The Dairy Industry at the Turn of the Century

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Numerous factors have shaped the dairy industry in the past. Many of these same factors continue, in one form or another, to affect it today. Some new factors are exerting new influences. This paper attempts to discuss factors that may be important in shaping the dairy sector as we approach the 21st Century.

Farm Size, Structure, and Location

There is a long trend toward fewer and larger dairy farms and fewer but more productive dairy cows. This trend can be expected to continue.

According to the census of Agriculture, the total number of farms reporting dairy cows has dropped from almost 2 million in 1959 to just over 200,000 in 1987. The number of dairy cows in the U.S. has declined about 40% since 1959, while milk production per cow has more than doubled during this period.

The size distribution of dairying has also changed dramatically. In 1959, 86 percent of the farms with cows had fewer than 20 cows. By 1987, only 33% were in this category, and they only accounted for 3% of all milk cows. In contrast, 7,172 farms (0.4%) had 100 cows or more in 1959, whereas in 1987 about 10% of farms were in this category and they represented 42% of all milk cows. Average herd size has grown from 9 cows in 1959 to 50 cows in 1987.

Dairy production is becoming increasingly concentrated in the biggest dairy states. Today, the two largest states account for over 30% of the milk produced in the U.S. This percentage hovered for most of the century in the range of 20% to 22%. The top five states have historically produced about 40% of the country's milk. Today they represent more than 50%.

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. The Upper Midwest and Middle Atlantic states have held relatively constant shares. The large gainers have been states in the Southwest, West, and Northwest.

In Arizona and California, 28% of the "commercial" herds have 500 or more cows (in this case, "commercial" simply means that the farm had more than 5 cows). These large herds accounted for 64% of the total cows in commercial herds. In contrast, only 3% of the commercial herds in Minnesota and Wisconsin possess more than 200 cows, and 82% were in the 20 to 29 cow range.

Profitability is affected by numerous factors, and it can look different depending on how it is calculated and measured. Nevertheless, it seems quite clear that large farms are typically generating much greater net farm incomes than small and medium size farms. This is no doubt a primary reason why farms are becoming larger and larger.

If milk production only keeps up with population growth of about 1%/year and production per cow grows at its historical average rate of about 2%/year, cow numbers must decline almost 10% by 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, decline about 40%. Obviously other assumptions could be made, but these are not particularly radical ones.

Technology and Productivity

The entire dairy community buzzes with discussions of bovine growth hormone and its potential impacts throughout the dairy sector. With or without growth hormone, the technologies that already exist today are sufficient to fuel productivity increases well into the future. The prospects for new technologies only increases this potential. In the simple example shown above, just moving the annual rate of gain in productivity from 2% to 3% would imply a decrease in cow numbers of almost 18% by 2000, other things being equal.

Declining farm numbers can also be explained in part by technological change. Some technologies have inherent scale 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 costs do not increase in direct proportion to cow numbers. Other technologies may be more size neutral; an example may be artificial inseminaton. Even in the case of size neutral technologies, the added complexities that any new technology probably implies probably leads to a built in bias toward larger farmers. Complex technologies require better education and more well developed management skills *and* the time to utilize them. Better 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 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 decline 59% 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 the potential for change that exists.

Labor

There are numerous factors that can alter the growth scenario suggested above. One of the major current constraints affecting many milk producing areas is a shortage of local labor. Land-grant universities are beginning to respond by studying the situaton, offering programs to train unskilled labor, and assisting farmers in developing their labor management skills.

Research indicates that in many cases the wage opportunities for farm labor is not the only 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, microprocessor, and micro-computer assisted devices may also be observed by 2000; however it is likely to be sometime later before such technology is commonplace.

Urbanization and Farm Land Preservation

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 New England is becoming familiar in many other parts of the U.S.

For example, between 1979 and 1989, ten counties in New York lost at least 39% of their dairy farms. This rate went as high as 60% in one county. With one exception in one of the more remote parts of the state, all of these counties 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 effect of having non-farming neighbors. Stories abound about new neighbors buying housing near farms and then complaining about agricultural odors, debris on highways, and the like. In many cases, municipal governments have forced changes on farming practices to accommodate the concerns of non-farm neighbors. This conflict is likely to continue to expand.

Environmental Issues

Urban sprawl is one element of the growing interest in environmental related issues; there are many others. Concerns are being expressed that dairy farming does not have a benign or even neutral effect on the environment. Concerns range from the legitimate to the bizarre. Spillage from manure ponds into nearby streams is serious but avoidable. Surface or ground water contamination from excessive field spreading or chemcial fertilizer usage is a legitimate issue, but there is a difficult question about how much is too much. Concerns that cow gas will hurt the environment 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 will be forthcoming 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 farms of 1000 cows or more. Florida went so far as to offer dairy farmers near Lake Okeechobee a "buyout" option after it introduced very strict runoff standards that necessitated very large capital expenditures for any farmer wishing to continue 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 is an extremely water-intensive activity. Milk is 87% 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. Yet the fastest growing milk

producing states are almost all in dry areas.

Some of these issues can be solved or minimized by the use of new practices or technological innovations, wherein 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 where milk is produced. In either case, many environmental issues or problems should be solvable, but they will simply add costs to the production of dairy foods.

Animal Welfare

Animal rights or welfare zealots are in some sense a part of the green agenda, but they probably should be distinguished from the more mainstream environmentalists. Activists in this area include those who are concerned about the conditions under which cattle are treated, particularly on the larger, dry lot style ranches that are a major part of expanding areas. 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 green agenda is food safety, in this case particularly as it relates to production practices. In response to other studies, FDA in 1988 conducted a 10 city survey of retail milk and found rather wide-spread contamination of milk by low levels of 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. The publicity surrounding these tests, combined with Alar on apples, and incidents of purposeful contamination beyond the farm, alarm the public and raise concerns about the presence of toxic substances in food products. Once again, producers can respond to serious concerns of this type, but they are more than likely to 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 scientist's 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 bogus issues as well.

The Consumer Driven Marketplace

Consumers may sometimes wonder if indeed they are kings (or queens), but it is certainly true that the dairy industry must in the long run provide dairy products that people want to buy. This has always been true, but it seems to be hitting home particular hard in the last year or two. 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% 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 lowfat 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 non-dairy 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 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 includ-

ed public health, market bargaining power equity, and farm family incomes.

Public health concerns were the motivation behind government intervention to dairy markets in the 1800s. Today the safety and qualtiy of farm milk and dairy products are taken for granted, so much so that some would question whether this issue is a valid justification for the continuation of intervention. Price and income support for farmers became the predominant motivation of 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 govenment programs costs. Budgetary constraints 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 crossroads. 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. By 2000 we will have a better idea what path we are on. 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.