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Issues Confronting Livestock Production and Marketing

Editor's Notes

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Food production, processing, and nutrition are complex. One must understand the complexity of our food system to propose improvements. Many proposals for improving our food system involve animals. This issue of *FoodReview* focuses on issues surrounding livestock production and marketing.

With increased environmental awareness, agricultural production practices are being scrutinized for their impacts on soil and water quality. Our lead article discusses how forage-based cattle production can protect and improve soil and water quality.

Consumers' concerns about value are also addressed. The article on meat slaughtering costs shows that larger firms have cost advantages over smaller firms. With larger firms controlling a greater share of supplies, there is concern about concentration in the industry. To date, such concern is not warranted based on analysis of the prices paid to farmers and those charged to consumers.

Animal products consist of more than meat, milk, and eggs. Fish and seafood products are also becoming important in our diet. Increasing amounts are being produced on farms instead of being harvested from the wild.

With the importance of meat and meat products in our diets and in the industry, some question human use of animals. One article addresses these concerns and some of the debate.

Stephen L. Ott
Economics Editor

FoodReview

CONTENTS

Issues Confronting Livestock Production and Marketing

The Federal Front

Cattle and Forages Can Play a Vital Role in Sustainable Agriculture

Ronald A. Gustafson
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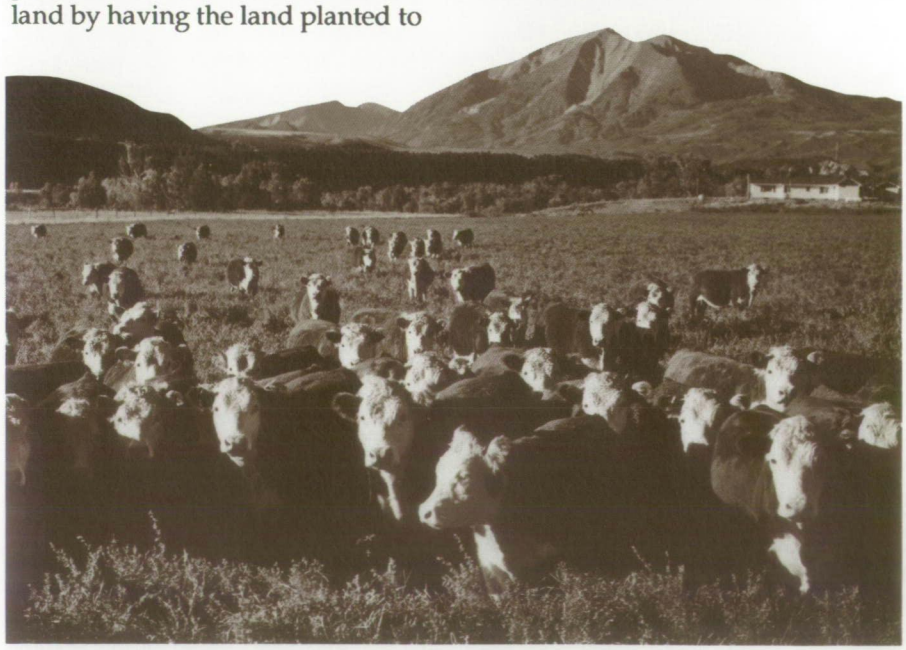
Beef cattle grazing on forages can play an important role in a "sustainable" agriculture system—one that minimizes farming's impact on nonrenewable natural resources while providing adequate supplies of food and fiber.

Forages and beef cattle were once an important element in a more diversified agriculture, which used crop rotations instead of synthetic fertilizers and pesticides to maintain soil fertility, break pest cycles, as well as retain soil moisture. But in response to expanded export grain demand at favorable prices in the 1970's, farmers shifted land from production of soil-conserving forages to more erosive crops—primarily corn, soybeans, and wheat. This shift to a single crop or rotations involving only row crops was made possible with heavier use of fertilizers, herbicides, and insecticides.

While such production practices have provided shortrun profits, questions about long-term sustainability arose. Increased environmental awareness brings renewed concerns about soil erosion, fertilizer and pesticide contamination of drinking water, and pesticide residues in foods. And when lower exports pushed down grain and oilseed prices, the short-term profitability of intensive row crop agriculture disappeared.

The Federal Government responded to low profitability and environmental concerns with policies that reduced grain and oilseed production on the most erodible land by having the land planted to conserving uses, such as forages. The Government also began funding research on alternative crop production methods, including forage in crop rotations, to reduce farmers' reliance on fertilizers and pesticides. With increased emphasis on forage, cattle have an important role in maintaining an economically and environmentally sound agricultural production system.



Improved pastures sustain beef production while conserving soil and water resources.

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Forages Are Important

About 1.2 billion acres in the 48 contiguous States, or 64 percent of the total land area, is in agricultural uses. Much of this land, however, cannot support continuous crop (grains and oilseeds) production. Inadequate moisture conditions, poor quality soils, rocky soils, or soils on steep slopes limit the potential for producing crops. Only 38 percent of agriculture's land base is considered cropland—that is, suitable for crop production. Most of this land is concentrated in the Midwest. The remaining agricultural land is better adapted for grazing, with 49 percent open grassland pasture or range and 13 percent grazed forested land.

Forages can play a critical role in maintaining soil productivity, even on cropland acreage. Forage cover protects the soil from wind and water erosion. When decomposed, forages provide organic matter—an important component of soil productivity. Deep-rooted forages bring soil nutrients to the surface, where they can be used by succeeding crops. Leguminous forages add nitrogen, an important plant nutrient, to the soil. Forages use excess soil nutrients from fertilizers applied to previous row crops and prevent the nutrients from leaching into groundwater supplies. When part of a crop rotation, forages help disrupt the natural cycle of weeds and insects, reducing the need for pesticides.

Government Programs Increase Forage Production

The Conservation Reserve Program (CRP), authorized in the 1985 farm bill, has the dual purpose of reducing excess grain and oilseed production and reducing the quantity of soil eroded from the land. CRP idles highly erodible farmland from producing crops for a period of 10 years. The land is diverted into conserving uses, such as forages or trees. Farmers are not allowed to harvest or graze CRP land, except during emergency drought periods. In return, farmers receive annual rents to compensate for lost production and half the cost of establishing a cover crop.

By the spring of 1991, nearly 34.5 million acres of the 40-45 million goal were enrolled in the program. CRP acreage is concentrated in the winter wheat growing areas of the Great Plains and the small grains areas of the North Central region, particularly the western Corn Belt.

Participation in Government commodity support programs (annual set-aside acres) also requires farmers to idle cropland and usually requires some type of forage cover crop. Like CRP land, set-aside acres are concentrated in the North Central and Great Plains regions.

Beef Cattle Are Efficient Meat Converters

Beef cattle are not wasteful users of feed grains and protein meals (concentrated feedstuffs), as is sometimes argued. Only about 20 percent of the concentrated feedstuffs fed to livestock goes to beef cattle. Unlike simple-stomached hogs and poultry, beef can be produced with little or no concentrates.

Misused feed-conversion statistics often imply that beef uses most of the concentrates fed to livestock and poultry, and that beef is less efficient in converting grains into meat. Concentrates actually account for only a small portion of the feed used in cattle production. Less than 2 pounds of concentrates are used per pound of live-weight beef produced, which is lower than for hogs or broilers.

Concentrates used in finishing (fattening) cattle produce the tender product consumers prefer, although there is disagreement about the amount of desired finish or fat. Using concentrates during the finishing phase of beef production increases the daily weight gain enough to significantly reduce nonfeed costs per unit of beef produced.

Beef cattle have the flexibility to use varying combinations of concentrates and forages, as cost dictates, including straight forages—a flexibility not available in hog or broiler production.

Much of the forage fed to cattle comes from crop residues and vast lands with limited or no alternative agricultural use. Thus, beef production tends not to compete for resources usable in the production of either concentrate feeds for other livestock or crops for human food. To use this land for food production, it will have to be grazed by cattle or some other ruminant.

Grazing Can Benefit Forest Wildlife

When improperly managed, cattle grazing in forests or woodlots destroy plants that provide food and cover for wildlife, increase soil erosion, and even kill mature trees. But with proper management, grazing can actually increase plant diversity when compared with ungrazed woodlots, reports Ann Dennis of the Illinois Department of Energy and Natural Resources in *The New Farm*.

