cropland

QUALITY OF CROPLAND AND PASTURE, 1970-80
(Fast-growth counties)



Prime land was converted to urban uses in fast-growth counties proportionally to its occurrence. While 43 percent of cropland and pasture in fast-growth counties was Prime, 40 percent of the cropland and pasture converted to urban uses was Prime.

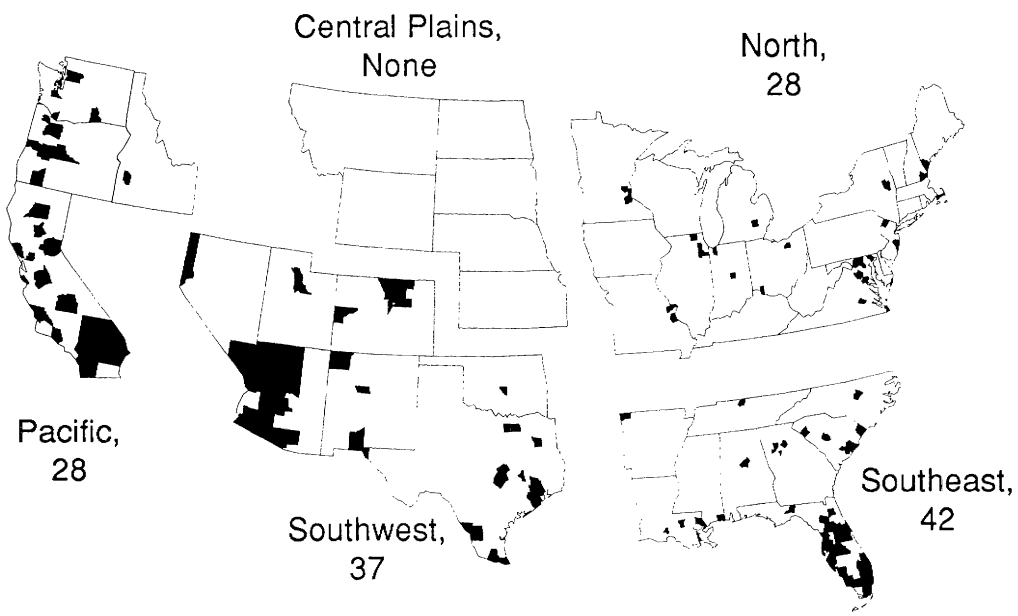
Additions to Prime Cropland Offset Some Losses to Urbanization



Gains of Prime cropland and pasture converted from other rural uses replaced a third of the Prime cropland lost to urban uses. Fast-growth counties lost 4 percent of all cropland to all uses, but lost only 3 percent of Prime cropland after additions to Prime cropland are counted.

Where are the changes in land use occurring?

Fast-Growth Counties Were Concentrated in the Southeast and Southwest Sunbelt



Did urbanization occur differently in these areas? If so, can the urbanization be traced to the rate of population growth? ...To regional differences?

Is there a general pattern to population growth and land use change?

Land Use Change Details

Urban Land Area Expanded the Most in the Southeast and Southwest

REGIONAL INCREASES IN HOUSEHOLDS AND URBAN AREA, 1970-80
(Fast-growth counties)

