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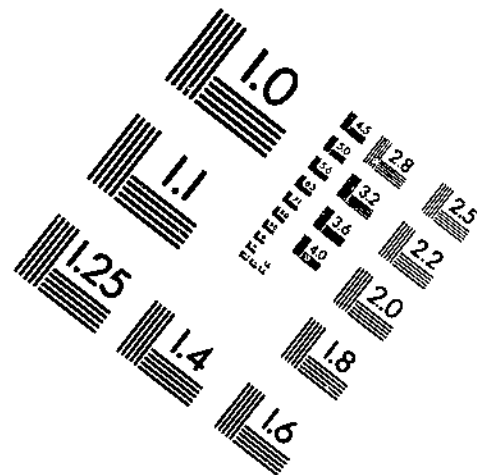
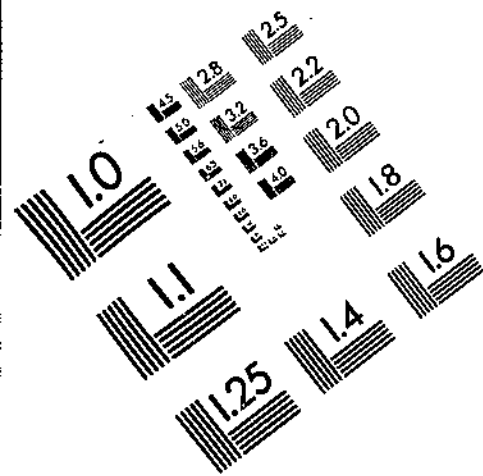
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FARM TYPE, AND SIZE ANALYSIS. (STATISTICAL BULLETIN.) / C.
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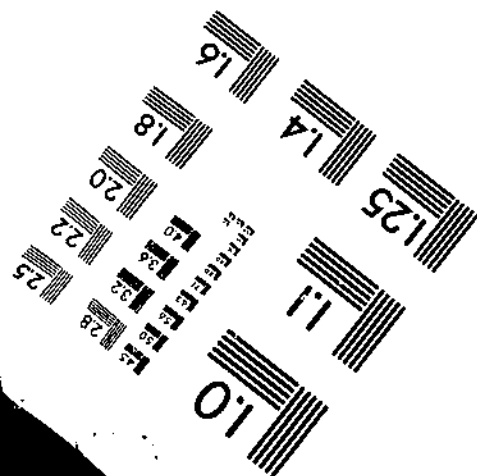
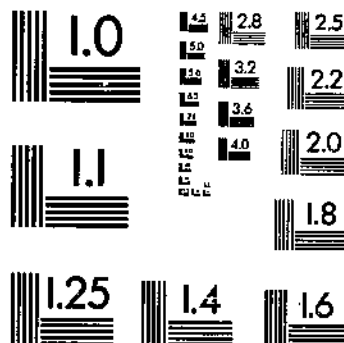
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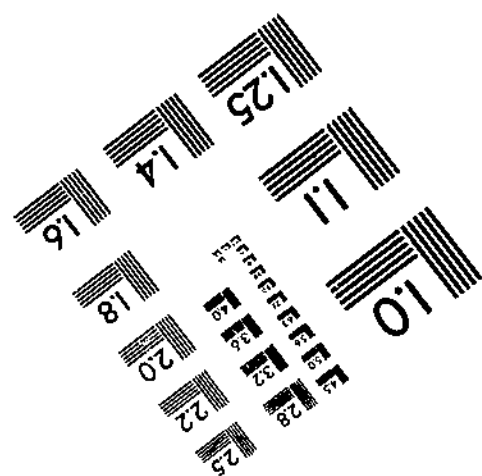
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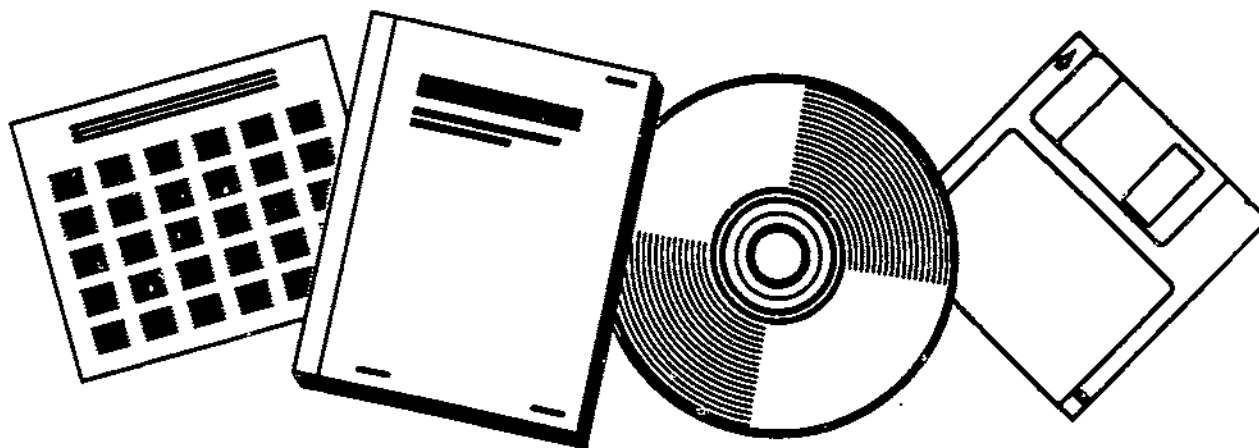
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PROFITABILITY OF FARM BUSINESSES: A REGIONAL, FARM TYPE, AND SIZE ANALYSIS

(U.S.) ECONOMIC RESEARCH SERVICE, WASHINGTON, DC

JUN 94



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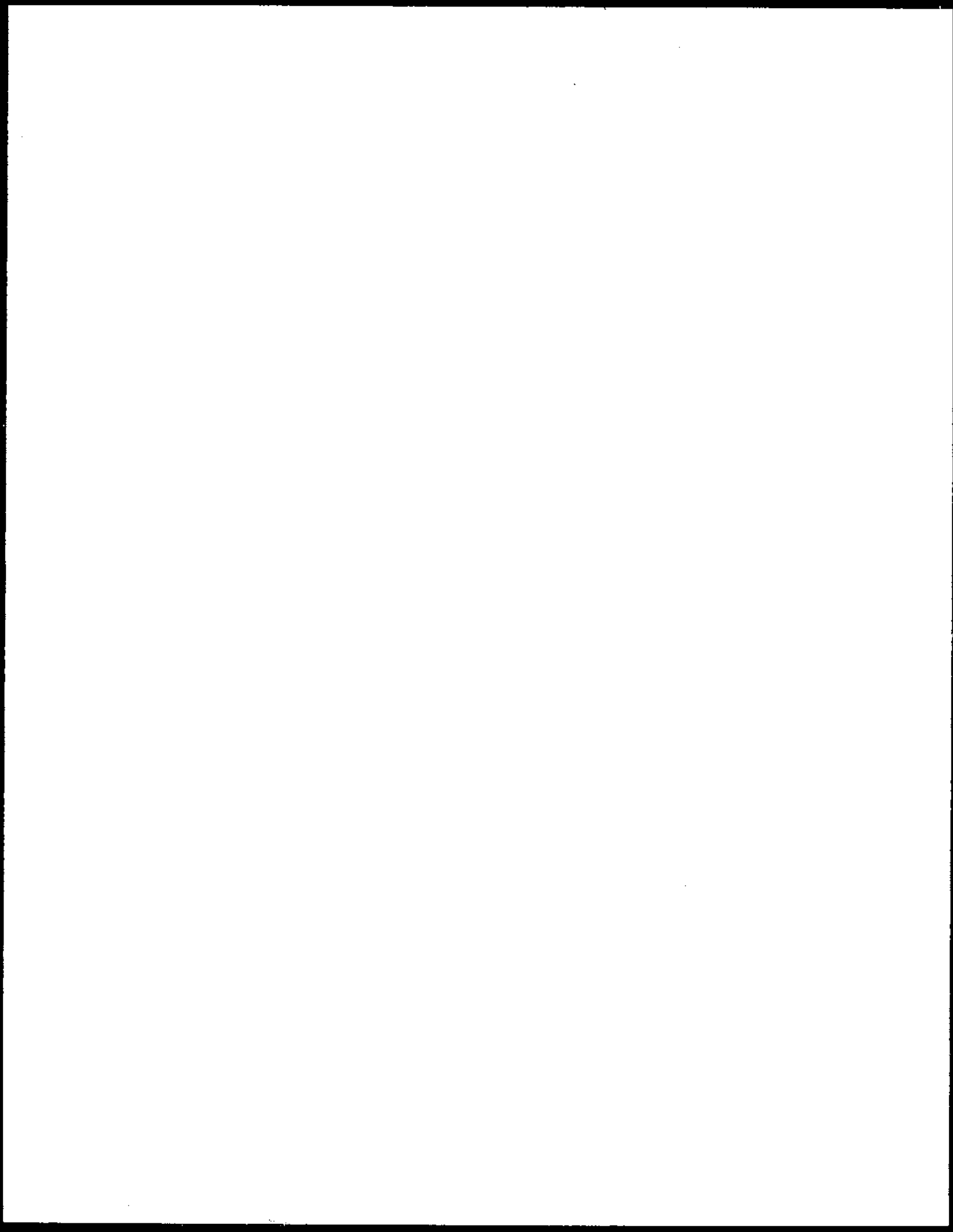
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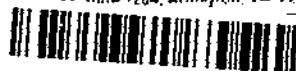
Abstract: Detailed information is given on farm business profits during 1987-91 among the various U.S. production regions, production specialties, and farm sizes. The report uses recent data to show the wide income variance among farms, a third of which are not profitable, and shows the major part played by larger and more specialized farms in the total production of U.S. agriculture. Average returns on assets including capital gains are determined for farms of the various regions, production specialties, and farm sizes. Farm incomes are compared against the returns of U.S. Treasury bills on the same value of capital investment.