Using woodlots as shelter during the winter causes much of the damage cattle do to forests. Preventing access to woodlots during the winter months reduces grazing damage to forests. Dennis found that limiting cattle access to woodlots to just the summer months increased forest plant species, which improved wildlife habitat. She speculates that cattle disturbing the forest litter layer released some species that were being suppressed by the forest cover.

—Stephen L. Ott

Concept of Sustainability Introduced

The 1990 farm bill broadened the conservation program beyond removing marginal cropland from row crop production and introduced the concept of sustainability. Agricultural sustainability means production systems provide adequate supplies of food and fiber at prices acceptable to farmers and consumers. Production is attained by using techniques, such as crop rotations with forages, that limit the use of nonrenewable resources in order to minimize environmental impacts.

But, while forages help enhance environmental quality and maintain long-term soil productivity, forages themselves do not contribute directly to human food or fiber needs. People, pigs, and poultry have simple stomachs and thus cannot digest large quantities of forage material. Only ruminants, such as cattle, sheep, and goats, can convert forages into food (meat and milk) for humans. Thus, when fed to ruminants, forages contribute to human food needs and to the economic well-being of farmers.

Cattle Production Becoming More Efficient

Beef production has remained fairly static at about 23 billion pounds per year, while the number of cows, and thus calves born, declined. Beef production has been maintained by marketing a larger proportion of the steer and heifer supply through feedlots, including a larger number of calves that were formerly slaughtered for veal. By 1990, nearly 80 percent of commercial cattle slaughter was comprised of feedlot-fed steers and heifers. The remaining slaughter consisted of cull bulls, stags, beef cows, and dairy cows. As more animals were sent to feedlots, slaughter weights rose, producing heavier and higher yielding carcasses than cull breeding stock.

Though a greater proportion of slaughtered animals come from feedlots and they are being fed to heavier weights, there has been little change in the total amount of grain fed to cattle. Beef calves today are weaned at much heavier weights and are increasingly kept on pasture to even heavier weights before being placed on feed. Improved genetics and feeding technology helped increase feed efficiency. Consequently, the amount of grain fed per pound of beef produced has declined as beef cattle are becoming leaner and more efficient.

Future Trends

Increased forage supplies will be needed by the late 1990's. Cattle numbers are slowly increasing from their 1989 low; weaned calves (stocker-feeders) are being grown on pastures to heavier weights before being placed on feed; and grazing on public lands in the West is becoming more controversial. (Some debates include: the number of cattle that a particular area can sustain without damaging the envi-

ronment, and the fees the Government charges for the right to graze the land.)

While a major source of forage production is land dedicated to permanent pastures and ranges, millions of additional acres will become available when CRP contracts expire. Cattle ranchers will be under intense scrutiny as to how they use these forage-producing lands. Conservationists, environmentalists, and others will be monitoring the industry for environmentally sound production practices. Ranchers will have to integrate not only the needs of their livestock, but also conservation and wildlife needs, when developing operating plans for their farms and ranches. This will likely require more detailed stocking plans, possibly with a broader mix of cow-calf-yearling and/or stocker cattle activities to allow for cattle inventory adjustments. These adjustments become particularly important during a drought, when forage growth is reduced.

There is some uncertainty, however, as to how farmers will use the CRP land as it starts becoming available in 1996. For example, will it remain in forage production, or will the forage cover be plowed under and crops be planted? A recent survey by the Soil and Water Conservation Society and USDA indicates that nearly half of CRP program participants have made plans on how their CRP lands will be used. More than 51 percent of the survey participants with plans indicated that they expect to leave the land either in grass for livestock forage, in trees, or in wildlife habitat. Another third plan to convert the land back into crop production under an approved conservation compliance plan. But planting intentions can change. The majority of farmers said economic considerations will be the primary deciding factor. The higher the crop prices, the greater the acreage going out of forage production and into growing crops. However, farmers indicated that special consideration would be given to the acreage most vulnerable to soil erosion, implying the most erodible land likely will remain in forages.

Implications of CRP Acreage Availability

Land coming out of CRP enrollment will expand forage production. Most CRP land is more productive than that currently in cropland pastures. And, CRP acreage is being rejuvenated over the 10-year enrollment period. So if only 10-15 million acres of the 35-40 million acres ultimately enrolled in the CRP remain in forage for grazing or hay production, total forage production should greatly expand beyond that provided by the existing 65 million acres of cropland pasture.

The North Central region—with much of the CRP land and with abundant feed supplies from crop residues and current pastures—can greatly expand its forage-based cattle production. The North Central region receives adequate rainfall, allowing highly productive plant species with high nutritive values, such as legumes, to grow well. With such highly productive pastures, North Central farmers may choose to focus on adding weight to stocker cattle instead of expanding cow-calf herds. The stocker cattle could come from areas with shorter grazing seasons, such as the intermountain areas or other areas where stocker operations are not practical. Thus, by using crop-pasture rotations, intensive and controlled grazing plans, and improved forage management, farmers in the North Central region can increase the beef supply while improving the environment.

Controversy Over Livestock Growth Hormones Continues

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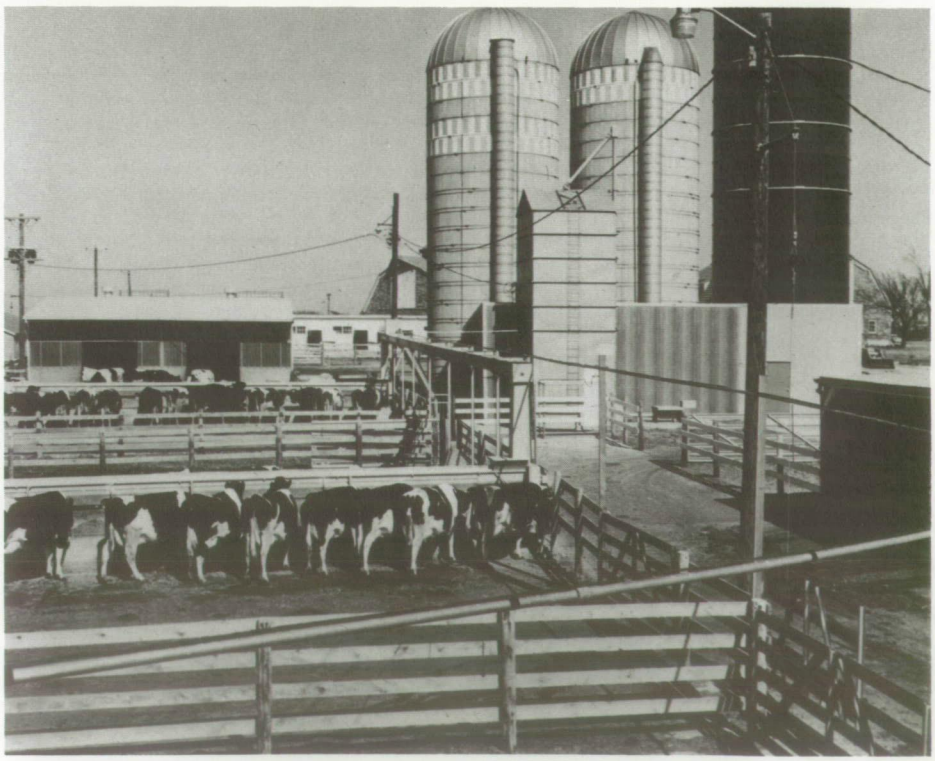
At the forefront of biotechnology in animal agriculture—which includes genetic engineering, recombinant DNA, tissue culture, and growth stimulant research—is the experimental use of somatotropins, growth hormones that occur naturally in animals. Bovine somatotropin (bST) and porcine somatotropin (pST) are being extensively studied.

Somatotropins affect animal metabolism by modifying or changing the use of nutrients absorbed from feed. Use of pST, for example, can result in leaner pork because nutrients such as nitrogen, calcium, and phosphorus are more likely to be channeled to muscles than to fat. By improving feed efficiency, pST use should allow the pork industry to become more price-competitive with other meats as well as to produce more desirable (lower fat) products.

In contrast, bST use for milk production does not change the composition of milk (the ratio of fat to nonfat solids). Unlike with pork, there would be no visible change in the composition of milk. Use of bST lowers milk production costs, since each cow produces more milk. Greater milk supplies should reduce the rate of future price increases of milk and dairy products.

A debate about bST has been going on among producers, consumer activists, and animal scientists. The four main issues in the debate are farm structure, over production, food safety, and animal health and welfare. These same concerns will likely be voiced in the future as animal agriculture incorporates other results from biotechnology advances.



Use of bST lowers milk production costs since each cow produces more milk. Greater supplies should reduce the rate of future price increases.

