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**THE CHANGING LANDSCAPE
OF NEW YORK AGRICULTURE
IN THE TWENTIETH CENTURY**

by

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THE CHANGING LANDSCAPE OF NEW YORK AGRICULTURE IN THE TWENTIETH CENTURY¹

It has been a memorable century for farmers and farming. Animal power and human labor have been replaced to a large extent by mechanical power and electricity. Great areas of land that were cleared for farming have reverted to forest or are now in transition. The industrialization of agriculture is in process at an accelerating pace. Increasingly, we recognize that farming is one of the key parts of the food industry served by specialized input suppliers on one side and selling to food processors and manufacturers on the other. They, in turn, serve the food retailers and the increasingly important "food-away-from-home" sectors.

This report seeks to highlight the changes that have occurred in New York State's agriculture during the twentieth century. It is a look backward to observe the processes of change that have occurred and to provide perspective on the changes yet to come. It is hard to believe that the next century can provide the same kind of dramatic changes we have experienced in the past fifty years, but we should not be surprised at the unexpected, even to a return of some forest land to farming!

Number of Farms and Land in Farms

Most of New York State was settled before the Civil War, but land in farms increased until 1870-1880 (Table 1). Census reports start in 1850 and provide consistent data on farms and farming to the present time. The definition of a farm has always included almost any unit that produced enough product so that there was some surplus for sale. Part-time farms have been an important component of the number of farms from the earliest years.

¹Most of the tables and charts in this manuscript were assembled for a presentation made in January 1992 at the annual meeting of the New York State Agricultural Society in Syracuse. This summary publication examines census data for individual counties to show both general trends and the substantial differences in the ways which farming has changed in different parts of the state.

Table 1. NUMBER OF FARMS AND LAND IN FARMS
New York,* 1850-1987

| Year | Number of farms | All land in farms |
|------|--------------------|----------------------|
| | | <u>million acres</u> |
| 1850 | 170,600 | 19.1 |
| 1860 | 197,000 | 21.0 |
| 1870 | 216,300 | 22.2 |
| 1880 | 241,100 | 22.9 |
| 1890 | 226,200 | 22.0 |
| 1900 | 226,700 | 22.6 |
| 1910 | 215,600 | 22.0 |
| 1920 | 193,200 | 20.6 |
| 1930 | 159,800 | 18.0 |
| 1940 | 153,200 | 17.2 |
| 1950 | 124,800 | 16.0 |
| 1959 | 82,400 | 13.5 |
| 1969 | 51,900 | 10.1 |
| 1978 | 43,100 | 9.5 |
| 1987 | 37,700 | 8.4 |

*Land area of New York = 30.6 million acres.

Source: U.S. Census of Agriculture.

From 1870 to 1910, a period of relative stability occurred both in farm numbers and land in farms. Railroads moved products to market; horses plowed the fields and were the source of transport for people living in both the countryside and the cities. There was some reduction in farm numbers as a result of new technology from World War I onward; much of this came between 1950 and 1969.

The impact on New York farming from competition of agricultural production in the Corn Belt and Great Plains and the switch from animal to mechanical power were important in the reduction in acres of cropland harvested between 1900 and 1969 (Table 2). Tractors replaced horses especially in the 1940s and 50s. Cropland harvested and the number of tractors have remained relatively constant since 1969.

Table 2. CROPLAND HARVESTED, TRACTORS, HORSES
New York, 1900-1987

| Year | Acres of cropland harvested | Number of tractors | Number of horses and mules |
|------|-----------------------------------|-----------------------|----------------------------------|
| | <u>millions</u> | <u>thousands</u> | <u>thousands</u> |
| 1900 | 9.04 | -- | 632 |
| 1910 | 8.39 | -- | 595 |
| 1920 | 8.15 | 7 | 543 |
| 1930 | 6.96 | 40 | 326 |
| 1940 | 6.58 | 59 | 275 |
| 1950 | 5.79 | 119 | 138 |
| 1959 | 5.03 | 155 | 47 |
| 1969 | 3.84 | 123 | 46 |
| 1978 | 4.35 | 128 | 52 |
| 1987 | 3.90 | 116 | 53* |

*Equine Census by NYASS -- 182,000 in 1988.

Source: U.S. Census of Agriculture.

Changes in farm size, as measured by acres per farm, have occurred more rapidly since World War II as small farms that could not compete went out of business and mechanization made it possible for one worker to handle the crops on many more acres (Table 3). Even in the 1987 census, there was a relatively large percentage of farms with less than 180 acres. Most of these were part-time operations where the primary income of the operator and his family came from off the farm. In contrast, most of the farms with 100-178 acres in 1900 would have been full-time operations where horses provided the power, and where some chickens, hogs, sheep and cows were part of nearly every business. In 1987, the 43 percent of the farms with 180 acres or more accounted for more than 80 percent of the land in farms and most of the commercial operations. The exceptions are intensive fruit, vegetable, and greenhouse businesses.

Table 3. ACRES OF LAND PER FARM
New York Census Data, 1900, 1950, 1987

| Acres per farm | Percent of farms | | | Percent of total acres, 1987 |
|-------------------|------------------|------------|-------------|---------------------------------|
| | 1900 | 1950 | 1987 | |
| 1 - 49 | 29.8 | 27.0 | 22.9 | 2.1 |
| 50 - 99 | 28.1 | 21.4 | 15.5 | 5.0 |
| 100 - 179 | 28.2 | 27.7 | 18.9 | 11.4 |
| 180 - 259 | 9.4 | 13.0 | 13.1 | 12.7 |
| 260 - 499 | 3.9 | 9.1 | 19.3 | 30.7 |
| 500 and over | <u>0.6</u> | <u>1.8</u> | <u>10.3</u> | <u>38.1</u> |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of farms | 226,700 | 124,800 | 37,700 | |

Source: U.S. Census of Agriculture.

A composite summary of changes in land use in New York between 1900 and 1987 is provided in Table 4. Almost 75 percent of the state's land area was divided up into operating farms between 1870 and 1910. Only 27.5 percent of the land area of the State remained in farms in 1987. A good share of the land area in farms in 1900 was in forest or wood lots. Livestock pastured much of the unimproved land and the wood lots as well. Improved land in 1900 was often in relatively small fields which incorporated large stones or boulders around which hay was cut and some crops planted. In the 1920s and again in the 1950s and 1960s, many of the rougher hill farms and fields that did not lend themselves to mechanization were abandoned and returned to brush and forest.