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Detailed information is given on farm business profits during 1987-91 among the various U.S. production regions, production specialties, and farm sizes. The report uses recent data to show the wide income variance among farms, a third of which are not profitable, and shows the major part played by larger and more specialized farms in the total production of U.S. agriculture. Average returns on assets including capital gains are determined for farms of the various regions, production specialties, and farm sizes. Farm incomes are compared against the returns of U.S. Treasury bills on the same value of capital investment.

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Profitability of Farm Businesses

A Regional, Farm Type, and Size Analysis

Charles B. Dodson



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About this report... Detailed information is given on farm business profits during 1987-91 among the various U.S. production regions, production specialties, and farm sizes. The report uses recent data to show the wide income variance among farms, a third of which are not profitable, and shows the major part played by larger and more specialized farms in the total production of U.S. agriculture. Average returns on assets including capital gains are determined for farms of the various regions, production specialties, and farm sizes. Farm incomes are compared against the returns of U.S. Treasury bills on the same value of capital investment.

This analysis of farm business profitability uses farm-level data from the U.S. Department of Agriculture's Farm Costs and Returns Survey, 1987-91. USDA has regularly published aggregate estimates of profitability for the U.S. farm sector. Sector estimates, however, provide little insight as to the profitability of individual farm businesses. This report examines farm business profitability by production regions, production specialties, and farm size. The report also provides information on the importance of specialized farms in U.S. production agriculture.¹

Profitability Measures

Net farm income, net cash income, percentage of farms with negative net farm income, and returns to assets are all indicators of farm business profitability. Net farm income equals gross cash and noncash income (inventory change, nonmoney income) less cash and noncash production expenses (depreciation, perquisites to hired labor), while net cash income equals gross cash income less cash expenses.

¹Specialized farms were defined as those which have 50 percent or more of the total value of production contributed by one enterprise or a group of like enterprises.

Returns on assets provide additional information on the performance of the farmer's investment. I estimated returns on assets with the following equation:

$$\text{Returns on assets} = \frac{\text{Net farm income} - \text{management charge} - \text{unpaid family labor} + \text{interest paid}}{\text{Total assets}}$$

The imputed management charge, 5 percent of the net value of production, was consistent with other USDA studies using FCRS data (Morehart, Johnson, and Banker).² The FCRS provided information on the hours of unpaid labor supplied by family members. Unpaid family labor costs were subsequently estimated using farm wage rates provided by National Agricultural Statistics Service (NASS) surveys (USDA, *Farm Labor*). Total assets are normally valued using an annual average. The FCRS, however, provided only end-of-year estimates of assets and debt. Farm-level net farm income was calculated using a method consistent with recommendations of the Farm Financial Task Force (American Bankers Association, 1991, p. 53).

Estimated aggregate U.S. farm income is an appropriate measure for analyzing sector performance over time and for comparing farm sector performance with that of other sectors of the U.S. economy. Sector estimates, however, are inappropriate as a measurement of the profitability of individual farm operators. Sector estimates conceal much of the individual farm-level variation and also include income received by contractors and landlords. Production agriculture is very heterogeneous, with broad variation observed in size, types of commodities produced, and geographic location of farm businesses. Estimates of aggregate U.S. net farm income ranged from \$39 billion to \$47 billion from 1987 to 1991 (USDA, 1992).

²Names in parentheses refer to items cited in References.

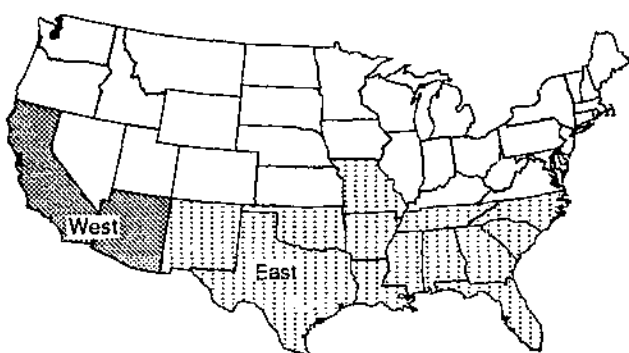
Table 1—Production specialties, production regions, and annual sales classes used in analysis of farm profitability

Production specialty	Production region	Annual sales class	Production specialty	Production region	Annual sales class
Cotton	West	All farms	Vegetables	West	Over \$40,000 \$40,000 and under
	East	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under		East	Over \$40,000 \$40,000 and under
Corn-sorghum-soybeans ¹	Midwest	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under	Beef	Midwest	Over \$100,000 \$40,000 to \$100,000 \$40,000 and under
	Plains	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under		Southeast	Over \$100,000 \$40,000 to \$100,000 \$40,000 and under
	Southeast	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under		Plains	Over \$100,000 \$40,000 to \$100,000 \$40,000 and under
Peanuts	All U.S.	Over \$100,000 \$100,000 and under	Dairy	West	Over \$100,000 \$40,000 to \$100,000 \$40,000 and under
Rice	Delta and Texas	All farms		Northeast	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under
Small grains ²	South Central	Over \$100,000 \$100,000 and under		North Central	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under
	North Central	Over \$100,000 \$100,000 and under		South	Over \$250,000 \$100,000 to \$250,000 \$100,000 and under
	Northwest	Over \$100,000 \$100,000 and under		West	Over \$250,000 \$250,000 and under
Tobacco	Flue-cured	Over \$40,000 \$40,000 and under	Hogs	North Central	Over \$100,000 \$100,000 and under
	Burley	All farms		Southeast	Over \$100,000 \$100,000 and under
Fruit and tree nuts	West	Over \$40,000 \$40,000 and under		All U.S.	Over \$100,000 \$100,000 and under
	South	Over \$40,000 \$40,000 and under	Poultry	All U.S.	Over \$100,000 \$100,000 and under
	North	Over \$40,000 \$40,000 and under		All U.S.	Over \$40,000 \$40,000 and under
Nursery and greenhouse	All U.S.	Over \$40,000 \$40,000 and under	Sheep	All U.S.	Over \$40,000 \$40,000 and under

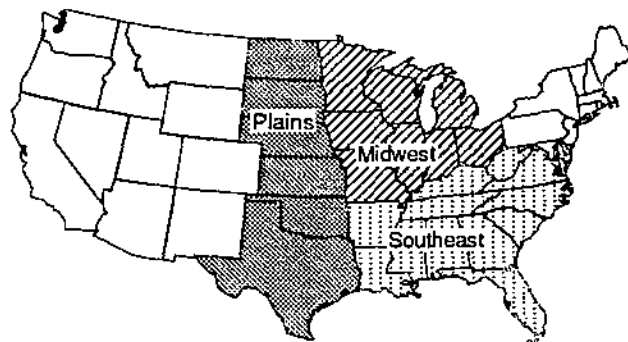
¹Farms where the cumulative production of corn, sorghum, and soybeans was greater than 50 percent of the total value of farm production.

²Farms where the cumulative production of wheat, barley, and oats was greater than 50 percent of the total value of farm production.