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The net effect of farmers adopting new technology is often expanded output and lower commodity prices. Smaller, high-cost farms are often the ones forced out of business as commodity prices fall. (Greater supplies can reduce the price by more than the decline in costs, putting economic pressure on producers.) Thus, there is some concern that new biotechnologies will drive many small farms out of business.

Farm Structure

While farm structure is a valid concern, eliminating biotechnology advances will not eliminate the problems faced by small farms. Any technique that expands production could force some farmers to leave farming. Even rotational grazing, which is being promoted as an environmentally friendly method for increasing milk production and lowering costs, could add to the pressures on smaller dairy farms.

An important factor in survival of farms is good management—which is especially critical if new biotechnologies, such as bST and pST, are to be successful. Research based on bST indicates that somatotropin technology can affect farms of any size, since good managers can be found on small farms as well as on large farms. Compared with previous technological advances, use of somatotropins does not require large capital outlays. Thus, operators of both small and large farms can use the products.

Overproduction

Throughout the 1980's and into the 1990's, the dairy industry periodically has had problems with surplus milk supplies, resulting in relatively low prices. To help maintain dairy farmers' income, the Government responded by purchasing large volumes of dairy products. The Government also had a program that paid dairy farmers to quit producing milk. With milk supplies already in surplus, bST could exacerbate the problem, unless there is flexibility in the dairy price support program and milk prices are allowed to fall.

In contrast, the pork industry relies on market supply and demand conditions to generate market-clearing prices without Government intervention.

Food Safety

One of the biggest issues fueling biotechnology debates and concerns is food safety. This issue translates into producer and dairy industry concerns about the likely effects on consumer demand for safe milk, dairy products, and meats.

The safety of meat and milk for human consumption from cows treated in bST research trials was determined in 1984 by the Food and Drug Administration (FDA). The findings included:

- The protein structure of synthetic bST and that produced by cows themselves is virtually the same;
- bST has no biological effects on humans and is degraded in the digestive process, as are meat and milk proteins;
- bST is present in all milk, and the amount in milk from bST-treated cows does not significantly differ from the amount in milk from nontreated cows;
- Milk composition is not altered on a long-term basis when cows are treated with bST.

bST and pST Are Naturally Occurring Hormones

bST is a protein hormone that occurs naturally in cattle. The hormone regulates body metabolism and, therefore, milk production. Early research efforts isolated the protein produced by the pituitary gland and identified its increased milk-producing effects. But since animals were the only source, the protein had to be extracted from the pituitary glands of slaughtered animals. This slow, expensive technique provided only limited quantities of bST for experimental use.

Research on pST faced the same problem—it had to be extracted from pig pituitary glands. pST affects the growth of hogs either by converting fat tissue into energy or by reducing the synthesis of fat and stimulating the release of a protein-increasing hormone.

Recent breakthroughs in genetic engineering techniques allow the bST and pST genes to be transferred from animals to ordinary bacteria cells. These bacteria can be reproduced through fermentation on a large scale at relatively low cost, making the purified product readily available for research or commercial use. The process used to manufacture bST and pST is similar to that used to produce human insulin and interferon. bST was one of the first targets of recombinant research in agriculture.

Other researchers have corroborated the FDA conclusions. Such support recently has included published reports in *Science* and the *Journal of the American Medical Association*; a statement by a panel of medical professionals, clinical investigators, and public representatives convened by the National Institutes of Health (NIH); a report on biotechnology by the Office of Technology Assessment; and research by the dairy industry. However, not everyone involved in the debate accepts the FDA findings. Some groups and individuals have argued that more testing is needed to ensure that milk and meat from bST-treated cows are safe for human consumption.

Animal Health and Welfare

Another concern over bST centers on the welfare of cows. Critics of biotechnology contend that cows are stressed by bST injections and by consuming more feed to increase milk production. Stress can lead to metabolic, reproductive, and other herd health problems. To date, questions of animal safety, efficacy, safety for the environment, and production controls related to bST remain to be answered by the FDA after a review of the data is completed. The safety of bST treatments to cows has not been determined by the FDA, contrary to some recent articles in the press.

A Contrast of bST and pST Issues

Since the mid-1980's, bST issues have been in the public eye almost continually. Critics of biotechnology have attempted to discredit the potential benefits of bST and of biotechnology in general.

There has been less criticism of both pST and bST in regard to meat production. The primary reasons appear to be: 1) bST for milk production was one of the first areas of recombinant-DNA research in animal agriculture; 2) milk has been promoted as a natural, healthful, and unadulterated product for both infants and adults, so critics of bST have attempted to portray milk from bST-treated cows as being unsafe; 3) pST use for meat production results in products having attributes perceived by consumers as being more healthful—less fat, less cholesterol, and fewer calories; 4) there is a larger selection of meat and meat substitutes for consumers to choose from than in the milk and dairy products area; 5) efficiency gains are more likely to be passed on to consumers in the more market-oriented meat industries than in the highly regulated dairy industry; and 6) socioeconomic issues may differ between the meat and dairy industries be-

Other Biotechnologies May Affect Dairy Farming

Researchers have been given a patent that uses a genetic test to screen bulls for breeding. The researchers developed a DNA probe that allows them to evaluate, within certain cattle families, a bull's ability to increase milk production in its offspring. Cows sired by the best bulls, as identified by the DNA probe, produced 1,200 pounds more milk per year than did cows not sired by the best bulls.

Scientific breakthroughs are occurring that one day may lead to dairy cows and other animals that secrete valuable medical drugs in their milk. Such drugs could then easily be separated from the milk at a cost lower than current production methods. TPA, a clot-dissolving drug used to reduce the risk of heart attacks, has been successfully produced from genetically engineered goats. Genetically engineered sheep have produced a human protein, alpha-1-antitrypsin, at a concentration thousands of times higher than that produced through cell culture. Much work remains to be done before production of medical drugs by dairy cows becomes a reality. Furthermore, only a small number of cows would likely be required for this purpose.

Similarly, studies with transgenic mice, in which genetic modifications have been made in the fat and casein content of the animal's milk, suggest that cows may be genetically engineered to produce milk with little or no fat or milk with casein modified to produce new kinds of cheeses.

These examples indicate that the potential impact on the dairy industry from other biotechnologies could easily be greater than any impact caused by bST.

—Stephen L. Ott

cause of differences in the structure and organization of the sectors (dairy farmers are sometimes perceived as the last of the small independent farmers, but better organized politically than other farmers).

bST and pST Current Status

FDA, under the New Animal Drug Application (NADA) procedures, is reviewing bST and pST. The FDA determines whether the products are approved for commercial applications. Each company interested in developing and marketing new animal drugs must submit all data from the studies conducted under the NADA procedures to FDA's Center for Veterinary Medicine (CVM) for review and a decision to approve or to not approve.

FDA will determine if the new animal drug is efficacious (produces the claimed effect), is safe for the target animal, has no adverse effect on the environment, can be produced under acceptable quality control standards, and, most critical of all, that edible products from treated animals are safe for human consumption. The FDA does not assess potential social and/or economic effects of new animal drugs.

Neither bST nor pST has yet been approved by FDA for commercial use in the United States. Each product is at a different stage in the approval process. bST is much farther along the path toward possible FDA approval and, therefore, has been studied more than pST.

The approval procedures for pST have received scant public attention, at least in relation to the spotlight focused on bST. Human consumption of pork from hogs involved in pST research was approved in 1987. Presumably, all of the other FDA approval criteria for pST are now being examined.

The overall effects of emerging biotechnology on the industries where they are employed will likely be less dramatic than earlier reports indicated. Effects on farm structure and the location of production should be minor. But early reports and news articles about the likely structural and socioeconomic impacts of bST raised concerns throughout the dairy industry and society.

Final acceptance of biotechnology will depend on whether consumers, dairy and hog farmers, industry leaders, and policymakers choose to believe the analyses supporting the safety, efficacy, and usefulness of biotechnology or those that do not support such claims.

References

Blayney, Don P., and Richard Fallert. *Biotechnology and Agriculture: The Emergence of Bovine Somatotropin (bST)*, Staff Report AGES 9037. USDA, ERS. Aug. 1990.

Fallert, Richard, Tom McGuckin, Carolyn Betts, and Gary Bruner. *bST and the Dairy Industry: A National, Regional, and Farm-level Analysis*, AER-579. USDA, ERS. Oct. 1987.

