

Tracking Agricultural Land Conversion in Colorado

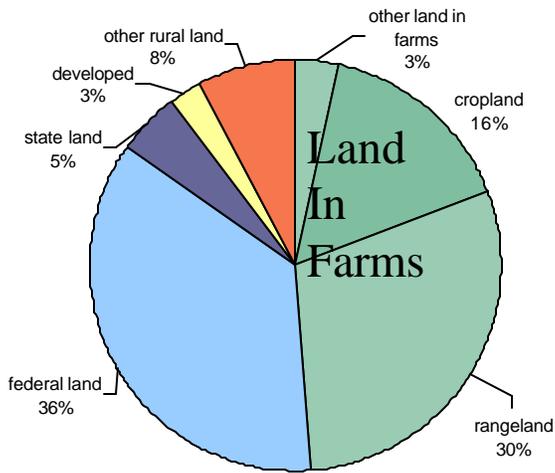
An Interagency Summary by the Colorado Department of Agriculture, Natural Resources Conservation Service, and Colorado Agricultural Statistics Service^{1,2}

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Figure 1

Colorado 1997 Land Use Totals

Total land area of state: 66.6 million acres



HOW MUCH AG LAND IS IN COLORADO?

- Colorado had 32.6 million acres of agricultural land (land in farms and ranches) in 1997, 49% of the state's total land area of 66.6 million acres (**Figure 1**). Another 36% was federally owned, of which a large percentage was leased for agricultural production.
- Agricultural land represents more than 85% of the *private*, undeveloped land in the state.³
- Cropland comprises 16% (10.7 million acres) of the total land area of the state and irrigated land 5% (3.4 million acres).

HOW QUICKLY IS CURRENT AGRICULTURAL LAND CONVERTED?

- Between 1987 and 1997, 1.4 million acres of agricultural land was converted to other land uses. This acreage is equivalent to an area 20 miles wide and 109 miles long (about the distance from Denver to Pueblo – **Figure 2**).

- Agricultural land conversion in Colorado is **accelerating**. From 1987 to 1997, the average annual rate of conversion was **141,000** acres per year. Between 1992 and 1997, the rate of conversion nearly doubled the 10 year average at **270,000** acres per year.
- County scale patterns of agricultural land change are displayed in **Figure 3**. This figure shows high growth counties (such as Weld, Boulder, and Larimer) experiencing high percentages of agricultural land conversion.⁴

Figure 2

Magnitude of Agricultural Land Conversion
To scale with the map of Colorado, the green rectangle represents the area of agricultural land converted from 1987 - 1997.

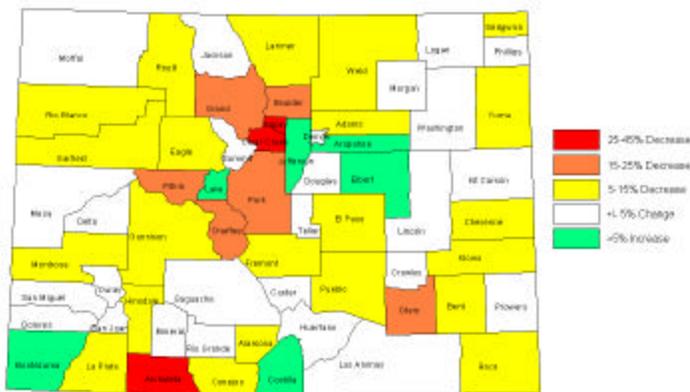


Figure 3

County Agricultural Land Percentage Change (1987-1997)



¹Editors: Bill Obermann and Dr. David Carlson, Colorado Department of Agriculture, Resource Analysis Section; John Batchelder, student intern.

²Unless otherwise noted, statistics are taken from the 1987, 1992, and 1997 Federal Census of Agriculture, conducted by the Department of Commerce, Bureau of the Census in 1987 and 1992, and the National Agricultural Statistics Service (USDA) in 1997.