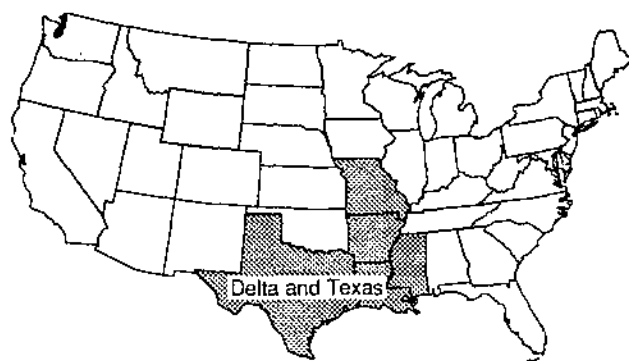
Figure 1
Production regions for specialized crop farms¹



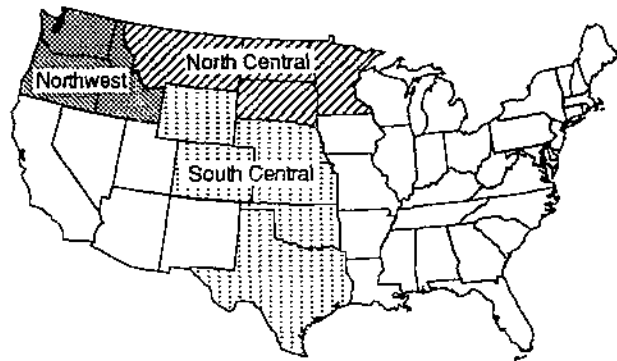
Cotton



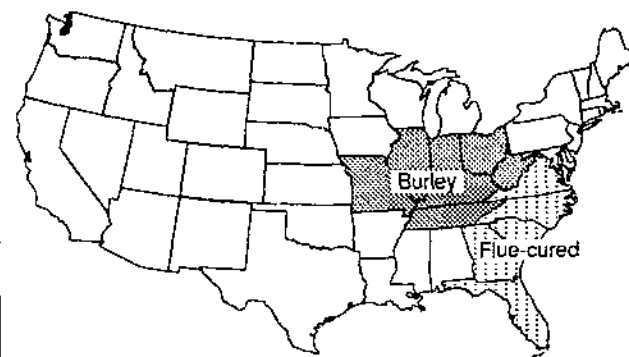
Corn-sorghum-soybeans



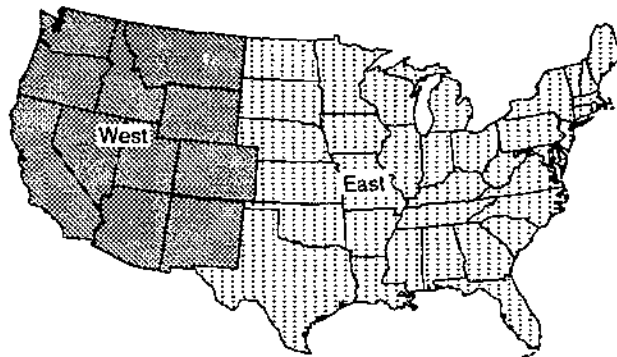
Rice



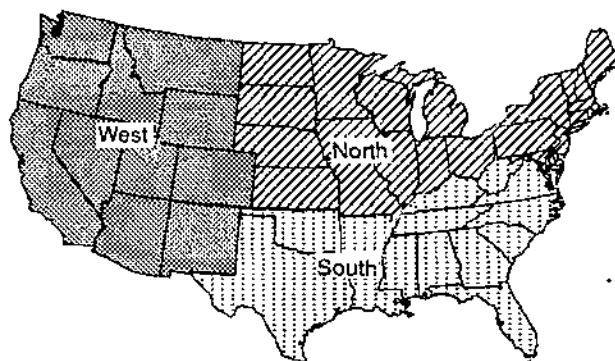
Small grains



Tobacco



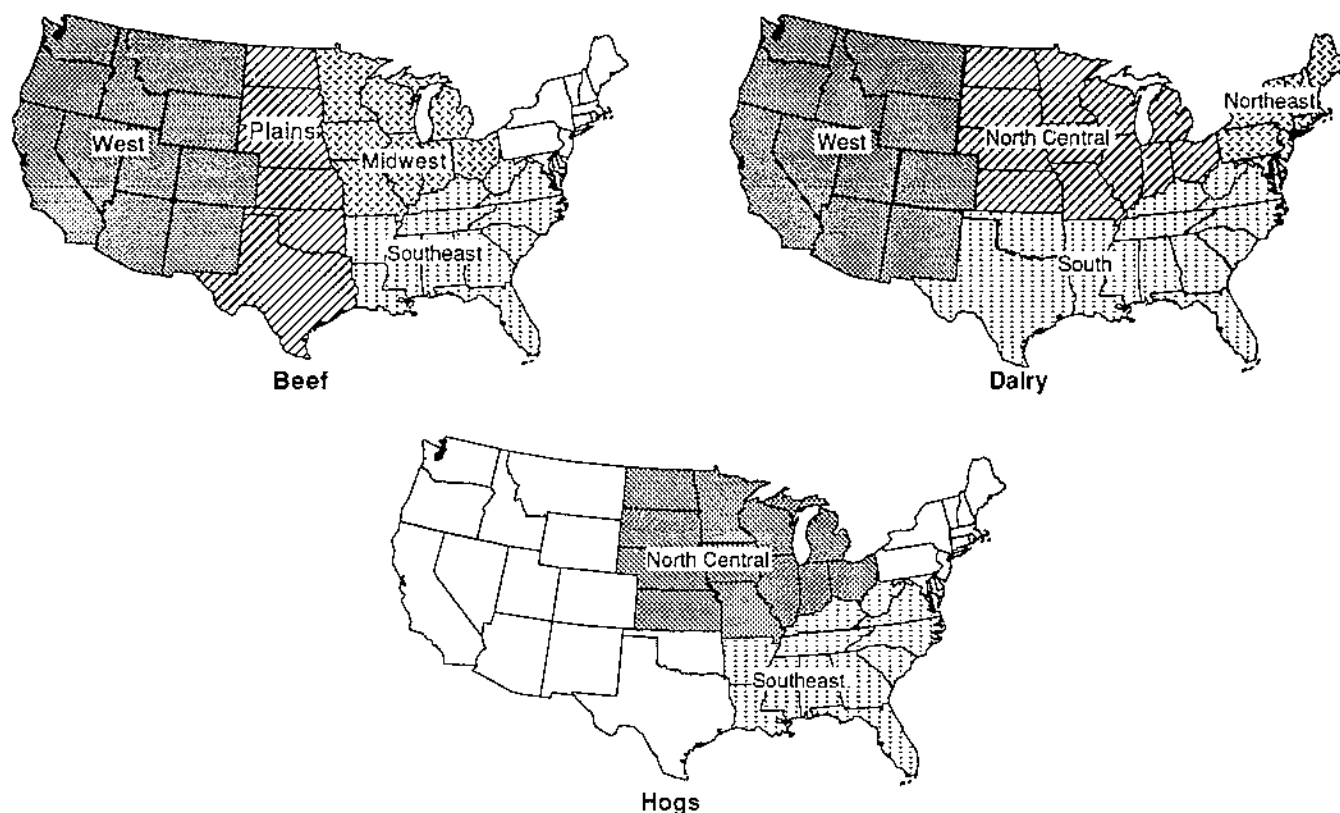
Vegetables



Fruit and tree nuts

¹No production regions are included for either nursery and greenhouse or peanuts, which were analyzed at only the U.S. level.

Figure 2
Production regions for specialized livestock farms¹



¹No production regions are included for either poultry or sheep, which were analyzed at only the U.S. level.

Northwest regions produce a combination of barley and wheat, with wheat accounting for over two-thirds of individual farm production over the 1987-91 period (table 4). On South Central farms specializing in small grains, wheat accounted for 68 percent of individual farm production. A corn-soybean rotation accounts for nearly 80 percent of individual farm production on Midwest corn-sorghum-soybean farms (table 5). On Plains corn-sorghum-soybean farms, corn accounted for about 50 percent of individual farm production, with soybeans, sorghum, and wheat accounting for a majority of the remaining production. On Southeast corn-sorghum-soybean farms, soybeans were the predominant commodity.

Smaller Farms Contribute Little to U.S. Production

Table 6 shows the distribution of individual commodity production by sales class. This differs from the production specialty, region, and sales class categories presented in tables 2-5. Over the 1987-91 period, farms

with annual sales of \$250,000 or more contributed 51 percent of total U.S. production (table 6). While farms with annual sales less than \$40,000 represented 68 percent of all farms and controlled 41 percent of all assets, these contributed only 9 percent of total production. These smaller farms contributed less than 20 percent of production for all commodities except sheep, oats, and tobacco. Farms with annual sales greater than \$250,000, on the other hand, accounted for about two-thirds of the production of fruit and tree nuts, vegetables, cotton, nursery, and sugar beets.

Profitability of Specialized Farms

Large specialized farms significantly influence the performance of the U.S. agricultural sector because of their importance in production and control of assets. Many specialized farm types displayed strong profitability as measured by returns to assets, net cash income, capital gains, total returns, and positive net farm income.

