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Working Paper: AEDE-WP-0042-06

An Overview of U.S. Farm Real Estate Markets*

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October 2006

Abstract: This paper offers an overview of U.S. farm real estate markets. Major uses of land, location of farm real estate, and ownership patterns are summarized. Characteristics of participants in farm real markets are reviewed. Farm real estate values and rents examined, and factors affecting farm real estate values are reviewed, including the effects of conversion of farm real estate to other uses. Finally, historic returns to farmland owners are summarized.

Keywords: Farm Real Estate Markets, Land Tenure, Rents, Market Values

JEL Classification: Q12, Q15, Q24

*Paper originally presented at the General Assembly of the CICA (International Confederation of Agricultural Credit), Quebec, Canada, September 29-30, 2006.

AEDE Agricultural, Environmental, and Development Economics

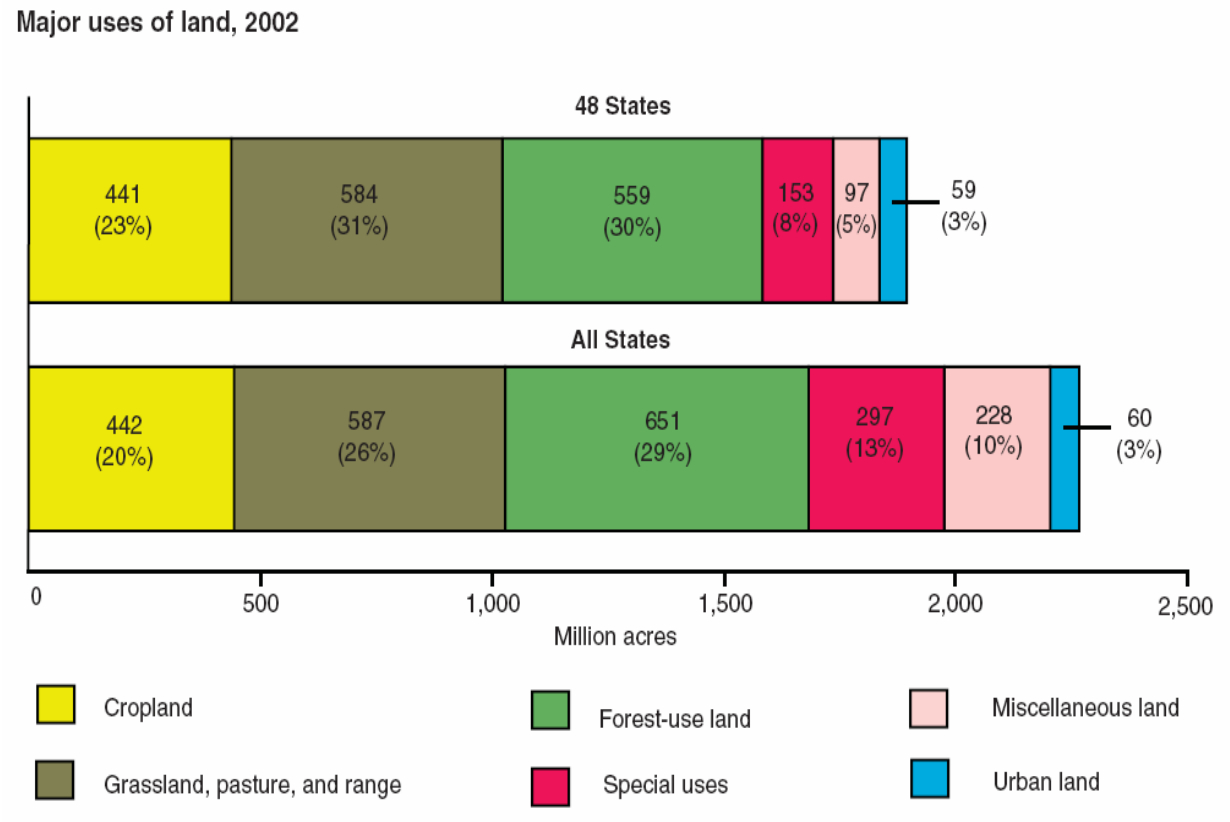
Ohio State University Extension
Ohio Agricultural Research and Development Center
College of Food, Agricultural, and Environmental Sciences

Introduction

The purpose of this paper is to an overview of farm real estate markets. First, information is presented to give backdrop or setting for U.S. farm real estate markets: major uses of land throughout the country as well as ownership patterns are summarized; location of privately held farm real estate is identified; and characteristics of farm operators, farm real estate owners, and lenders are reviewed. Next, farm real estate values are examined: time series and cross sectional market value and rent data are presented; factors affecting farm real estate values are reviewed, including the effects of conversion of farm real estate to other uses; and historic returns to farmland owners are summarized. Finally, I conclude with some remarks about investments in U.S. farm real estate.

Land Use and Ownership of U.S. Real Estate

The United States has a total land area of nearly 2.3 billion acres. Major uses in 2002 were forest-use land, 651 million acres (28.8 percent); grassland, pasture and range land, 587 million acres (25.9 percent); cropland, 442 million acres (19.5 percent); special uses (primarily parks and wildlife areas), 297 million acres (13.1 percent); miscellaneous other uses, 228 million acres (10.1 percent); and urban land, 60 million acres (2.6 percent).



Major Uses of Land in the United States, 2002/EIB-14
Economic Research Service/USDA

Over 60 percent of the land in the United States is privately owned, the Federal Government is the next largest landowner with more than 28 percent, state and local governments own nearly 9 percent, and Indian trust land accounts for over 2 percent. (Lubowski et al., 2006) Nearly all of U.S. cropland is privately owned as is the majority of grassland, pasture and range.

Of the 1.4 million acres of privately held land, principal land uses include cropland (32 percent), grassland, pasture and range (26 percent), and forest land (31 percent). Privately owned land includes 99 percent of the nation's cropland, 61 percent of its grassland pasture and range, and 56 percent of forest-use land.

Ownership and use of land, by major categories, 2002

Ownership	Cropland	Grassland pasture and range	Forest land [1]	Special uses, urban uses, and miscellaneous land [2]	Total land area [4]
			Million acres		
Federal	--	152	246	237	635
State and other public	3	40	70	82	195
American Indian [3]	2	36	11	7	56
Private	436	358	422	162	1,378
Total [4]	442	587	749	487	2,264

-- = Less than 500,000 acres.

[1] Includes reserved forest land in parks and other special uses.

[2] Excludes an estimated 98 million acres in special uses that have forest cover and, therefore, are included with forest land in this table.

[3] Managed in trust by the Bureau of Indian Affairs for Amrican Indian and Alaskan Native tribes and individuals.

[4] Distributions may not add to totals due to rounding.

Sources: Federal, State, and local government and Indian land acreage are approximations based on public records and reports (DOI; FS; GSA). Private land is the remainder of the land in each use category. Land use data are from DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; DOI/FWS, 2001; GSA, 2001; GDT, 2000; HUD/BOC, 1992, 2002, 2003; USDA/FS 1989, 1998; USDA/NASS, 2004a, 2004b, 2005; DOI/NPS, 2002; USDA/NRCS, 2000, 2004a; and WI, 2002.

Major Uses of Land in the United States, 2002/EIB-14
Economic Research Service/USDA

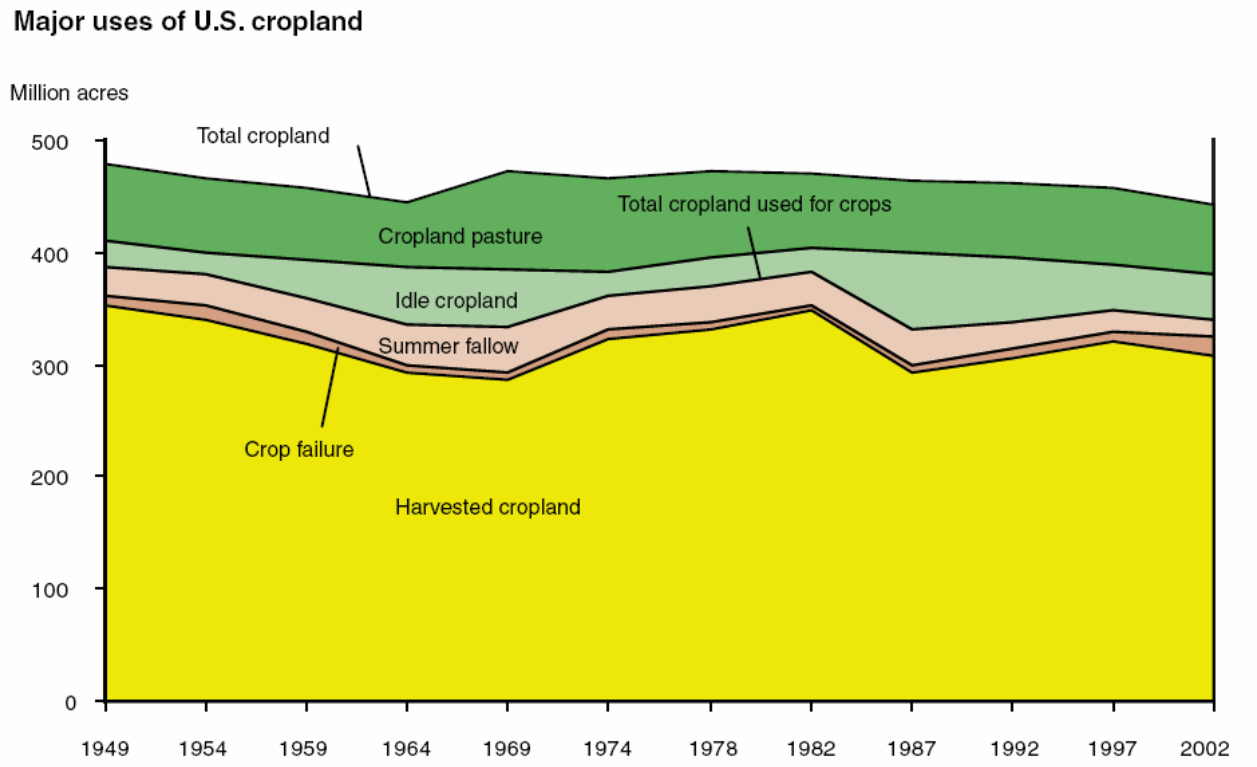
Total cropland is about 440 million acres, of which 340 million acres is used for crops. In the lower 48 states, urban land use accounts for 3.1 percent, total cropland is 23.4 percent, and all agricultural land is 61.8 percent of total land area.