Fallert, R.F., S.D. Shagam, R.P. Stillman, and D.P. Blayney. "Applicability and Repercussions Related to the Animal Production System in Industrialized Countries," *Biotechnology for Control of Growth and Product Quality in Meat Production—Implications and Acceptability.* Proceedings of International Symposium (preconference edition), P. van der Wal and F. van der Wilt, eds. Wageningen Agricultural University, Netherlands. Dec. 1990.

Fallert, Richard F., and Don P. Blayney. "The Economics of bST: Impacts on the Farmer, the Consumer, and the Industry," Presented at the Annual Meeting of the American Association for the Advancement of Science, Washington, DC, Feb. 14-19, 1991.

U.S. Congress, Office of Technology Assessment, *U.S. Dairy Industry at a Crossroad: Biotechnology and Policy Choices*, Special Report OTA-F-470. May 1991. ■

Beefpacking Costs Are Lower for Larger Plants

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Beefpacking plants with annual capacities of 10,000 head or more slaughter over 95 percent of the federally inspected cattle slaughtered. The trend is toward fewer and larger plants, as the number of these size plants declined from 296 in 1980 to 159 in 1990. The 18 largest plants, each with an annual capacity of 500,000 head or more, accounted for over half the federally inspected cattle slaughter in 1990.

Large plants can slaughter beef at considerably lower cost than small plants due to significant economies of size. Larger plants also have a cost advantage in further processing activities (division of carcass into smaller cuts). Clearly, small beefpacking plants are under pressure to find ways to reduce costs or increase returns.

A computer simulation model was used to determine the impact of plant size (number of head processed per hour) on costs and returns under various operating assumptions. The model can quickly calculate how costs change

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Larger Beefpacking Plants Have Lower Costs and Higher Profits Than Smaller Plants

Item and plant size (head per hour)	Slaughter only		Slaughter and process	
	One shift	Two shifts	One shift	Two shifts
	Dollars per head slaughtered			
Total costs for:				
10-hph plants	73.440	60.415	133.895	116.416
47-hph plants	41.230	35.171	89.768	81.094
75-hph plants	39.136	32.764	83.710	74.735
120-hph plants	36.311	30.714	78.379	70.916
210-hph plants	34.188	26.249	74.010	64.249
300-hph plants	31.741	24.704	70.259	61.578
Revenue minus costs for:				
10-hph plants	-62.280	-49.255	-59.305	-41.826
47-hph plants	-30.070	-24.011	-14.978	-6.304
75-hph plants	-17.976	-11.604	.880	9.855
120-hph plants	-15.151	-9.554	6.211	13.674
210-hph plants	-13.028	-5.089	10.580	20.341
300-hph plants	-10.581	-3.544	14.331	23.012
	Number			
Employees for:				
10-hph plants	34	58	60	108
47-hph plants	70	125	160	302
75-hph plants	93	167	209	396
120-hph plants	129	237	312	598
210-hph plants	186	346	479	926
300-hph plants	250	466	648	1,255

Note: Estimates are from simulated data for research purposes and do not necessarily reflect actual costs or returns from any existing plants.

Warehouse Clubs and Retail Discounters May Stimulate Case-Ready Beef Sales

Case-ready, vacuum-sealed individual beef cuts have been available for a few years. *Supermarket Business* reports that the Excel meatpacking company, which had supplied such cuts to as many as 1,000 supermarkets since 1986, suspended their program for further evaluation and study.

According to an Excel spokesperson, a major problem with case-ready, vacuum-sealed beef is getting consumers to make their first purchase, because of its dark red or purple color. Many consumers associate these colors with spoiled meat. Case-ready, vacuum-sealed beef is not bright red because it is deprived of oxygen. But the meat turns bright red once the seal is broken. Many supermarket meat managers believe that it would be too difficult and expensive to convince consumers that the purple color is indeed fresh.

The breakthrough in marketing case-ready, vacuum-sealed beef may come from warehouse clubs and other retail discounters. Professor Jack Allen, of Michigan State University, says this product offers discount retailers the opportunity to compete against supermarkets for beef sales. Discount retailers do not have the facilities to process beef so case-ready, vacuum-sealed beef allows them to enter the meat trade. K-mart has test-marketed the product.

With case-ready, vacuum-sealed beef, individual cuts are sealed in a vacuum pouch (without oxygen) at a packing plant, leaving the retailer to unload the shipping containers and stock the meat cases. Costs are thereby reduced: the retailer does not need expensive meatprocessing equipment and labor for handling or wrapping the meat. Costs are further reduced because supermarkets can substitute higher paid butchers with fewer, and lower paid, stocking help.

Case-ready, vacuum-sealed beef can also increase sales. A study sponsored by the National Livestock and Meat Board found that "shrink" (lost revenue from markdowns and price differentials on cuts that are at the end of their shelf life) in a supermarket meat department with $30,000 in weekly sales would be $720 per week—more than four times the weekly operating income of $170. With a longer shelf life, case-ready, vacuum-sealed beef would have less shrink.

The study also found that lost sales due to out-of-stock items were high for fresh beef cuts. Nine of the 39 cuts studied were out of stock 40 percent of the time or more. Keeping the meat case stocked with vacuum-sealed beef should be easier, as workers can move the desired cuts from inventory instead of waiting for the butchers to cut additional pieces.

A more subtle reason for not offering case-ready, vacuum-sealed beef may be the supermarket meat manager. Meat managers often focus on gross margins rather than on net profits. Even though vacuum-sealed beef has lower handling and preparation costs, meat managers mark up vacuum-sealed beef as much as boxed beef. Since meat managers pay a higher price for case-ready, vacuum-sealed beef, it is priced higher than plastic-wrapped boxed beef, which reduces consumer purchases.

By taking into account lower costs, reduced shrink, and fewer out-of-stocks, the markup for vacuum-sealed beef can be reduced, which would lower its price to consumers and still generate as much profit as boxed beef.

However, labor contract obligations may reduce the incentive for meat managers to make the switch to vacuum-sealed beef. The existence of such contracts means that supermarkets may not be able to substitute lower cost stocking help for butchers.

—Stephen L. Ott

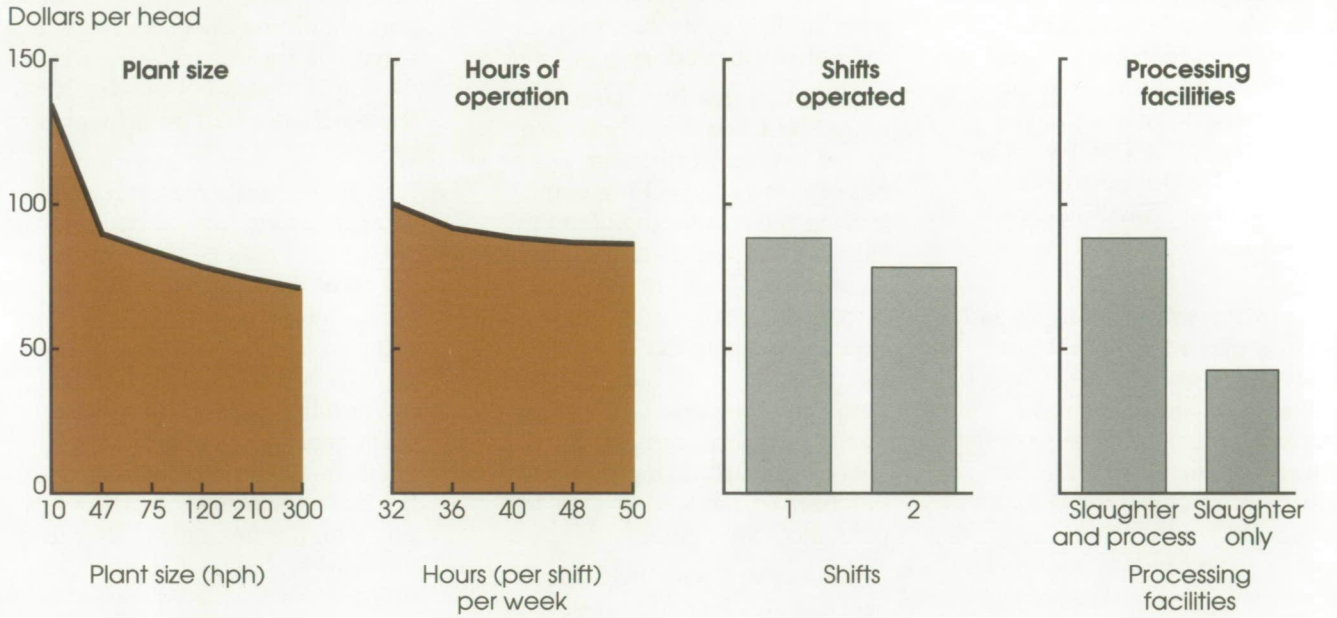
due to simulated plant size, number of shifts, and weekly shift operating hours. The change in costs and revenue from further processing (into boxed beef, for example) also can be estimated.

