CORNELL
AGRICULTURAL ECONOMICS
STAFF PAPER

CURRENT OUTLOOK FOR DAIRY FARMING, DAIRY PRODUCTS, AND AGRICULTURAL POLICY IN THE UNITED STATES

Andrew M. Novakovic
Nelson L. Bills
Kevin E. Jack

August 1991 **No. 91-23**

Department of Agricultural Economics
Cornell University Agricultural Experiment Station
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York, 14853

CURRENT OUTLOOK FOR DAIRY FARMING, DAIRY PRODUCTS, AND AGRICULTURAL POLICY IN THE UNITED STATES

by

Andrew M. Novakovic
Nelson L. Bills
Kevin E. Jack*

Dairy farming is a key component of the U.S. farm economy. Receipts from the sale of dairy products exceeded $19 billion in 1989 and accounted for about 12 percent of total cash receipts from farm marketings (USDA, 1991). Just over 202,000 or 10 percent of all U.S. farms have milk cows, and about 138,000 are classified as dairy farms in the Census of Agriculture because sales of dairy products are the principal source of farm income; these dairy farmers own or lease less than 5 percent of total U. S. farmland but generate 19 percent of net cash income from farm marketings (U.S. Dept. of Commerce, 1989). Processing, packaging, and movement of fluid milk and other dairy products to final consumers adds substantially more value to the American dairy subsector.

The purpose of this paper is to discuss the current outlook and situation for the U.S. dairy sector and highlight some longer term trends in the structure and organization of the industry. A concluding section of the paper mentions some factors and policy considerations which we believe will influence the dairy industry in the years ahead.

CURRENT STATUS OF NATIONAL DAIRY MARKETS AND PRICES

Since 1983 when the U.S. government initiated the first of seven reductions in the Federal support price for milk, farm prices for milk have shown increasing volatility. In the span of the last two years, milk prices have reached record heights and experienced record declines. Following the record high national benchmark (M-W) price of $14.93 in December 1989, this price fell to $12.02 in March 1990.[1] It recovered to $13.43 by July 1990 but has since fallen to $10.02 in March 1991, including a one-month plummet of $2.02 in October 1990. The M-W price increased to $10.58 by June, ahead of the typical seasonal increase, and shows signs of continuing to move sharply upward this fall.

---

* Novakovic and Bills are associate professors and Jack is an extension associate in the Department of Agricultural Economics at Cornell University, Ithaca, New York, USA. Paper presented at a workshop on *The Current Situation and Prospects for Dairy Farming in Cold Regions*, Obihiro, Japan, August 31, 1991.

[1] The M-W price is used as the basic formula price for establishing class (fluid and manufactured) milk prices and, subsequently, blend prices throughout the Federal milk marketing order system. The order system represents about two-thirds of the Nation's milk supply. It also directly or indirectly undergirds prices for much of the remaining U.S. milk supply. Hence, national average milk prices, and prices in all parts of the U.S., have been affected similarly.

Farm Milk Prices Have Moved Lower

Basic market supply and demand conditions worked together to generate this unusually volatile pattern of milk prices over the last several years. Because of the large surpluses that existed in the early 1980s, the initial declines in the support price resulted in corresponding reductions in market prices. However, the Milk Diversion Program in 1984 and early 1985 helped strengthen milk prices then, as did the Dairy Termination Program in 1986 and 1987. These programs reduced milk production by subsidizing slaughter or export of dairy cattle. Following the final implementation of sellouts under the DTP in late 1987, it appeared that milk prices would quickly tumble to the support price of $10.33 or even lower. Instead, serious drought conditions, especially in the Midwest, led to speculative increases in market prices in the second half of 1988. The M-W peaked at $12.27 in December. After buyers of milk realized that milk production was not seriously curtailed in 1988, market prices began to fall in early 1989; however, as often occurs with a drought, the effects of very low sub-soil moisture and poor planting and growing conditions started to impact on milk production by the summer of 1989. Overall, annual national milk production declined only 0.4 percent (on a daily average basis); yet this seemingly insignificant tightening of milk supplies resulted in competitive pressures that pushed the M-W price up to $14.93 in December 1989. Although milk production was still increasing slowly in early 1990, milk prices weakened from this peak, reflecting in part the fact that milk prices had probably attained a higher level than the market could bear and in part reflecting seasonal declines.

In April 1990, the M-W price started doing something virtually unheard of -- it started a Spring increase. In fact, the M-W rose $1.20 from March to July. This unusually early seasonal increase was driven by two key factors. First, milk production appeared to be growing only modestly in early 1990. Second, buyers of cheese were aggressively purchasing cheese, driving up cheese prices at a time of year when wholesale prices are usually weak. The National Cheese Exchange price for 40-pound blocks rose 19.6 cents per pound from February to July, which is approximately equal to a $1.96 rise in milk value. Thereafter, cheese markets began to soften, and then they collapsed in October. In retrospect, it appears that cheese buyers, after having seen cheese prices run up in late 1988 and then run up to a record high in late 1989, were determined not to get stung again in 1990. Hence, they purchased more than normal amounts early in 1990 and built precautionary stocks. The level of stocks built, coupled with what may have been a recession-induced weakening in retail sales, not only kept cheese prices from rising in the Fall, they contributed to a very unusual, contra-seasonal collapse in cheese markets. With butter prices already riding at support levels and no strength in nonfat dry milk markets, this meant there was no way to sustain milk prices. Moreover, with milk production apparently increasing by leaps and bounds in late 1990, it was not difficult to obtain more than adequate amounts of milk.

Where Will Dairy Markets Go in the Near Term?

Virtually all dairy market forecasters agree that milk prices will be depressed throughout 1991. A certain amount of seasonal strengthening is expected for the Fall; however, even then most forecasters seem doubtful that the M-W price will peak at much beyond $11.00. Opinions begin to diverge beyond 1992, although it would seem that a

majority of forecasters foresee a continuation of low prices, with the M-W price averaging below $11.00 for the next couple of years.

Although experiences of the last three years teach us that milk prices can change rapidly, it does appear most likely that they will remain depressed throughout 1991. However, there are good reasons to believe that market prices should show more significant improvement in 1992. As implied above, three factors led to depressed milk prices: (1) increases in milk production, (2) the collapse of wholesale cheese prices, and (3) a Federal policy that did not so much cause prices to decline as it failed to prevent a collapse. Federal policy may or may not be changed, but eventually market forces will reverse or correct the first two factors and lead to better prices for farmers.

Federal policy can always be changed legislatively, and there are and have been many proposals for reopening the 1990 farm bill which lays out dairy policy for the 1991-95 term. The U.S. House and Senate Agriculture Committees attempted to pass legislation containing higher prices and supply controls but were unable to do so prior to their 1991 summer recess. Although there will be some impetus for resuming discussions in September, continuing stiff opposition to such changes by the Administration and many members of Congress, combined with an improved market situation, means that significant changes in Federal policy will not be made easily.

Without further motivation from Federal policy, when farmers will see more favorable prices will depend on market conditions. More than adequate milk supplies and the collapse of cheese markets in 1990 led to depressed milk prices. Thus, a tightening of supplies and a reinvigoration of cheese markets is essential to the improvement of milk prices. In my opinion, there are good reasons to believe that both will occur and that it won't take a particularly long period of time.

To the extent that cheese markets were depressed by an excessive buildup of precautionary stocks, it is literally just a matter of time before these stocks are worked off. Thereafter, changes in cheese prices will depend on the underlying strength of consumer demand. Although there are always different forecasts, most macroeconomic forecasters seem to believe that the current recession will not be very deep and will not last very long. To the extent that the recession has held back the growth in cheese sales, this bodes well for the cheese industry. Although it is possible to be more pessimistic, overall the potential for a resumption of a strong cheese market seems good. It is, of course, difficult to predict precisely when this corner is turned, but cheese markets may well show significant signs of improvement in 1991.

It also shouldn't take terribly long for milk supplies to tighten up. First, the magnitude of excess supplies in 1990 wasn't particularly great. Although annual rates of gain of 4 percent or so in the last half of 1990 looked impressive, they are as much the result of lower production in 1989 as they are a reflection of longer-term increases in 1990. Thus, it seems that while a tightening of supplies is probably needed, the amount of change required is quite modest.

The second factor that may bring production into line with product sales fairly soon is simply the fact that farm prices for milk are presently very low. Generally we would expect profitability to be low for a large number of farms, and quite a few farms will

have difficulty in maintaining a positive cash flow. As was true in the early 1950s, the mid-1960s, and the mid-1970s, the marketplace can correct itself when farm prices become unreasonably low. However, for many farmers these market-induced corrections do not come fast enough, and they are forced to exit the dairy industry.