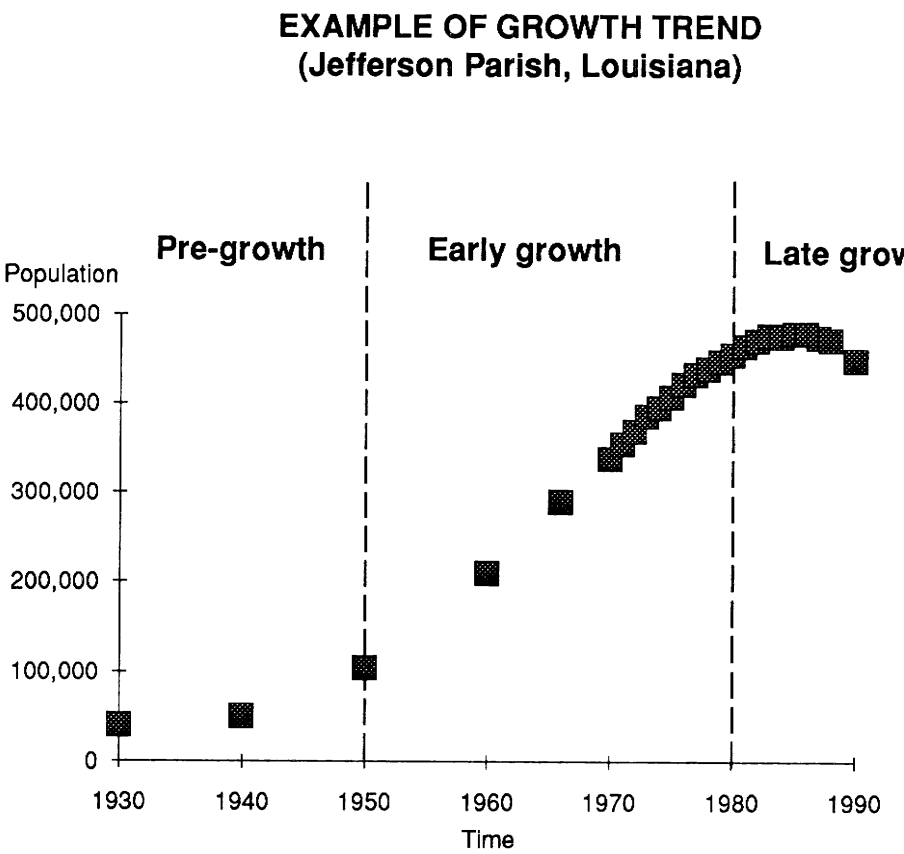
	Expansion in urban area	÷	Increase in house-holds	=	Gross urban conversion per new household
	1,000 acres		*Number*		*Acres per household*
North	337		687		0.49
Pacific	439		1,098		.40
Southeast	875		1,620		.54
Southwest	810		1,620		.50

Sunbelt counties added the most urban land and used the most land for each new household.

In the Southeast and Southwest, large increases in urban area mirror increases in households...

...and the rate of conversion per household was higher as well.

Population Growth Sets the Stage for Successive Development Phases and Land Use Changes