Large Plants Have Many Economic Advantages

Important economies of size exist. A 300-head-per-hour (hph) plant's slaughtering cost is almost 60 percent lower than a 10-hph plant and over 20 percent lower than a 47-hph plant (see table). Large plants have lower average fixed costs and require less labor per carcass. A 10-hph slaughtering plant requires 3.4 workers for each hph capacity, the 47-hph plant 1.5 workers, but the 300-hph unit needs only 0.8 workers.

Lower Packing Costs Are a Reflection of Economies of Size and Plant Utilization

Factors affecting production costs



Based on simulated plant: operating one shift, 40 hours per week, slaughtering and processing meat.

Based on simple average of six plant sizes, operating one shift, slaughtering and processing meat.

Based on simple average of six plant sizes, each shift operating 40 hours per week, slaughtering and processing meat.

Based on simple average of six plant sizes, operating one shift, 40 hours per week.

The advantage of size is demonstrated in other ways. Significant cost savings are possible by adding a second shift, as fixed costs are spread over twice as much output. But even with this savings, the smallest plants still have higher costs than a single shift 300-hph plant. A 120-hph plant with a second shift is about equal in cost to a single shift 300-hph plant.

Even the risk associated with uneven cattle supplies favors larger plants. A simulated 300-hph plant that has to close 1 day per week due to lack of cattle has costs similar to a 120-hph plant operating 5 days per week. Of course, if a smaller plant lacks cattle to slaughter, then its average fixed costs increase rapidly.

Smaller plants are further disadvantaged in revenues generated. Smaller plants may receive less per head than larger plants due to differing byproduct values. A minimum volume is needed before it is economical to process certain byproducts into salable commodities. For example, the simulated 10- and 47-hph plants do no edible rendering. In addition, the simulated 75- and 120-hph plants have facilities for edible rendering only if they do further processing (boxed beef).

Further Processing Increases Net Revenue

Beef slaughtering plants have gradually moved from selling carcasses to selling boxed beef, which involves cutting into primal and subprimal cuts before shipping. Dividing carcasses into cuts is less costly at packing plants (slaughtering plants with further processing) than at retail stores. Labor is more efficient because the cutting is done on a disassembly line, and wage levels are usually lower.

Net revenues increase for all size plants when they box as well as slaughter beef, because the in-

Computer Simulation Model Easily Calculates Slaughtering Costs

The ERS computer program, called "PACKER" (written in the BASIC interpreter language), translates detailed input data into simulated packer cost estimates. PACKER first divides the whole beefpacking plant or operation into 20 stages, ranging from procurement to kill floor to sales. Under each stage are up to 10 accounts, such as investment in facilities, wages and salaries, and supplies and containers. Each account can be further divided into up to 10 subaccounts, such as depreciation, interest, electricity cost, grading fees, salary fringe benefits, and others.

The model simulates any size plant for which data are provided. This article was prepared using data from six basic plant sizes (10, 47, 75, 120, 210, and 300 head per hour) for either one or two shifts per day. Five alternative work configurations are included: 32, 36, 40, 50, and 60 hours per week per shift.

Data for the simulated plants were obtained from a number of sources, including an earlier study by researchers from the University of California, several packing plants, and equipment manufacturers. Costs included provisions to meet USDA sanitation and other requirements for federally inspected slaughtering facilities.

The model develops simulated costs and returns, based on several assumptions that may or may not apply to a specific plant. It was designed to make comparisons of calculated costs for research purposes or to answer "what if" questions—not to replicate or prescribe operational decisions for any particular firm or plant. Individual users can easily input their own data to develop specific cost estimates.

For more information about the model see *Beefpacking and Processing Plants: Computer-Assisted Cost Analysis*, AGES 9115, by Lawrence A. Duewer and Kenneth E. Nelson, USDA, ERS, April 1991.

Order your copy by calling toll-free 1-800-999-6779. The report and an accompanying 5.25" disk of the program and data are available at cost from the same number.

crease in receipts for boxed beef is greater than the costs of cutting and boxing. Given the price and cost assumptions made, our computer model indicated that net revenue goes from negative to positive when boxed beef processing is added for all but the two smallest plants.

As in slaughtering, there are also economies of size in boxed beef processing. For example, a 300-hph plant can box beef for less than $40 per head, while the cost is almost $60 per head for a 10-hph plant. However, the decrease in cost is not as great on a percentage basis for boxing beef as it is for slaughtering.

Ways Smaller Plants Can Compete

For smaller plants to compete with larger ones, they should first fully utilize their present capacity. Costs can be significantly reduced by adding a second shift or by operating more hours per shift. For example, the 47-hph boxed beef plant can reduce costs by 1.4 percent by operating on Saturdays and by 9.7 percent if a second shift is added.

Smaller plants can also increase revenues by developing niche markets for certain types of beef slaughter or by providing special services not offered by the largest plants. Niche markets may include specially branded beef or unique types of beef, such as lean, natural, or gourmet. Extra trimming or portion control cuts are special services that can be provided. Daily delivery or delivery of small quantities is another example. ■

Meat Price Spreads Are Not Proof of Price Gouging

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The relationship between farm, wholesale, and retail prices for meats is often controversial. Data from USDA's Economic Research Service (ERS) show that retail beef and pork prices react faster to cost increases than to cost decreases. Wholesale and farm pork and beef prices also adjust more quickly upward than downward. In addition, wholesale-to-retail price spreads have grown faster than inflation over the past 20 years.

These facts have convinced some people that retailers or packers have, and use, market power to the disadvantage of consumers and producers. Increases in the price spread, for example, often lead to accusations by producer and consumer groups of price gouging and to Congressional calls for investigation of the meat industry.

The long-term trend, however, shows farm-to-wholesale price spreads increasing less than inflation. And, more labor-intensive services offered by retailers account for some of the widening in wholesale-to-retail meat price spreads.

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Price Spreads Monitor Industry Performance

ERS monitors farm, wholesale, and retail prices for Choice beef and pork and the spreads between these prices. Price spreads are designed to measure how the value of an animal and its meat changes through marketing stages from the farmer to the consumer. Price spreads for beef and pork are adjusted for the value of byproducts generated from processing and for the weight loss as animals are transformed into retail cuts of

Providing services, such as improved packaging and closer trimming, accounts for some of the widening in the price spread between the packer and the consumer.

meat. For instance, farm prices for Choice steers and hogs are converted from dollars per pound of animal to dollars per pound of retail cuts.

Theoretically, the farm-to-retail price spread consists of the costs and profits of marketing firms. An economically efficient marketing and processing system will move products from the farm to the consumer at low costs and will not earn "excessive" profits (those arising from abuse of market power).

Two factors limit the use of pork and beef spreads as a tool for monitoring industry performance. First, ERS price spreads are not divided into costs and profits. Second, the retail prices for Choice beef and pork are based on a mix of cuts that an animal can produce, not on the mix that grocery stores actually sell. For instance, lower priced pork cuts are often processed into hot dogs or luncheon meats. Restaurants are a more important outlet for beef steaks than for beef chucks. Because grocery stores sell a different mix of cuts than ERS uses to calculate the retail price, the wholesale-to-retail spread cannot measure retail gross margins (the difference between the price of the product bought and the price of the product sold). Price spreads cannot widen (or narrow) unless the gross margin on at least one meat cut widens (or narrows).

Longrun Price Spreads Are Stable

The beef- and hogpacking industries have undergone major consolidation in the past 20 years. The largest slaughtering firms have gained increasing shares of the Nation's meat production. Despite the fears of some industry observers that this consolidation would make it easier for meatpackers to exploit market power, the farm-to-wholesale spreads for beef and pork have not kept pace with inflation. Improved productivity by packers has kept down farm-to-wholesale spreads. ("Beefpacking Costs Are Lower for Larger Plants," elsewhere in this issue, explains how the trend to fewer and larger slaughter plants lowers processing costs.)

The slow growth in farm-to-wholesale price spreads (relative to inflation) is good for both retailers and farmers. It allows farmers to receive more for their animals and retailers to pay less for beef and pork. This improvement in packing industry performance does not imply that packers cannot or are not earning excess profits. Productivity increases may have been great enough to allow the largest packers to cut spreads and still increase profits.