Table 4. LAND USE
New York, 1900 and 1987

| Description | 1900 | 1987 |
|--|-------------------------|-------------------------|
| Land in farms, million acres | 22.65 | 8.42 |
| Land in farms as percent of state's area | 74.0% | 27.5% |
| <u>Uses of land in farms:</u> | <u>Percent of total</u> | <u>Percent of total</u> |
| Improved | 68.9% | |
| Unimproved | 31.1% | |
| Cropland | | 63.9% |
| Woodland | | 20.8% |
| All other | | 15.3% |
| Percent of state in forest and trees | ~50% | 65-70% |

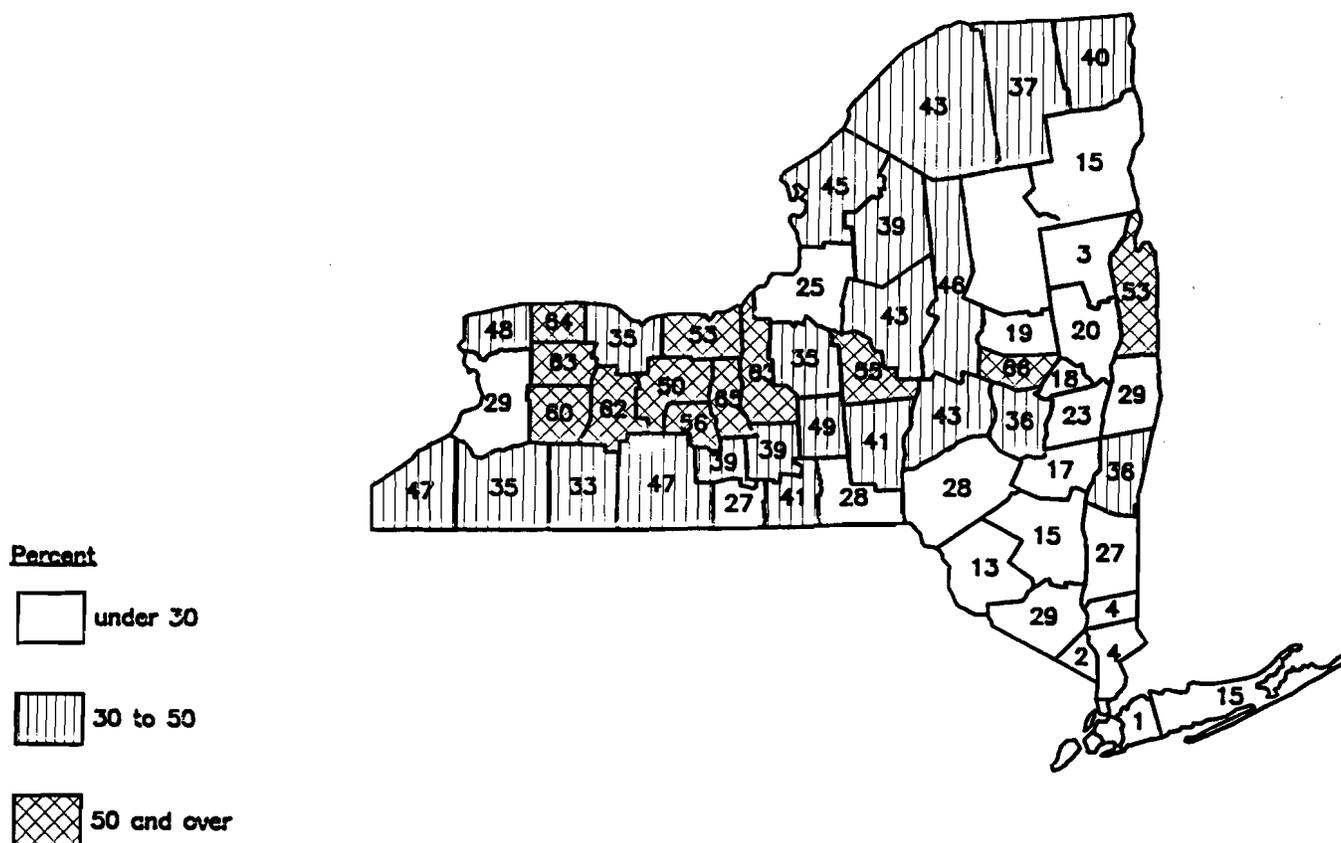
No careful estimates were made of the total land area in trees in 1900, but it is likely that about 50 percent of the State's area was in woodlots on farms, and in the Adirondack, Catskill, Allegany and Tug Hill State Parks. Despite all the conversion of land for urban and suburban development, the space used for these purposes is surprisingly small compared to the State's total area. The USDA estimated that in 1987 from 65-70 percent of the land area was in forest, brush or trees. Much of the land going out of agriculture had returned or was returning to the forest from which it had come in the 18th and 19th centuries.

Changes in Individual Counties in Land Use

While the State as a whole has only 37 percent as much land in farms in 1987 as it did in 1900, the pattern of change in individual counties differs widely over the State (Figure 1). Land in farms in 1987 in each county is compared with the total in 1900 in Figure 1. In the eastern Adirondack counties and south-eastern New York, the exit from agriculture is much more pronounced than many western counties.