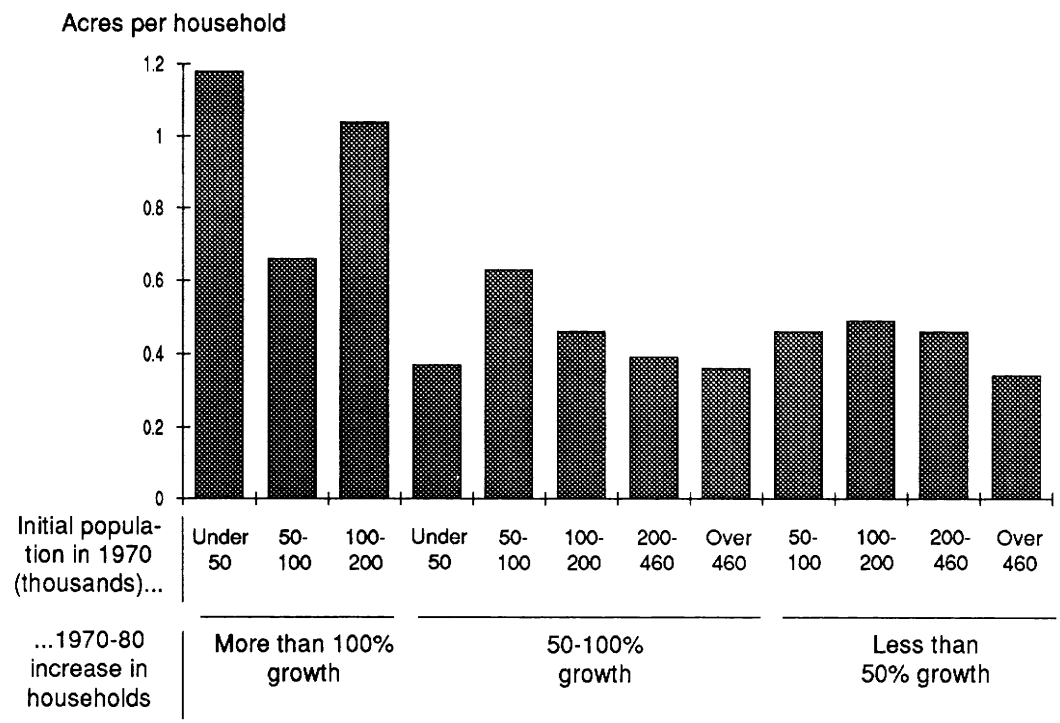


In early stages of growth... Residential land is generally cheaper, so consumers are apt to buy larger lots. More land for essential services, such as retail and office space, public buildings, and roads, must also be converted in newly growing areas.

Counties with smaller initial population and larger percentage household increases are in an earlier stage of growth than are counties with larger populations adding households at a slower rate. Newly developing counties use more land per household added for larger residential lots and supporting urban land uses.

At later growth stages... Land is more expensive and supporting land uses can better accommodate population increases, so less land is urbanized per household added.

Regardless of Location, Counties in Earlier Growth Stages Converted More Land to Urban Uses Per New Household



Fast-growth counties in the early growth stage--those with fewer than 50,000 people in 1970 and rapid growth in household numbers over the decade--converted 1.18 acres for each new household but accounted for only 10 percent of fast-growth county urbanization.

Counties in later growth stages--those with more than 460,000 people and slower growth in household numbers--converted 0.34-0.36 acre per new household but accounted for 24 percent of fast-growth county urbanization.

Over time, metro areas have experienced faster population growth than nonmetro areas. Is faster land use change associated with this faster growth?

Most New Urban Area Was Added in Metro Counties

METRO AND NONMETRO GROWTH, 1970-80
(Fast-growth counties)

Year and county type	Number of counties	Growth in-- Households	Growth in-- Urban area	Gross land conversion
	Number	*Percent*	*Acres*	*Acres per household*
1970 defintion:				
SMSA	83	65.4	1,732	0.4
Non-SMSA	52	77.6	729	.7
1980 definition:				
MSA	118	67.1	2,227	.5
Non-MSA	17	78.6	234	1.0

SMSA = Standard Metropolitan Statistical Area.
MSA = Metropolitan Statistical Area.

Metro counties (as identified by the Bureau of the Census) converted more land to urban uses because they added more households than did nonmetro counties.

But, each household added in nonmetro counties used more new urban land. These results are true whether the older SMSA definition or the newer MSA definition is used to classify counties, because metro counties have larger initial populations and slower growth rates.

Over the decade, 35 fast-growth counties were reclassified from metro to nonmetro status. Metro/nonmetro differences in the rate of land conversion per household also reflect changing phases of growth as an area develops.

Although the Urbanization Rate Has Stayed the Same, the Composition of Fast-Growth Counties Has Changed