Wholesale-to-retail meat spreads have grown a little faster than inflation. While this could be the result of retail stores earning greater profits on meat sales, there are two reasons to believe that store costs have increased faster than inflation. First, labor productivity in grocery stores probably has not increased, and may have dropped. Second, some stores are providing more services related to beef and pork sales, such as improved packaging and closer trimming. The costs of providing these extra services account for at least some of the widening in the price spread between the packer and the consumer. However, wide retail meat spreads concern livestock producers and processors because higher retail meat prices cause lower consumer purchases of beef and pork.

Month-to-Month Price Spreads Are Erratic

Longrun price spreads seem to reflect changes in inflation and productivity. Shortrun price spreads, on the other hand, vary greatly from month to month, especially the wholesale-to-retail spreads. (Farm-to-wholesale price spreads, while variable, are more stable than wholesale-to-retail spreads.) This variability leads to sharp cycles in price spreads.

Beef Price Spreads Set New Records

Since spring 1991, ERS price spreads for Choice beef set several record highs. Through November 1991, the record farm-to-retail price spread was set in August at $1.40 per pound, up 26 cents from August 1990. Such high price spreads have prompted much concern and numerous calls by farmers and politicians for investigation into market abuse or price gouging, especially by supermarkets.

While the beef price spreads in 1991 have been high, the spread for Choice beef is consistent with past farm-to-retail price relationships. Our economic model for predicting retail beef prices did so with accuracy to plus or minus 1 cent. Given the model's ability to predict current retail prices based on marketing relationships of the early 1980's, it is likely that retail beef markets have changed very little. While some may not like the current shortrun performance, it did not worsen in 1991.

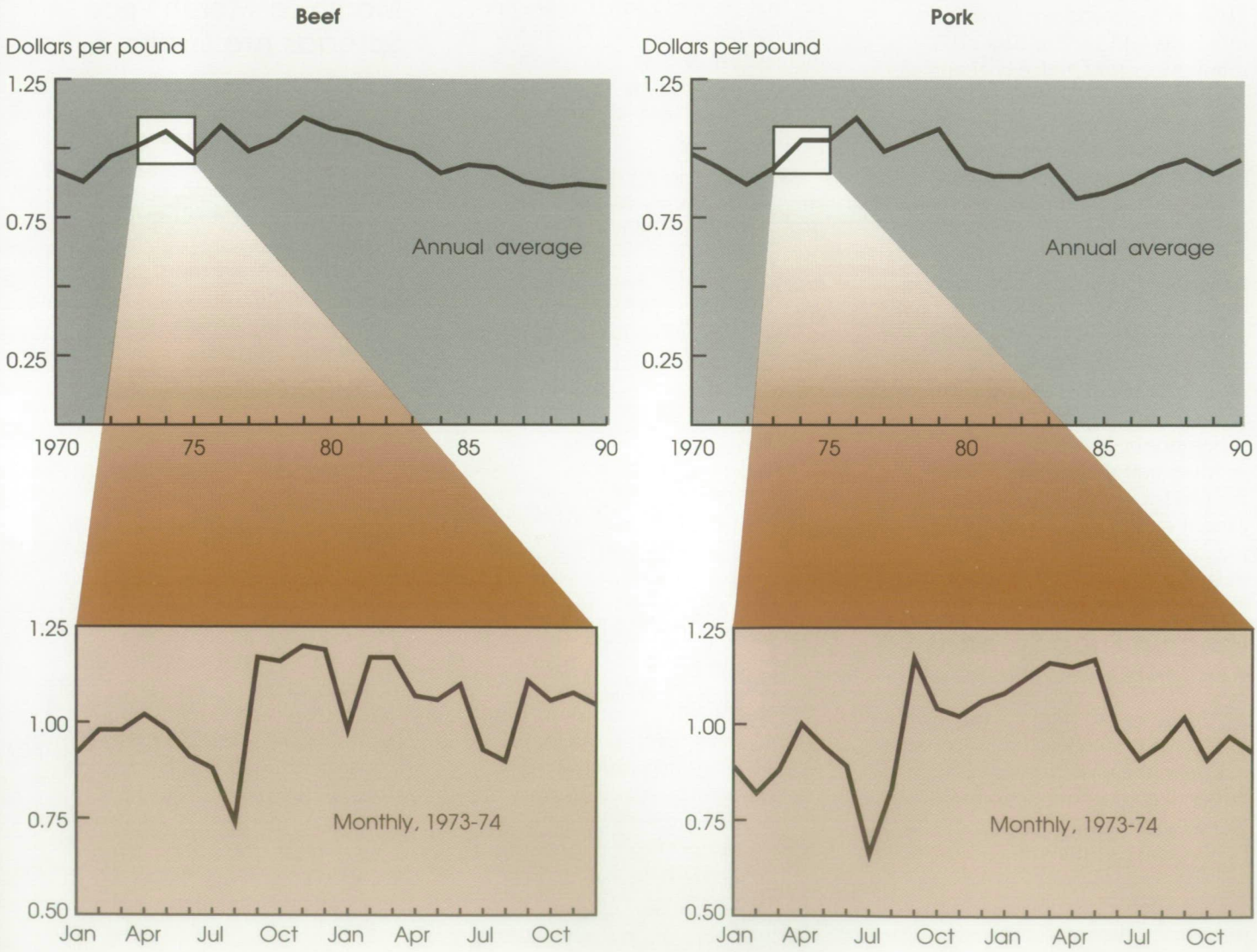
The instability in wholesale-to-retail price spreads is primarily caused by two factors. First, farm and wholesale prices vary more than retail prices. Fluctuations in wholesale prices, coupled with relatively stable retail prices, cause spreads to vary.

Meat is not the only food product for which retail prices are more stable than farm prices. In fact, retail prices of most foods are more stable than their farm prices. Retailers sometimes claim that they stabilize prices partly as a service to their customers, because consumers do not like price fluctuations. Consumers naturally dislike price increases more than they like price decreases, and price increases also appear to be more memorable. Store managers clearly have an incentive to stabilize prices.

The delay between farm and retail price changes also makes price spreads more volatile. Farm prices and wholesale prices tend to move parallel to each other. Retail prices

Despite Monthly Fluctuations, Meat Price Spreads Are Stable Over Time

Farm-to-retail price spreads



Note: Data are adjusted for inflation.

tend to hit their highs and lows a month after farm and wholesale prices hit theirs. When farm and wholesale prices rise, the lag in response by retail prices causes the wholesale-to-retail price spread to narrow. When farm and wholesale prices drop, a lag causes the wholesale-to-retail price spread to widen.

The lag between wholesale and retail price changes is often attributed to the amount of time it takes to move products from the farm to the consumer. The retail industry claims that since products currently in the store were bought from the farmer at some earlier time, the prices reflect earlier farm prices.

A 1-month delay between farm sales of livestock and consumer purchases of meat seems too long for most fresh meat items. Retail stores typically take delivery of fresh meat at least once a week. Many meatpackers can process live animals into wholesale cuts in 1-2 days. USDA's regulations require beef carcasses to be refrigerated for 24 hours prior to grading carcasses.

Most of the lag between farm and retail price changes for meats is due to factors other than the time it takes to move products from the farm to the consumer. One possible factor is that many retailers try to maintain fairly stable prices. Wholesale and farm prices change daily, and often a price rise one day is followed by a price drop the next day. It makes little sense for retailers to react to day-to-day changes in wholesale meat costs, especially if a price change may not persist.

Asymmetric Price Changes

ERS research shows that the lag between farm and retail prices depends upon whether the farm price is increasing or decreasing. In both beef and pork markets, retail prices rise faster than they fall, as do farm and wholesale prices. Prices exhibit what economists call asymmetric adjustment. That is, if delays in product movement are responsible for lags in price changes, then the faster adjustment to price increases implies that meat reaches consumers sooner when prices are rising. The quicker movement of meat from farms to consumers during price increases is reasonable. In a market economy, price increases are signals that demand has grown more rapidly than supply. To meet the increase in demand, inventories can be drawn down and the meat spends less time moving from farms to consumers.

The faster reaction of retail prices to wholesale price increases could also be the result of psychological factors. Retailers, like consumers, may react more strongly to price increases. Because increases are more memorable than decreases, store managers could be quicker to call a price increase a permanent change.