Table 2—Specialized U.S. crop farms: Production of each commodity as a share of specialized farm production and of total U.S. production of each commodity, 1987-91 average¹

Production specialty, region, and annual sales class	Share of each commodity in—	
	Specialized farm production	U.S. production
	Percent	
Cotton	79	74
East	78	60
Over \$250,000	77	35
\$100,000 to \$249,999	81	18
Under \$100,000	80	7
West	78	14
Peanuts	73	73
Over \$100,000	72	56
\$100,000 and under	76	17
Rice	NA	NA
Delta and Texas	72	53
Tobacco	81	74
Flue-cured region	80	49
Over \$40,000	79	43
\$40,000 and under	84	6
Burley region	82	25
Fruit and tree nuts	87	93
West	92	63
Over \$40,000	92	59
\$40,000 and under	93	4
South	93	15
Over \$40,000	94	14
\$40,000 and under	83	1
North	87	93
Over \$40,000	83	13
\$40,000 and under	90	1
Nursery and greenhouse	83	95
Over \$40,000	83	92
\$40,000 and under	87	3
Vegetables	80	67
West	78	36
Over \$40,000	78	35
\$40,000 and under	91	1
East	85	31
Over \$40,000	84	27
\$40,000 and under	93	4

NA = Sufficient data not available.

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 3—Specialized U.S. livestock farms: Production of each commodity as a share of specialized farm production and of total U.S. production of each commodity, 1987-91 average¹

Production specialty, region, and annual sales class	Share of each commodity in—	
	Specialized farm production	U.S. production
	Percent	
Beef	73	73
Northeast	77	1
Midwest	68	13
Over \$100,000	7	9
\$40,000 to \$100,000	67	1
Under \$40,000	72	3
Southeast	75	9
Over \$100,000	76	4
\$40,000 to \$100,000	71	1
Under \$40,000	76	4
Plains	72	30
Over \$100,000	72	23
\$40,000 to \$100,000	87	3
Under \$40,000	72	4
West	79	20
Over \$100,000	80	16
\$40,000 to \$100,000	75	2
Under \$40,000	76	2
Dairy	90	97
Northeast	93	25
Over \$250,000	90	8
\$100,000 to \$250,000	94	13
Under \$100,000	90	4
North Central	84	36
Over \$250,000	81	9
\$100,000 to \$250,000	83	16
Under \$100,000	85	11
South	92	15
Over \$250,000	90	11
\$100,000 to \$250,000	88	3
Under \$100,000	82	1
West	93	21
Over \$250,000	93	19
\$250,000 and under	90	2
Hogs	81	68
North Central	67	61
Over \$100,000	66	50
\$100,000 and under	73	12
Southeast	76	5
Over \$100,000	80	4
\$100,000 and under	57	1
Poultry	96	95
Over \$100,000	93	45
\$100,000 and under	98	49
Sheep	79	68
Over \$40,000	79	55
\$40,000 and under	71	13

¹See figure 2 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91

Table 4—Specialized U.S. small-grain farms: Production of each commodity as a share of specialized farm production and of total U.S. production of each commodity, 1987-91 average¹

Region and annual sales class	Share of each commodity in—					
	Specialized farm production			U.S. production		
	Barley	Wheat	Sorghum	Barley	Wheat	Sorghum
	<i>Percent</i>					
South Central	1	68	6	10	16	10
Over \$100,000	2	72	7	8	8	5
\$100,000 and under	1	74	5	2	8	3
North Central	17	63	—	37	17	—
Over \$100,000	18	62	—	29	12	—
\$100,000 and under	14	67	—	9	5	—
Northwest	14	68	—	19	11	—
Over \$100,000	13	68	—	15	10	—
\$100,000 and under	19	67	—	4	2	—
Total U.S.	11	67	2	66	43	10

— = Less than 0.5 percent.

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 5—Specialized U.S. corn-sorghum-soybean farms: Production of each commodity as a share of specialized farm production and of total U.S. production of each commodity, 1987-91 average¹

Region and annual sales class	Share of each commodity in—							
	Specialized farm production				U.S. production			
	Corn	Soybeans	Sorghum	Wheat	Corn	Soybeans	Sorghum	Wheat
	<i>Percent</i>							
Midwest	45	39	—	3	55	55	3	8
Over \$250,000	47	36	—	3	18	16	1	2
\$100,000 to \$250,000	44	39	—	3	22	22	1	3
\$100,000 and under	42	43	—	4	15	17	1	3
Plains	51	18	9	7	16	6	37	4
Over \$250,000	56	15	6	7	6	2	8	1
\$100,000 to \$250,000	51	17	10	7	6	2	15	2
\$100,000 and under	46	23	12	7	4	2	14	1
Southeast	19	45	2	12	4	10	5	5
Over \$250,000	18	42	2	10	2	4	2	2
\$100,000 to \$250,000	20	43	2	14	1	3	2	2
\$100,000 and under	18	54	2	13	1	3	1	1
Northeast	43	31	8	—	1	1	—	1
Total U.S.	44	66	5	2	76	72	45	19

— = Less than 0.5 percent.

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 6—Distribution of individual commodity production by annual sales class, 1987-91

Commodity	Annual sales class		
	\$250,000 and over	\$40,000 to \$249,999	\$39,999 or less
	Percent		
Feed grains:			
Corn	38	55	7
Sorghum	30	60	10
Barley	38	55	7
Oats	21	57	22
Food grains:			
Wheat	35	56	9
Rice	54	44	2
Oilseeds:			
Soybeans	35	55	10
Peanuts	55	39	6
Cotton	65	32	2
Tobacco	31	42	27
Fruit	67	26	7
Nursery	81	16	3
Vegetables	77	18	6
Sugar beets	75	23	2
Livestock:			
Beef	55	30	14
Hogs	47	46	7
Sheep	46	33	21
Poultry	32	50	18
Dairy	48	50	2
All commodities	51	39	9

Source: USDA Farm Costs and Returns Survey, 1987-91.

Returns on Assets and Farm Size

Returns on assets increased as farm size increased. Farms that had less than \$40,000 in annual sales typically had average returns on assets that were less than zero. Average returns on assets for the smaller dairy, tobacco, corn-soybean, hog, beef, small-grain, vegetable, and fruit and nut farms were negative over the 1987-91 period, while the average return on assets for farms with sales greater than \$100,000 were positive for all classifications (tables 7-9).

Large Cotton, Grain, Nursery, and Western Vegetable Farms Were Most Profitable

The more profitable farms included the larger Eastern cotton, Plains grain, Western vegetable, and all U.S. nursery farms. Each of these farm types had average

returns on assets for the 5-year period exceeding 10 percent. Larger Southern dairy farms, tobacco farms in the flue-cured region, and Midwestern and Southeastern corn-sorghum-soybean farms consistently provided average returns on assets of more than 6 percent.

Capital Gains Benefited Midwest Farmers

Real estate represented a significant investment for farm businesses, making up about 75 percent of total assets. Hence, a large proportion of a farmer's increase in wealth can be attributed to capital gains on real estate. For this analysis, it was assumed that non-real-estate assets earned no capital gains. Capital gains on real estate were estimated by applying State-level percentage changes in agricultural real estate values (Jones and Canning) to individual farm observations:

$$\text{Capital gains} = \frac{(\text{Annual rate of change in State farm real estate values}) \times (\text{real estate assets})}{\text{Total assets}}$$

Capital gains were added to returns on assets to arrive at an estimate of total returns (tables 7-9):

$$\text{Total returns} = \text{Capital gains} + \text{returns on assets}.$$

Since land values increased in most regions during 1987-91, capital gains increased average total returns for most farm types. Such gains were especially high in the Corn Belt, Lake States, and Northern Plains regions where real estate values recovered from the devaluation of the 1980's.⁴ Texas land values declined over the period, resulting in total returns being less than current returns for eastern cotton and Delta and Texas rice farms (table 7).

Farmers and nonfarm investors are often interested in how well farm investments perform relative to nonfarm investments. For such a comparison, total returns were compared with returns received from relatively risk-free 3-month Treasury bills. A sizable proportion of farms have total returns greater than the 3-month Treasury bill rates. Average total returns exceeded Treasury bill rates on over 50 percent of the farms for several specialty and region classifications: large Eastern cotton; large corn-sorghum-soybean in the Midwest, Southeast, and Plains regions; large tobacco in the flue-cured region; large North Central small-grain; North Central dairy; and large Western vegetable (tables 7-9).

⁴See Jones and Canning for a description of these regions.