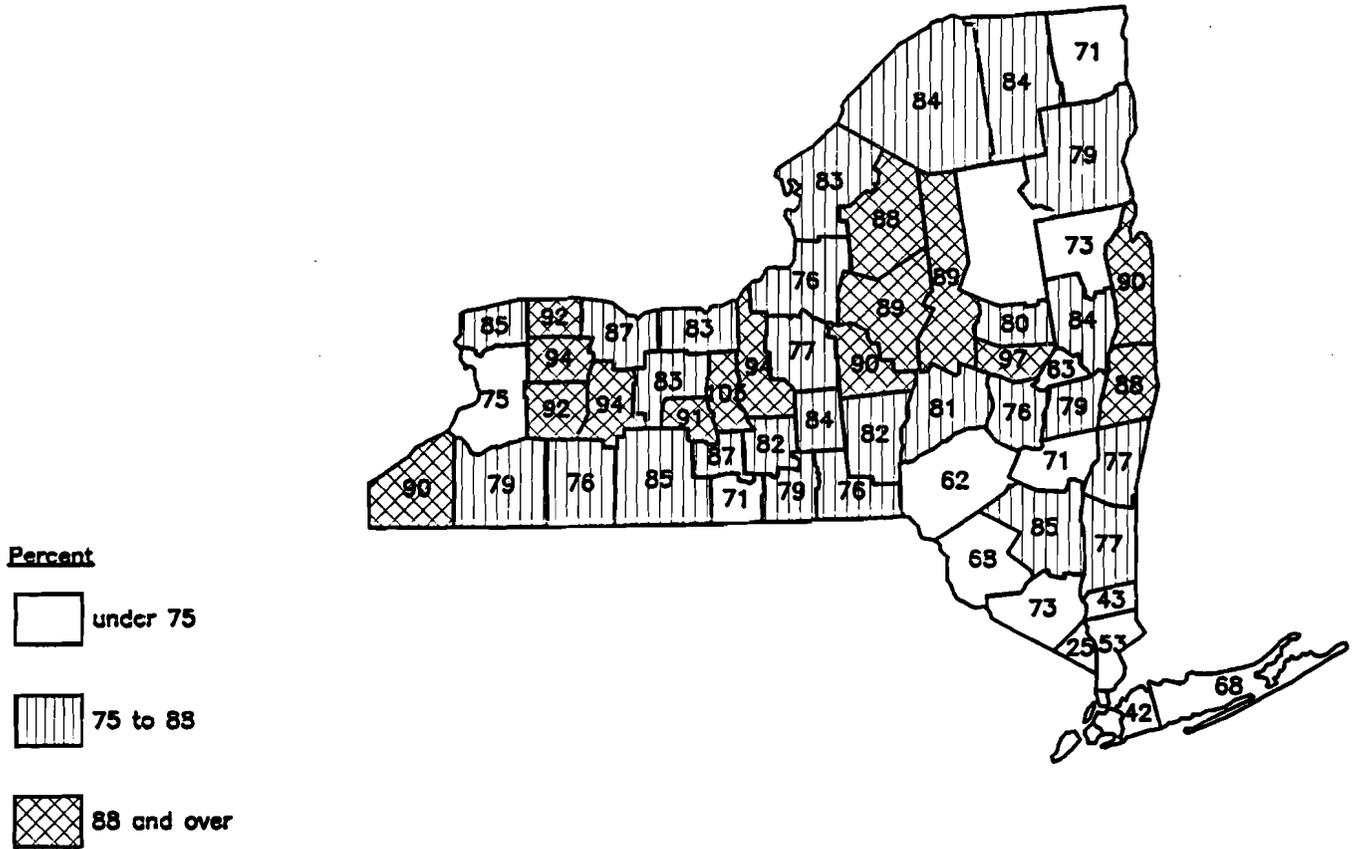
Figure 1.

LAND IN FARMS 1987 as Percent of 1900



Most of the exodus of land from farming had occurred by 1969. Land moving out of farming has been much slower in the 1970s and 80s (Figure 2). The declines in the southeastern parts of the state continue, but overall, there is greater stability, particularly in the counties with productive land and a strong agricultural base. Non-agricultural buyers of land for recreational purposes continue as important forces in the market in many counties.

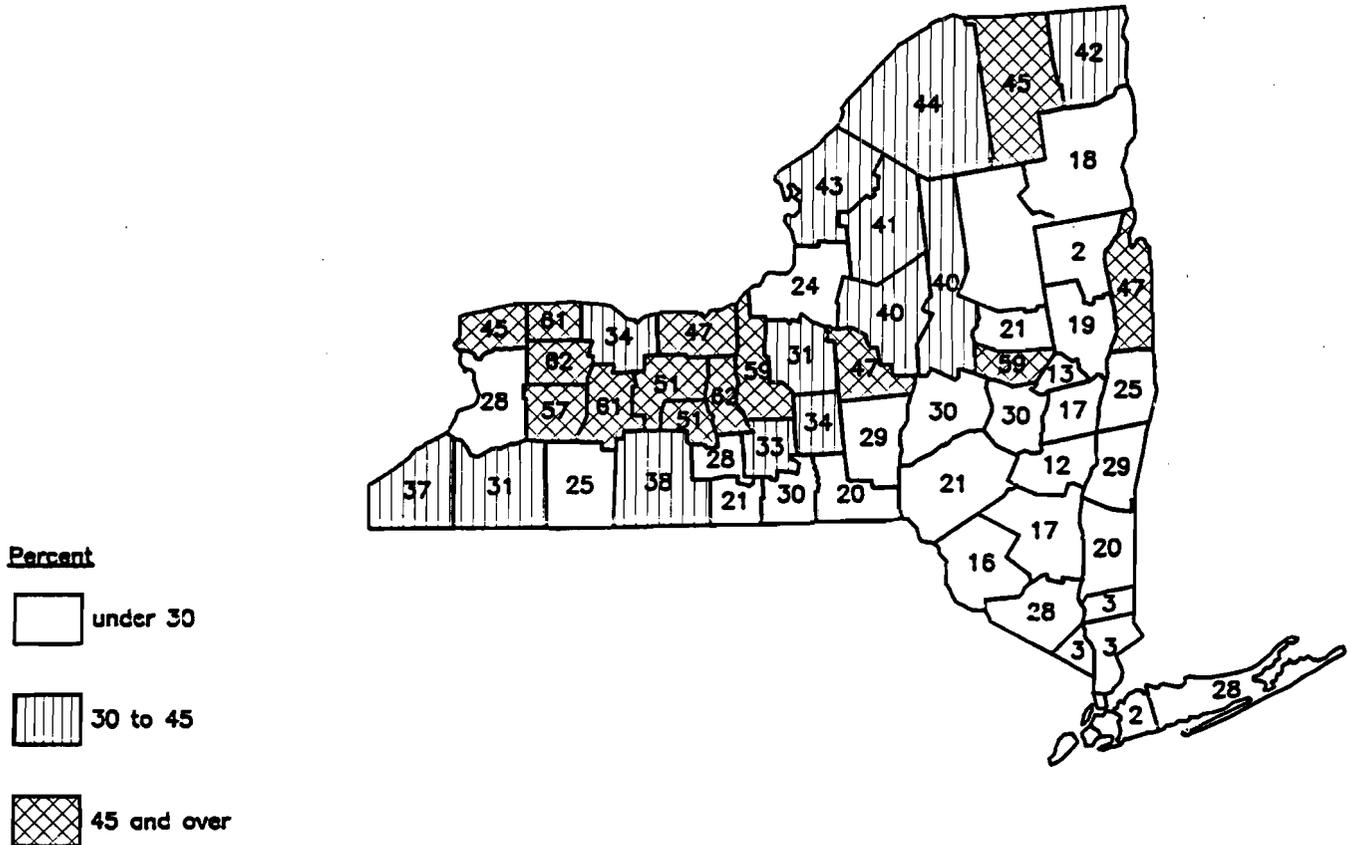
Figure 2. **LAND IN FARMS**
1987 as Percent of 1969



During the century, some of the changes in the amount of cropland used for farming are even more striking (Figure 3). As little as 20 percent of the cropland reported in 1900 remained in a number of southeastern and mountain counties. In contrast, a group of counties with more productive land have retained more than 50 percent of the land described as "improved" in 1900. Counties with major centers of population like Erie, Monroe and Onondaga reflect the effect of these pressures in the reductions in acres of cropland.