This discussion of current events reveals two factors that may be very important in affecting U.S. dairy farmers in the future. The first is a minimal approach to U.S. price support policy. For ten years, dairy industry advocates and policymakers have debated the use of nonmarket controls on production versus using lower prices when milk supplies exceed demand. Since 1983, Federal policy has reflected both viewpoints to one extent or another, but there has been strong resistance to the use of supply controls that were not voluntary and short term in nature. The inability of supply control advocates to achieve a program in the first half of 1991, when dairy farmers suffered the most severe price decline in memory, is a signal that such legislation is not even likely to pass. In fact, it now seems that as long as a conservative administration is in power, Federal price support policy will focus on minimal price support.

A minimalist support policy leads to the second factor characterizing U.S. dairy markets in the last three years and one which is likely to be an important factor in the future -- that is, volatile farm prices. For an industry that had been accustomed to glacial price changes, the last few years have been exceedingly turbulent. One might speculate that price instability will decline as market participants become more adept at responding to and managing risk factors. Nevertheless, greater seasonal and annual price fluctuations are likely to be a part of the dairy industry's future.

STRUCTURAL CHANGE IN THE U.S. DAIRY INDUSTRY

Numerous nonprice factors have also shaped the American dairy industry in the past. Many of these same factors continue, in one form or another, to affect it today. In this section we want to document several very persistent trends toward fewer and larger dairy farms and fewer but more productive dairy cows. We will also show that milk production is increasingly concentrated in a few production regions.

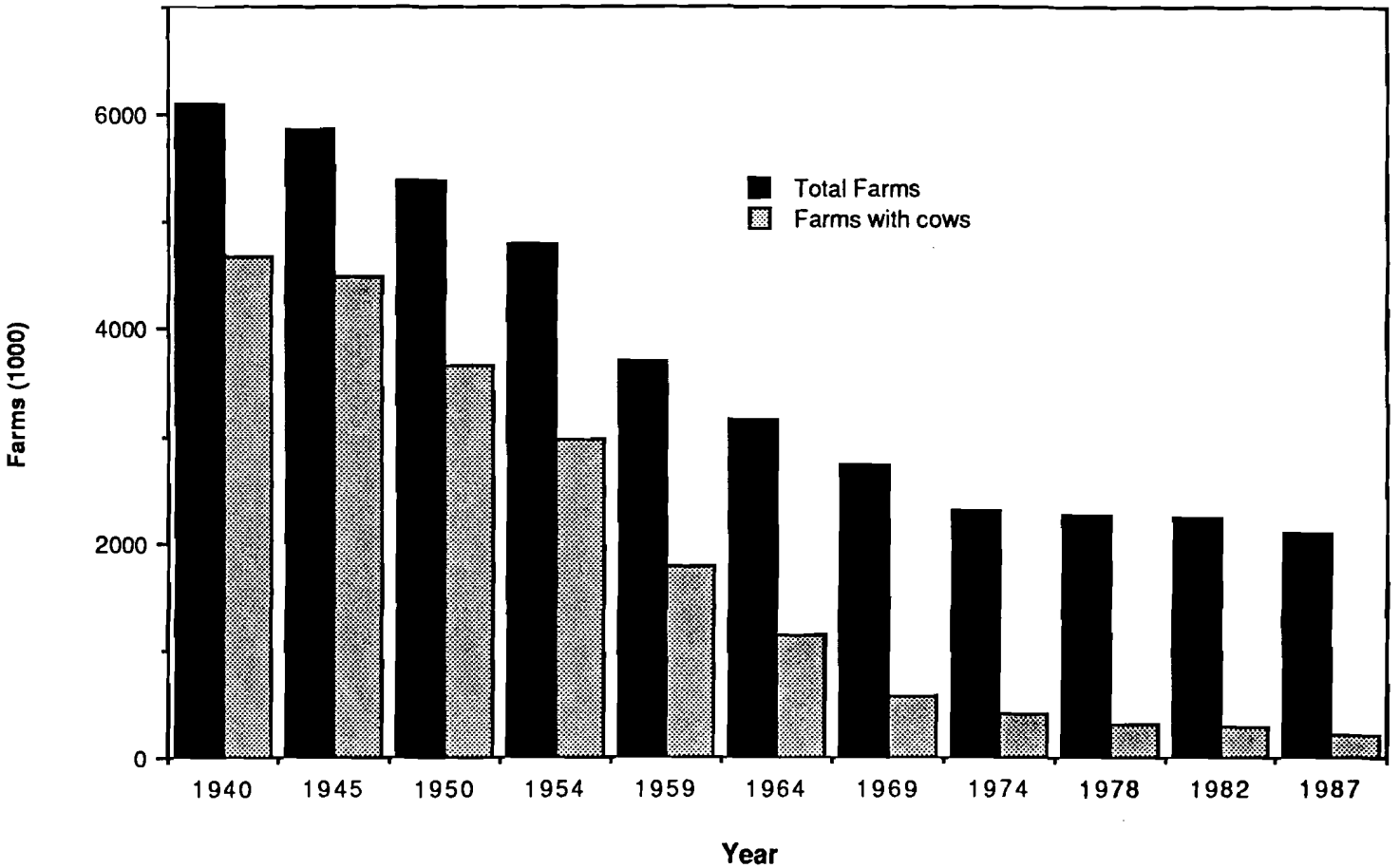
Fewer Dairy Farms

Five decades ago, there were 6.1 million farms in the U.S., and 4.7 million of these farms -- 76 percent of the total -- reported milk cows (Figure 1). Farm consolidation has proceeded at a very rapid pace in the United States over the past fifty years. In 1987, the Census of Agriculture reported nearly 2.1 million farms, a decrease of 3 million since 1940. A small amount of that change is due to revised definitions of a farm.[2] However, farm losses principally reflect the reorganization of American agriculture into ever larger economic units. The average size of a farm in the U.S. has increased because the total farmland base has been fairly stable in the 0.9 to 1 billion acre range since the early 1900s.

---

[2] Currently, a farm is a place with annual production valued at $1,000 or more (U.S. Dept. of Commerce).

Figure 1. Total farms and farms with milk cows, United States, 1940-1987



Source: U.S. Dept. Commerce.

Consolidation of farms with milk production has been even more dramatic -- see Figure 1. In 1940, more than 4.6 million (three-fourths) of all farms reported some milk cows. After Word War II that fraction fell very rapidly, and in 1959 well under 2 million farms reported milk cows, a decrease of nearly 3 million farms over the 1940-59 span. Reductions in farms with dairy livestock were even more remarkable in percentage terms during the 1960s. Dairy operations were terminated on more than 1.2 million farms during the 1960 decade, a 10-year decrease of 68 percent. This trend has persisted in the 1970s and 1980s, and in 1987 the Census reported 202,000 farms with milk cows. These farms account for about 10 percent of all U.S. farms. Of the 202,000 farms with cows, two-thirds or 138,000 farms are classified as dairy farms in the Census because sales of dairy products account for 50 percent or more of gross receipts from farm marketings. Over 90 percent of all milk cows in the Nation are on Census-defined dairy farms.

Fewer but More Productive Cows

Reductions in farms with dairy livestock have been accompanied by rapid declines in the size of the Nation's dairy herd. During the 1940s and the early 1950s, milk cow numbers were in the 20-25 million range (Figure 2). Abrupt decreases during the next 20 years brought cow numbers to the 11 million range by the mid-1970s. Milk cow numbers have been falling since that time but at a far slower rate. By the late 1980s, the Nation's dairy herd had stabilized somewhat in the range of 10.1 - 10.3 million cows.