³The percent of private, undeveloped land $\geq 49\%$ ($49\% + 8\%$) $\geq 85\%$. 49% represents Land in Farms and 8% represents other rural land in Figure 1.

⁴Some of the green counties showing agricultural land gain could signify the headquarters of an operation are in that county. In the Federal Census, all land acreage maintained in a multi-county operation is attributed to the county where the headquarters is located.

WHAT HAPPENS TO CONVERTED AGRICULTURAL LAND?

- Agricultural land in Colorado is being converted in three primary ways: urban and built up lands, low density non-agricultural rural land, and public open lands (Table 1).

Table 1

What is agricultural land converted into?

28,000 ac/yr + X + Y = 141,000 ac/yr		
Urban & Built Up	Low Density, Non Agricultural Rural Land	Public Open Land
- residential	- large acre home sites	- non agriculture open space
- commercial	- transitional lands	- state parks
- industrial	- other rural land/waste	- wilderness
- highway	- ???	- wildlife habitat
NRI: 28,000 ac/yr	X	Y

- The Urban and Built Up estimate is developed by the USDA-NRCS National Resources Inventory (NRI), which shows this land use increased by 28,000 ac/yr from 1987 to 1997.
- Some land no longer in farming and ranching is converted to 35-acre ranchettes and other low density rural residential use. This converted land is frequently classified as agricultural land in the NRI.⁵ The average amount of acres converted per year is unknown (Variable X).
- Some agricultural land is converted by local, state, and federal government into public lands such as parks, wilderness, and other types of public open space.⁶ This annual rate of conversion is unknown (Variable Y).

IS COLORADO'S HIGH QUALITY AGRICULTURAL LAND UNDER CONVERSION PRESSURE?

- Colorado has **1.7 million acres**⁷ of prime agricultural land (a classification for high quality agricultural land that meets soil composition and slope requirements ideal for food and fiber production), about 2.5% of the state's total land base. Due to the semi-arid climate of the state, all prime agricultural land in Colorado must be irrigated.
- Figure 5** shows a strip 24 miles wide and 109 miles long, representing the acreage of prime agricultural land currently available in the state.
- The state's 3.4 million acres of irrigated agricultural land generates nearly \$1 billion in revenue. Currently, 20% of the irrigated land in the state depends on finite water resources, such as the Ogallala Aquifer in eastern Colorado.

Figure 5

To scale with the area of Colorado, the blue rectangle represents the amount of prime farmland currently available.



OTHER INFORMATION SOURCES:

Other resources involved with the agricultural land conversion issue include:

- County tax assessors** collect information annually on nine categories of agricultural land. These categories are summarized by county in an annual report published by the Department of Local Affairs, Division of Property Taxation.
- Several private and public **GIS** (Geographic Information System) **databases** may indicate high quality farmland under high conversion pressure. The **American Farmland Trust** (<http://www.farmland.org>) has developed a coarse GIS to track agricultural land conversion.

⁵ In the NASS estimates, the land area within a 35-acre ranchette that is no longer used in an agricultural enterprise is removed entirely from the Census inventory. In the NRI process, only the portion where buildings exist are removed from an agricultural land classification; the remaining land is classified as rangeland, forest land, etc.

