In February the Food and Drug Administration approved a new drug, called rBGH, to inject into dairy cows, to make them produce more milk. rBGH is a genetically-engineered hormone that stimulates milk production. This is not the first technology invented to increase agricultural yield. What effects do yield-enhancing technologies have on the dairy business?

The demand for milk does not change much year to year. An economist would say the demand for milk is "inelastic." Therefore, increasing milk production tends to lower the price of milk, a classic case of the law of supply-and-demand.

Since 1950 U.S. dairy farmers have been producing more milk than Americans can consume. To prevent supply-and-demand from bankrupting the dairy industry, the government buys up surplus milk via a "price support" program, to help dairy farmers survive, to assure the future of the nation's milk supply. During 1980-1985 the government spent an average of $2.1 billion each year buying surplus milk. In 1985 Congress passed the Food Security Act to try to reduce the total cost of the dairy price support program by reducing the number of dairy herds. During 1986-87, the government paid farmers to kill their cows and stop dairy farming for 5 years. Some 14,000 farmers participated in this voluntary program, slaughtering a total of 1.55 million milk cows.[1] But even that drastic program did not solve the problem. Excess milk production, which continues today, has steadily driven down the "support price" (the price farmers receive for milk).

Ironically, because of a web of federal and state laws and regulations, a lower milk price on the farm does not necessarily translate into lower milk prices in the grocery store. In fact, during recent years the support price paid to farmers for milk has dropped steadily from $12.50 per hundredweight in 1986 to $10.10 in 1990, a 19% decrease; yet the price of milk in the grocery store during the same period rose from $1.11 per half-gallon of whole milk to $1.49, a 29% increase.[2] Therefore, there is no good reason to believe that increasing milk production with rBGH will provide cheaper milk for the consumer.

Historians and economists have observed a pattern when new farm technologies become available. The "early adopters" of a new technology benefit for a time. The first farmers to adopt the new technology get the jump on their competitors; their milk yield rises faster than their costs and for a time their profits increase. (Because of inelastic demand, during this period more profitable farms drive less profitable farms out of business.) Before long, however, increased milk yields and wider use of the technology remove the early adopter's advantage. As we have noted, the consumer may never see a price decrease, but increased yields drive down farm prices, reducing farmers' profits. The farmer is soon back at square one, pressed to the wall by a cost-price squeeze, scrambling for the next competitive advantage. This has been dubbed the "technology treadmill."[3]

The latest treadmill technology, rBGH, will very likely repeat this pattern. It will benefit the early adopters and increase milk production which, in turn, will drive down the support price of milk.

After the early adopters' competitive advantage disappears, the net result will simply be more surplus milk that will have to be purchased at taxpayer expense.

In the meantime, introduction of rBGH will have driven a certain number of farms out of business--maybe as many as 30,000 or 40,000 farms--accelerating a trend that has been under way for decades. (Ten thousand dairy farms have gone out of business in Minnesota alone since 1980.)

Because large farms are usually best-equipped to manage complex technologies, and because they are best able to take and survive financial risks, large farms tend to be the "early adopters" of a high-tech innovation like rBGH. Large dairy farms tend to be located in the sunbelt. Mid-sized farms tend to be located in the midwest and northeast. For example, California has 2500 large dairy herds averaging 400 cows each. Wisconsin, on the other hand, has 35,000 mid-sized dairy farms averaging 50 cows each.

According to eight studies by federal agencies and by university researchers, rBGH will tend to favor the survival of large farms in the sunbelt, and will tend to drive mid-sized farms out of business in the midwest and northeast.[4] A long and well-established body of literature has demonstrated that the presence of mid-sized farms is vital to the social and economic health of many rural communities. Thus yield-enhancing technologies, like rBGH, degrade rural community life, and drive less-successful farmers into cities where they may become part of the "urban problem."