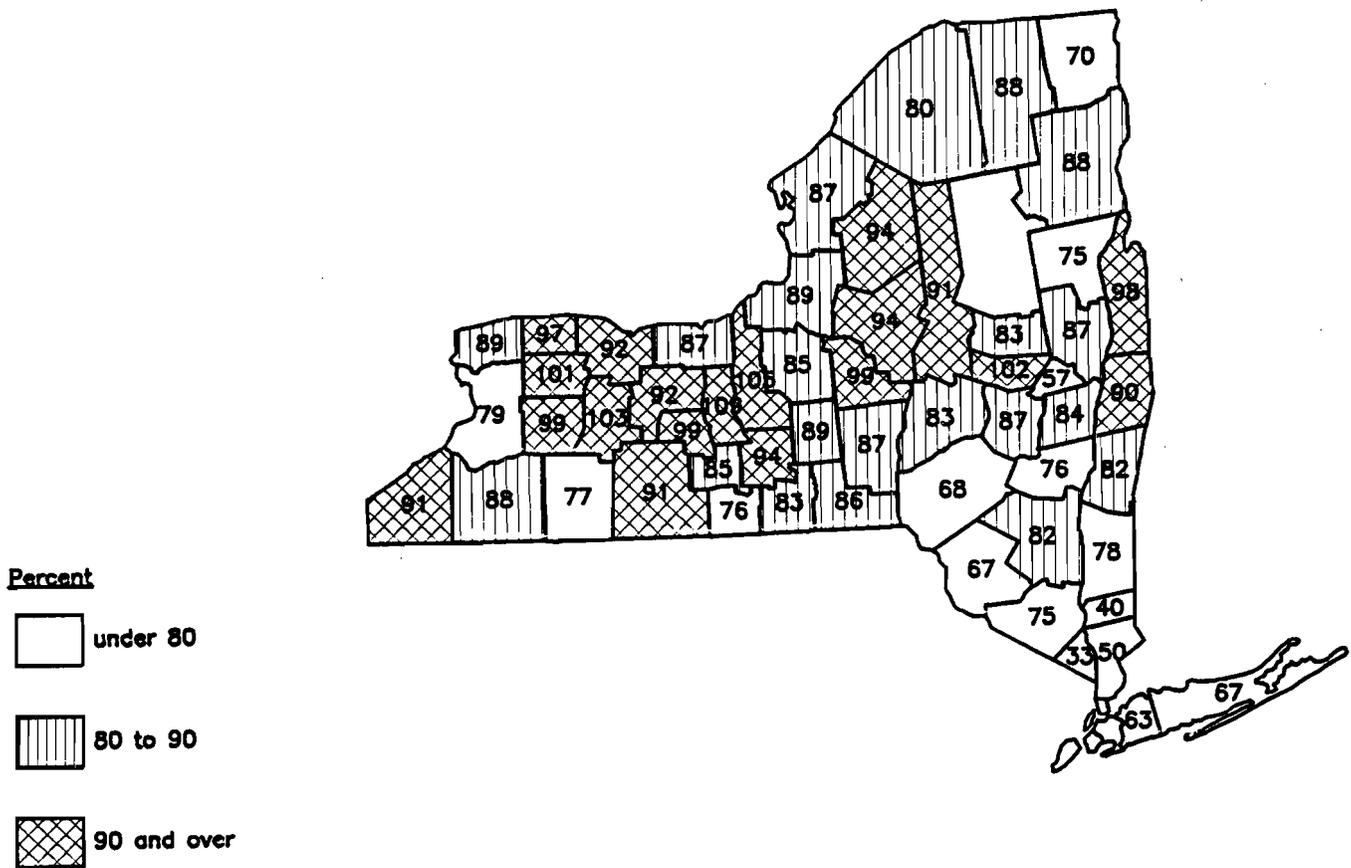
Figure 3.

**ACRES OF CROPLAND
1987 as Percent of 1900**



When the changes in cropland between 1969 and 1987 are considered, one gets a greater sense of the differential response to competitive pressure in individual counties (Figure 4). In a few counties, there was more land considered as cropland in the 1987 census than in 1969. These tend to be counties where farm sizes are expanding by the increased use of rented land. Except for the southeastern part of the state, most of the cropland that was harvested in 1969 continues in production into the 1990s.