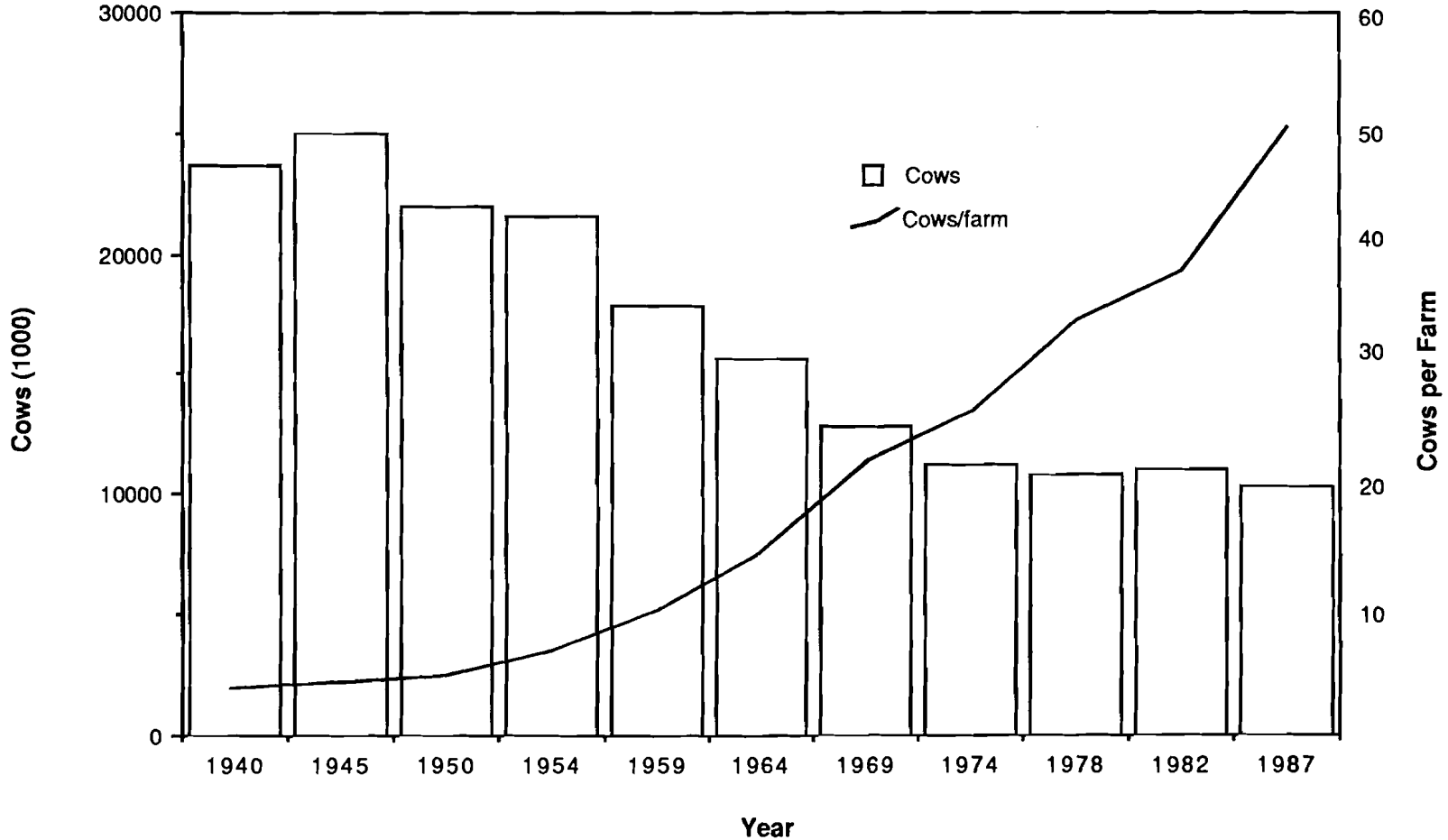
Rapid declines in milk cows are driven by some very substantial gains in farm productivity. Productivity trends in the U.S. dairy sector can be observed in steady increases in milk per cow (Figure 3). American dairy producers have realized a three-fold increase in average milk production since 1940, from 4,600 pounds per cow to about 13,800 pounds per cow. These productivity gains emanate from a number of sources, including technological breakthroughs in breeding, maintenance of herd health, improved feeding rations, and more efficient use of machinery and equipment.

Productivity gains have allowed sustained increases in total milk supply with fewer cows and even fewer dairy farms. The total amount of milk produced in the United States increased from 109 to 142 billion pounds between 1940 and 1987, despite the very large decrease in cow numbers (Figure 4). Due to changing demographic conditions and dietary habits, production on a per capita basis has decreased appreciably over the past 50 years, from 829 pounds in 1940 to under 600 pounds in 1987. Most of these adjustments occurred before 1970.

Larger Farm Size

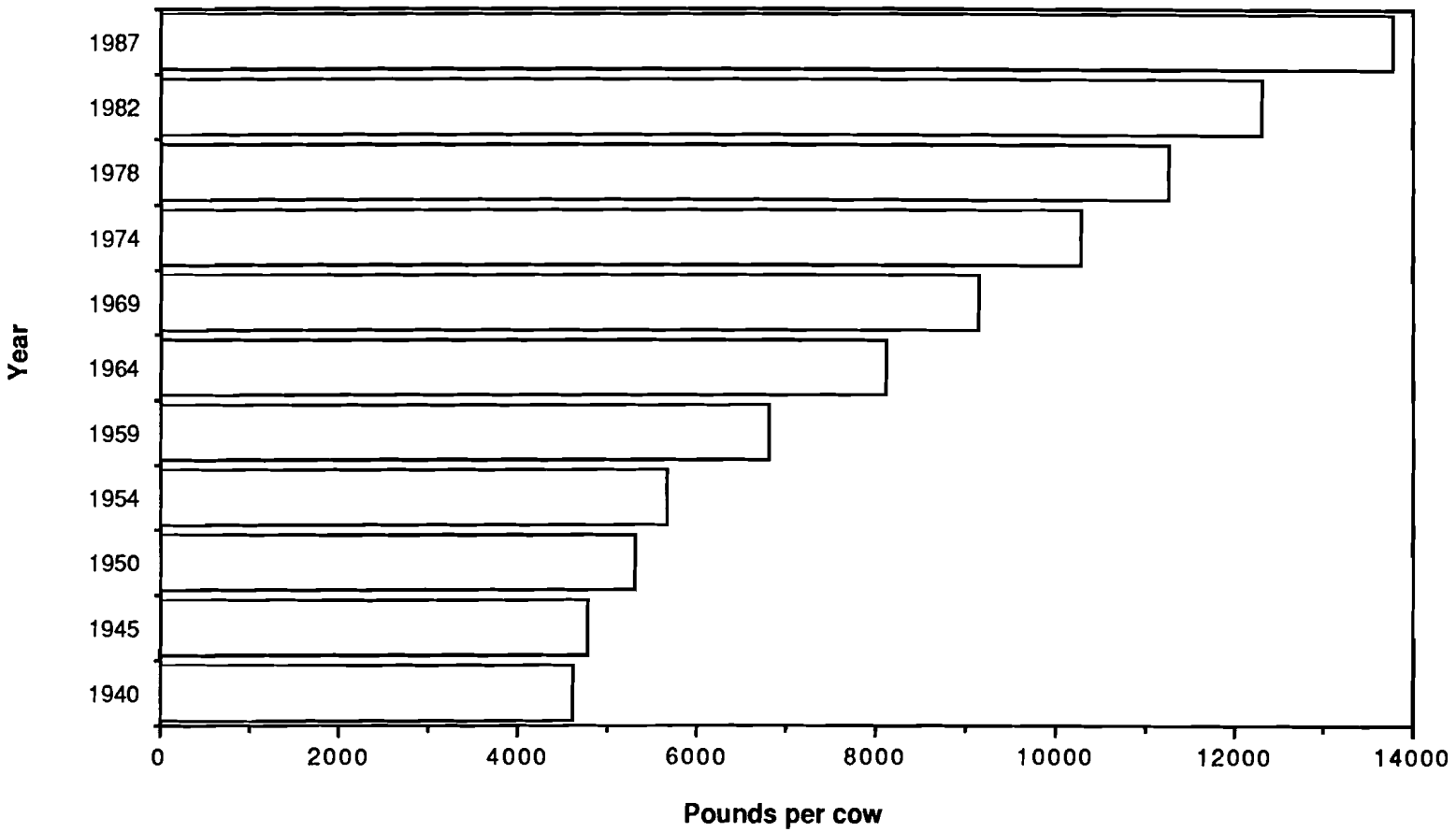
Perhaps the most widely discussed facet of structural adjustment in American agriculture is farm size. This traces to long-standing views on land ownership and the role that individual family farmers should play in American society. Modernization in American agriculture has involved large reductions in labor input and very substantial reductions in farm numbers as capital items and other purchased inputs were substituted for labor supplied by the farm family. The forces governing farm consolidation, such as