Agricultural and nonagricultural uses of land, United States, 2002

Land use	Acreage		Proportion of total	
	48 States	U.S.	48 States	U.S.
	-----Million acres-----		*-----Percent-----*	
Agricultural				
Cropland:				
Cropland used for crops [1]	340	340	18.0	15.0
Idle cropland	40	40	2.1	1.8
Cropland used only for pasture	62	62	3.3	2.7
Grassland pasture and range	584	587	30.8	25.9
Forest-use land:				
Forest land grazed	134	134	7.1	5.9
Special uses:				
Farmsteads, farm roads	11	11	0.6	0.5
Total agricultural land [2]	1,171	1,174	61.8	51.8
Nonagricultural				
Forest-use land:				
Forest-use land not grazed [3]	425	517	22.4	22.8
Special uses:				
Transportation uses [4]	27	27	1.4	1.2
Recreation and wildlife areas [5]	100	242	5.3	10.7
National defense areas [6]	15	17	0.8	0.8
Urban land	59	60	3.1	2.6
Miscellaneous other land [7]	97	228	5.1	10.1
Total nonagricultural land [2]	723	1,091	38.2	48.2
Total land area [2]	1,894	2,264	100.0	100.0

[1] Cropland harvested, crop failure, and cultivated summer fallow.
[2] Breakdown of land uses may not add to totals due to rounding.
[3] Excludes 98 million acres of forest land in parks and other special uses.
[4] Rural highways, roads and railroad rights-of-way, and rural airports.
[5] National and State parks and related recreational areas, national and State wildlife refuges, and national wilderness and primitive areas.
[6] Federal land administered by the Department of Defense for military purposes and land administered by the Department of Energy.
[7] Includes miscellaneous uses not inventoried, and areas of little surface use such as marshes, open swamps, bare rock areas, desert, and tundra.
Sources: Estimates are based on reports and records of the Bureau of the Census (HUD/BOC, 1992, 2002, 2003) and Federal, State, and local land management and conservation agencies, including DOI/BLM, 2003; DOT/BTS, 2004; DOT/FAA, 2002; DOT/FHWA, 2002; DOT/FRA, 2004; USDA/FS 1989, 1998; DOI/FWS, 2001; GSA, 2001; GDT, 2000; USDA/NASS, 2004a, 2004b, 2005; DOI/NPS, 2002; USDA/NRCS, 2000, 2004a; and WI, 2002.

Acres of harvested cropland have fluctuated since the end of WWII, but total cropland has remained relatively stable. While some cropland has been lost to urban use and transportation use, expanded irrigation has enabled rangeland to be converted to cropland. Total cropland was 442 million acres in 2002 and has changed surprising little since 1949 when it totaled 478 million acres.

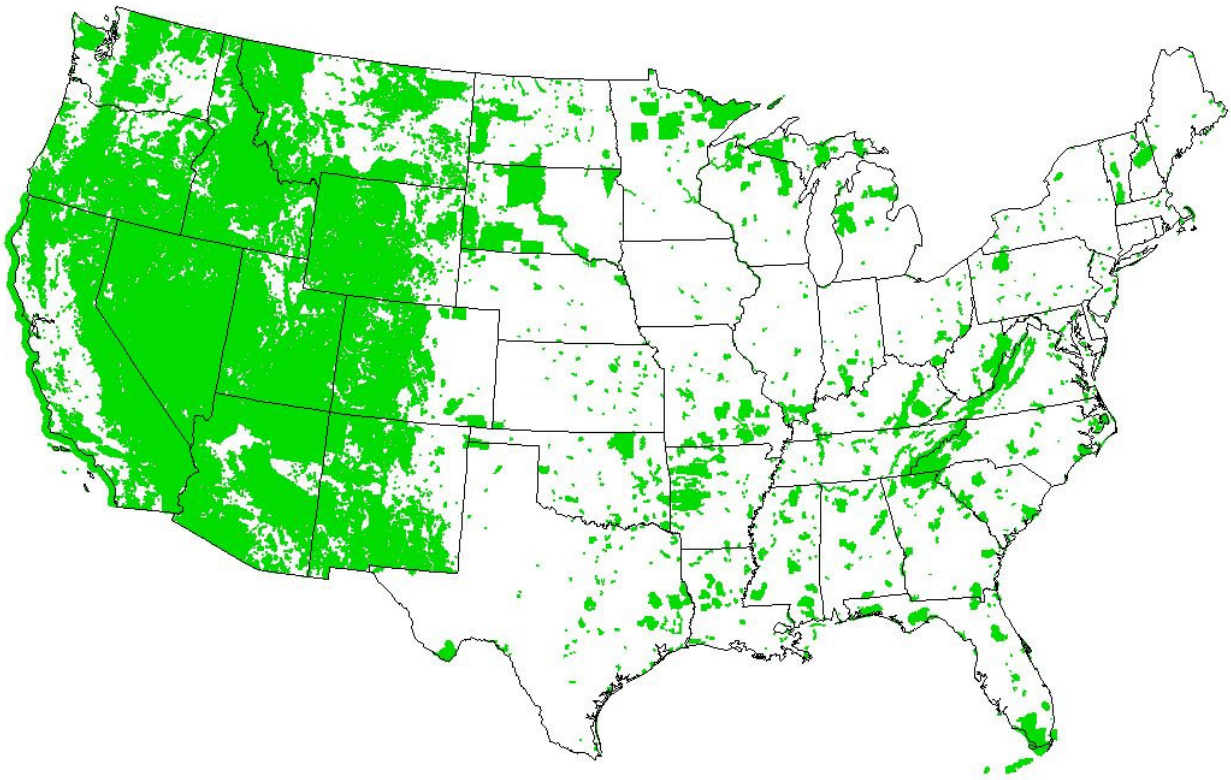


Major Uses of Land in the United States, 2002/EIB-14
Economic Research Service/USDA

Location of U.S. Farm Real Estate

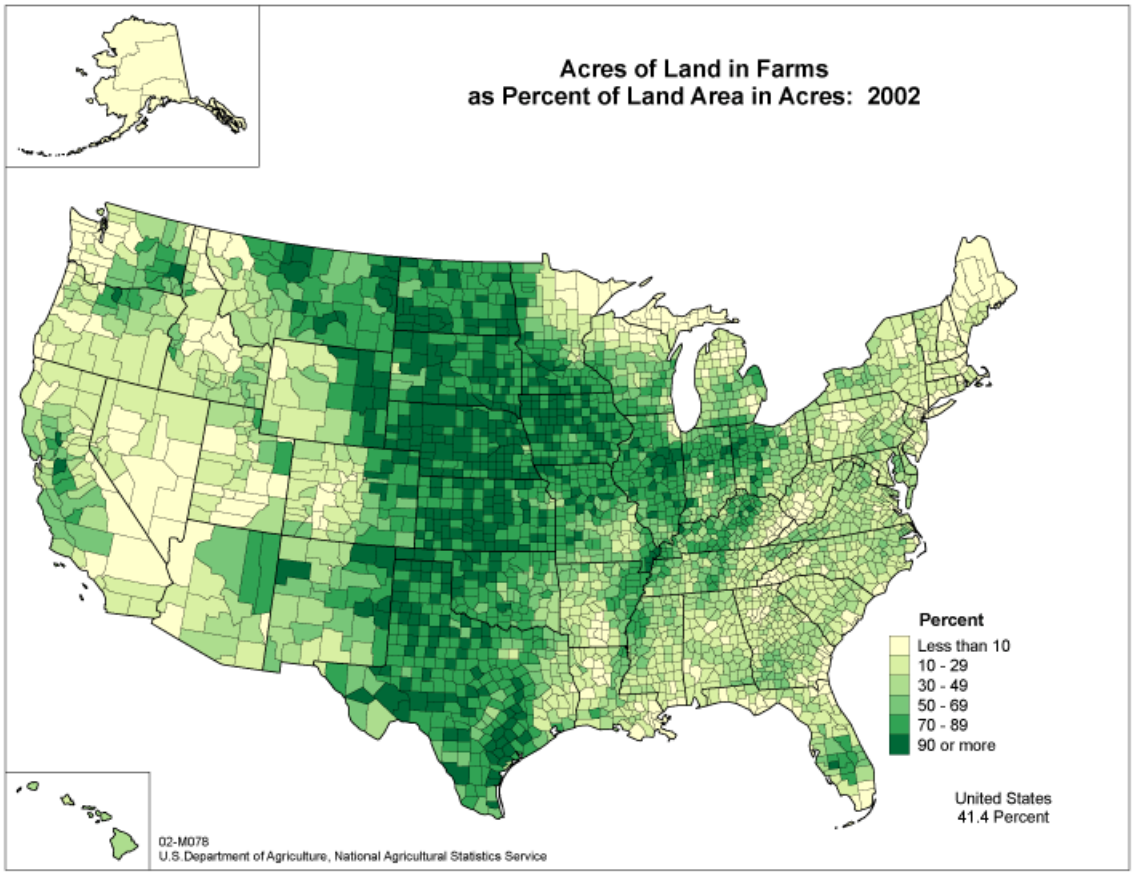
Mapped is the location of federally owned land in the 48 states, most of which is in the Mountain and Pacific regions. Federal grassland and some Federal forestland are leased to ranchers and farmers for grazing.

Location of privately held land is primarily in the eastern two-thirds of the country as is much of the country's agricultural production.

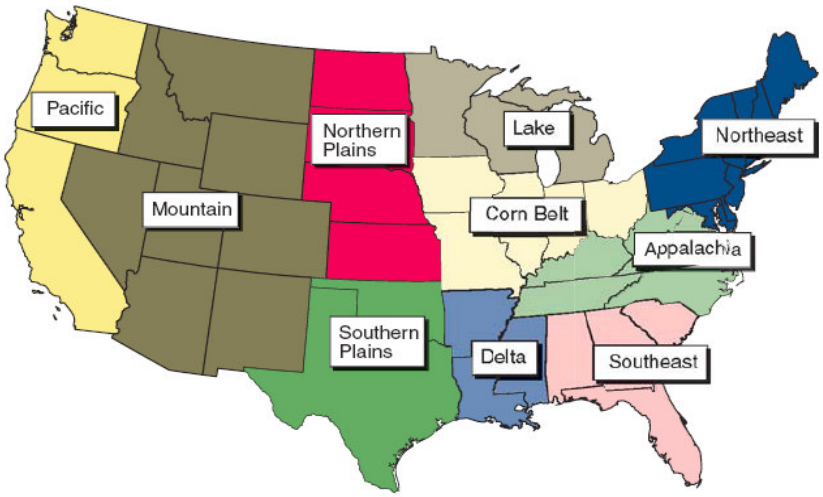


U.S. Lands Owned by Federal Government Entities
U.S. Department of Interior

Location of land in farms illustrates that much of U.S. farm real estate is located in the mid-section of the country: Northern Plains, Southern Plains, Lake, Corn Belt and Delta production regions. Other areas where farm real estate is concentrated include California and Florida.