Table 7—Specialized U.S. row crop farms: Profitability as measured by average returns on assets (ROA) with and without capital gains, 1987-91¹

Production specialty, region, and annual sales class	ROA						ROA plus capital gains	
	1987	1988	1989	1990	1991	5-year average	5-year average	Total with 5-year return > T-bill
	<i>Percent</i>							
Cotton	7.9	4.8	10.7	7.7	3.0	6.6	6.7	42
West	4.4	-3.5	9.2	3.6	-0.4	1.9	3.3	39
East	9.5	7.8	10.9	8.7	3.7	7.9	7.6	42
Over \$250,000	14.1	10.1	17.7	11.3	11.9	13.0	12.9	64
\$100,000 to \$250,000	9.6	10.0	6.8	6.5	-1.3	6.1	5.6	53
\$100,000 and under	2.6	1.5	-3.2	2.8	-8.2	-0.7	-1.4	23
Corn-sorghum-soybeans	2.2	2.0	2.7	2.4	1.3	2.1	5.3	35
Midwest	2.3	1.1	2.7	2.8	1.3	2.0	5.6	36
Over \$250,000	6.2	5.7	6.9	8.2	5.9	6.6	9.8	63
\$100,000 to \$250,000	2.7	2.6	3.9	2.8	1.5	2.7	6.0	46
\$100,000 and under	0.3	-1.7	-0.3	-0.1	-1.3	-0.6	3.4	30
Plains	4.4	5.3	7.3	2.0	2.2	4.2	7.1	40
Over \$250,000	7.4	15.3	NA	8.0	6.2	11.8	14.6	60
\$100,000 to \$250,000	8.6	6.7	2.3	3.2	1.3	4.3	7.1	50
\$100,000 and under	1.2	0.0	-2.0	-1.8	-2.6	-0.9	2.3	32
Southeast	1.5	4.0	0.8	0.9	1.6	1.8	3.1	21
Over \$250,000	9.9	8.9	5.1	10.2	12.6	8.8	10.7	62
\$100,000 to \$250,000	4.0	5.6	2.9	1.1	1.0	3.1	4.0	42
\$100,000 and under	-2.3	-0.9	-3.7	-3.7	-3.8	-2.9	-1.7	12
Peanuts	3.5	3.1	2.6	-4.1	4.7	2.7	3.6	34
Over \$100,000	6.3	7.4	4.7	0.9	6.9	4.0	5.2	49
\$100,000 and under	0.1	1.2	-0.9	-4.3	-2.5	-0.7	1.5	28
Rice	2.4	10.8	4.7	9.5	2.0	6.0	6.6	46
Delta and Texas	5.3	12.4	6.3	10.7	2.4	7.9	8.0	47
Small grains	1.8	1.3	1.0	0.9	0.9	1.2	3.8	29
South Central	2.0	1.5	0.3	-0.6	-1.6	0.4	1.8	28
Over \$100,000	4.3	4.0	2.5	0.3	0.8	4.0	3.6	49
\$100,000 and under	0.0	0.3	-0.6	-1.2	-3.4	-0.9	0.8	23
North Central	2.2	1.1	2.1	3.7	2.6	2.4	5.6	35
Over \$100,000	3.7	3.3	3.8	5.1	4.9	4.1	7.6	51
\$100,000 and under	0.0	-2.5	-0.8	1.3	-0.5	-0.5	2.4	25
Northwest	2.8	3.1	3.8	2.6	3.4	3.1	4.6	35
Over \$100,000	5.0	3.8	5.9	3.9	4.5	4.5	5.8	47
\$100,000 and under	-2.0	0.8	0.5	-2.5	-0.5	-0.6	1.3	21
Tobacco	-0.7	0.6	2.4	4.9	-0.2	1.2	2.1	18
Flue-cured region	4.5	6.0	6.7	5.4	3.7	5.1	6.3	35
Over \$40,000	10.3	10.2	13.5	9.5	6.2	9.3	10.0	55
\$40,000 and under	-3.0	-4.0	-1.8	-0.4	-1.2	-1.9	0.0	24
Burley region	-3.0	-2.5	-0.9	-0.6	-2.5	-2.0	-1.4	11

NA = Sufficient data not available.

¹See figure 2 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 8—Specialized U.S. specialty crop farms: Profitability as measured by average returns on assets (ROA) with and without capital gains, 1987-91¹

Production specialty, region, and annual sales class	ROA						ROA plus capital gains	
	1987	1988	1989	1990	1991	5-year average	5-year average	Total with 5-year return > T-bill
	Percent							
Fruit and tree nuts	-0.4	1.1	0.4	0.9	1.6	0.8	3.4	19
West	-1.6	1.1	0.1	1.5	1.4	0.8	3.0	21
\$40,000 and over	-1.7	2.7	1.3	2.6	3.3	1.9	4.0	40
Under \$40,000	-1.6	-1.9	-1.9	0.1	-0.3	-0.3	2.1	7
South	0.2	2.7	-0.2	-1.5	2.0	0.5	4.0	18
\$40,000 and over	1.8	5.2	0.6	-1.2	4.2	1.7	4.0	49
Under \$40,000	-0.9	-2.9	-2.9	-2.7	-3.9	-2.5	-0.3	9
North	-0.5	-1.0	-1.8	-1.1	0.8	-0.7	3.5	31
\$40,000 and over	3.8	-0.2	4.4	-0.8	5.1	2.5	6.7	39
Under \$40,000	-1.6	-2.9	-3.4	-2.1	-6.3	-2.9	0.7	22
Nursery and greenhouse	7.1	7.7	8.7	8.6	1.7	6.5	8.8	29
\$40,000 and over	13.2	14.5	19.3	11.2	2.8	10.9	12.6	49
Under \$40,000	-2.9	-2.7	-4.9	1.9	-0.6	-2.0	1.5	17
Vegetables	2.2	2.1	5.6	4.6	3.0	3.5	5.9	25
West								
\$40,000 and over	10.4	1.5	15.0	13.5	13.9	11.1	12.8	51
East	1.0	3.6	2.1	-3.8	-0.3	0.3	3.3	22
\$40,000 and over	4.9	7.5	4.0	-3.8	2.5	3.2	5.7	39
Under \$40,000	-2.1	-4.5	-2.5	-3.9	-6.6	-3.7	-0.1	15

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

The large proportion of farm businesses that received returns below the risk-free Treasury bill rate suggests that these owners of farm assets could increase their wealth by investing their liquidated farm assets in Treasury bills.

Farm real estate liquidation, however, itself involves significant costs, such as sales commissions, income taxes, and capital gains taxes. These costs may explain why farmers may be willing to accept lower returns. Also, the farming enterprise enjoys some income tax advantages available to few other businesses that may be considered as alternatives to farming.

Larger Farms More Often Had Positive Net Farm Income

Average net cash farm income per farm varied substantially among farm sizes and specialty. Among

farms with more than \$250,000 in annual sales, several farm types had average net cash incomes of greater than \$100,000: Eastern cotton, Plains and Southeastern corn-sorghum-soybean, and Southern and Western dairy farms (tables 10-12). But these same farm types, when the annual sales were less than \$100,000, had average net cash income levels of less than \$10,000.

Another indicator of farm financial health was the proportion of farms with positive net farm income (tables 13-15). The proportion of farms with positive net farm income over the 5-year period increased as farm size increased for most of the farm classifications analyzed. On average, only 15-20 percent of larger grain, peanut, tobacco, and dairy farms had negative income over the 1987-91 period. In contrast, over 40 percent of the smaller size grain and hog farms located in the Southeastern region had negative incomes over the same period.