Figure 2. Total milk cows and milk cows per farm, United States, 1940-1987



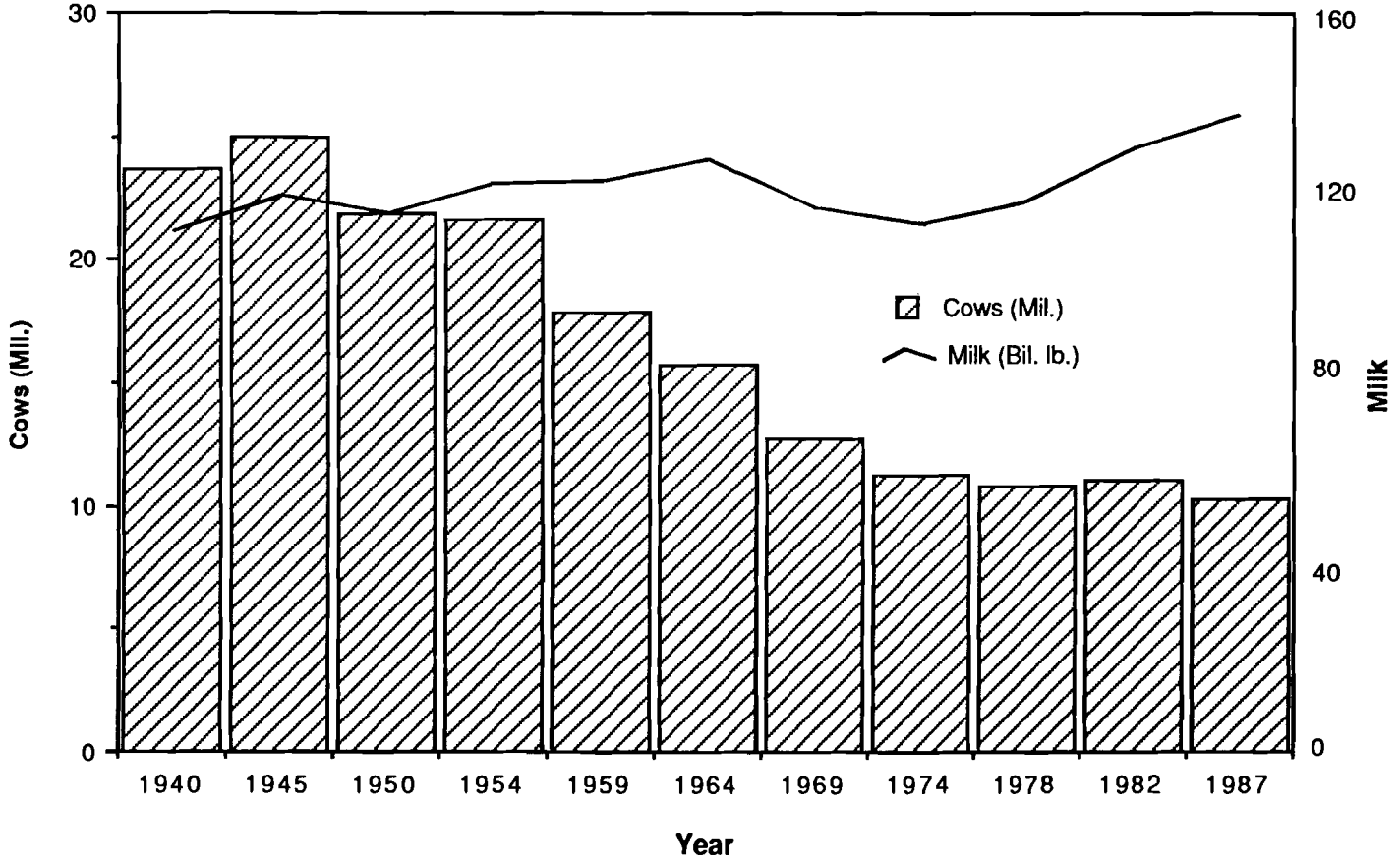
Source: U.S. Dept. Agriculture, 1990

Figure 3. Milk production per cow, United States, 1940-1987



Source: U.S. Dept. Agriculture, 1990

Figure 4. Total cows and total milk production, United States, 1940-1987



Source: U.S. Dept. Agriculture

adoption of new technology and improved farm management, are generally encouraged by U.S. agricultural policy and freely associated with economic and social progress. However, there is persistent concern about reduced farm numbers and attendant social and economic impacts on local communities. Similarly, concerns are periodically raised about the growth of large-scale "corporate" farms at the expense of smaller, family-operated farms.

Larger farm size is very much in evidence for the U.S. dairy sector. Reductions in cow numbers have been far more abrupt than losses in dairy farms, resulting in steady increases in average herd size on each farm. Using Census data on farms reporting dairy cows as a reference point suggests that average herd size has increased from the 5-cow range in the 1940s to slightly more than 50 cows per farm in 1987 -- see Figure 2. The subset of farms which specialize in the production of dairy products and are so classified by the Census reported 68 cows per farm, on average, in the 1987 Census. As the average herd size has increased, the range of farm sizes has expanded greatly.

Trends in dairy farm size are shown in Figure 5. In 1940, well over 90 percent of all farms with dairy livestock had fewer than 20 cows. Today, farms are approximately evenly distributed among the 1-19, 20-49 and over 50 cow classes. Smaller dairy farms are still the mainstay of the U.S. dairy industry despite the notoriety often received by the Nation's very large dairy farms. According to the Census, the largest dairy farms, those with 500 milk cows or more, make up less than 1 percent of all Census-defined dairy farms, but they do account for more than 10 percent of the total U.S. dairy cow herd. Large dairy farms first evolved in California in the 1950s, and presently about 57 percent of all farms with 500 or more cows are located there (Figure 6). Oregon and Washington, with another 55 large farms, also contribute to the heavy concentration of large farms in the Pacific farm production region. Large dairy farms are also established in significant numbers in the "Sunbelt states" of Arizona, New Mexico, Texas, and Florida.