Overall Performance Is Competitive

The longrun trend of inflation-stable meat price spreads suggests that the competitive performance of meat and livestock markets has changed little in past years. However, because price spreads are not divided into profits and costs, they cannot be used to tell how well the markets worked at the start. Shortrun fluctuations in price spreads suggest that the performance of meat markets is erratic—that at times retail stores earn high margins on meat and at other times margins are low. The asymmetry in the transmission of farm price changes to retail prices has resulted in some critics claiming that there are shortrun inefficiencies, perhaps caused by abuse of market power.

The fact that retail prices react more quickly to cost increases than to cost decreases is consistent with many critics' views of food retailing: that retailers are quicker to pass on cost increases than decreases.

But while asymmetric retail price change is consistent with the idea that profits may sometimes be excessive, it is not sufficient proof that this is occurring. As noted, competitive business practices may account for asymmetric price changes. Also, farm prices usually react more quickly upward than downward to changes in market conditions, and this keeps farm-to-wholesale price spreads for both beef and pork relatively stable. This may suggest that livestock markets may function about as well in the short run as they do in the long run. ■

Aquaculture: A Diverse Industry Poised For Growth

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Aquaculture has become a prominent industry, encompassing such products as mussels, abalone, catfish, sturgeon, alligators, ornamental fish, and aquatic plants. Domestic producers raised over 800 million pounds of aquacultural products in 1990, four times over that produced in 1980. With many fish and shellfish species being caught in the wild at close to maximum rates and with better aquacultural production methods, further increases look promising. But a variety of resource constraints, environmental issues, and food safety concerns will make continued expansion more of a challenge. In addition, per capita consumption has not grown in the United States over the past few years—despite all the publicity recommending fish for better health and diets.

Technological advances in hatchery operations and improved feeds have made production of the two most valuable seafood species in the international market—shrimp and salmon—economically possible. Most aquacultural production is targeted at high-income consumers in the United States, Japan, and the European Community (EC). Aquaculture has benefited from both U.S. and foreign governments' eagerness to develop the industry to boost export earnings and to improve local rural economies.

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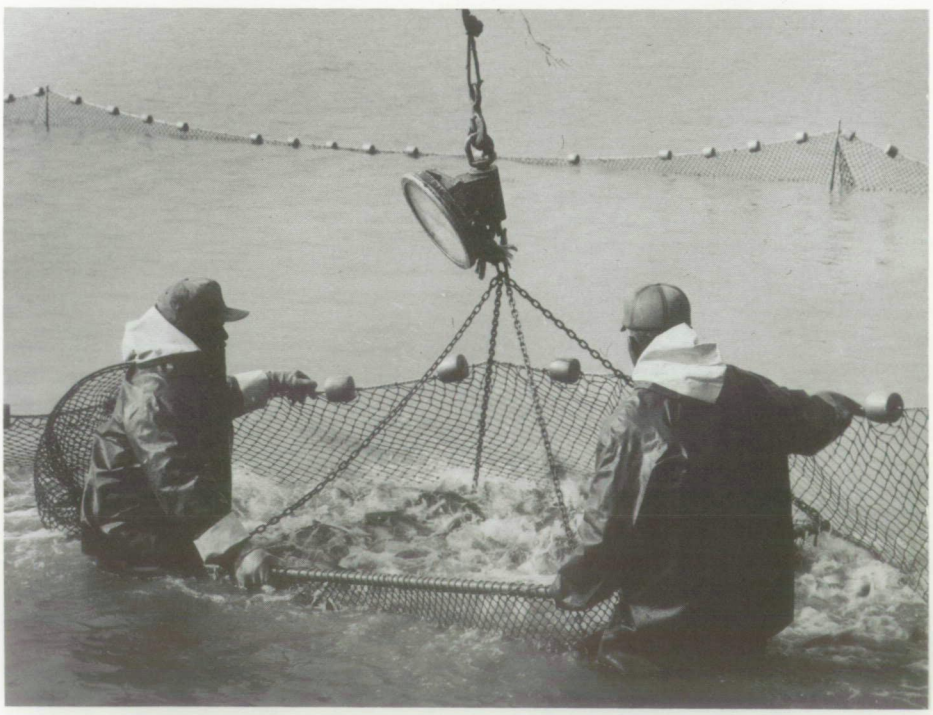
U.S. Aquaculture Concentrated, But Evolving Rapidly

For each aquacultural species grown in the United States, a single State or region dominates. For example, Mississippi is by far the largest catfish producing State, growing 70 percent of the Nation's output. But, catfish production is



The harvest from the catfish industry—by far the largest sector of U.S. aquaculture—reached a record 391 million pounds in 1991.

expanding into adjacent States. Production will probably end up concentrated in a crescent-shaped area in the Southeastern United States, extending from North Carolina down through Florida and as far west as eastern Texas. For crawfish, Louisiana provides the overwhelming majority of production, with only small amounts produced elsewhere. And while trout is grown in many States, Idaho's production is by far the largest at around 75 percent. Other production leaders are:

- Pen-raised salmon—Maine and Washington, with about 85 percent;
- Oysters—Washington, with over 50 percent;
- Tropical fish—Florida, with over 90 percent; and
- Alligators—Louisiana and Florida, at almost 100 percent (see box).

Many other species are produced, but output is so small or new that it is hard to identify leading producers.

Production concentrates in areas with the lowest-cost combination of water resources and climate, and with producers willing to diversify into new enterprises. In most cases, the species being grown (or a closely related species) were native to the area.

Production systems range from only slight modifications of the natural environment for crawfish and mussels, to highly sophisticated systems monitoring and manipulating a number of environmental parameters, such as dissolved oxygen and ammonia levels used for tilapia or sturgeon. These complex systems include indoor water-recirculation and hatchery production. The level of sophistication used may vary from one phase of the life cycle to another. Most production systems are evolving, as new developments in optimal farm size, aeration techniques, waste management, feeding schedules, and harvesting systems are adopted.

Alligator Farming: A Growing Industry

Alligator farming is one growing sector of domestic aquaculture. Alligator farms are concentrated mainly in Louisiana and Florida. An estimated 67,000 alligators were produced in Louisiana and 16,000 in Florida in 1989, up from only a fraction of this level a decade earlier.

Farmed alligators are hatched from eggs taken from both wild and captive populations. Some of the hatchlings are returned to swamps to maintain the wild population. The rest are raised in heated, enclosed barns. Heated barns are used to speed growth—at a rate that doubles that of wild animals. After 15-18 months on a diet of dry grain products, nutria (muskrat-like rodents), fish, beef, chicken, or horse meat, farm-raised alligators reach a market size of around 4 feet.

Alligators are raised primarily for their hides. A farm-raised 4-foot alligator hide ranges in price from $30 to $40 per foot, depending on quality. Tanners prefer large hides, so farm-raised hides usually sell at less per foot than wild-harvested hides. Still, the higher price does not offset the higher cost of growing alligators to a larger size.

The meat is a valuable byproduct, sold chiefly to specialty retailers and restaurants. Many compare the taste and consistency to chicken.

In the future, the domestic industry will face increased competition from farms in Asia, Africa, and South America. Wild-harvest alligators will also be a rising source of competition to U.S. alligator farmers. Conservation measures put in place in the 1960's to protect alligators have been so successful that the populations have risen rapidly, and limited wild harvesting is now allowed.

Industry Marked by Diversity

The diversity of products allows aquacultural production to take place in a wide variety of locations. Some species of fish, shellfish, or aquatic plants are possible candidates for production in almost any area of the country. Arctic char and oysters can be raised in very cold waters, while tilapia and alligators require very warm temperatures for maximum growth rates.

However, this diversity may have slowed research to improve production efficiency. Only a few species generate enough revenue to warrant large research expenditures. And while some research developments may be transferred or adapted from one species to another, the diversity of organisms and growing systems in aquaculture makes this only a limited possibility. For example, research in selective breeding is not transferable from one species to another. Breeding programs are especially important to many new aquaculture species, because producers are starting with essentially wild stock.

Commercial Production, Not Wild Harvest, Will Have To Meet Future Consumption

The Food and Agriculture Organization of the United Nations estimates that the United States is in the odd position of being the world's largest exporter of seafood products while still being a net importer. In 1990, the United States exported $2.8 billion worth of edible seafood and imported $5.2 billion worth. Seafood imports were the second-largest source (after petroleum) of the U.S. trade deficit among nonmanufactured products.

U.S. per capita seafood consumption grew over 20 percent between 1980 and 1987. But after peaking in 1987 at 16.2 pounds (edible weight), consumption fell to 15.5 pounds in 1990—the same as in 1986. Domestic landings have increased greatly since 1985, but most of the increase has been in pollock landings, which yield only 15-20 pounds of edible weight per 100 pounds of fish. In terms of edible weights, domestic landings have not kept pace with exports. That, coupled with steady imports, means domestic fish supplies over the last several years have fallen.