NUMBER OF FAST-GROWTH COUNTIES, 1960's AND 1970's

Decade	Number
1960's	135
1970's	139
1960's *and* 1970's	71

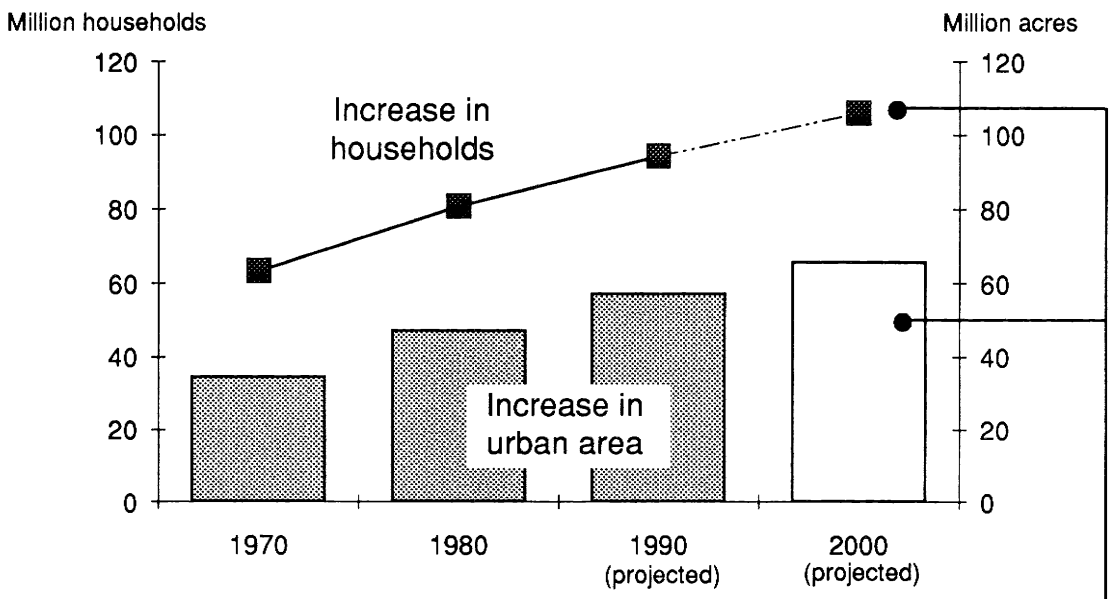
Only 71 counties were fast-growth in both the1960's and the 1970's. Half the fast-growth counties dropped out of that classification as they entered later stages of growth.

But the rate of urbanization in fast-growth counties stayed constant at half an acre per household, because the fast-growth definition captures counties at the same early growth stage.

Therefore, we can predict how future growth will affect urbanization.

Expected Household Growth Would Increase Urban Area 15 Percent by 2000

HOUSEHOLD AND URBAN AREA PROJECTIONS, 1970-2000



Source: U.S. Department of Commerce, 1989.

Assuming the rate of land conversion continues at rates observed since 1960, projected household growth would annually add 860,000 acres of urban area until 2000.

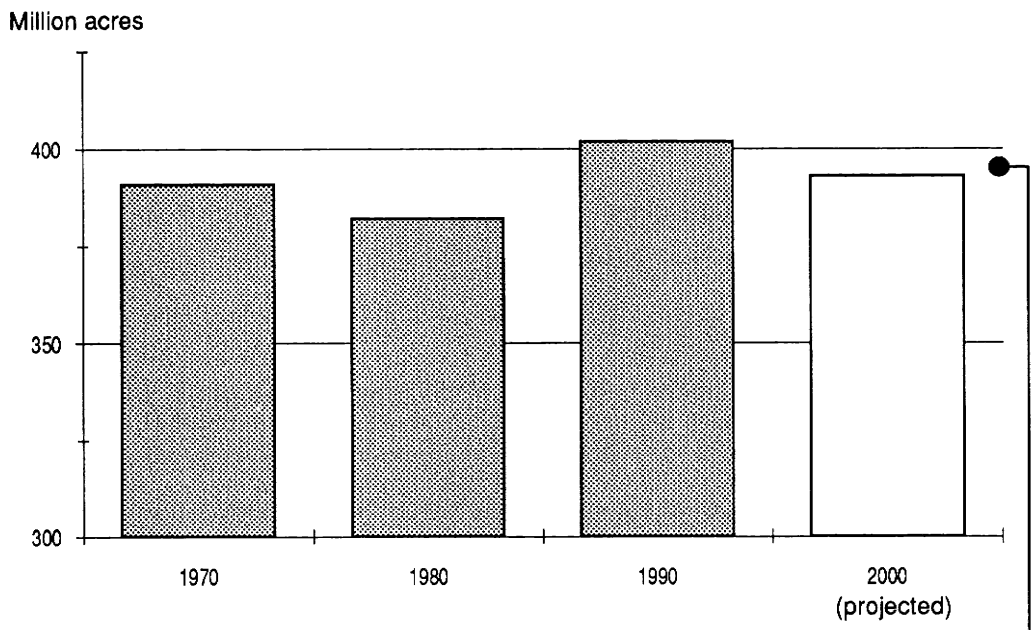
Rates of urbanization per household added were relatively constant in fast-growth areas between 1960 and 1980. Even if each new household projected for 1990-2000 in fast-growth areas adds 0.5 acre of urban land and each new household in other areas adds 1 acre, urban area would expand by 9 million acres to 66 million acres.