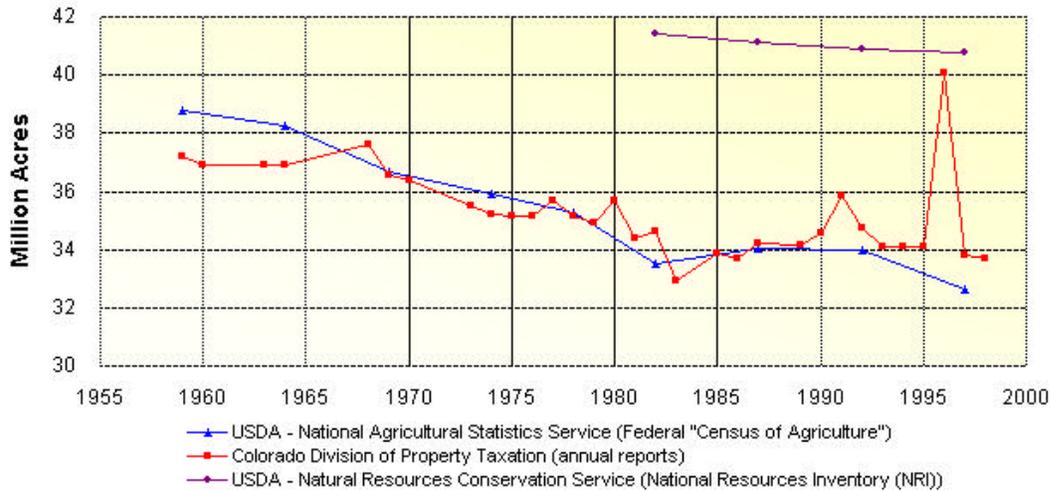
⁶ Some public lands are leased back to agriculture, mostly for livestock grazing. Of such lands, variable Y would only include per-acre leases. Land leased on a per head or AUM basis is not included in the agricultural land statistics published by NASS-USDA.

⁷ Table 9, 1997 National Resources Inventory (NRI) Summary Report, page 39.

Agricultural Land Use/Land Cover Inventories

<u>Agency</u>	<u>USDA/NASS/CASS</u> NASS: National Agricultural Statistics Service, Washington DC CASS: Colorado Agricultural Statistics Service, Lakewood, CO		<u>USDA/NRCS</u> Natural Resources Conservation Service	<u>Division of Property Taxation</u>
<u>Inventory</u>	Colorado Agricultural Statistics	1997 Federal Census of Agriculture Vol 1, Geographic Area Series, Part 6, State and County Data	The 1997 National Resources Inventory (NRI)	1998 Annual Assessor Summary Report
<u>Objective</u>	Annual estimates of ag production and value, number of operations, and land operated.	County summary of number of farms, land use, production, demographic, and economic data.	To report on conditions and trends of soil, water, and related resources.	To summarize county assessor reports for property tax assessment.
<u>Scale</u>	State: Number of operations, land operated, livestock number, and economic data.	State: Very minor amount of crop and livestock commodities. County: Most commodities, land uses, operations, & economic/demographic data.	Statewide, MLRA (Major Land Resource Areas), & Hydrologic Subregions	County
<u>Frequency</u>	Annual (published in July for previous year).	Years ending in 2 & 7 (published in March two years later).	Every 5 years	Annual
<u>Last Survey</u>	2000 edition for 1999 year.	1997 (published March 1999)	1997	1998
<u>Agricultural Land Definition</u>	All land operated by any place that normally produces \$1,000 or more of agricultural products during the reference year. Includes cropland, livestock acreage, idle land, land in set aside or commodity programs and wasteland. Excludes public, industrial, and grazing association land leased on a per head (AUM) basis.		No definition for ag land. Can be inferred by aggregating certain land use/land cover types.	Any private land used to produce agricultural products.
<u>Agricultural Land Categories in Survey</u>	Cropland (irrigated and non irrigated), Rangeland, Pastureland, CRP land, Woodland, and Other Rural Land.		Cropland, CRP land, Rangeland, Pastureland, Forestland, and Other Rural Land.	Sprinkler and Flood Irrigated land, Dry land, Meadow Hay land, Grazing land, Orchard land, Waste land, Timberland, Other Ag Property
<u>Methodology</u>	Quarterly sample surveys of farms and ranches with a known probability of selection. Estimation/Imputation used for non-response.	All known farms and ranches surveyed. Estimation/Imputation used for non-response.	Analysis of sample survey areas by remote sensing, aerial photography, and local NRCS information.	[TO BE INSERTED]
<u>Error of Survey</u>	Not Applicable	State: 0.5% ($\pm 163,171$ ac.) relative standard error. County: 0.5-11% relative standard error.	[TO BE INSERTED]	[TO BE INSERTED]
<u>Advantages</u>	Annual publication of estimates. Smaller sample surveys are less costly.	Comprehensive land use, commodity, economic, and demographic county data by types and size of operation.	Determines what agricultural land is converted into (i.e., rangeland into pastureland or rangeland into developed land).	Detailed annual agricultural land inventory within each county.
<u>Limitations</u>	Addresses conversion on a statewide scale. No indication what ag land is converted into.	Frequency (only every five years) and the large number of operations contacted is very costly. Also, no indication what ag land is converted into.	Results reported on a statewide basis. Does not capture all land taken out of ag production where low density development exists.	Not developed for use as an agricultural land inventory.
<u>Contacts</u>	CASS: http://www.nass.usda.gov/co/ NASS: http://www.usda.gov/nass Phone: 303-236-2300 / 1-800-392-3202		http://www.nhq.nrcs.usd.gov/NRI Phone: 303-655-1691	http://www.dola.state.co.us/dpt/dpt.htm