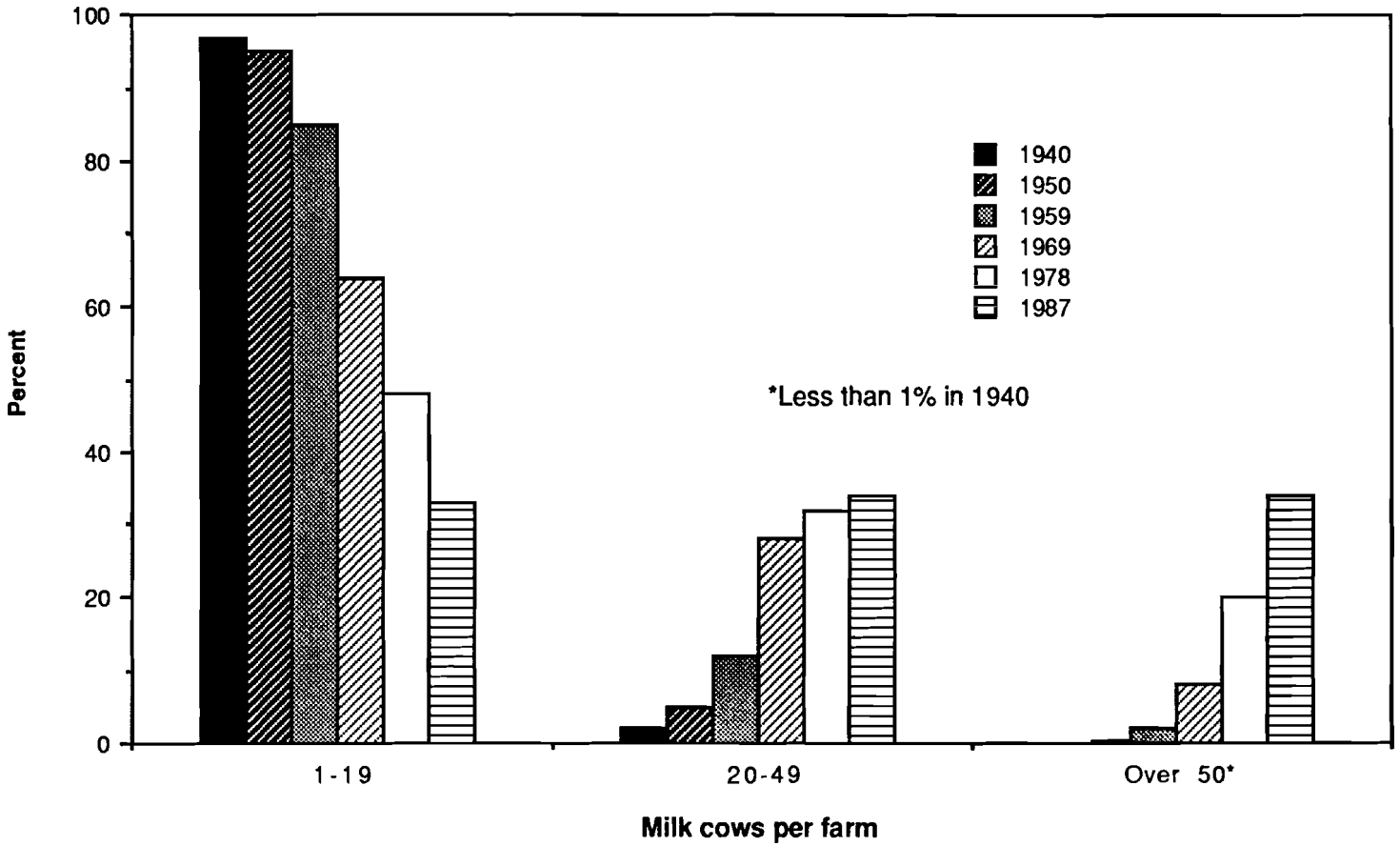
Regional Patterns of Milk Production

Major U.S. farm production regions, along with the 40 largest metropolitan areas, are shown in Figure 7. The Northeast has relatively few very large farms but accounts for roughly one-quarter of total U.S. milk production (Figure 8). Milk production is becoming increasingly concentrated in the biggest dairy states. There has also been a marked shift in regional production patterns over the past 30 years. Regions experiencing long-term declines in share of national milk production include the Corn Belt, the Southeast, the Western Plains, and New England (Figure 9). The Upper Midwest and Middle Atlantic states have held relatively constant shares. The large gainers have been states in the Southwest, West, and Northwest (Novakovic, et al.).

THE U.S. DAIRY INDUSTRY IN THE YEARS AHEAD

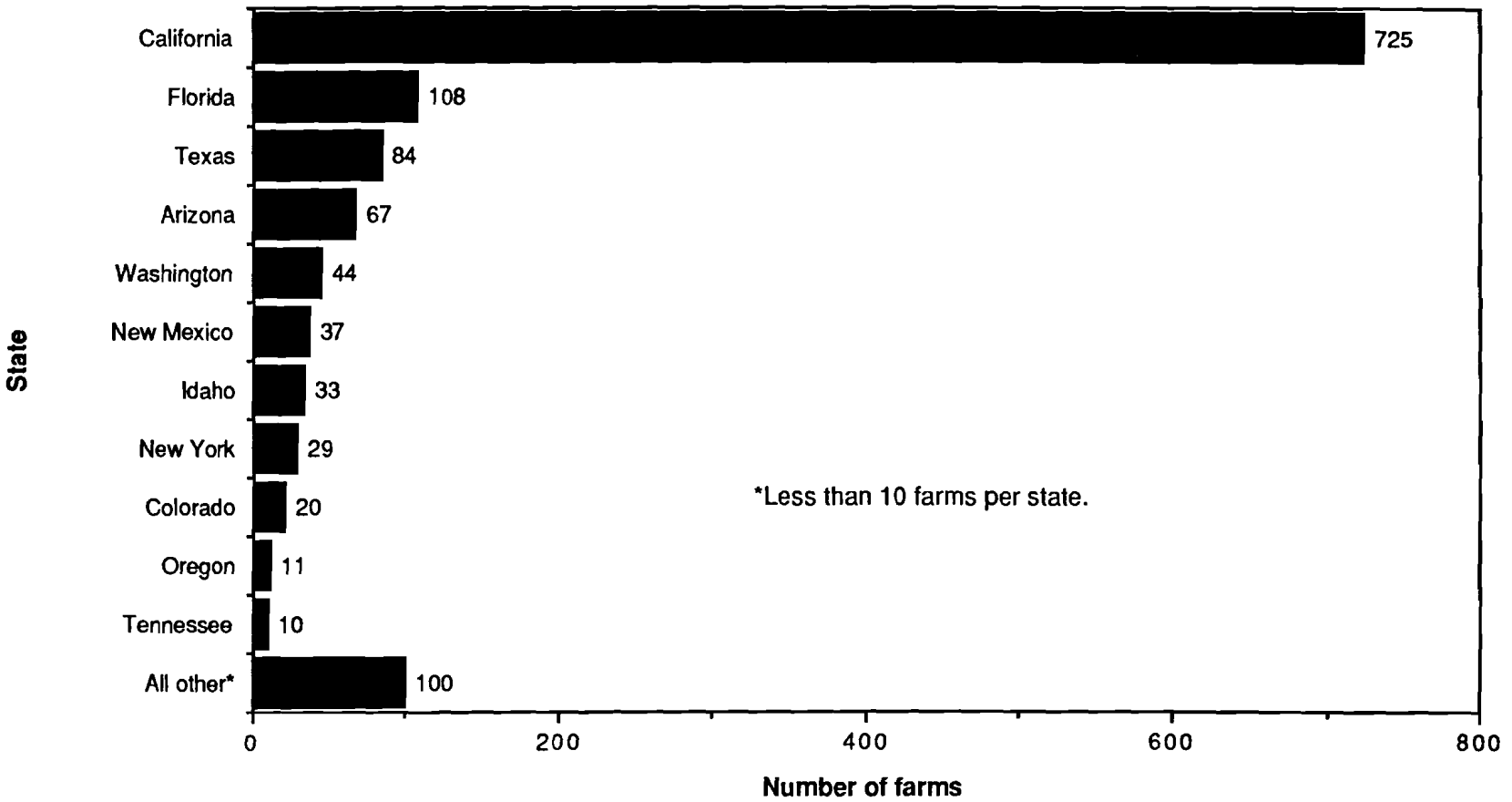
If milk production only keeps up with population growth of about 1 percent per year and production per cow grows at its historical average rate of about 2 percent per year, cow numbers must decline almost 10 percent by the year 2000. If farm size moves up to an average of 75 cows per farm, the number of farms in the U.S. would, by inference,