How will this expansion affect food production capacity?

Future Land Use

Projected Urban Growth Will Not Reduce Cropland Significantly

PROJECTED CHANGE IN CROPLAND FROM URBANIZATION, 1970-2000

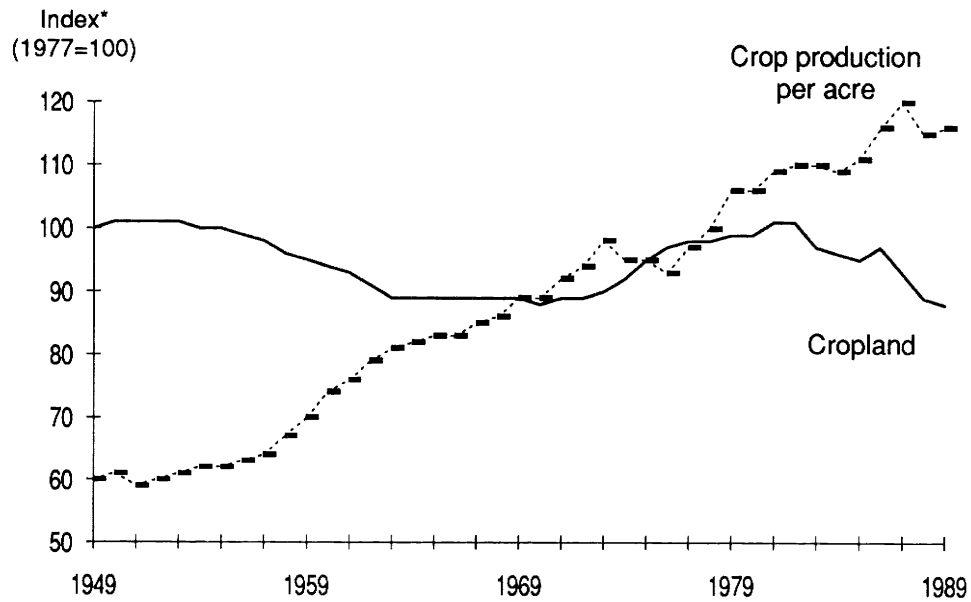


Even if cropland supplied all expected new urban land, the cropland base would be reduced only 2 percent from 1990 levels. The remaining area devoted to cropland in 2000 would still be higher than in 1980 because of new land brought into production between 1970 and 1990.

However, only a third of urbanized land will likely come from cropland. If crop prices are high enough to justify conversion, as much as two-thirds of gross cropland losses to urban uses will be made up by converting range and forest lands to crop production.

Increased Productivity Per Acre Would Offset Projected Cropland Losses

CROPLAND AND PRODUCTIVITY, 1949-89



* 3-year rolling average.
Source: U.S. Department of Agriculture, Economic Research Service, 1989.

Crop production per acre has doubled since 1949 and will likely increase in the future.

Productivity gains from new technology will likely more than offset any future net losses of cropland to urbanization.

While Future Urbanization Will Not Affect Farm Production, Concerns About Local Farmland Loss Remain

WHY PROTECT FARMLAND?