**Figure 4. ACRES OF CROPLAND
1987 as Percent of 1969**

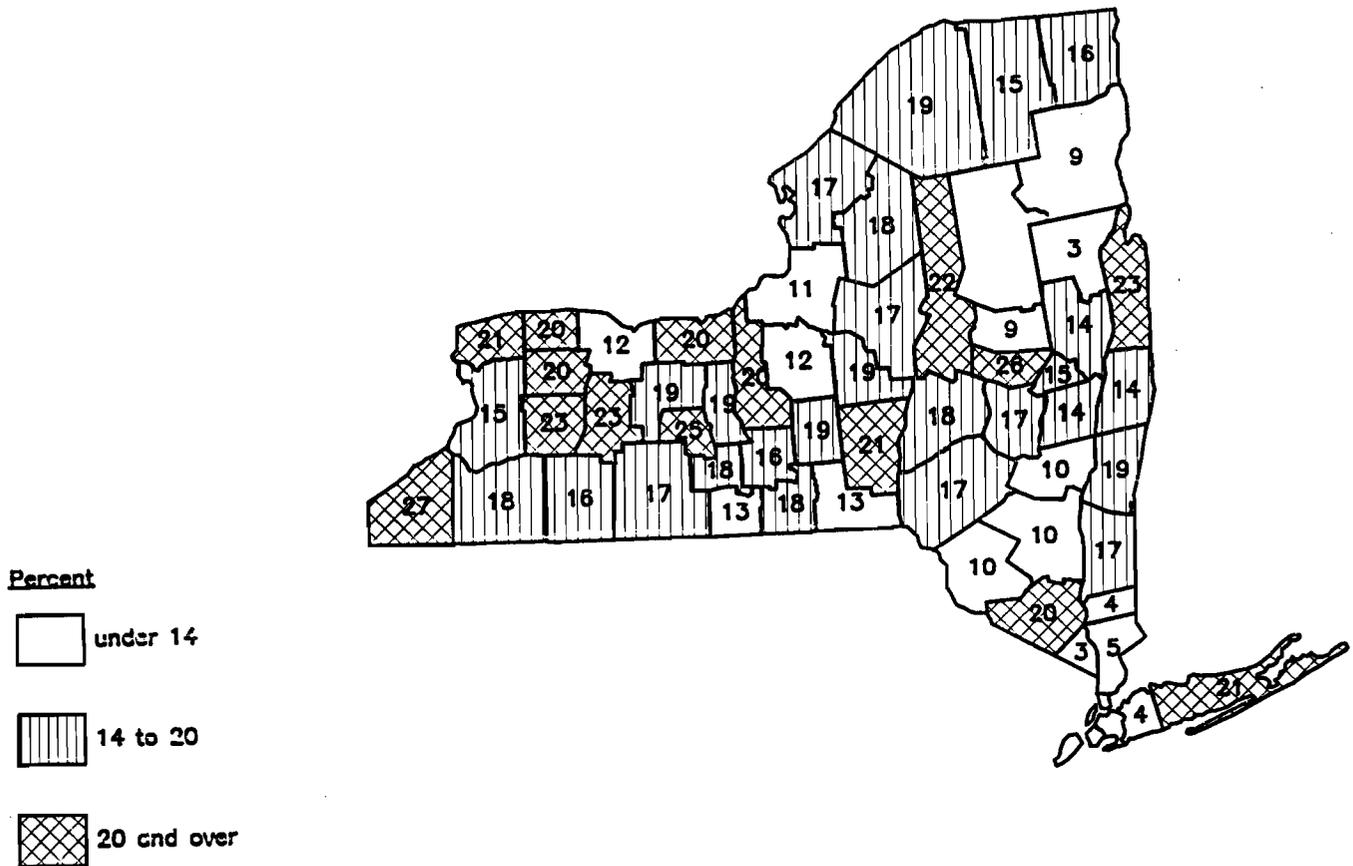


Changes in Number of Farms by Counties

An examination of the number of farms that were counted in the census in 1900 in relation to numbers in 1987 requires one to consider a number of different forces which brought about these results (Figure 5). For example, Orange County with its important fruit and vegetable industries, as well as its soil resources has fared differently than most of its neighbors. One can see this in Figure 1 for land in farms as well. These county data are provided so that these individual differences can be examined for such purposes as land use planning, which has become increasingly important in each of the counties of the state.

Figure 5.

**NUMBER OF FARMS
1987 as Percent of 1900**



Agricultural Periods, 1870-1990

One way to summarize the changes in land use and the forces at work during the 20th century is to divide the years into agricultural periods. This generalization is readily open to challenge. It does, however, capture a sense of the ups and downs in farming during these years and some of the major reasons for the timing of change (Chart 1).

Chart 1. AGRICULTURAL PERIODS New York, 1870 to 1990

1870-1919

- Stability in farm numbers, land in farms.
- Output based on human and animal power.
- Yields stable; few purchased inputs.
- Favorable prices in agriculture from 1910 to 1919.

1920-1940

- Agricultural depression, falling land prices.
- Introduction of tractors, greater mechanization.
- Improved roads, some electricity.
- Land in hills abandoned.

1940-1949

- War effort; new capital for investment.
- Tractors replacing horses.
- Applications of agricultural technology.

1950-1969

- Quiet agricultural revolution.
- Exodus of agricultural labor to off-farm jobs.
- Electrical and mechanical power replaces human labor.
- Major increases in yields and labor efficiency.

1970 to 1990

- Industrialization of agriculture.
- Impact of environmental concerns.
- Applications of biotechnology.
- Changes in consumer demand.

Farming was a relatively stable industry in New York during the late 19th and early 20th century. Providing feed and hay for the horses of urban areas was an important source of cash income for many farmers in these years. Proximity to markets was also important because transport, refrigeration and many of the things taken for granted in the 1990s were not available. Many farms succeeded because of their self sufficiency, producing much of what the family consumed and trading surplus products for necessities.

Agricultural prosperity came between 1910 and 1919 as immigrants flooded into the country as rapidly as food production increased. The war in Europe raised agricultural prices including those for agricultural land and the inevitable agricultural depression that followed had started by 1920. Land prices fell in real terms for each of the years between 1920 and 1934. These were tough years for farmers everywhere including New York. The return of the hill land carved out of the forest less than 100 years before had begun. Mechanization began on the better cropland; horses in the cities were replaced by motor transport; improved roads reduced the need for many rural hamlets and crossroad stores. The exodus out of farming would have been faster if there had been more jobs in town. The great depression of the 1930s kept people on the land because this was their best alternative.

Once again, war in Europe rescued agriculture and the American economy in the 1940s. The backlog of new agricultural technology developed in previous decades could now be applied, as savings from the war years could be invested in new labor-saving equipment. All weather roads and electricity made life in the country much more like that in urban centers.

The greatest changes in agriculture during the century occurred in the 1950s and 1960s. This was true not only in New York but the United States as a whole. Farm numbers in 1969 had declined to 42 percent of what they were 20 years earlier. Land in farms and cropland harvested declined dramatically. New technology allowed impressive increases in yields and productivity. Off-farm jobs were available to displaced farmers and farm workers, many of whom could commute to work on good roads from existing rural residences. The best land from farms going out of production was acquired by continuing farmers.

The 1970s brought a period of rapidly rising grain prices and a boom mentality nationally for agriculture, particularly in the midwest. New York was spared much of this partly because the dairy industry did not share as much in the boom. Land prices did not escalate as they did in the Corn Belt and Great Plains. The great fall in land prices of the early 80s in the midwest and south likewise did not occur in New York. Local demands for real estate from outside agriculture were often more important than trends in the rest of the country.