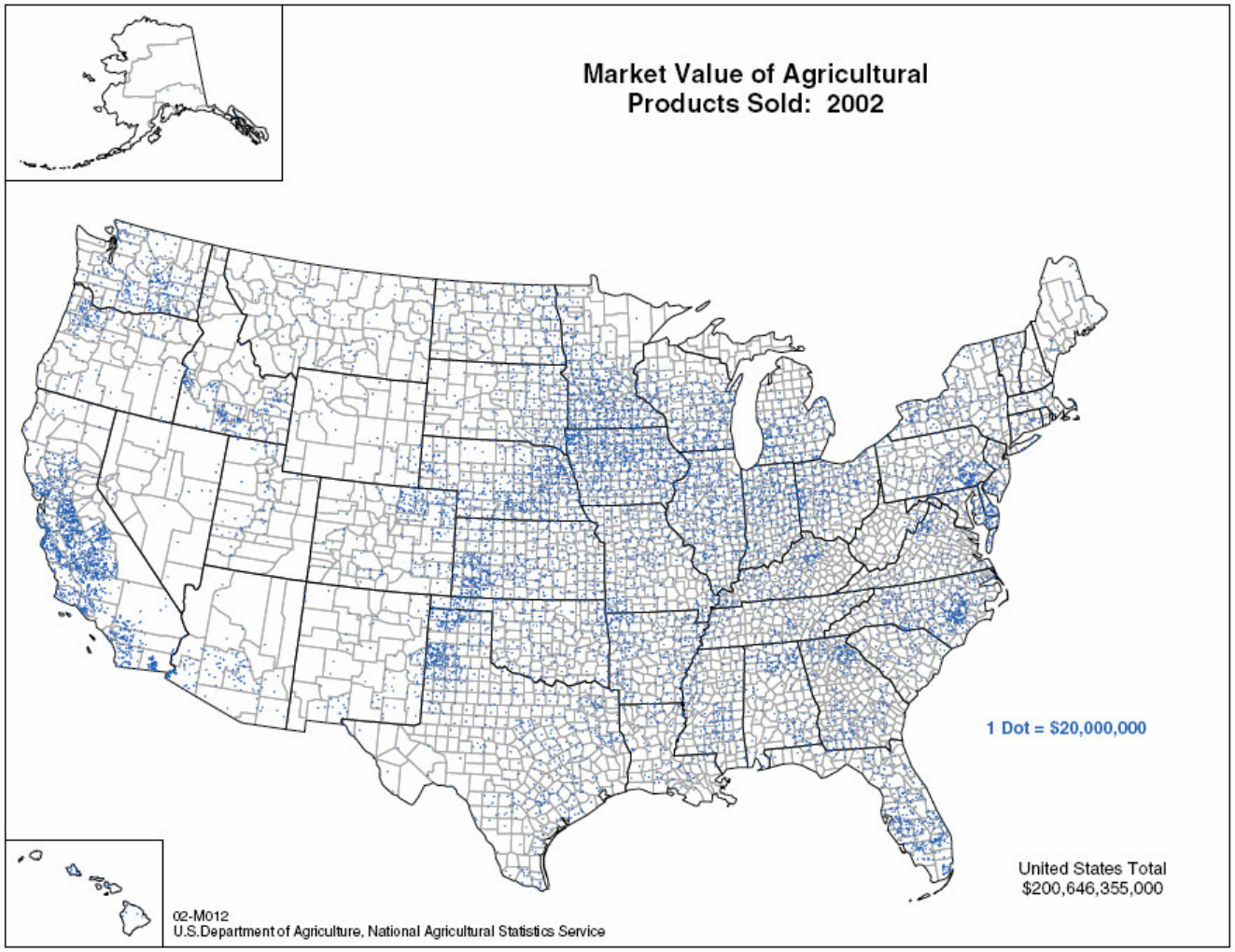


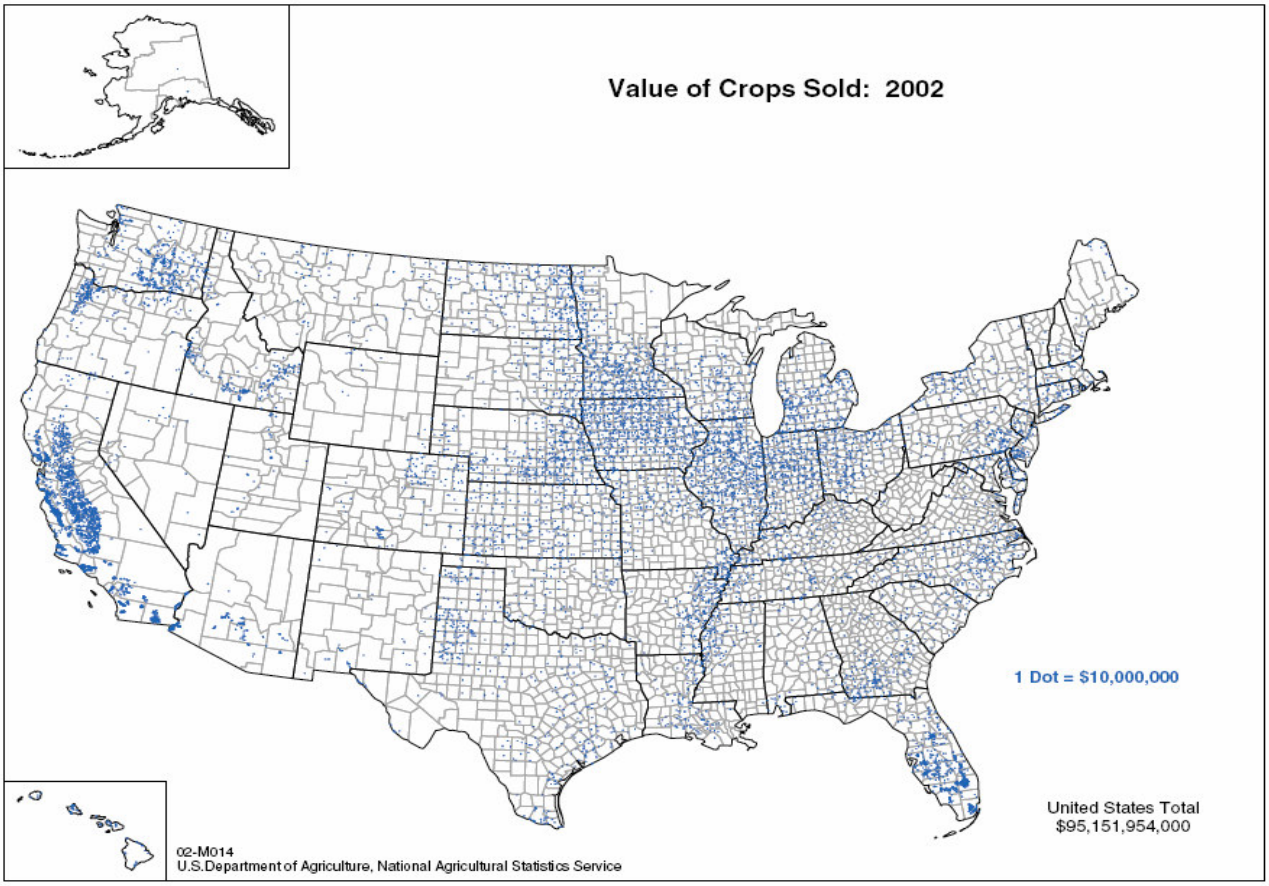
USDA farm production regions

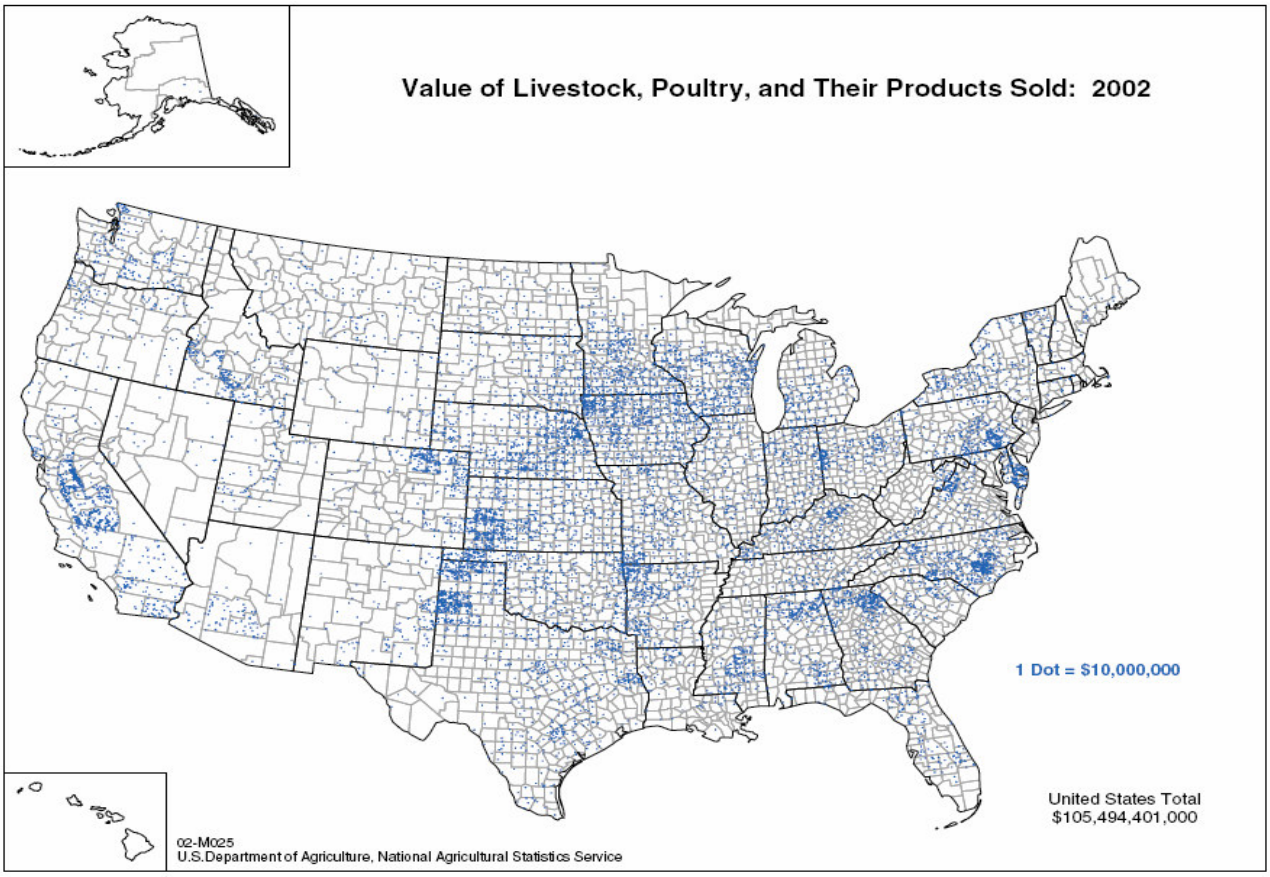


Source: Economic Research Service, USDA.

Farm real estate consists of tangible assets such as land, fencing, drainage/irrigation improvements, and buildings. For areas unaffected by land use conversion to residential or commercial uses, farm real estate values are a function of expected future net returns from crop and livestock products. The location of gross sales from all agricultural products is mapped, and also depicted are the location of crop sales and livestock sales. Real estate in areas of intense concentrations of crop sales and livestock sales would be expected to have higher agricultural use values.




Value of Crops Sold: 2002
1 Dot = $10,000,000
United States Total
$95,151,954,000
02-M014
U.S.Department of Agriculture, National Agricultural Statistics Service


Value of Livestock, Poultry, and Their Products Sold: 2002
1 Dot = $10,000,000
United States Total
$105,494,401,000
02-M025
U.S.Department of Agriculture, National Agricultural Statistics Service

U.S. Farm Real Estate Market Participants

The U.S. has 3.4 million owners of farmland. Farm operators own about 60 percent of the land they farm, and rent the remaining 40 percent from non-farm operating landlords. People rather than large organizations own most farmland: 70 percent of farmland is owned by individuals/families, 14 percent by partnerships, and 10 percent by family-held corporations. Non-family-held corporations own about 3 percent of all U.S. farmland.

The average amount of farmland owned is 270 acres per owner, but many owners own relatively small parcels. Those owning less than 50 acres account for 33 percent of the owners but only 3 percent of the land; those owners 500 acres or more account for 10 percent of the owners and 62 percent of the land. They tend to take the "long view" of farm real estate ownership with over 60 percent owning land more than 20 years.