Table 9—Specialized U.S. livestock farms: Profitability as measured by average returns on assets (ROA) with and without capital gains, 1987-91¹

Production specialty, region, and annual sales class	ROA						ROA plus capital gains	
	1987	1988	1989	1990	1991	5-year average	5-year average	Total with 5-year return > T-bill
	<i>Percent</i>							
Beef	0.0	-0.6	0.2	-0.1	-1.6	-0.4	0.8	14
Midwest	0.2	-0.1	1.2	-1.7	-2.6	-0.8	2.6	18
Over \$100,000	4.5	5.3	8.0	2.9	-0.8	4.1	7.9	48
\$40,000 to \$100,000	1.8	-0.6	2.2	-0.4	-0.5	0.5	3.8	32
Under \$40,000	2.7	-3.4	-2.1	-3.6	-3.7	-3.2	0.1	14
Southeast	1.2	-1.7	-1.2	-0.8	-2.5	-1.4	0.1	11
Over \$100,000	2.5	1.0	0.4	0.6	0.7	0.9	3.6	27
\$40,000 to \$100,000	0.5	-1.0	-0.2	-0.9	-1.9	-0.5	-0.7	22
Under \$40,000	1.8	-2.1	-1.8	-1.6	-3.2	-2.1	-0.7	10
Plains	1.1	-0.2	1.1	2.0	-0.9	0.4	0.2	13
Over \$100,000	6.2	4.6	7.5	6.4	2.3	5.3	6.4	44
\$40,000 to \$100,000	1.0	-1.0	-0.2	-0.9	-1.9	-0.5	-0.7	23
Under \$40,000	1.6	-3.6	-1.7	-2.6	-2.9	-2.5	-3.6	7
West	0.2	0.2	0.4	0.8	-0.4	0.3	2.2	16
Over \$100,000	1.7	3.5	3.7	3.2	1.9	2.9	4.8	41
\$40,000 to \$100,000	2.9	-0.8	-3.2	-0.9	-1.3	-0.7	0.6	26
Under \$40,000	2.0	-4.0	-2.1	-1.7	-2.3	-2.3	-0.2	10
Dairy	5.3	0.9	3.0	1.9	-0.5	1.5	3.8	28
Northeast	1.3	0.1	1.4	-0.7	-1.8	0.1	2.5	23
Over \$250,000	4.3	5.8	5.9	1.2	2.6	3.7	5.4	46
\$100,000 to \$250,000	1.9	-0.4	2.3	-0.1	-2.6	0.3	2.5	28
Under \$100,000	1.9	-3.8	-4.1	-5.8	-7.4	-4.1	-0.9	13
North Central	0.8	0.3	2.9	1.2	-1.9	0.6	3.7	29
Over \$250,000	6.2	2.5	6.7	5.1	2.8	4.6	7.5	55
\$100,000 to \$250,000	2.9	1.1	3.8	1.2	-0.6	1.8	4.8	37
Under \$100,000	3.4	-4.4	-0.5	-2.3	-5.5	-3.2	-0.1	20
South	4.7	3.3	3.4	5.3	3.2	4.1	4.8	31
Over \$250,000	7.5	5.5	5.4	9.2	6.4	6.9	7.7	43
\$100,000 to \$250,000	2.9	1.3	1.9	3.4	-0.3	1.9	2.9	37
Under \$100,000	1.6	0.3	-0.8	-0.8	-2.2	-0.9	-1.2	18
West	5.8	4.7	5.4	4.7	3.1	4.8	6.0	30
Over \$250,000	7.6	6.2	6.3	5.4	4.1	5.9	7.2	41
\$250,000 and under	1.6	-1.5	0.2	-1.0	-2.3	-0.2	1.1	20
Hogs	2.9	-0.7	-0.2	2.9	-0.3	1.0	4.4	24
North Central	4.2	-0.0	0.1	4.5	-0.4	1.9	6.0	32
Over \$100,000	6.1	1.6	1.3	6.6	1.6	3.7	7.8	48
\$100,000 and under	6.7	-8.0	-5.0	-7.0	-10.6	-7.3	-3.1	12
Southeast	0.2	-2.2	-0.4	-0.5	3.5	-0.3	0.4	11
Over \$100,000	4.5	6.0	4.3	5.7	8.9	5.6	6.6	40
\$100,000 and under	4.9	-9.5	-5.6	-6.2	-0.6	-5.9	-5.4	6
Poultry	NA	3.4	4.8	4.1	3.3	3.8	5.3	27
Over \$100,000	NA	5.1	9.3	8.7	7.7	6.3	7.8	22
\$100,000 and under	NA	0.4	2.5	0.8	1.2	0.4	2.0	39
Sheep	0.6	-0.3	-2.7	-2.8	-4.6	-3.5	-1.5	13
\$40,000 and over	0.5	0.9	-2.9	-2.8	NA	1.0	-0.3	23
Under \$40,000	-2.6	-5.2	-2.6	-2.6	-4.8	-4.2	-1.9	13

NA = Sufficient data not available.

¹See figure 2 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 10—Specialized U.S. row crop farms: Net cash farm income, 1987-91¹

Production specialty, region, and annual sales class	1987	1988	1989	1990	1991	5-year average
<i>Dollars per farm</i>						
Cotton	56,116	45,532	79,599	51,299	42,049	54,269
West	73,344	-348	87,593	54,779	26,265	46,378
East	53,598	51,942	78,806	51,016	44,192	55,242
Over \$250,000	182,329	155,303	193,265	150,946	175,879	172,160
\$100,000 to \$250,000	58,794	53,383	59,333	23,663	14,634	43,317
\$100,000 and under	15,822	14,350	3,398	8,202	-14,426	7,442
Corn-sorghum-soybeans	17,471	14,932	22,234	19,243	17,858	18,368
Midwest	19,320	12,886	20,083	21,001	17,231	18,179
Over \$250,000	89,339	73,625	96,686	99,897	87,249	89,700
\$100,000 to \$250,000	34,595	24,670	40,116	30,378	31,004	32,489
\$100,000 and under	7,106	3,079	3,838	6,978	3,569	4,977
Plains	22,630	24,170	11,388	22,253	26,653	28,989
Over \$250,000	97,583	141,602	263,755	108,259	88,800	149,286
\$100,000 to \$250,000	39,533	31,051	37,148	36,764	27,676	33,999
\$100,000 and under	10,815	5,389	6,527	4,725	6,685	7,045
Southeast	10,608	19,018	11,546	9,652	13,302	12,846
Over \$250,000	118,940	142,288	120,563	122,593	127,695	127,203
\$100,000 to \$250,000	29,789	30,058	35,885	27,805	22,830	30,124
\$100,000 and under	1	1,710	-3,088	-4,705	-4,298	-1,923
Peanuts	22,876	19,469	22,139	7,719	41,173	23,121
Over \$100,000	65,029	48,897	57,298	31,788	69,785	58,672
\$100,000 and under	5,785	10,509	7,359	-33	8,427	6,539
Rice	20,326	73,204	54,451	75,550	16,912	46,705
Delta and Texas	29,014	76,636	51,712	63,150	16,692	46,345
Small grains	22,989	13,555	11,759	11,682	15,417	13,148
South Central	9,318	13,115	9,500	9,051	4,048	9,389
Over \$100,000	23,066	38,061	45,878	3,242	42,573	30,513
\$100,000 and under	5,423	8,241	2,757	4,215	2,893	4,985
North Central	18,961	18,010	18,203	23,760	32,538	21,846
Over \$100,000	30,292	38,645	44,198	58,119	46,598	43,094
\$100,000 and under	11,916	3,272	4,331	12,188	11,348	8,562
Northwest	29,511	28,729	25,215	33,764	28,424	28,824
Over \$100,000	64,183	38,645	63,626	58,190	47,631	56,257
\$100,000 and under	5,100	8,103	2,114	3,366	4,183	4,806
Tobacco	4,529	6,693	9,435	10,316	8,707	7,887
Flue-cured region	19,424	24,781	21,381	18,931	21,951	21,370
Over \$40,000	47,104	56,007	64,093	49,129	48,894	52,300
\$40,000 and under	2,945	1,961	126	3,027	3,304	2,396
Burley region	-220	406	4,052	4,095	2,616	2,065

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 11—Specialized U.S. specialty crop farms: Net cash farm income, 1987-91¹

Production specialty, region, and annual sales class	1987	1988	1989	1990	1991	5-year average
<i>Dollars per farm</i>						
Fruit and tree nuts	6,914	14,988	13,810	6,837	22,143	12,754
West	1,506	14,531	9,218	11,759	20,884	11,608
\$40,000 and over	12,743	56,307	34,307	61,177	84,967	49,911
Under \$40,000	611	-2,261	-5,474	3,210	-10,230	-4,411
South	-28	19,446	7,142	-10,922	101	587
\$40,000 and over	28,460	106,008	57,245	-48,500	68,109	53,207
Under \$40,000	-8,485	-1,775	-2,371	-3,795	-4,238	-3,622
North	1,518	715	-861	-220	2,222	1,160
\$40,000 and over	64,928	27,991	126,602	20,932	68,038	60,503
Under \$40,000	613	-297	-2,846	-1,634	-2,444	-1,337
Nursery and greenhouse	37,488	48,355	47,518	46,924	17,192	37,834
\$40,000 and over	109,915	126,476	153,891	124,529	47,092	106,086
Under \$40,000	-892	-3,514	-6,494	-761	-357	-2,229
Vegetables	31,178	25,416	40,545	38,796	39,317	35,473
West						
\$40,000 and over	160,537	50,714	142,859	144,938	241,392	150,271
East	17,073	26,184	24,583	1,380	19,475	17,331
\$40,000 and over	90,823	76,133	75,217	7,085	68,521	64,188
Under \$40,000	-7,033	-1,084	153	-472	-3,438	-2,518

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Most Small Beef, Hog, and Sheep Farms Had Negative Net Farm Income

Beef, hog, and sheep farms with less than \$40,000 in annual sales had the lowest proportion of farms with positive net farm income. Over 50 percent of the smaller hog, sheep, and Western beef farms had negative net farm incomes during 1987-91 (table 15). Also, smaller proportions of these farms displayed total returns greater than could be received on Treasury bills.