The growing importance of larger farms in producing national agricultural output was increasingly recognized from 1970 onward. In 1982, the 27,800 farms with sales of \$500,000 or more produced 32.4 percent of total sales. The 1987 census reported 32,000 farms of this size with 38.2 percent of the total. Similar trends were shown in New York with 400 farms accounting for 16.1 percent of output in 1982 and 480 with sales of \$500,000 or more providing 21.5 percent in 1987. The industrialization of agriculture became more evident with specialization of production in one or two key commodities the general rule. Concerns for the environment became imperative in doing business. Consumers increasingly demanded products that they considered good for their health and in a convenient form for consumption. Niche markets for specialty products grew.

Why Did So Much Land Go Out of Farming?

In the first nine decades of this century, 46 percent of the state's total area went out of farming. In 1900, almost 75 percent of the land was in farms. The great exodus from agriculture resulted from a complex set of circumstances. Among the most important were:

1. Strong agricultural competition from other regions in the United States.
2. The loss of markets for hay when horses were replaced by other transport.
3. Much of the "improved land" that was harvested with human and animal power was not suitable for mechanized farming.
4. Many of the hill soils did not have the innate productivity to compete even when fields were enlarged and adapted for mechanization.
5. Suburban and metropolitan development could outbid agriculture for the use of desirable land in good locations.
6. Growing demand by private individuals to own land for recreation purposes and country living.
7. New technology allowed increased output from the most productive cropland encouraging consolidation of production on the best land not required for development.

It is important to emphasize that much of the land in the eastern third of the United States that went out of farming in the 20th century exited because it could not compete with land used for farming in other parts of the country. Urban development did not drive out farming except in the areas close to cities. To the good fortune of rural land owners and local governments, much of the land no longer used for farming was over time purchased by private citizens for recreational uses or homes and remained on local tax roles.

Changes in the Dairy Industry

Throughout most of the State's history, dairy production has been its most important agricultural enterprise. In the Census of 1900, New York was the leading producer of dairy products in the country (Table 5). The ten leading states were all east of the Mississippi River or bordered it. In 1990, New York was still a leading dairy state along with Pennsylvania to our south. The newcomers to the top 12 were California, Washington, and Idaho to the far west as the top five states produced more than half of the total.

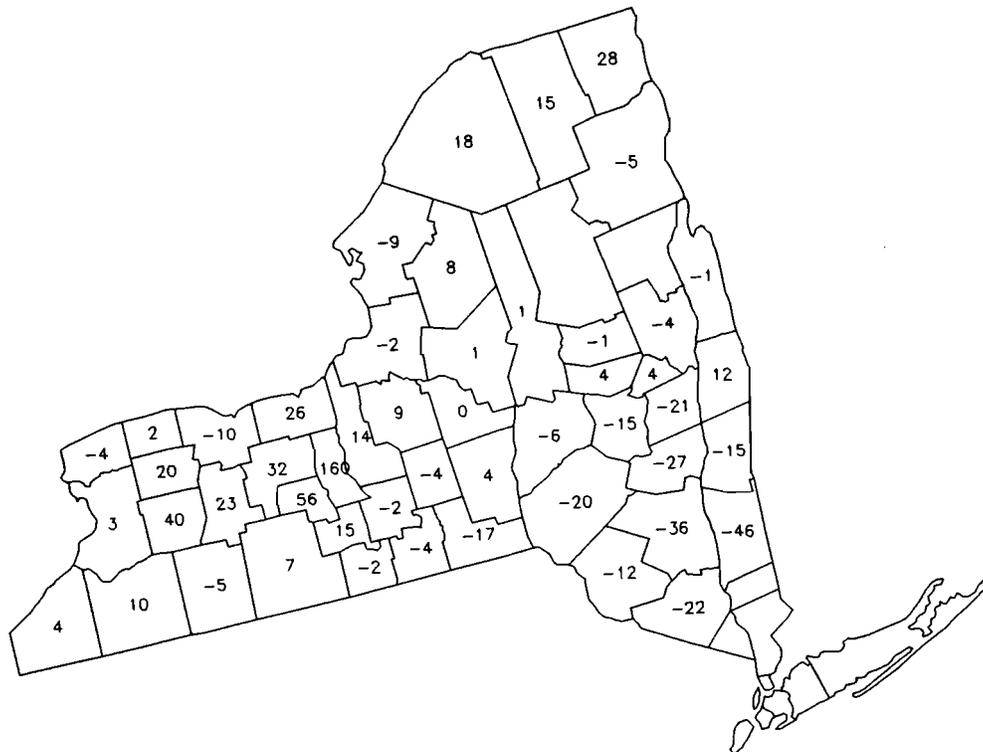
Table 5. MILK PRODUCTION: RANK ORDER BY STATES
United States, 1899 and 1990

| 1899 | | 1990 | |
|------------------|------------------|------------------|------------------|
| State | Percent of total | State | Percent of total |
| 1. New York | 10.6 | 1. Wisconsin | 16.5 |
| 2. Iowa | 7.4 | 2. California | 14.1 |
| 3. Pennsylvania | 6.7 | 3. New York | 7.5 |
| 4. Wisconsin | 6.5 | 4. Minnesota | 6.7 |
| 5. Illinois | 6.3 | 5. Pennsylvania | 6.6 |
| 6. Ohio | 5.9 | 6. Texas | 3.7 |
| 7. Michigan | 4.3 | 7. Michigan | 3.5 |
| 8. Minnesota | 4.2 | 8. Ohio | 3.0 |
| 9. Indiana | 3.6 | 9. Washington | 3.0 |
| 10. Missouri | 3.5 | 10. Iowa | 2.9 |
| 11. Texas | 3.4 | 11. Missouri | 2.0 |
| 12. Kansas | 3.4 | 12. Idaho | 2.0 |
| All other states | 34.2 | All other states | 28.5 |

Source: U.S. Census; A.E. Ext. 91-20.

One further comparison made for milk production coming from individual counties between 1979 and 1989 is provided in Figure 9. Here, the combined influence of cows and yields is provided for the most recent decade. Output increased in key counties of the Central Plain region of western New York and the North Country. Most of the decreases were in an expanded set of counties in the southeast, as many as 120 miles from New York City.