Figure 5. Size distribution of farms reporting milk cows, 1940-1950



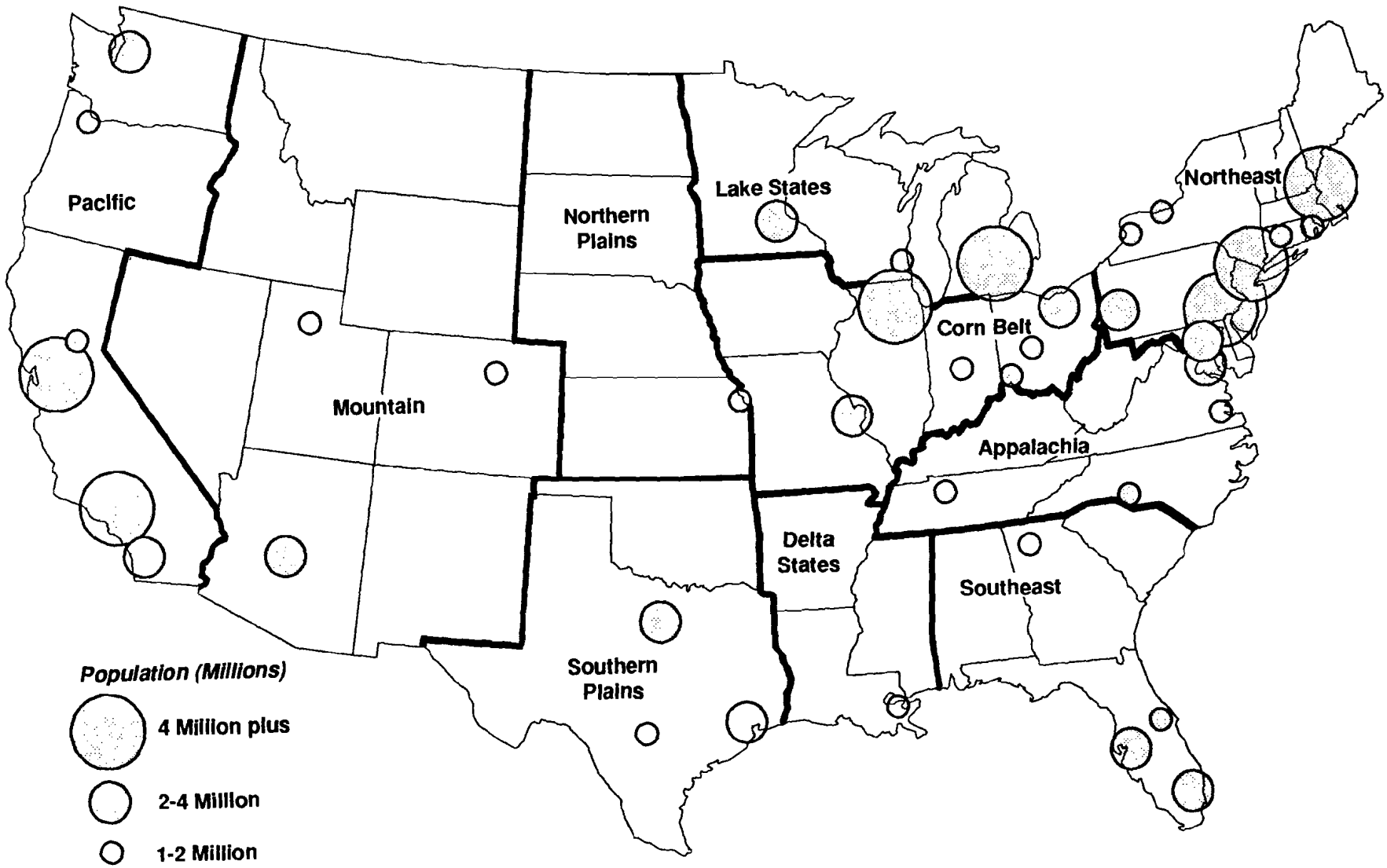
Source: Census of Agriculture

Figure 6. State location of farms with 500 or more milk cows, United States, 1987



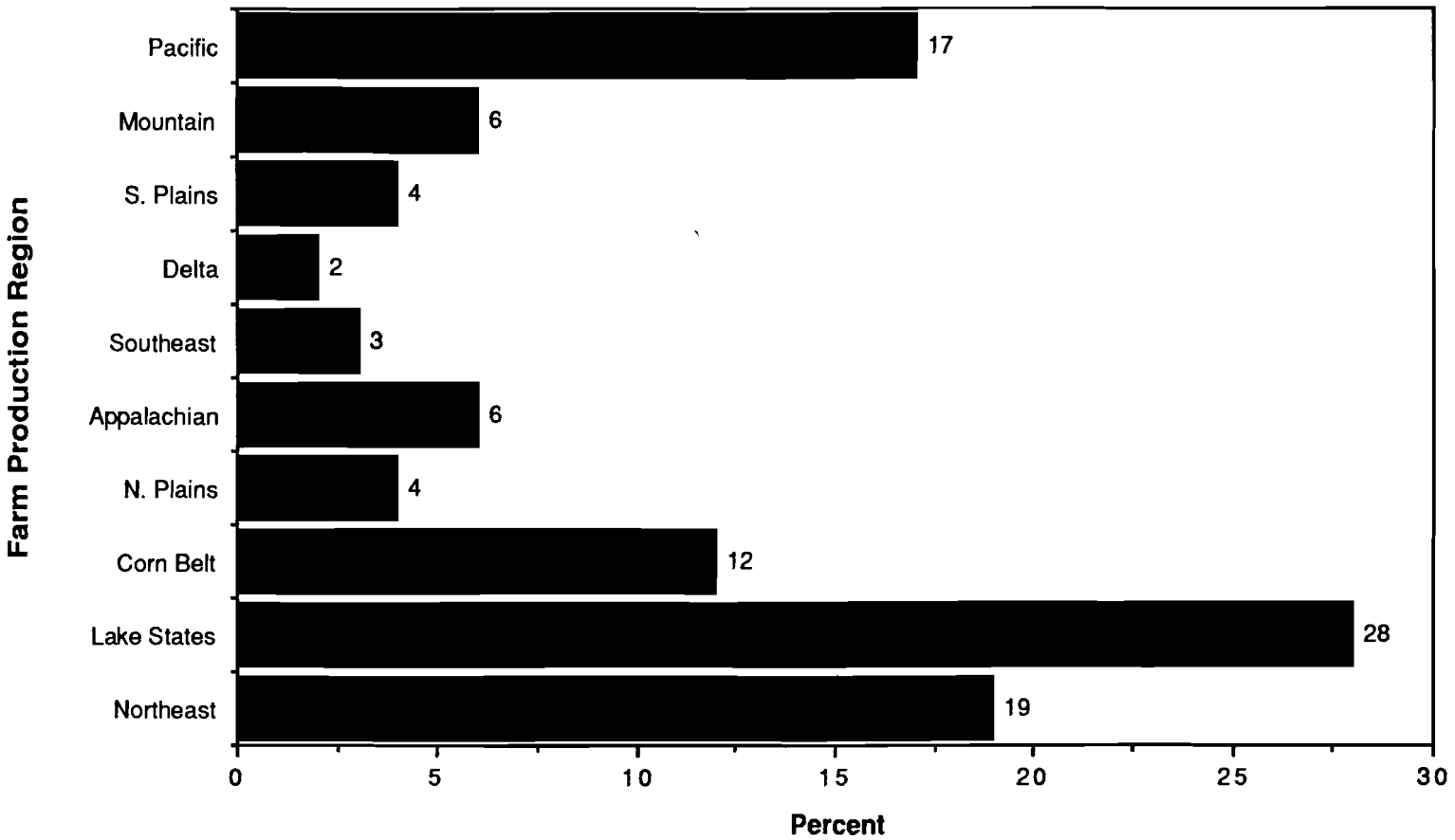
Source: Census of Agriculture

Figure 7. Multi-State Farm Production Regions and the 40 Largest Multi-County Standard Metropolitian Areas (SMA)



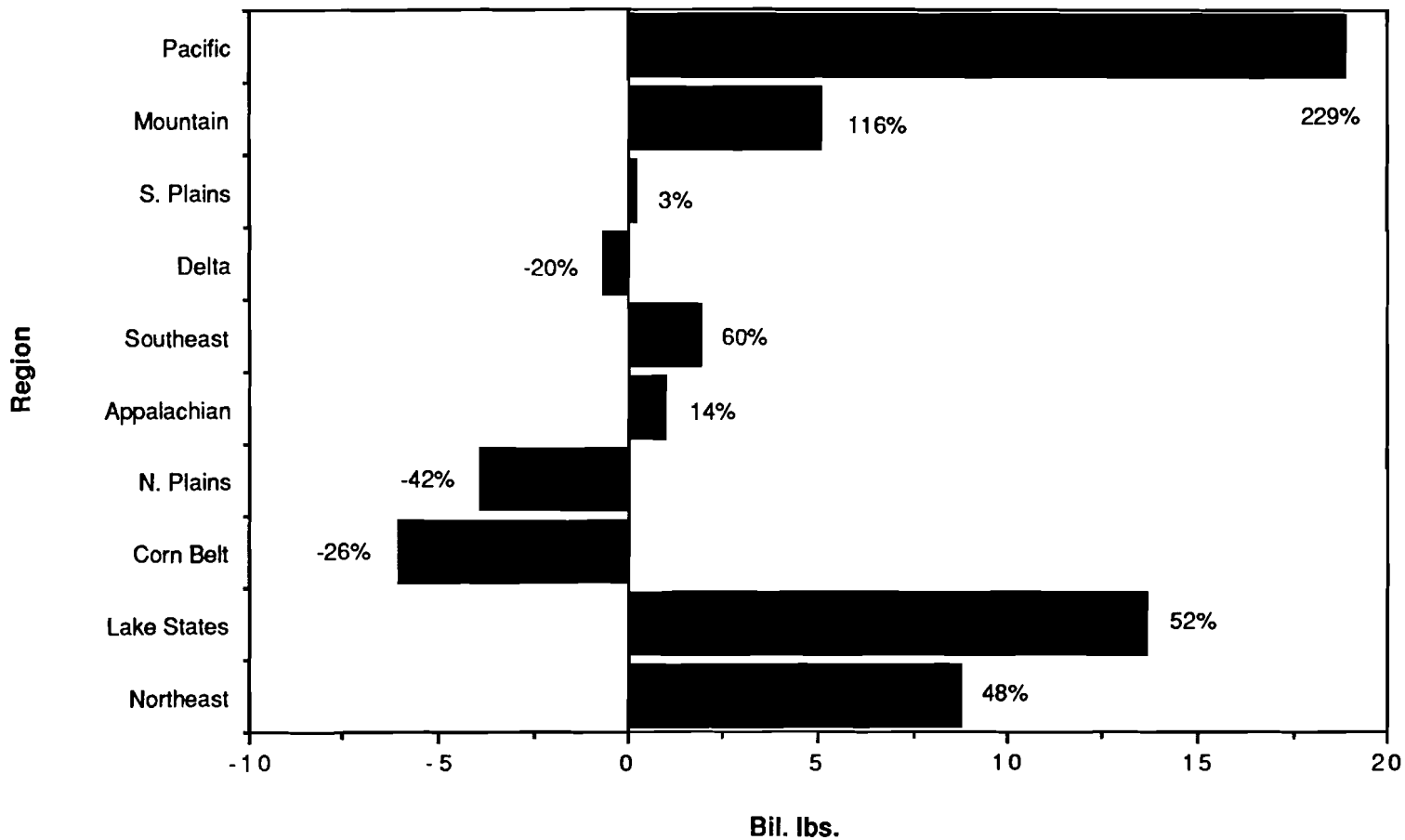
Source: USDA-ERS; U.S. Dept. Commerce.