In most agricultural regions, there are active real estate markets. Annual ownership transfers (i.e., owner reported land acquisitions) are about 5 percent of total farmland. Professional farm management services, usually hired by non-farm operating landlords, are used on about 15 percent of the farmland.

Economies of scale result in lower costs per unit and a competitive advantage for larger farm operators. These farmers aggressively expand the size of their operations by leasing. Because of capital constraints and financial risks associated with using debt, leasing is a more preferred means of acquiring control of land resources than is ownership. A high proportion of leased farmland is operated by large-scale farm operations.

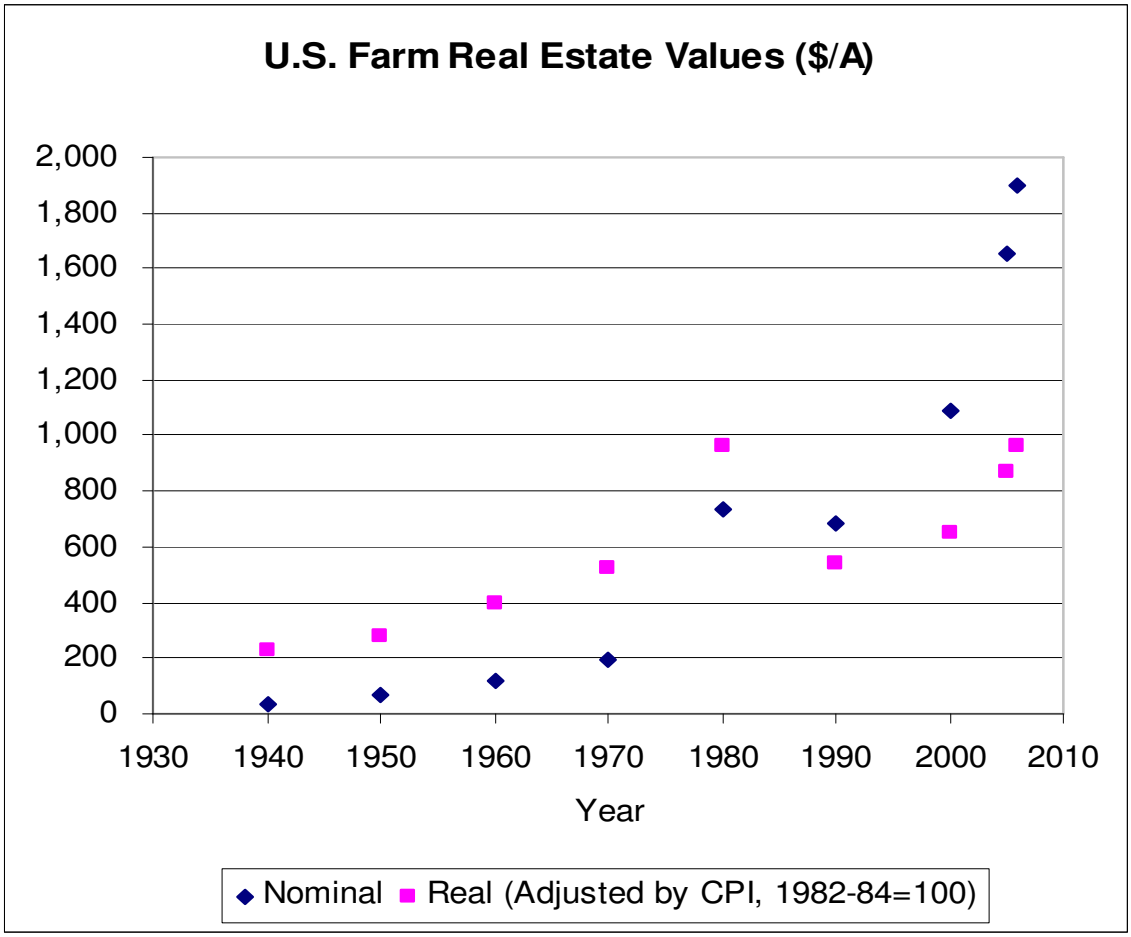
Leasing land was traditionally viewed as the bottom rung of the tenure ladder. Those with little capital might be able to farm by leasing. Young farmers might begin their careers by leasing land, often from relatives. However, leasing farmland has changed from small-scale operations or a method of entering into farming to a way for large farm operators to control more land resources.

Farm operators leased 38 percent of total farmland in 2002, down slightly from 1997 (42 percent) and 1992 (43 percent), but higher than in most census years since the turn of the century, except during the Great Depression. In many Corn Belt states, more than 50 percent of the farmland is owned by off-farm landlords. The majority of landlords are either a relative of the tenant or a retired (or other) farmer. Developers, off-farm investors, and realtors own a relatively small proportion of farm real estate.

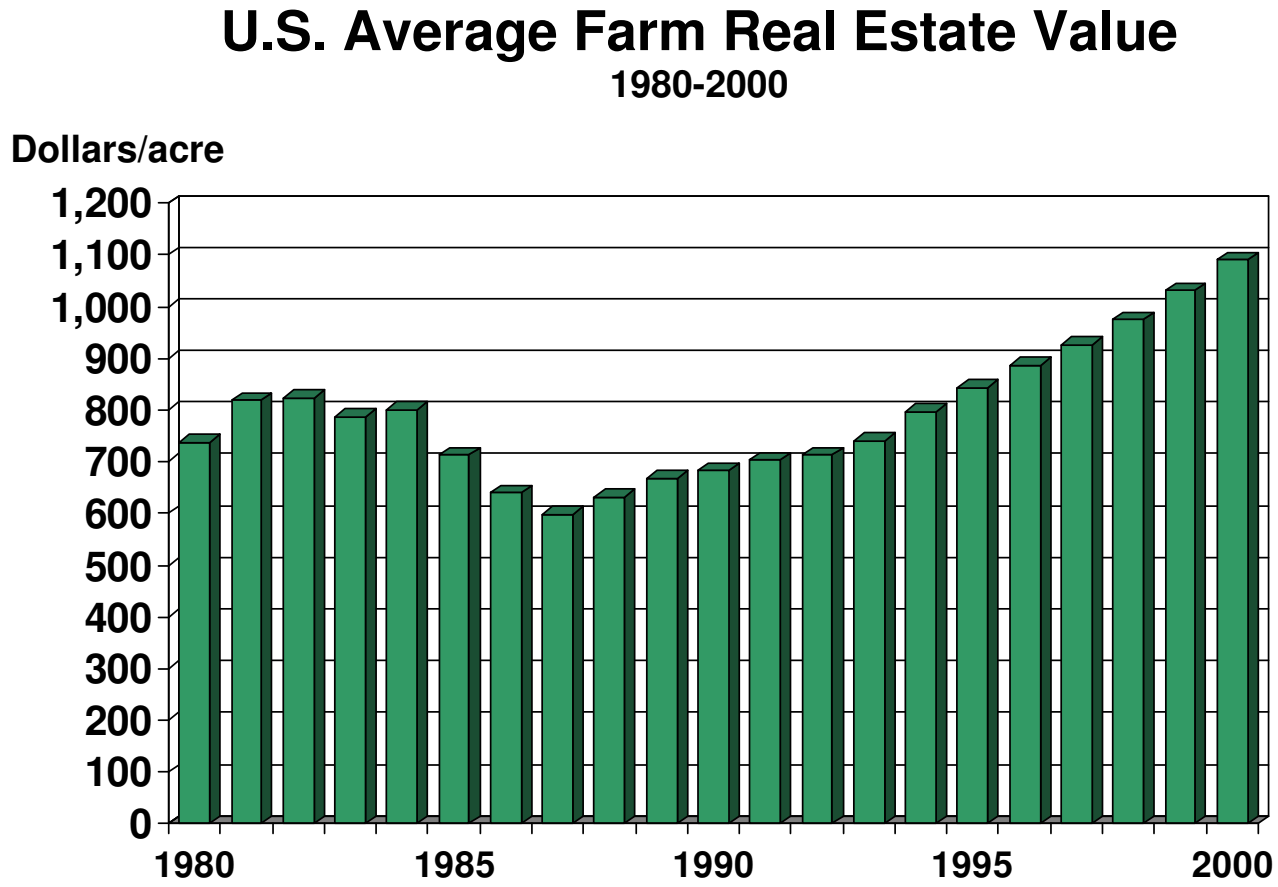
Farm operators and farm real estate owners generally use debt conservatively. The average debt-asset ratio for all farms is 10.2 percent, with large-scale farms averaging 15 percent. (Hoppe and Banker) Types of lenders making credit available to agriculture include commercial banks (40 percent market share), Farm Credit System (31 percent), individuals and others (21 percent), life insurance companies (6 percent), and USDA Farm Service Agency (3 percent). Farm Credit System, a borrower owned cooperative, has the largest share of farm real estate loans (38 percent). Commercial banks have 34 percent of the real estate loans; individuals and others, 16 percent; life insurance companies, 10 percent; and USDA Farm Service Agency (FSA), 2 percent. FSA is a government agency and is referred to as a lender of last resort because it makes direct and guaranteed loans to beginning farmers and family farms unable to obtain credit form other lenders.

U.S. Farm Real Estate Values

With the exception of 1920s, 1930s, and mid-1980s, U.S. farm real estate values have risen rather consistently in nominal and real terms. During 1940-2006, farm real estate appreciated at 6.4 percent annually, which exceeded the 4.1 percent annual inflation rate, as measured by the consumer price index.



From their low point in 1987, U.S. farm real estate values have risen substantially: 4.4 percent average annual increase during 1987-1997, and 8.3 percent average annual increase during 1997-2006. During 2005-2006, farm real estate values increased 15.2 percent.