**Figure 9. PERCENT CHANGE IN MILK MARKETINGS
December 1979 to December 1989**



Farm Marketings

While the dairy industry has been the primary source of livelihood for a majority of New York farmers throughout the century, other crops and livestock products are also important (Table 6). Much of the poultry industry has been lost since 1970. Cull dairy animals and beef are the second most important sources of livestock sales. The greenhouse and nursery industries provide a much larger share of total agricultural value, especially since 1980. Vegetable production, increasingly for fresh market, has increased in the last two decades. Fruit has declined a bit in relative terms while field crop enterprises remain an important alternative on many farms.

Table 6. FARM MARKETINGS
New York, 1970, 1980, 1990

| Description | 1970 | 1980 | 1990 |
|-------------------------------|------------|-------------------------|------------|
| Total cash receipts, millions | \$1,117 | \$2,480 | \$3,006 |
| | | <u>percent of total</u> | |
| Dairy products | 55.4 | 56.6 | 53.0 |
| Cattle and calves | 8.3 | 7.1 | 6.5 |
| Poultry and eggs | 7.3 | 3.7 | 2.4 |
| All other livestock | <u>2.0</u> | <u>4.2</u> | <u>4.1</u> |
| Total livestock products | 73.0 | 71.6 | 66.0 |
| Field crops | 7.7 | 9.3 | 8.1 |
| Vegetables | 6.4 | 7.1 | 8.6 |
| Fruit | 6.8 | 6.5 | 5.7 |
| Greenhouse and nursery | 5.1 | 5.1 | 11.4 |
| Other | <u>1.0</u> | <u>0.4</u> | <u>0.2</u> |
| | 100.0 | 100.0 | 100.0 |

Source: New York Agricultural Statistics Service.

Any estimate of the level of cash marketings from farms in the year 2000 is open to many questions and must be based on some subjective assumptions. The estimates in Table 7 do not anticipate major changes from the trends observed in Table 6. Cash receipts are expected to increase by a compound rate of three percent per year. Much will depend on what happens in other regions of North America as well as the United States. It assumes that the dairy industry will continue to compete effectively with other regions of the country; vegetable production is expected to increase in importance as direct marketing continues to develop. The "green" industries, depressed at the beginning of the 1990s are assumed to gather strength again. Field crops are expected to decline relative to other alternatives.

Table 7. PROJECTED CASH MARKETINGS
New York, 2000

| Description | 1990 | 2000 |
|-------------------------------|-------------------------|------------|
| Total cash receipts, millions | \$3,006 | \$4,040 |
| | <u>percent of total</u> | |
| Dairy products | 53.0 | 55.0 |
| Cattle and calves | 6.5 | 6.0 |
| Poultry and eggs | 2.4 | 2.0 |
| All other livestock | <u>4.1</u> | <u>3.0</u> |
| Total livestock | 66.0 | 66.0 |
| Field crops | 8.1 | 7.0 |
| Vegetables | 8.6 | 9.8 |
| Fruit | 5.7 | 5.0 |
| Greenhouse and nursery | 11.4 | 12.0 |
| Other | <u>0.2</u> | <u>0.2</u> |
| | 100.0 | 100.0 |

Structure of Farming

It is quite common in talking about businesses to refer to their size in terms of sales volume. This is the most widely used way of looking at the distribution of farms by size groups in the second half of this century (Table 8). Essentially 35 percent of New York's farms at the time of the 1987 census were residential units with sales of less than \$5,000 annually. Clearly, these farm operators rely on other sources of income for their family livelihood.

Table 8. FARM NUMBERS BY VALUE OF SALES
New York, 1987

| Value of products sold | Number of farms | Value of sales | Percent of total |
|---------------------------|-----------------|----------------|------------------|
| <u>Residential farms:</u> | | | |
| Less than \$5,000 | 13,200 | \$ <u>22.7</u> | 0.9 |
| <u>Part-time farms:</u> | | | |
| \$ 5,000 - 19,999 | 7,300 | 75.8 | 3.1 |
| 20,000 - 39,999 | 3,100 | 88.0 | 3.6 |
| <u>Commercial farms:</u> | | | |
| \$ 40,000 - 99,999 | 6,800 | 465.0 | 19.0 |
| 100,000 - 249,999 | 5,500 | 841.8 | 34.5 |
| 250,000 - 499,999 | 1,300 | 422.5 | 17.3 |
| \$500,000 and over | <u>500</u> | <u>526.1</u> | <u>21.6</u> |
| Total | 37,700 | \$2,441.9 | 100.0 |

Source: U.S. Census of Agriculture.

A second group of farms produce enough agricultural products so that they are important in their respective communities as small commercial producers and as buyers of inputs from local suppliers. In most cases, these units, which sell from \$5,000 to \$40,000 of farm products annually, rely on sources other than farming for most of their family income. They represent a wide range of situations from retirees to weekend farmers and accounted for 27.5 percent of farm numbers in 1987 but only 6.7 percent of the value of sales.

More than 92 percent of all sales of farm products come from the 14,100 farms that sell more than \$40,000 annually. Almost all of these can be considered commercial farms where at least one worker equivalent is involved in farm operations. In 1987, the 1,800 largest farms accounted for 39 percent of total sales.

A projection of the number of farms in the year 2000 and their distribution by size groups is provided in Table 9. A moderate rate of inflation (three percent) is projected. Small reductions in each of the three major size categories is expected assuming the national definition of a farm remains unchanged. There might well be an increase in the number of "residential" farms if more of the current, smaller part-time farmers decide that the amount of time spent farming is not providing sufficient returns. The most important projection is the expectation that an increasing part of total sales will come from the 3,000 largest farms.

Table 9. FARM NUMBERS BY SIZE CLASS
New York, 2000

| Size class (value of sales) | Number of farms | Value of sales | Percent of sales |
|--|--------------------|-----------------------------|---------------------|
| <u>Residential:</u> (Less than \$5,000) | 12,000 | <u>millions</u> \$ 25.00 | 0.6 |
| <u>Part-time:</u> (\$5,000-49,999) | 9,000 | 175.00 | 4.4 |
| <u>Commercial:</u> Primarily family labor (\$50,000-249,999) | 9,000 | 1,500.00 | 37.5 |
| Hired labor significant (\$250,000 and over) | <u>3,000</u> | <u>2,300.00</u> | <u>57.5</u> |
| TOTALS | <u>33,000</u> | <u>\$4,000.00</u> | <u>100.0</u> |