Profitable Farms Represent a Majority of Production

Examination of the distribution of production of the individual commodities shows that profitable farms dominated agricultural production (table 16). While over a third of all farms had negative net farm income during the 1987-91 period, such farms contributed only 23 percent of total U.S. farm production. Farms and ranches reporting positive net farm income produced more than 70 percent of all

major commodities, except sheep. Farms and ranches reporting positive income produced more than 85 percent of tobacco and nursery/greenhouse production.

Smaller Was Not Always Unprofitable

The relationship between profitability and size did not imply that all small farms were unprofitable. A sizable proportion of the farms in the smaller size categories showed positive returns. A subset of these farms even received total returns greater than Treasury bill rates. The quality of available resources and management skills are factors which may contribute to the profitability of such farms. Profitable small farms may operate more productive land or hold livestock of higher genetic quality. Another possibility may be that profitable small farm operators use their resources more efficiently. A successful small operator, for example, may fully use labor through custom work and thus increase farm-related income.

Table 12—Specialized U.S. livestock farms: Net cash farm income, 1987-91¹

Production specialty, region, and annual sales class	1987	1988	1989	1990	1991	5-year average
<i>Dollars per farm</i>						
Beef	3,125	2,933	5,496	4,043	1,252	3,376
Midwest	4,513	5,914	8,745	3,000	1,383	4,606
Over \$100,000	45,575	50,695	89,808	49,962	28,438	52,842
\$40,000 to \$100,000	13,552	9,337	19,720	16,028	13,203	14,497
Under \$40,000	13	211	159	-2,681	-1,576	-779
Southeast	-1,204	-1,199	-1,842	-309	-1,268	-1,170
Over \$100,000	-2,889	34,283	-2,159	38,606	10,385	15,521
\$40,000 to \$100,000	13,868	-3,785	-3,751	8,222	4,752	4,640
Under \$40,000	-1,862	-1,753	-1,772	-1,660	-1,758	-1,760
Plains	6,896	6,555	11,388	7,443	4,004	7,289
Over \$100,000	57,303	58,841	102,453	71,555	37,927	64,899
\$40,000 to \$100,000	11,808	11,305	13,038	10,818	6,301	10,779
Under \$40,000	-1,482	-3,215	-2,103	-3,348	-2,055	-2,478
West	5,600	2,690	9,271	9,766	3,141	6,251
Over \$100,000	43,162	36,036	81,207	98,173	45,565	62,069
\$40,000 to \$100,000	15,968	7,190	10,884	1,058	13,001	9,261
Under \$40,000	-2,977	-4,427	-3,298	-5,220	-6,557	-4,563
Dairy	33,728	33,472	36,216	38,732	31,061	34,721
Northeast	30,289	33,782	31,456	32,397	25,746	30,853
Over \$250,000	84,089	111,693	115,398	70,303	85,473	91,807
\$100,000 to \$250,000	37,681	38,058	37,083	37,565	22,824	34,974
\$100,000 and under	12,580	10,336	7,163	9,509	5,171	9,389
North Central	27,583	28,884	32,485	32,794	25,073	29,493
Over \$250,000	105,280	77,315	101,323	107,513	93,483	96,275
\$100,000 to \$250,000	41,421	40,320	43,803	38,668	34,744	40,016
\$100,000 and under	14,193	14,676	15,332	16,646	11,405	14,485
Southeast	48,261	35,237	39,531	48,346	52,043	44,102
Over \$250,000	123,237	113,753	106,118	149,337	125,428	124,396
\$100,000 to \$250,000	34,141	30,641	27,484	34,913	20,710	29,829
\$100,000 and under	9,007	9,315	8,154	8,261	16,243	9,594
West	76,118	73,280	80,053	103,765	83,753	82,221
Over \$250,000	183,665	141,562	131,655	159,859	126,654	148,833
\$250,000 and under	19,439	14,671	16,914	13,006	17,099	16,808
Hogs	18,270	10,126	8,260	17,136	18,153	14,251
North Central	27,179	16,727	12,564	28,255	25,884	22,097
Over \$100,000	46,689	31,388	25,002	51,180	40,883	39,297
\$100,000 and under	-2,369	-2,705	-2,707	-3,252	-1,530	-2,565
Southeast	4,521	617	3,023	3,333	7,741	3,201
Over \$100,000	45,865	22,475	26,660	28,366	42,056	32,127
\$100,000 and under	-2,572	-4,748	-1,815	-2,359	-997	-2,700
Poultry	NA	34,142	22,925	26,560	25,896	26,408
\$100,000 and over	NA	97,942	86,262	86,756	108,815	87,744
Under \$100,000	NA	10,126	9,475	9,230	7,827	8,019
Sheep	-1,330	-749	-3,386	-8,820	-4,776	-3,898
Over \$40,000	15,661	21,174	6,103	9,728	NA	12,801
Under \$40,000	-3,752	-3,525	-4,369	-9,829	-4,765	-5,370

NA = Sufficient data not available.

¹See figure 2 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91

Table 13—Specialized U.S. row crop farms: Percentage with positive net farm income, 1987-91¹

Production specialty, region, and annual sales class	1987	1988	1989	1990	1991	5-year average
	<i>Percent</i>					
Cotton	82	78	72	76	60	74
West	76	56	76	75	43	64
East	83	81	71	76	62	76
Over \$250,000	93	85	79	87	77	84
\$100,000 to \$250,000	85	82	81	82	62	79
\$100,000 and under	79	80	57	67	53	70
Corn-sorghum-soybeans	68	63	69	69	69	68
Midwest	70	61	70	71	70	68
Over \$250,000	71	75	81	85	80	78
\$100,000 to \$250,000	73	70	81	78	78	76
\$100,000 and under	68	57	65	66	66	65
Plains	76	76	68	70	71	72
Over \$250,000	92	84	84	85	84	84
\$100,000 to \$250,000	75	86	72	78	71	77
\$100,000 and under	75	64	63	65	66	68
Southeast	59	64	61	55	61	60
Over \$250,000	87	84	90	87	83	86
\$100,000 to \$250,000	70	70	78	78	69	73
\$100,000 and under	54	60	56	50	57	55
Peanuts	78	80	92	74	76	80
Over \$100,000	88	79	96	81	82	83
\$100,000 and under	73	82	83	72	68	78
Rice	69	73	66	79	70	71
Delta and Texas	71	74	75	79	71	72
Small grains	68	66	66	67	71	67
South Central	74	71	63	66	61	68
Over \$100,000	69	75	80	58	69	70
\$100,000 and under	76	72	60	72	60	68
North Central	72	60	72	84	81	73
Over \$100,000	69	62	75	84	88	75
\$100,000 and under	74	59	70	83	78	73
Northwest	66	70	71	73	82	72
Over \$100,000	68	73	79	88	87	77
\$100,000 and under	65	67	66	58	78	67
Tobacco	78	78	83	85	81	81
Flue-cured region	82	85	84	92	94	88
Over \$40,000	85	95	94	92	94	92
\$40,000 and under	80	78	77	92	94	85
Burley region	78	76	83	82	76	79

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 14—Specialized U.S. specialty crop farms: Percentage with positive net farm income, 1987-91¹

Production specialty, region, and annual sales class	1987	1988	1989	1990	1991	5-year average
	<i>Percent</i>					
Fruit and tree nuts	66	63	53	62	59	61
West	57	58	57	61	61	64
\$40,000 and over	63	82	69	70	71	71
Under \$40,000	64	57	40	59	51	54
South	61	59	60	60	82	60
\$40,000 and over	65	72	62	57	90	73
Under \$40,000	55	55	57	62	56	57
North	77	59	60	60	79	65
\$40,000 and over	75	55	71	68	94	72
Under \$40,000	79	64	54	55	28	58
Nursery and greenhouse	76	57	67	65	75	68
\$40,000 and over	84	71	86	84	82	81
Under \$40,000	76	47	54	55	71	61
Vegetables						
West	66	66	73	65	62	66
\$40,000 and over	85	63	71	83	70	75
East	61	75	76	59	82	65
\$40,000 and over	80	79	83	58	82	77
Under \$40,000	54	73	73	60	57	62

¹See figure 1 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Why Do Unprofitable Farms Remain in Farming?

A substantial amount of farm capital was invested in operations that lose money. Over the 1987-91 period, farms with negative income controlled 35 percent of all assets and 34 percent of equity, and they contributed 23 percent of total U.S. farm production. This appears to represent a substantial amount of capital which could be put to more productive uses.