USDA-NASS; March 2000

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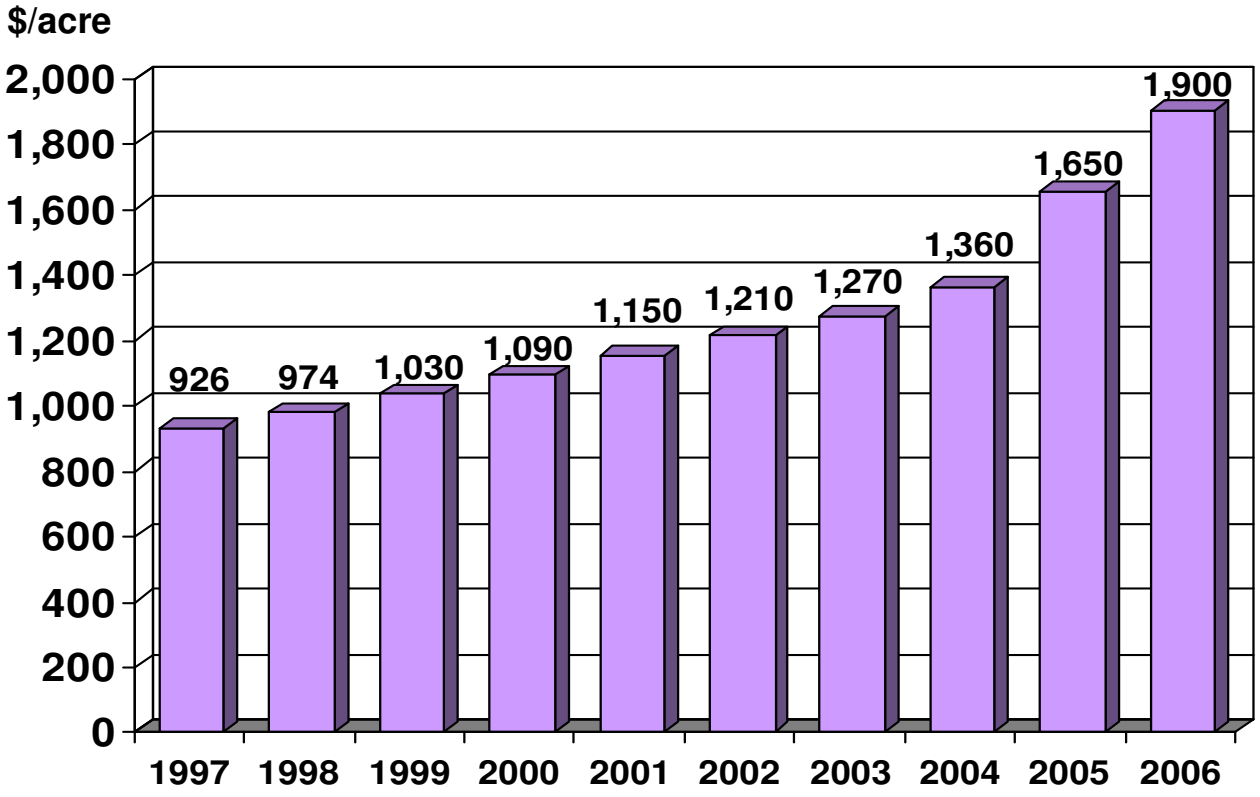
U.S. Average Farm Real Estate Value

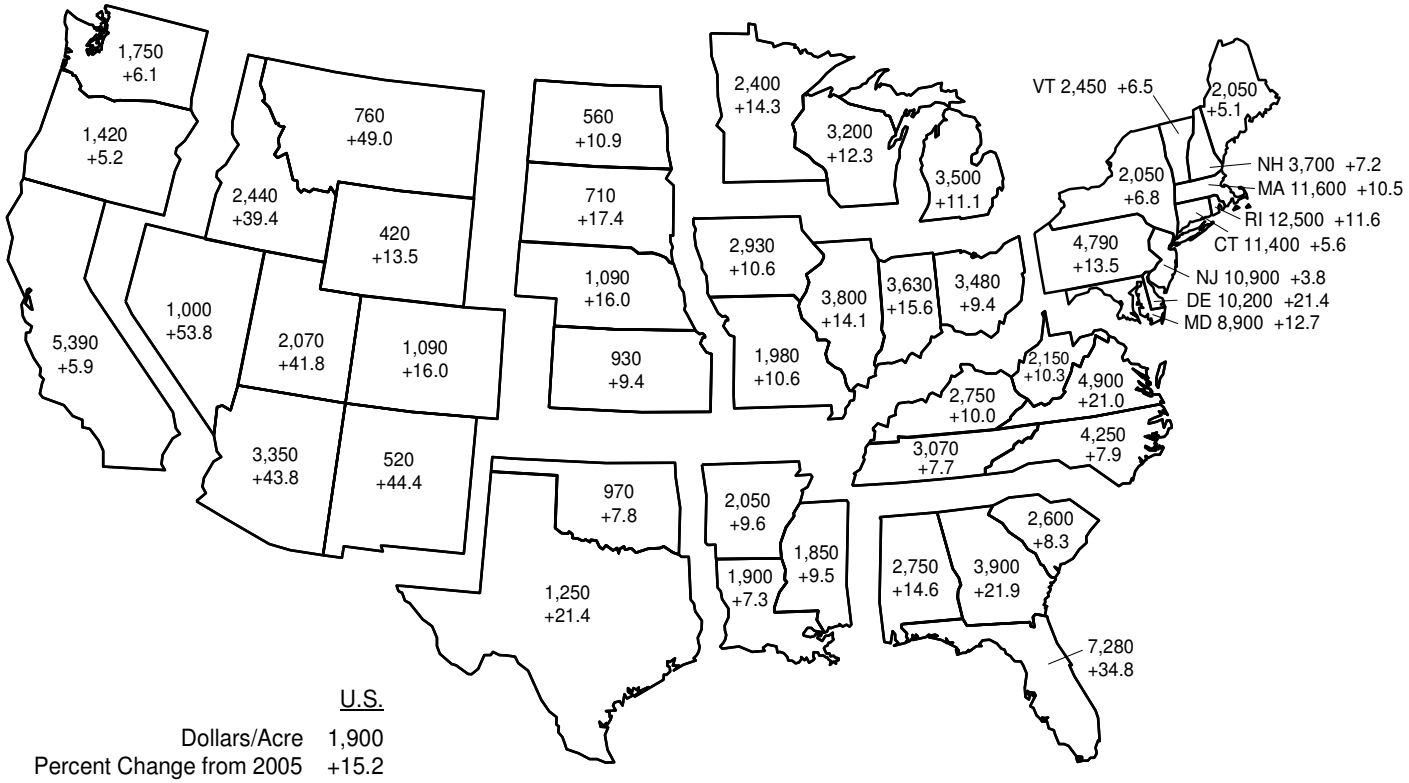
Dollars per Acre, 1997-2006



USDA-NASS; August 2006

Mapping average farm real estate values by state illustrates enormous differences in those values among states. In the mid-section of the country, average land values in 2006 are $3,230 per acre in the Corn Belt, but average $1,040 per acre in the Northern Plains region. Farm real estate values increased substantially throughout the country during 2002-2006, with average annual increases of 11 percent in the Northeast, 11.4 percent in Appalachia, and 19.9 percent in the Southeast. Annual increases in the mid-section of the country averaged 11 percent in the Lake region, 10.6 percent in the Corn Belt, 8.8 percent in the Delta region, 9.7 percent in the Northern Plains, and 12 percent in the Southern Plains. In the Mountain and Pacific regions, annual increases averaged 17.2 and 10 percent, respectively.

2006 Farm Real Estate Value by State
Dollars per Acre & Percent Change from 2005



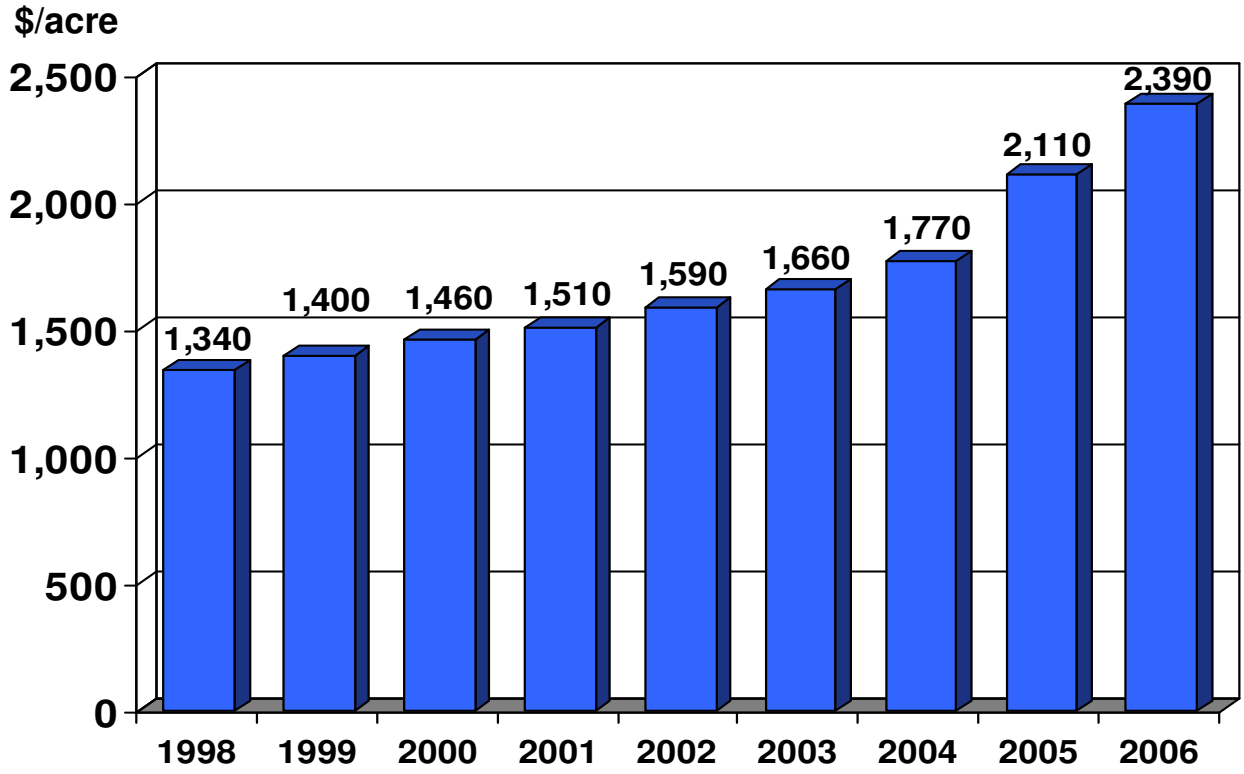
Factors Affecting Farm Real Estate Values

Both agricultural and nonagricultural factors affect the value of farm real estate. In areas where farming is the dominant land use and where land values are not influenced by neighboring development, farm real estate values are, in theory, the present value of expected future net returns to agricultural uses of farmland. For parcels located in regions economically dominated by agriculture, proximity to markets, soil productivity, temperature, rainfall and other environmental factors, parcel size, and drainage or irrigation improvements emerge as important determinants of net returns and market values. Real (i.e., inflation adjusted) interest rates are also important factors affecting real estate values. For a particular set of expected future returns, lower (higher) real interest rates imply higher (lower) market values. (Heimlich, 2003)

A variety of government policies influences net income derived from farm real estate, and thus affects market values. Several studies show that Federal commodity support programs increase farm real estate values (Featherstone and Baker, 1988; Herriges, et al., 1992, and Barnard et al., 1997) Land value impacts caused by Federal government farm programs are estimated to average 19.7 percent nationally, with large regional variation. (USDA, Economic Research Service) Likewise, local zoning and environmental regulations, property taxes, infrastructure improvement and other government policies influence farm real estate net income and thereby have some bearing on market values.