Figure 8. Percentage distribution of total milk production, Farm Production Regions, 1990



Source: U.S. Dept. Agriculture.

Figure 9. Regional shifts in U.S. milk production 1940-1990



Source: U.S. Dept. Agriculture

decline about 40 percent. Obviously, other assumptions could be made, but these are not particularly radical ones. These rough calculations help focus attention on the future of the American dairy industry.

Technology and Productivity

Attention of the entire dairy community is riveted on the bovine growth hormone and its potential impacts throughout the dairy sector. Some field tests show dramatic production response to growth hormone injections for dairy animals. With or without growth hormone, however, the technologies that already exist today are sufficient to fuel productivity increases well into the future. The prospects for new technologies only increase this potential. In the simple example shown above, just moving the annual rate of gain in productivity from 2 to 3 percent would imply a decrease in cow numbers of almost 18 percent by 2000, other things being equal.

Along with increased production per cow, declining farm numbers can also be explained in part by technological change. Some technologies have inherent scale or size advantages. Milk parlors, for example, represent a substantial capital investment on any farm; however, a large farm can better bear such an investment because the expenditures do not increase in direct proportion to cow numbers. Other technologies may be more size neutral; an example may be artificial insemination. Even in the case of size neutral technologies, the added complexities that any new technology usually implies probably leads to a built-in bias toward larger farms.

Complex technologies require better education and more well-developed management skills and the time to utilize them. Good managers can and do exist on small farms, and not all large farms are well managed; nonetheless, well-managed farms are likely to grow in size, and as they do, owners can begin to hire labor, preserve more of their time for management, and afford to hire more specialized skills to assist them in the management function. If we assume that advances in technologies result in more larger farms and greater productivity gains to the point that the average herd size in 2000 rises to 100 cows instead of 75, then farm numbers will decline 59 percent over the next ten years, other things being equal from the first example above. Again, these numbers are hardly a rigorous, scientific prediction of what will be, but rather a simple example to illustrate that an immense potential for further change exists in the U.S. dairy sector.

Technological change in processing and marketing will be just as, if not more, important. Some of these changes will be cost-reducing technologies and practices that will be fairly transparent to farmers and producers. Others will lead to new products, packaging, or processes. For example, it may well be that processing technologies will be more successful in helping to alleviate the burgeoning milkfat problem than changes on the farm (Cosgrove and Novakovic). For example, technologies to remove cholesterol from milkfat are just now being exploited, but they will soon be eclipsed by the need to reduce and/or change milkfats, and the processes to do it. Some of these technologies will be costly. Their purpose will be to address consumer concerns relating to things such as a healthful diet or the environment, which are discussed further in later sections.

Availability of Labor

There are numerous factors that can alter the growth scenario suggested above. Despite increases in scale and dramatic reductions in labor input on dairy farms, one of the major current constraints affecting many milk producing areas is a shortage of local labor. Some land-grant universities, technical schools and local community colleges are beginning to respond by studying the situation, offering programs to train unskilled labor, and assisting farmers in developing their labor management skills.

Research indicates that the wage opportunities for farm labor are often not the only, or even primary, concern of potential or existing laborers. Often just the fundamental nature of dairy farm work is inhibiting, particularly the regular grind of milking cows. Whereas farmers may view such work as a way of life which offers its own rewards, more and more potential workers may view this life as just another job. Dairy farmers are challenged to come up with creative ways to address this issue. As farm populations decline along with family size, and as the range of career opportunities for farm children expands, farmers will also be challenged to expand their labor pool beyond the more traditional population of farm children, young adults, and retired farmers. As hard as it will be for many farmers to get used to, it will become increasingly necessary to train unskilled workers, many of whom may have no farm backgrounds whatsoever. The increased use of robotic, micro-processor, and micro-computer assisted devices may also be observed in the next ten years; however, it is likely to be sometime later before such technology is commonplace.

Urbanization and Farmland Protection

Pressures on alternative uses of agricultural land are coming from numerous quarters and with increasing levels of intensity. Urban and suburban sprawl from cities of all sizes is steadily putting more land on the inside of the urban fringe. Increasing numbers of people are seeking the pleasures of rural life and buying or building secondary or even primary homes in rural areas. What was once thought to be a peculiarity of the densely populated Northeast is becoming familiar in many other parts of the U.S. Many state and local governments operate programs designed to counteract the influence of population expansion on farm operations in traditional farm communities.

Dairy farmers are particularly vulnerable to these kinds of outside pressures. Milk production initially developed in relatively close proximity to urban markets. The industry is capital intensive, and dairymen must invest in some very specialized buildings and equipment to stay competitive. These investments may not be warranted if conversion of the land to an urban use is expected before these capital items are used up.

For example, during the 1980s most of the counties in New York with high dairy farm losses were either attracting large numbers of commuters or part-year residents from the greater New York City area or they were on the edge of urban expansion in other smaller upstate cities. A similar picture emerges if one looks at areas having the largest relative declines in milk production.

In addition to concern for the loss of farm land, there is an increasing concern on the part of many remaining farmers about the affect of having ever larger numbers of non-farm neighbors. Stories abound about new neighbors buying housing near farms and then issuing complaints about agricultural odors, debris on highways, and the like. In some cases, municipal governments have responded with regulations to force changes on farming practices to accommodate the concerns of nonfarm neighbors. Complaining neighbors can, and increasingly do, go to court with a nuisance suit to seek relief from farming operations they perceive to be offensive. This conflict is likely to continue to expand.

Environmental Issues

Urban sprawl is only one element of the growing interest in environmentally related issues; there are many others. Concerns are being expressed that dairy farming does not have a benign or neutral effect on the environment. Concerns range from the legitimate to the bizarre. Spillage from manure storage ponds into nearby streams is serious but avoidable. Surface or ground water contamination from excessive field spreading of manure or chemical fertilizer usage is a legitimate issue, but there are problems in determining the source of reduced water quality. Questions about methods achieving cost-effective remedies are yet to be resolved in some cases. Concerns that cow gas will hurt the environment as an important source of global warming or greenhouse gases seem too bizarre to even take seriously, although agriculturalists may find they are forced to defend themselves anyway.

Several state governments are beginning to take initiatives on environmental issues, and it is expected that Federal initiatives in the environmental arena will be expanded at some point in the not-too-distant future. For example, Texas dairy farms of over 250 cows require a permit from the State Water Commission. A common estimate of the cost of sanctioned waste handling systems in the rapidly growing area of Erath County, Texas is about $100 to $150 per cow; air quality permits are also required for Texas farms with 1,000 cows or more. The state of Florida went so far as to offer dairy farmers located near Lake Okeechobee a "buyout" option after it introduced very strict nutrient runoff standards for watersheds surrounding the lake. The standards necessitated very large capital expenditures for any dairy farmer wishing to continue operating in that area. The largest farms tended to make the investments and stay.

Activities or practices which may pollute the environment are probably the focal point; however, conservation of natural resources is also a serious issue. The leading example is water usage in the West. Milk production is an extremely water-intensive activity. Milk is 87 percent water. In hot climates, cows require water for cooling as well as milk production. Irrigated feed and forage crops fed to dairy cattle account for large amounts of water usage in the arid Western states. Yet, the fastest growing milk-producing states are almost all in dry areas.

Some of these issues can be resolved or minimized by the use of new practices or technological innovations. In this case, the issue for the dairy sector is more one of cost competitiveness than survivability. In other areas, if pressed, environmental pressure could lead to shifts in the geographic location of milk production. In either case, many

environmental issues or problems should be solvable, but they may well add costs to the production of dairy foods.