Good Land Use Planning
- Maintain open space
- Preserve rural lifestyles
- Prevent urban sprawl
- Control infrastructure costs
- Preserve local agricultural economy

Environmental Protection
- Protect watersheds
- Maintain air quality
- Retain natural systems and processes

Natural Resource Conservation
- Conserve prime, unique, and locally important farmland
- Conserve energy

Food and Fiber Production
- Maintain agricultural production capacity
- Promote local self-sufficiency
- Maintain specialty crops

Losses of local farmland will affect land use, the environment, and natural resources. But these losses will not affect national agricultural production.

Net losses of cropland and pasture are not large, even in fast-growth counties. Productivity gains will offset even these losses.

How do State and Federal governments assist local efforts to save farmland?

Many States Have Programs to Help Farmers Cope With Urban Development Pressures

STATE AND LOCAL FARMLAND PRESERVATION PROGRAMS

Purchase or Transfer of Development Rights. State and local governments (or developers) pay landowners the difference between market and agricultural use values of farmland in return for permanent agreements to restrict developed uses. Fifteen States have enabling legislation and 11 have active programs which have protected 142,000 acres.

Current Use Assessment. State and local governments reduce farmland property tax assessments from market to agricultural use values with rollback penalties for conversion within a specified number of years. All States have enabling legislation.

Agricultural Districts. States organize special districts to administer farmland retention programs (such as current use assessment), require modifications to local regulations to encourage farming as a preferred use, and restrict local government authority to regulate farm structures or take farmland by eminent domain. Twelve States have programs covering 25.8 million acres.

Zoning and Land Use Regulation. States authorize, and local governments or regional bodies implement, exclusive or nonexclusive zones where development is restricted and farming is the preferred use. State or regional land use regulation is directed at controlling growth, usually large developments with multi-jurisdictional impacts. Twenty-four States have such regulations.

Right-to-Farm Laws. State laws protect farmers from certain legal actions on the part of subsequent residents, such as nuisance suits, against normally accepted farming practices on established farms. Forty-four States have legislation.

Governor's Executive or Legislative Orders. State policies declare the importance of agriculture to the State, address the rate and causes of farmland loss, and order State agencies to reduce or restrict activities that would convert farmland. Fifteen States have policies.

Land Evaluation and Site Assessment. A land classification and assessment system identifies areas most suitable for agricultural use, in relation to pressures for development, to assist local governments in targeting farmland preservation efforts. Such systems have been implemented in several dozen counties.

Source: Heimlich (ed.), 1989.

What is the Federal Government's role in farmland preservation?

Federal Policy Is Aimed At Assisting State and Private Farmland Protection Efforts

FEDERAL FARMLAND PRESERVATION LEGISLATION

Farmland Protection Policy Act. Part of the 1981 omnibus farm legislation, this act requires Federal agencies to identify adverse effects of their programs on farmland preservation; to minimize the extent to which Federal programs contribute to unneccessary farmland conversion; and to ensure compatibility with State, local, and private farmland programs.

Donations of Conservation Easements. Section 170(h) of the Internal Revenue Code enables taxpayers to claim deductions for charitable contributions of conservation easements to qualifying nonprofit organizations. This is the principal economic incentive for participation in private farmland protection programs, such as the American Farmland Trust and similar regional and local trusts.

Farms for the Future Act. Part of the 1990 omnibus farm legislation, this act establishes the Agricultural Resource Conservation Demonstration Program. This program provides Federal guarantees and interest rate assistance for loans made by lending institutions to State trust funds. The trusts invest in the protection or preservation of farmland for agricultural purposes (such as purchase of development programs).

Sources: PL 97-98, 95 Stat. 1329 Title XV, Subtitle I, Farmland Protection Policy Act, December 22, 1981. PL 101-624, Subtitle E, Chapter 2, Farmland Protection, November 28, 1990. Daugherty, 1980.

The Federal Government's supporting role in farmland retention is appropriate because the impact of urbanization on U.S. agricultural capacity is small.

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