U.S. Average Cropland Value

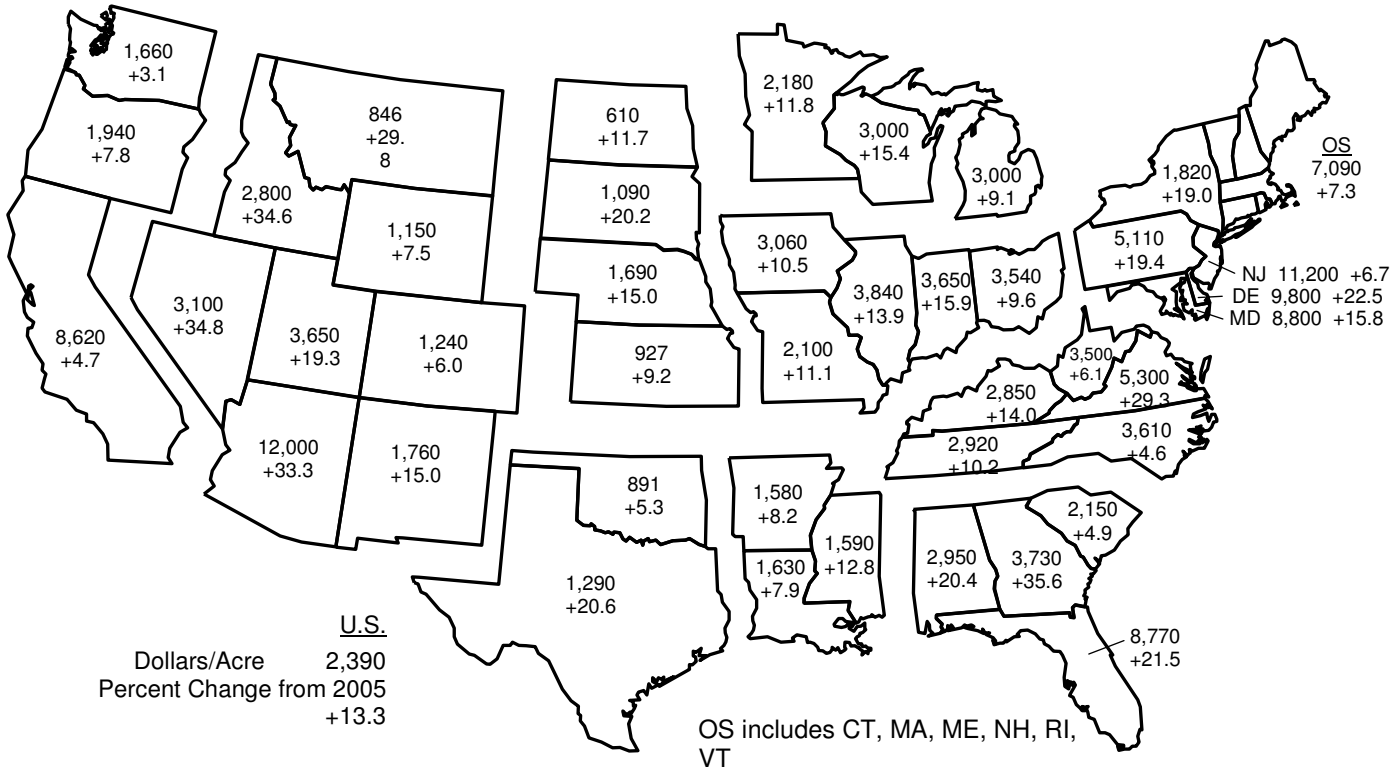
Dollars per Acre, 1998-2006



USDA-NASS; August 2006

2006 Cropland Value by State

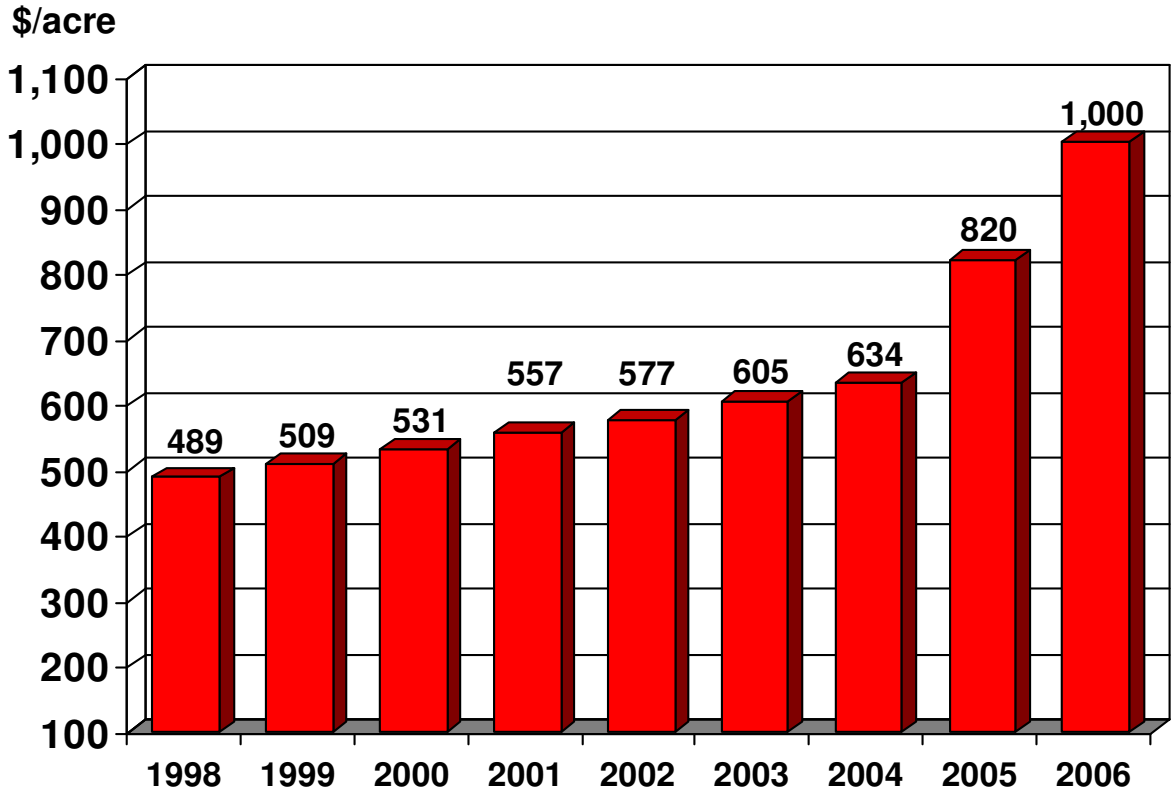
Dollars per Acre & Percent Change from 2005