Animal Welfare

There is a growing interest in animal rights or welfare. Individuals and groups with this orientation probably should be distinguished from the more mainstream environmentalists in the United States. Activists in this area include those who are concerned about the conditions under which cattle are treated, particularly on the larger, dry-lot style livestock operations. They also include individuals who are against any use of animals for food. Dairy farmers, and the rest of animal agriculture, should be able to work with the less extreme elements of this group, but even this may require added costs.

Food Safety

Another aspect of the broader social concern with the U.S. dairy industry is food safety, particularly as it relates to on-farm production practices. Increasing attention is focused on chemical use. For example, in response to other studies, the Federal Food and Drug Administration (FDA) conducted a ten-city survey of retail milk in 1988 and found rather widespread contamination of milk by low levels of the drug sulfamethazine. Although the level of sulfamethazine found did not pose a general human health threat, this prescribed drug should not have been detected at all in the Nation's milk supply. The publicity surrounding these tests, combined with controversy over chemical use on other commodities -- such as Alar on apples -- has alarmed the public and elevated concerns about the presence of toxic substances in food products. Once again, producers can respond to serious concerns of this type, but more than likely there will be cost implications.

A particularly troubling aspect of the food safety issue is symbolized by the reaction to bovine growth hormone. The negative reaction to bGH is multifaceted, but a large part of it is presented as a food safety concern. Scientists who have studied pituitary growth hormone research overwhelmingly conclude that there is no food safety or human health issue. By extension, recombinantly derived bGH is accepted as no different than pituitary hormone and therefore it also is not perceived as a food safety concern by knowledgeable food scientists and medical experts. This notwithstanding, there is clearly a strong reaction by consumers to the generic use of hormone supplements in animal agriculture and latent concerns about the possibility of scientists underestimating the potential for food safety problems to develop. Thus, dairy farmers must contend with what may be legitimate food safety issues and, in the age of recombinant biotechnology, with issues that appear to have little scientific merit as well.

The Consumer Driven Marketplace

Consumers are sovereign in a market economy. The dairy industry must in the long-run provide dairy products that people want to buy. Changes in tastes, preferences and the Nation's demographic make-up will have to be accommodated. There is a rapidly

growing interest in healthful diets and the relationship between what we eat and our short-term and long-term health. According to a recent National Dairy Council study, 20 percent of Americans state they have changed their diets because of fears related to cholesterol and fat.

This concern has made itself vividly apparent in per capita consumption of dairy products. Whereas per capita consumption of all dairy products has been fairly stable since 1970, the specific product mix has not. As consumers continue to substitute low-fat and nonfat alternatives for traditional dairy foods, the dairy industry will be increasingly challenged to figure out what to do with the residual unwanted milkfat. If the alternatives consumers substitute are nondairy foods, the problem for the dairy industry is much greater. In a short time, much progress has been made in the development of new dairy products to meet changing consumer demands. More work will surely be needed as the pace of these consumer changes picks up and spreads. It is not clear how much of the milkfat problem will be solved by changes in dairy processing and product development vs. adjustments at the farm level. Some changes at the farm level are possible; economics will determine whether they become likely.

Federal Dairy Policy

Since the 1930s, Federal and state legislation has played a major role in regulating aspects of the economy of dairy markets. In the half century or more since then, there have been countless changes in the industry. Some critics now ask whether today's government programs are an anachronistic artifact of yesterday's problems. Proponents argue that Federal policies still address vital needs that are not altered by changes in technology and which serve a legitimate public interest.

Government involvement in a market usually occurs when there is at least a perception that the public's general or specific interests have not been, or would not be, effectively served by an unregulated market. Although there is a view that government intervention is purely the result of political influence, compelling public interest arguments can be found for many government regulations. In milk and dairy product markets, these motivations have included public health, market bargaining power equity, and farm family incomes.

Public health concerns were the initial motivation behind government intervention in dairy markets. Today the safety and quality of farm milk and dairy products are largely taken for granted, despite some lingering concerns about food safety. Price and income support for farmers became the predominant motivation for government programs beginning in the 1930s. After several decades of working rather efficiently and benignly, Federal dairy programs went awry in the 1980s, resulting in record levels of farm prices, farm production, dairy product surpluses, and government program costs. Federal budgetary constraints have recently forced solutions on an industry that was reluctant to admit that changes were needed. With heightened public awareness of what agricultural policy does and how much it costs, Federal farm and food policies have become increasingly criticized for favoring a small segment of the U.S. population and having seemingly perverse effects on income distribution and the environment.

Traditional Federal farm programs may be at a crossroad. The direction taken may lead to modified but continued commitment to a positive intervention in farm markets, or it could lead to the dismantling of programs built up over a half century or more. On top of this uncertain commitment, the dairy industry, and agriculture more generally, is confronted with a rapidly changing market situation involving new technologies, new consumer demands, larger market dimensions, new relationships to the environment and urban areas, and so on. For the time being, no watershed changes are anticipated, but over time substantial changes may occur. One possibility is that we will take the route of much less government intervention and decide, after a few years, that it is necessary to reverse course and put some governmental controls back.

The dairy industry is also learning that other Federal policies can be just as or more important than dairy-specific programs. Examples include health policies that shape consumer dietary concerns, welfare policies that affect the use of dairy foods in food assistance programs, energy and transportation policies that affect the cost of fuels and energy, fiscal policies that determine how much Federal dollars are available for Federal programs, trade policies that are more concerned with the big picture than the little parts of that picture, and so on. The dairy industry has a stake in all of these major areas, but it is not large enough in and of itself to have much influence on the directions taken. The next example of this may be in the arena of trade policy. Although the current round of talks on the General Agreement on Tariffs and Trade have stalled, the long-run pressures are for freer trade. Moreover, bilateral or even trilateral agreements with Canada and Mexico are taking place. At some point in the not-too-distant future a U.S. dairy industry may find that it is no longer relatively insulated from the rest of the world. How it fares in the global arena is difficult to judge, but it will depend in part on what the rules of engagement will be.

REFERENCES

Cosgrove, T. and A. Novakovic. *The Milkfat Issue: Production, Processing and Marketing.* A.E. Ext. 90-18, Department of Agricultural Economics, Cornell University, Ithaca, NY. July 1990.

Novakovic, A., K. Jack, and M. Keniston. *National and State Trends in Milk Production.* A.E. Ext. 90-12, Department of Agricultural Economics, Cornell University, Ithaca, NY. August 1991.

U.S. Department of Agriculture. *Agricultural Statistics 1990.* U.S. Government Printing Office, Washington, DC. 1990.

U.S. Department of Agriculture, Economic Research Service. *Dairy Situation and Outlook Report.* DS-429, Commodity Economics Division, Washington, DC. April 1991.

U.S. Department of Agriculture, Economic Research Service. *Economic Indicators of the Farm Sector: Production and Efficiency Statistics, 1989.* ECIFS 9-4, Resources and Technology Division, Washington, DC. April 1991.

U.S. Department of Commerce, Bureau of the Census. *1987 Census of Agriculture.* Vol. 1, Geographic Area Series, Part 51, United States Summary and State Data. AC87-A-51, U.S. Government Printing Office, Washington, DC. November 1989.

Other Agricultural Economics Staff Papers

No. 91-11	Principles of Institutionalist Research Methodology	Mark Cohen
No. 91-12	Bulgaria A Long and Winding Road to Democracy and a Market Economy - The Special Problems of Agriculture	Christo Petkov Dimo Dichev
No. 91-13	The "Adirondack Dilemma"	Mark Cohen
No. 91-14	Needed Reforms in the Harmonization of U.S. Patent Law	William Lesser
No. 91-15	Time-of-Use Pricing for Electric Power: Implications for the New York Dairy Sector--A Preliminary Analysis	Mark C. Middagh
No. 91-16	The Causes of Economic Inefficiencies in New York Dairy Farms	Arthur C. Thomas Loren W. Tauer
No. 91-17	Role of the Non-Profit Private Sector in Rural Land Conservation: Results from a Survey in the Northeastern United States	Nelson L. Bills Stephen Weir
No. 91-18	Concept Maps: A Tool for Teachers and Learners	Deborah H. Streeter
No. 91-19	What Can Be Learned from Calculating Value-Added?	B. F. Stanton
No. 91-20	Northeast Dairy Cooperative Financial Performance 1984-1990	Brian Henehan Bruce Anderson
No. 91-21	Urban Agriculture in the United States	Nelson Bills
No. 91-22	Effects of Housing Costs and Home Sales on Local Government Revenues and Services	David J. Allee