Colorado Agricultural Land Conversion Trends



- The above graph shows changes in total agricultural land over time using three data sources. These differences in agricultural land acreage between sources are due to differences in survey methods and agricultural land definitions used by each inventory (see page 3). Note that the NRI shows a much larger amount of agricultural land than either the Census or annual Taxation reports. This is due to the NRI classifying land not in agricultural production as rangeland and other agricultural land use types (see page 2).

COLORADO'S LAND BASE											
COLORADO LAND IN FARMS: 1997 (USDA - NASS)											
TABLE 2: NASS DATA WITH NRI CROSTABS	CROPLAND					WOODLAND	OTHER LAND		TOTALS	Land NOT in Farms	NRI TOTALS
	Harvested cropland	Cropland used only for pasture or grazing	in cover crops; not harvested or pastured	in cultivated summer fallow	cropland idle and all crops failed	pastured and not pastured	pastureland & rangeland other than cropland and woodland pastured	land in house lots, ponds, roads, waste land			
NRI CATEGORIES	Cropland	5,896,984		small-0	2,380,384	141,069			8,418,437	441,663	8,860,100
	CRP Land			792,306		598,105			1,890,200	small-0	1,890,200
	Pastureland						681,895		1,268,900	small-0	1,268,900
	Rangeland								19,557,443	4,297,157	23,854,600
	Forest Land						495,948		495,948	3,232,852	3,728,800
	Other Rural Land							1,003,293	1,003,293	168,707	1,172,000
	Developed Land							small-0	small-0	1,705,600	1,705,600
	Water Areas							small-0	small-0	350,500	350,500
	Federal Land							small-0	small-0	23,793,800	23,793,800
	NASS TOTALS	5,896,984	700,536	792,306	2,380,384	739,174	1,177,843	19,943,701	1,003,293	32,634,221	33,990,279

WHITE CELLS INDICATE PUBLISHED DATA BY USDA-NASS AND USDA-NRCS
 GREEN CELLS INDICATE CONSENSUS INFERENCE BY EXPERTS THAT THESE CELLS SHOULD BE AT 0 (OR SMALL IF NOTED)
 YELLOW CELLS INDICATE NUMBERS FILLED IN AFTER DECIDING WHICH CELLS SHOULD BE 0
 ORANGE CELLS INDICATE CELLS THAT CANNOT BE FILLED IN WITH CERTAINTY

- The chart above relates NRCS land use/cover types with agricultural land uses defined by NASS. The "Land NOT in Farms" column shows several NRCS agricultural land uses contain excess acreage when compared to NASS categories. One example is the 4,297,157 acres classified as rangeland by the NRCS that is not classified by NASS. Much of this land is state land leased for livestock grazing and land in a low density, rural area that is not in agricultural production (see page 2).