If you think of agriculture as an industrial enterprise where the aim is to grow as much as possible with as few people as possible, without regard to environmental or social costs, replacing family farmers with genetically-engineered drugs is a "successful" approach. On the other hand, if you think of a mid-sized farm as a family occupational base, and as the backbone of rural community life, displacing farmers by drugs is clearly antisocial and bad public policy.

The large farms whose survival will be favored by rBGH confine their herds year-round in the style of a "feed lot." The cows spend their lives confined in a building with a concrete floor (sometimes abrasive, sometimes slippery with urine and manure) which gives rise to foot and joint problems. Manure and urine are concentrated, which creates serious environmental problems of disposal. Sunlight and fresh air--excellent disinfectants--are not abundantly available; disease rates tend to be elevated in confined herds. Confined animals are fed a diet high in grain with protein supplements, including meat. Raising grain in the modern way is energy-intensive operation employing heavily-polluting inorganic fertilizers, insecticides, herbicides, and tillage practices that intensify soil erosion. In sum, dairy factories create serious new environmental problems, and exacerbate old ones.

To reduce their own labor and to increase profits, since 1983 many American farmers have shifted away from confined feeding to a technique called "rotational grazing" developed first in France and then in New Zealand where it is the dominant dairy technology.

In rotational grazing, the daily forage requirement for cattle is met by dividing pastures into smaller paddocks and moving animals every 12 hours to 3 days. With a sufficient number of paddocks in the system, each paddock will be rested between 15 and 40 days, depending on forage regrowth before regrazing. This system allows cattle to do much more for themselves to produce milk, compared to confinement feeding.

A new book from the ag school at University of California at Davis offers case studies of rotational grazing on 34 farms in Maine, Wisconsin, Pennsylvania, and Vermont.[5] The farms vary in size from 40 cows on 12 acres to 800 cows on 2000 acres.

With remarkable consistency, these case studies reveal the following consequences of rotational grazing compared to confinement feeding:[7]

1) Substantially reduced feed costs. Feed is a major cost of dairying. "It costs up to six times less to feed animals on pasture than to feed them in confinement, because of savings in feed, machinery use and repair, fuel, labor and veterinary costs due to improved herd health."[6]

2) Decreased energy costs (for example, reducing fuel use 23 to 26 percent in crop production);

3) Increase in the grazing season by up to 100 days;

4) Increased milk protein (as a percentage of the milk);
5) Reduced labor for feeding hay, spreading manure, and putting up forage as hay or green chop;

6) Increased value of pasture land;

7) Improved herd health and thus improved profitability. The two greatest causes of economic loss to dairy farmers are mastitis (inflammation of the udder, caused by infection), and reproductive problems. "Pasture feeding offers a practical, low-input method of reducing labor and increasing profit by minimizing contamination of teats and udders to improve milk quality, reduce mastitis, and decrease the use of teat sanitizers and antibiotics...." says University of Vermont agronomist William M. Murphy. Furthermore, he points out, cows in pasture show improved reproductive performance and therefore more profitability.

8) Reduced soil erosion on the farm 24 to 31 percent.

9) Less work and therefore improved family farm lifestyle, allowing farmers to spend more time with their families and in community activities;

10) Preservation of existing community jobs;

11) Farm children encouraged to continue in farming because it's enjoyable and profitable again;

12) The community becomes more self-reliant, using existing human and natural resources rather than purchased inputs that drain capital from the community.

Two ways of making milk. Two visions of our future:

** One dominated by chemical corporations, corrupt government officials, and indentured savants in the nation's agricultural colleges, scheming together to prevent consumers from making informed choices in the marketplace, promoting unnecessary and unsustainable technologies that wreak havoc across the rural countryside, blind to the ensuing environmental blight and social decay.

** The other vision dominated by sustainable, profitable mid-sized family farms offering consumers free choice in the marketplace, wholesome food and milk at affordable prices grown by environmentally beneficial and socially equitable techniques.

Two visions. Two realistic choices. Which will it be?

--Peter Montague


[2] Hansen, cited above in note 1, pg. 5, Figure 1.