USDA-NASS; August 2006

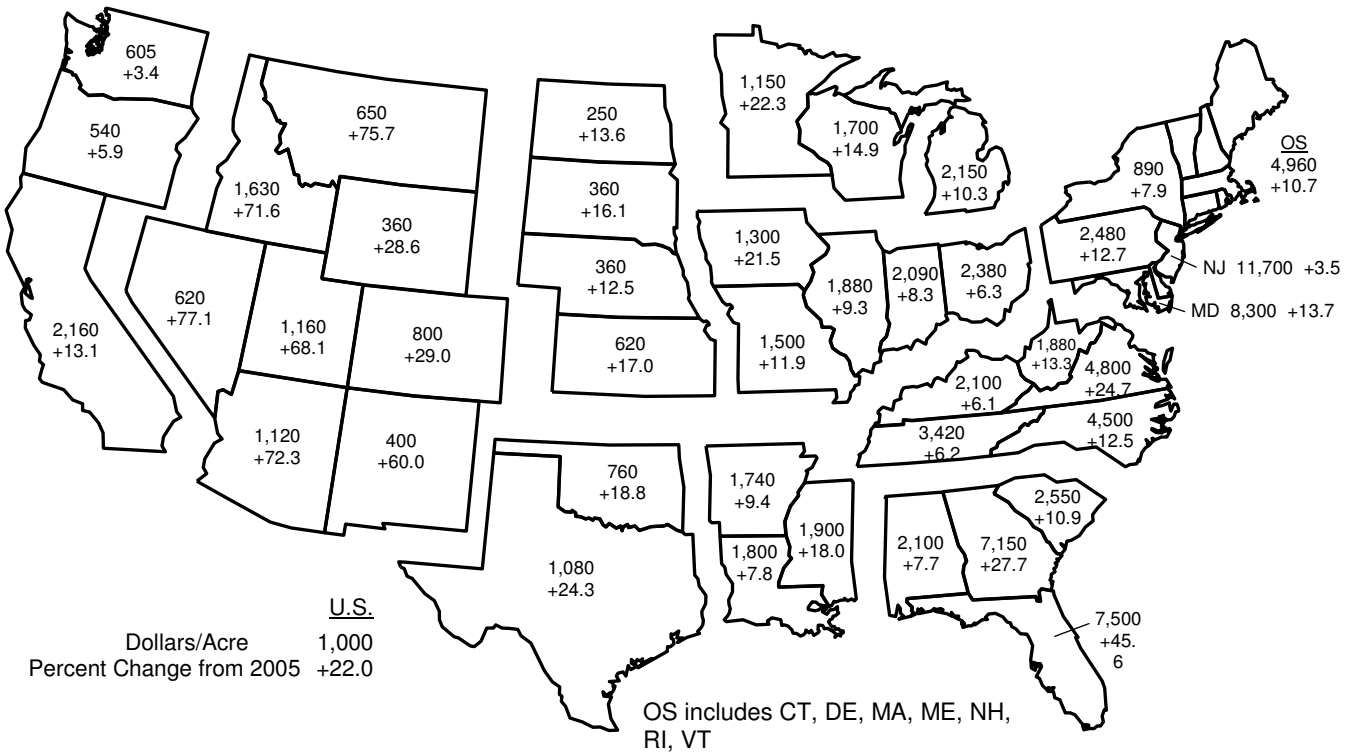
U.S. Average Pasture Value

Dollars per Acre, 1998-2006



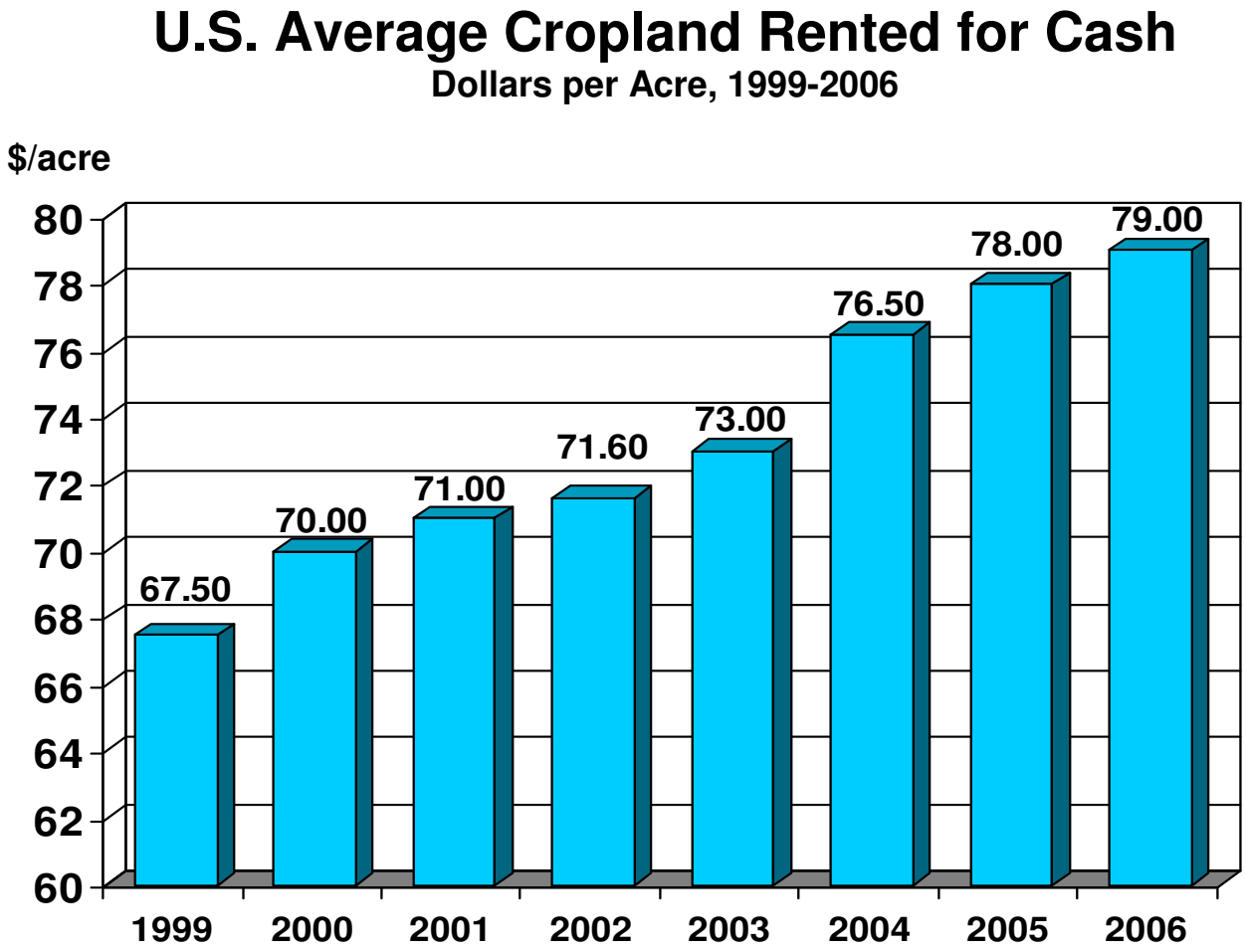
USDA-NASS; August 2006

2006 Pasture Value by State
Dollars per Acre & Percent Change from 2005



USDA-NASS; August 2006

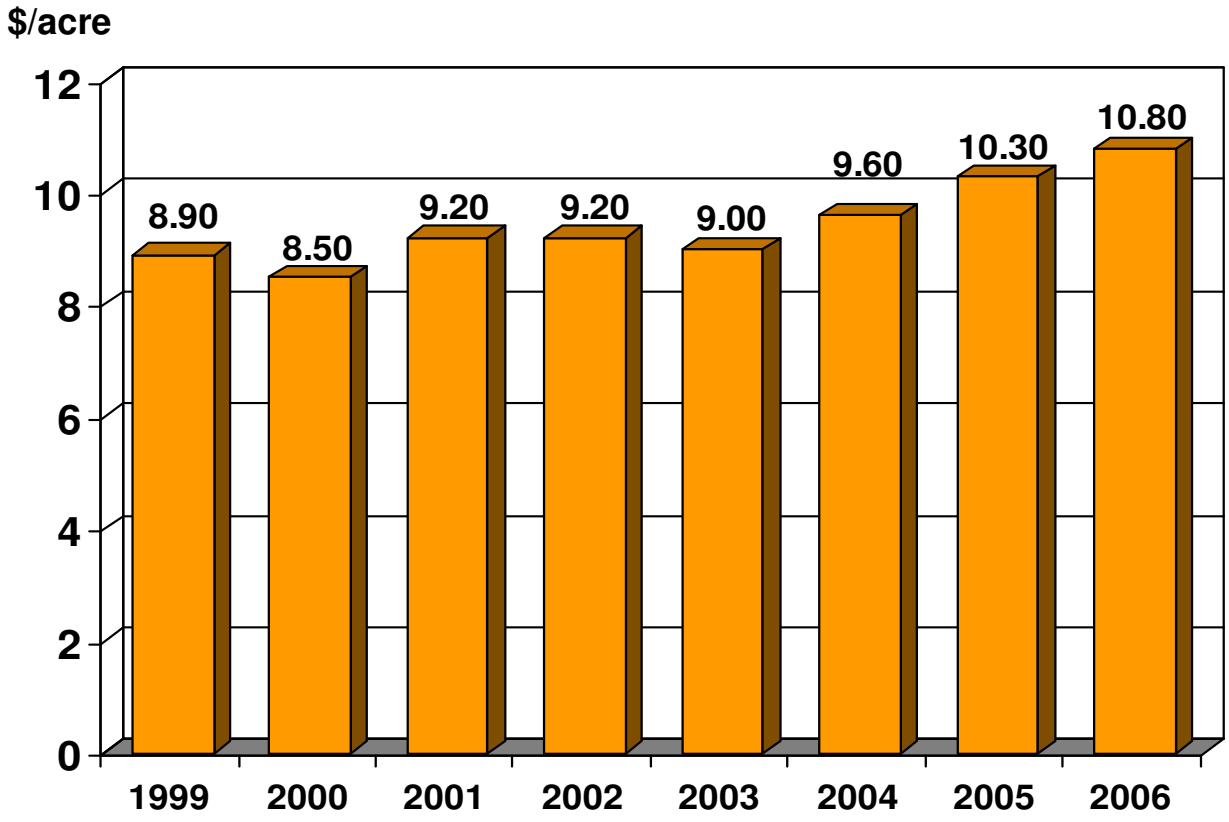
Cash rents are a measure of current net returns from agriculture, and like market values, they vary substantially from state to state.