Important Forces Affecting Farming in the 1990s

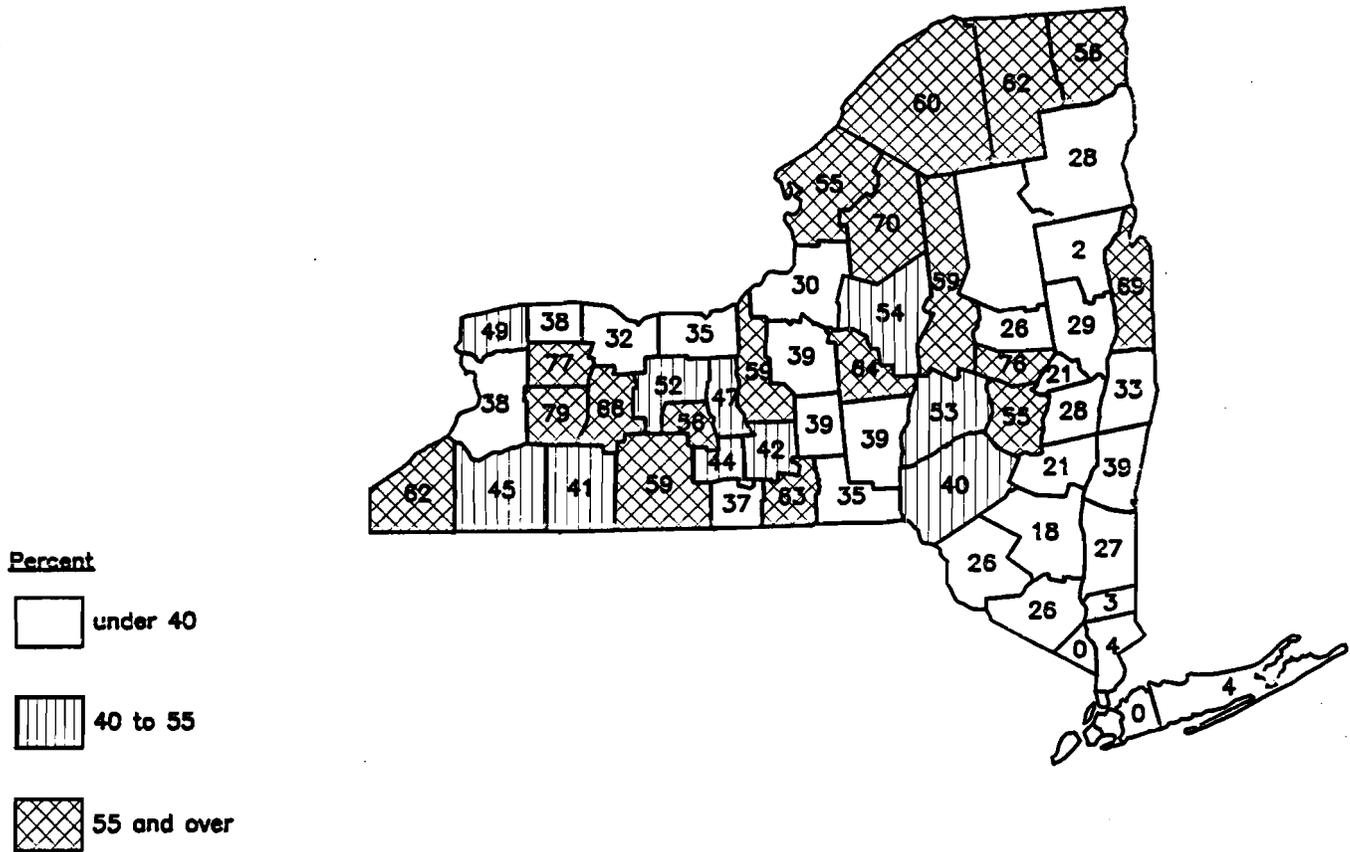
The economic environment in which farming takes place is constantly changing. Of particular note in the 1990s are:

1. The growing importance of production for specialized markets.
2. The need to establish secure market outlets for production.
3. Recognition of price premiums paid for consistent large supplies and discounts obtained for volume purchases.
4. Potential for contracting for specialized production services, forage supplies, other needs.
5. Impact of consumer demand shifting away from animal fats, cholesterol, red meats.
6. The growth in demand for whole grains, fresh fruits and vegetables in the diet.
7. Public concerns about the environment are increasing especially for contamination of surface and ground water.
8. Farming is increasingly looked on by the public as a business; less and less as a way of life.

Tremendous changes have occurred in the farm sector in New York in the 20th century. The advances in agriculture have made possible substantial increases in people's standard of living, undreamed of 90 years ago. The new century will undoubtedly bring unexpected change as advances in biotechnology, information systems, and biological controls unfold. We are the inheritors of a productive agricultural system made possible by the hard work and initiative of many farm families who have gone before us. Ours is the responsibility to continue to build on that heritage.

Appendix I.

ACRES, ALL HAY
1987 as Percent of 1900



OTHER AGRICULTURAL ECONOMICS EXTENSION PUBLICATIONS

| | | |
|-----------|---|--|
| No. 91-30 | Considerations in Establishing Retirement Plans for Farm Employees | George Casler Tom Maloney |
| No. 91-31 | Item Pricing in New York State: A Three Phase Study Focusing on Price Systems, Accuracy, Consumer Perception and Related Costs to the Food Industry | Gene A. German Debra J. Perosio |
| No. 91-32 | New York Economic Handbook 1992 Agricultural Situation and Outlook | Extension Staff |
| No. 91-33 | 1990 Northeast Beef Farm Business Summary | Caroline Nowak Rasmussen Danny G. Fox Stuart F. Smith Ted C. Perry |
| No. 91-34 | Issues in the Development and Marketing of Reduced Chemical Agricultural Products: A Look at Disease-Resistant Apple Cultivars | Cecile Murphy Lois Schertz Willett |
| No. 92-01 | Economics of Integrated Pest Management Practices for Insects in Grape Production | Darwin P. Snyder Timothy H. Weigle Gerald B. White |
| No. 92-02 | Economic Implications for Integrated Crop Management Practices for Field Crops | Darwin P. Snyder J. Keith Waldron Donald R. Specker |
| No. 92-03 | Micro DFBS: A Guide to Processing Dairy Farm Business Summaries in County and Regional Extension Offices for Micro DFBS v 2.6 | Linda D. Putnam Wayne A. Knoblauch Stuart F. Smith |
| No. 92-04 | Motivation: Improving Business Performance Through People | Thomas R. Maloney Robert A. Milligan Jonas B. Kauffman, III |