If farms are consistently losing money each year, why do they remain in farming? Possible explanations for the continuing unprofitable farms include tax incentives, structural barriers, or nonmarket amenities. For example, farmers with low taxable bases in their farmland may choose not to liquidate because of the potential tax liability. Structural barriers such as the illiquidity of farm real estate or the costs of moving may slow the exits of unprofitable farms. Also, non-market amenities such as a preference for the rural lifestyle may compensate the farm operator for negative financial returns from farming.

Conclusions

There was large variation in profitability among farm types and regions. Average returns on assets ranged from -3.5 percent for specialized sheep farms to 6.5 percent for nursery farms. Average returns to specialized beef farms ranged from -1.4 percent in the Southeast to 0.4 percent in the Plains. Also, several farm categories received total returns greater than could have been received on 3-month T-bills.

These circumstances arise largely because of the structural characteristics of U.S. farming. While farms with less than \$40,000 in annual sales comprise about two-thirds of all farms, such farms contribute only 9 percent of total U.S. farm production. These small farms are most likely to report negative returns. On the other hand, farms with annual sales greater than \$250,000 represent 7 percent of all farms but control 50 percent of total U.S. production. Larger farms also tend to be much more profitable, with many receiving cash incomes of more than \$100,000 per year.

Table 15—Specialized U.S. livestock farms: Percentage with positive net farm income, 1987-91¹

Production specialty, region and annual sales class	1987	1988	1989	1990	1991	5-year average
	<i>Percent</i>					
Beef	62	60	60	56	58	60
North Central	63	62	67	54	61	67
Over \$100,000	73	65	86	62	62	69
\$40,000 to \$100,000	73	70	88	63	75	73
Under \$40,000	61	61	63	52	59	59
Southeast	59	62	62	60	61	61
Over \$100,000	49	66	47	58	53	55
\$40,000 to \$100,000	67	63	66	47	41	56
Under \$40,000	58	62	62	61	62	61
Plains	67	60	58	56	58	59
Over \$100,000	77	70	76	82	63	73
\$40,000 to \$100,000	72	65	67	69	60	67
Under \$40,000	66	57	54	49	56	56
West	63	59	52	55	49	54
Over \$100,000	70	80	74	77	68	74
\$40,000 to \$100,000	78	61	64	61	75	65
Under \$40,000	59	45	46	50	44	48
Dairy	81	75	83	81	75	79
Northeast	81	75	77	85	63	77
Over \$250,000	79	89	87	85	74	79
\$100,000 to \$250,000	85	76	89	92	70	85
\$100,000 and under	79	70	64	75	53	79
North Central	82	75	86	84	80	82
Over \$250,000	92	82	92	85	83	91
\$100,000 to \$250,000	87	75	90	77	84	87
\$100,000 and under	79	74	85	88	77	79
South	80	77	84	70	79	78
Over \$250,000	83	82	82	87	84	83
\$100,000 to \$250,000	89	81	80	88	70	89
\$100,000 and under	69	74	87	54	84	69
West	75	69	69	66	62	69
Over \$250,000	87	66	66	73	62	71
\$250,000 and under	69	71	73	54	63	68
Hogs	50	57	58	62	55	59
North Central	73	56	62	73	60	65
Over \$100,000	90	68	72	90	75	79
\$100,000 and under	50	40	50	51	43	46
Southeast	61	36	50	54	62	51
Over \$100,000	74	64	56	62	60	70
\$100,000 and under	58	31	49	47	63	48
Poultry	NA	70	65	67	68	66
Over \$100,000	NA	84	77	79	74	78
\$100,000 and under	NA	64	63	63	66	63
Sheep	58	49	43	44	38	45
\$40,000 and over	70	63	49	55	NA	60
Under \$40,000	56	47	42	43	38	44

NA = Sufficient data not available.

¹See figure 2 for a description of regions.

Source: USDA Farm Costs and Returns Survey, 1987-91.

Table 16—Distribution of individual commodity production between positive and negative income farms, 1987-91

Commodity	Net farm income	
	Positive income	Negative income
	Percent	
Crops:		
Feed grains:		
Corn	76	24
Sorghum	75	25
Barley	74	26
Oats	72	28
Food grain:		
Wheat	76	24
Rice	74	26
Oilseeds:		
Soybeans	77	23
Peanut	79	21
Cotton	78	22
Tobacco	88	12
Fruit	72	28
Nursery	89	11
Vegetables	78	22
Sugar beets	76	24
Livestock:		
Beef	73	27
Hogs	77	23
Sheep	61	39
Poultry	80	20
Dairy	82	18
All farms	77	23

Source: USDA Farm Costs and Returns Survey, 1987-91.

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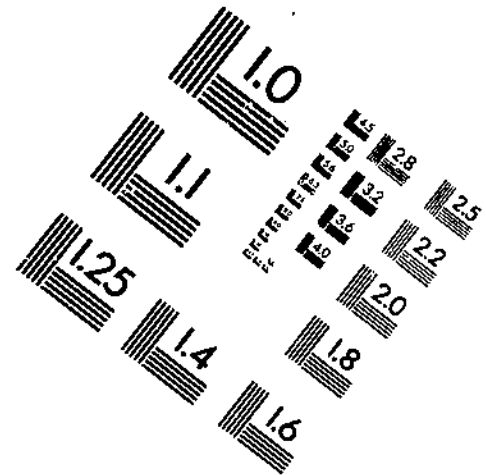
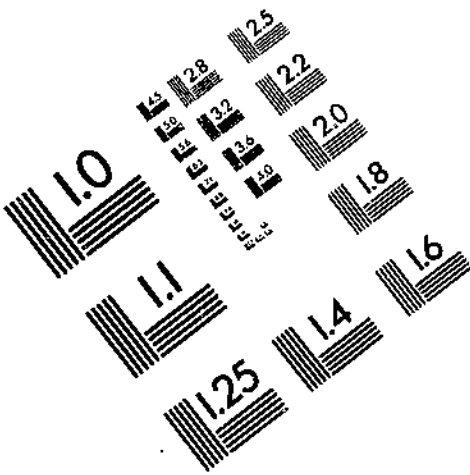
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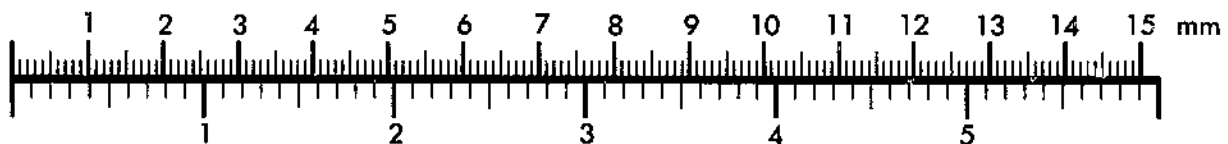
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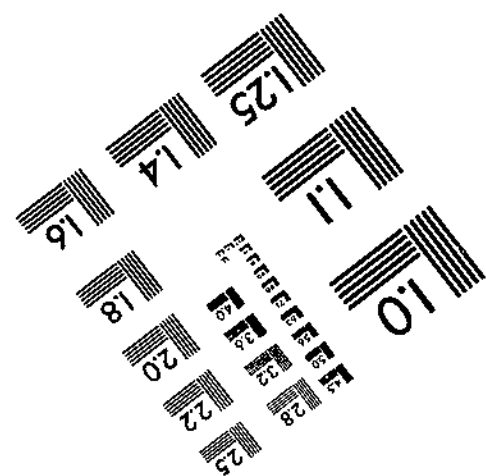
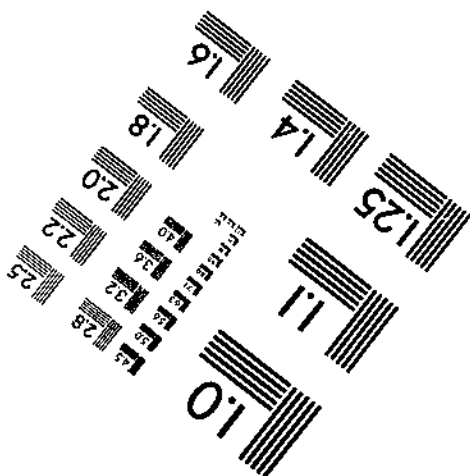
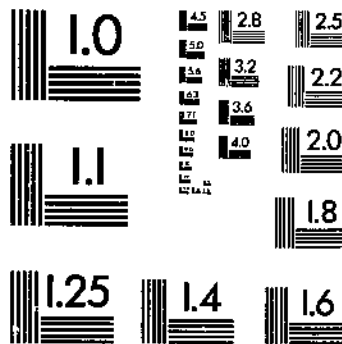
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