USDA-NASS; August 2006

U.S. Average Pasture Rented for Cash

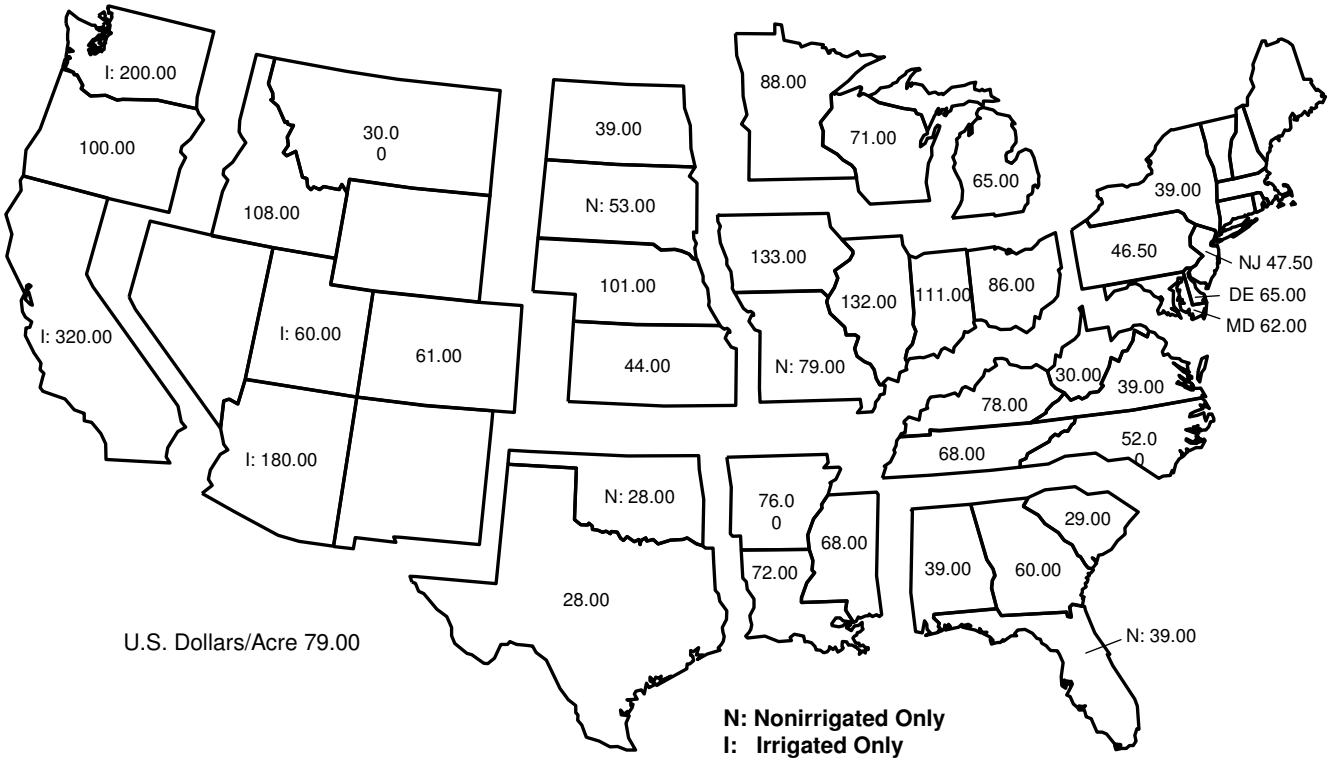
Dollars per Acre, 1999-2006



USDA-NASS; August 2006

2006 Cropland Rented for Cash by State

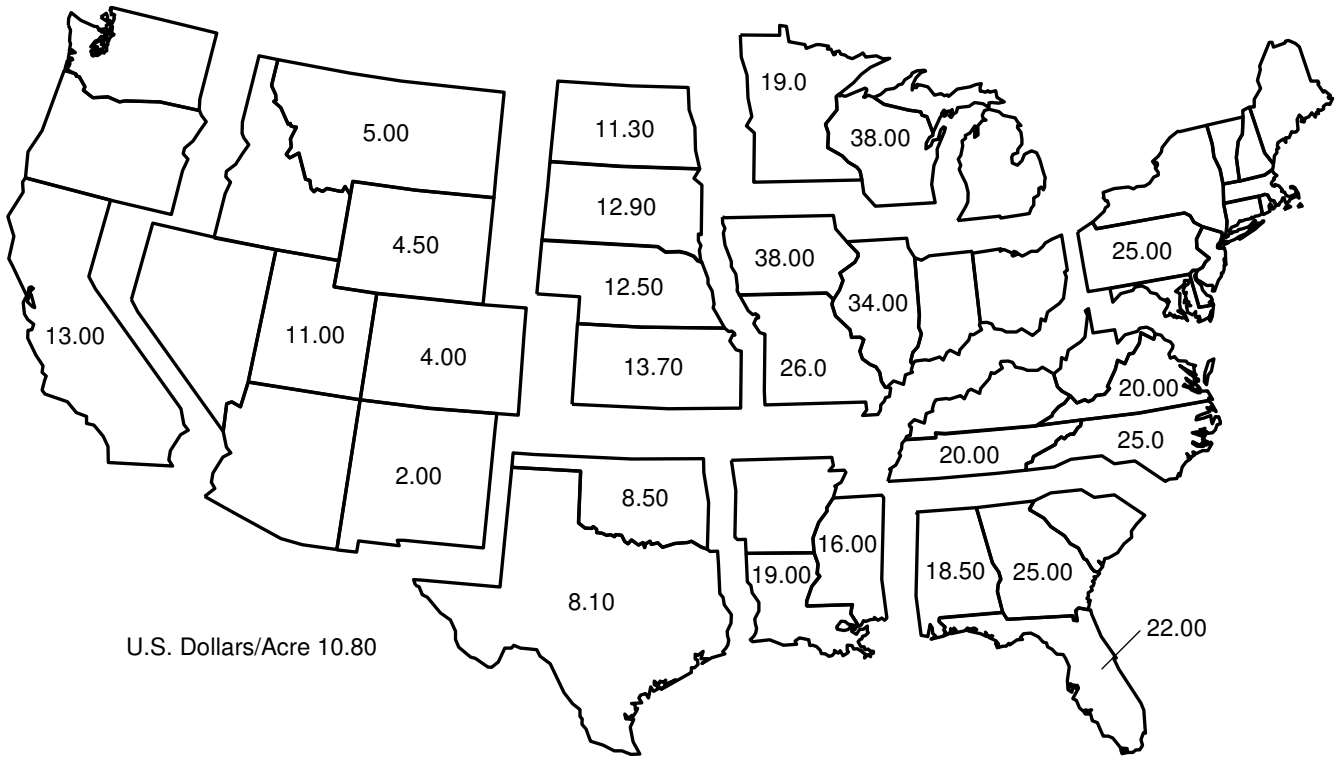
Dollars per Acre



USDA-NASS; August 2006

2006 Pasture Rented for Cash by State

Dollars per Acre



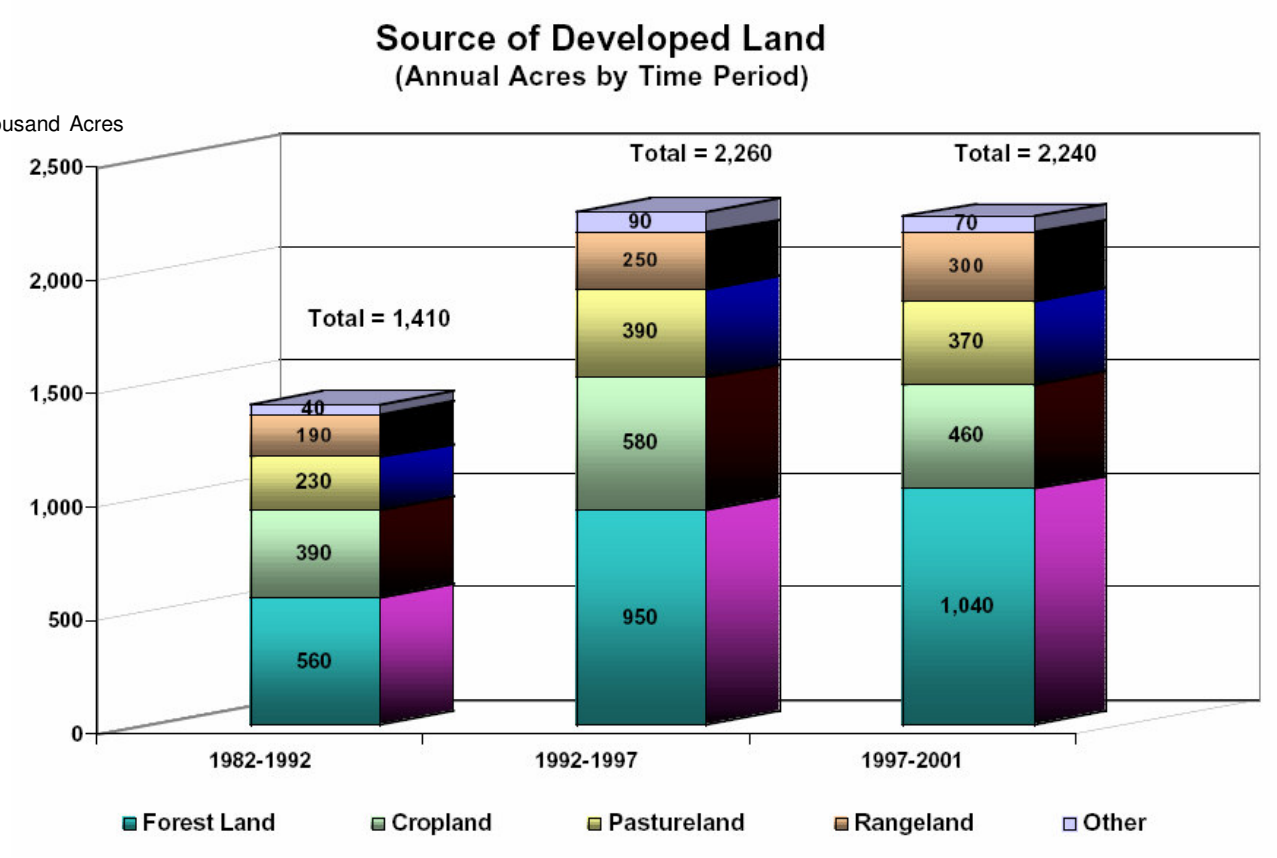
USDA-NASS; August 2006

Effects of Conversion of Farm Real Estate to Other Uses

Near cities, farm real estate values may be affected by neighboring non-farm uses of real estate and by the prospect of future conversion of real estate to non-farm use. In areas where population growth is occurring, increasing demand from residential and commercial uses causes farm real estate values to have little or no relationship with net returns from agricultural uses. In fact, demand may be highest for poor quality agricultural land because of home buyers' preferences for rolling, wooded landscapes.

Annual conversion of land to residential and commercial uses totals about 2 million acres per year. Recent conversion of cropland is about 500,000 acres per year or about 0.1 percent of total U.S. cropland. Pastureland is converted at the rate of about 400,000 acres per year, which is about 0.1 percent of total privately owned pasture land. Conversion of forest land is about 1 million acres per year or 0.2 percent of privately owned forest land. While these are relatively small land use changes, farmland conversion has ripple effects that cause substantial increases in real estate values of neighboring farms and can have some effect on land values of far-away

farms.



U.S. Department of Agriculture, Natural Resources Conservation Service, National Resources Inventory, July 2003

Even in areas where population is relatively stable, urban related influences are felt in rural real estate markets due to "exurban" development. Commuters travel long distances or telecommute in order to have a rural residence or hobby farm. Some households buy agricultural properties for building second homes or pursuing hunting, wildlife viewing, or other recreational uses. Thus, exurban development pressures may increase demand for farm real estate even in low population density regions far removed from metropolitan areas. Barnard (2000) estimates that non-farm influences account for about one-fourth of the average market value of U.S. farm real estate.

Urban land use accounts for about 15 percent of Ohio's total land area, while land in farms is 56 percent of the total. Results from a recent survey have pointed out that development affects a high proportion (nearly 50 percent) of farm real estate values in the state of Ohio (Forster et al., 2003). What explains the paradox that annual conversion of farm real estate to non-farm uses is a relatively small share of farmland but seemingly has such a large effect on farmland market values? The theory of "real options" offers some perspective.

According to the theory of real options, land values reflect discounted future net income plus the "real option" value. Where there is a prospect of land use conversion from agricultural to other use, land's market value includes an implicit call option value, which reflects potential, but uncertain, future land value appreciation and future benefits of land use conversion. The real option value is a premium in excess of the expected net present value of future net income, reflecting the opportunity cost of investing now (i.e.., converting farmland to commercial or residential use) and foregoing the option to delay investment (i.e. later land use conversion) until more information about the future becomes available (Plantinga, 1998). Real options that have been considered in the literature include capital investments, natural resources, and urban land use (Quigg, 1993).

Real options analysis has also been applied to real estate investments and development decisions. The rationale behind using option-pricing theory in real estate applications is the same as in financial options, i.e., there is uncertainty about the future and in an uncertain environment, having the flexibility to postpone action until some of that uncertainty is resolved has value (Merton, 1998). With uncertainty present, there is some value associated with keeping one's options open (Reed, 1993).

Three characteristics of many investments result in real option values (Dixit and Pindyck, 1993). First, an investment is often completely or at least partially *irreversible*, which is to say that it is not possible to completely recover it in the face of unfavorable market conditions. Therefore, the option to delay an irreversible decision can be valuable (Coggins, 1998). The second characteristic is

the *uncertainty* over the future rewards (cash flows) from the investment. The third characteristic is the leeway about the *timing* of investment; that is, one can postpone action to get more information about the future.

Holding farmland may involve a real call option because the owner/farmer has the right, but not the obligation, to keep the land in farming or to retain it for possible future development opportunity, e.g., residential or commercial construction. Exercising this real call option means that the owner is willing to sell his land and hence close the door to all future opportunities that might be brought by changing land use. Thus the land use conversion decision has an opportunity cost that must be included in the price for the land because it is an irreversible decision (Dixit and Pindyck, 1995). The rate of land use conversion of neighboring parcels, local population growth, distance to metropolitan areas, and local population density are variables that appear to affect real option values of farm real estate (Isgin and Forster, 2006).

Anecdotal evidence suggests that annual operating returns average less than 2 percent of current market value for farm real estate on the urban fringe of Ohio metropolitan areas. After conversion to residential or commercial use, annual operating returns typically are 5-15 percent of current market value. Despite higher current returns in residential or commercial development, farm real estate owners continue to use properties for agricultural use. They realize relatively low current returns, but they retain the possibility of capturing large capital gains in the future by foregoing an irreversible land use conversion decision.

Farm Real Estate Returns

Returns to farm real estate investments compare favorably with returns from other investments, such as common stock, corporate bonds, and treasuries. Furthermore, risk, as measured by the variation in return over time, is modest with farm real estate. As an investment, farm real estate has two other attractive features. First, historically it has been a hedge against inflation, with farm real estate values increasing during periods of high inflation rates. Second, there are low

correlations between farmland returns and other investment returns, suggesting that farmland is an attractive investment to reduce portfolio risk. (Irwin et al., 1988)

Average Annual Nominal Returns, 1926-2002

Asset	Mean Return	Risk Premium	Standard Deviation
Small Company Stocks	16.9%	13.1%	33.2%
Large Company Stocks	12.2	8.4	20.5
Farm Real Estate	10.5	6.7	8.2
Long-term Corp. Bonds	6.2	2.4	8.7
Long-term Govt. Bonds	5.8	2.0	9.4
Intermediate-term Govt. Bonds	5.4	1.6	5.8
U.S. Treasury Bills	3.8	-	3.2
Inflation	3.1		4.5

Sources: Ibbotson Associates. *Stocks*, *Bonds, Bills, and Inflation: 2003 Yearbook.*
Farm Real Estate returns are estimated using USDA data.
Annual Nominal Return = (Pt - Pt-1 + Dt) / Pt-1
Risk Premium equals difference between an asset's mean return and U.S. T-bill return.

Concluding Remarks

Historically, U.S. farm real estate values have appreciated both in nominal and real terms, with the exception of some relatively brief time periods. Farm real estate has been an attractive investment considering its historical rates of return, risk of those returns, its hedge against inflation, and portfolio diversification considerations. Real estate values are hypothesized to be a function of discounted future net income plus the "real option" value.

An economic system with private ownership of natural resource parcels has inherent conflicts between individual owners' self interest and aggregate well-being. (Kelso, 1977) With individual

ownership, individual maximization of economic surplus (i.e., rent) on parcels introduces behavior that may ignore externalities and public goods and the non-reproducibility of stock resources produced in consumption. Private ownership gives the owners of parcels economic power and freedom of action relative to others that are affected by use of particular units of space.

In the U.S., a range of institutions are used to deal with conflicts between the property owner and aggregate well-being. Zoning, taxes, subsidies, and other public policies directly affect economic surpluses on parcels and their market values. In a particular location, these institutions evolve and can change the owner's income and wealth dramatically. For example, in central Ohio, adoption of a "land use accord" by several local government entities is aimed at regulating conversion of farmland to residential and commercial uses in order to protect The Big Darby Creek Watershed, which is one of the last refuges supporting the native animal and plant species that were once common in many Midwestern U.S. rivers. Implementation of the accord has reduced some parcels' market value by as much as 75 percent while increasing market values of others.

Finally, if farmland conversion rates continue to grow, average farm real estate values would be expected to increase. Also, the "risk premium" might be expected to increase because of uncertainty surrounding intervention of institutions in farm real estate markets. Of course, an increased risk premium would imply higher rates of return to compensate farm real estate owners for assuming higher degrees of financial risk.

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