While media reports have extolled the health benefits of fish consumption, the slowing economy has probably worked against higher fish consumption. Many seafood products are relatively more expensive than competing protein products, such as poultry. Over the last 5 years, retail seafood prices have risen faster than prices for beef, pork, and poultry. But those kinds of comparisons are not made on an edible-weight basis.

These changes do not mean that the demand for aquaculture products will fall. Even without increases in consumption rates, U.S. population growth means an increase in demand of around 40 million pounds per year of edible product, or 80 million pounds of farm sales. By 2000, U.S. demand for seafood would be higher: almost 400 million more pounds of edible product per year and 800 million more pounds in farm sales.

The export market for aquaculture products can also expand. While Japan is by far the largest export market for U.S. seafood, the EC could become a growth market for aquacultural products. Landings of wild-catch seafood in the EC have remained flat over the last decade. Also, the European market has a larger population than the United States, a relatively high standard of living, and higher overall seafood consumption.

It is doubtful that the domestic wild harvest industry can supply significant additional amounts without hurting its longrun survival. Therefore, if demand increases, much of the additional product will have to come either from higher domestic aquacultural production or from increased imports.

Aquaculture Will Face More Foreign Competition

International competition in the sale of aquacultural products should increase further. While the United States is a major producer of some aquacultural commodities, many countries strongly support fish-farming research and development. Competition for domestic fish farmers will come from two basic types of producers. First are the countries using systems with advanced technologies, such as Taiwan, Canada, Japan, and Norway. These countries will use advances

Onions May Replace Insecticides for Some British Fish Farmers

While most salmon farmers use insecticides to control sea lice, onions show promise as a natural control.

The Economist reports that Shetland Island farmers, who raise a third of Britain's farmed salmon, are starting to use onions to control sea lice. Sea lice prey on the salmon, impairing their appearance and, thus, value. Sometimes, sea lice even kill salmon.

One farmer reportedly eliminated the problem of sea lice by throwing 7 kilograms of onions into his fish cages each week. The Shetland Salmon Farmer's Association has started a research project to test the efficiency of onions as lice prey, and to find exactly how/why the salmon become lice-free when onions are introduced. The phenolic compounds in onions are already known to be toxic to fungi.

Wrasse is another natural control of sea lice. This small fish eats the lice off the salmon's skin. Wrasse are collected from the wild. Since they are so small, finer meshes must be used to prevent the wrasse from escaping the salmon cages. This has limited their use in controlling sea lice.

—Stephen L. Ott

in production techniques to raise the productivity of existing industries. The techniques can also be used to diversify into culturing new species where there is less competition. Second are countries that use low-technology methods of cultivation which rely on the advantages of low land and labor costs, more favorable climate, and fewer environmental constraints for cost competitiveness.

Aquaculture Can Enhance Wild Stocks

Aquacultural production can help wild species recover from over-harvesting. Mortality rates for fish are highest at the very beginning of their life cycles. Hatchery techniques have been developed to grow salmon until they reach a size where their survival chances are much greater. The release of large numbers of fingerlings would permit higher annual harvests.

However, it is more difficult to carry out a stock-enhancement program with species that do not return to spawn in clearly defined areas. A second stumbling block is funding for the hatcheries. Many fisheries' stocks are regarded as

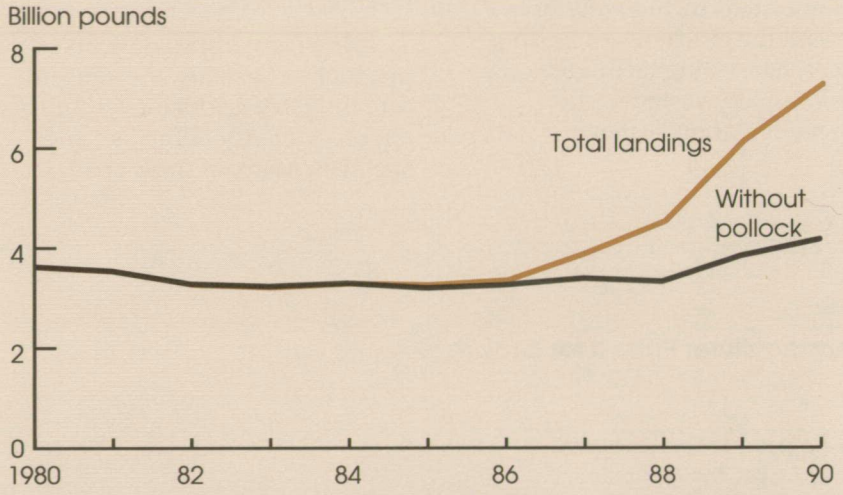
Pollock Pushes Up U.S. Fish Harvests

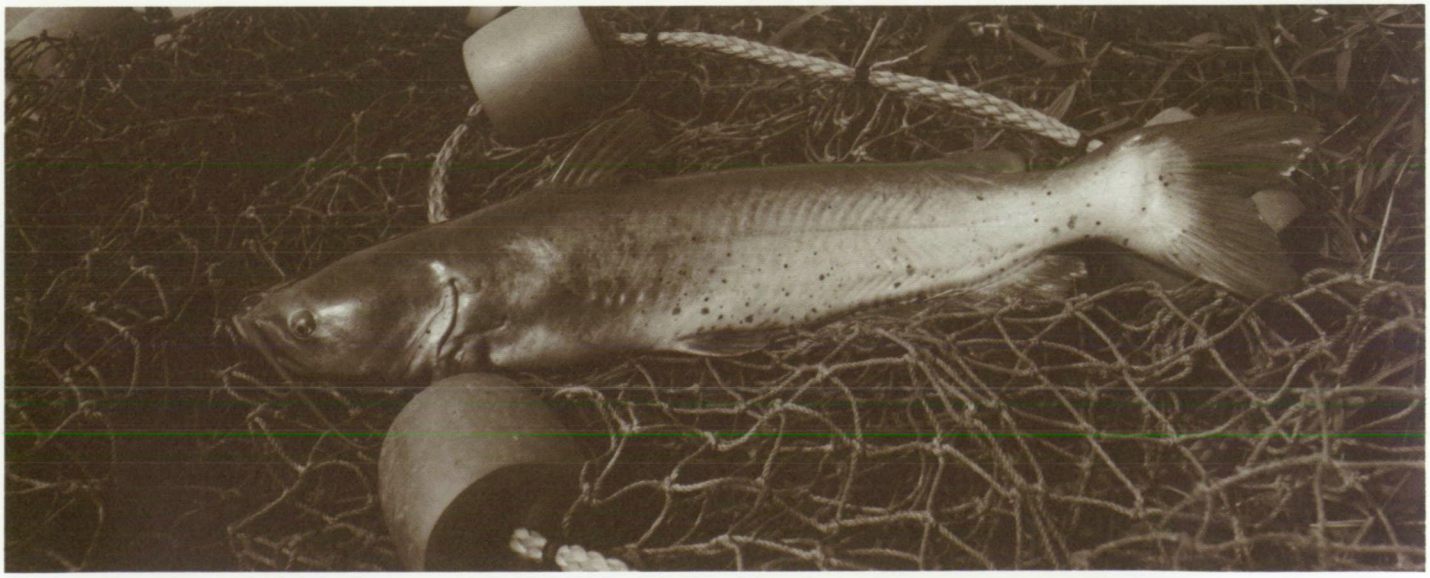
Increased landings of Alaska pollock are dramatically boosting domestic seafood landings. Pollock landings were 3.2 billion pounds in 1990, 480 percent higher than in 1987. Pollock accounts for one-third of all domestic landings.

Pollock is a major ingredient in processed fish products and is the fish often used in surimi (imitation crabmeat or lobster).

Increased pollock landings have stemmed from lower fishing quotas given to foreign countries in U.S. waters. Rapid growth in landings, however, could be ending as pollock is being harvested at close to maximum sustainable rates.

Without Pollock, U.S. Landings of Edible Fish Would Be 43 Percent Smaller





common property resources. Unless funding for the hatcheries were through general tax revenues, some method of taxing those harvesting the affected species would have to be developed.

New Technologies Will Help

Research projects now under way are aimed at helping growers either reduce production costs or improve product quality. The list of areas where growers are changing production practices to incorporate new developments is extensive. Some areas include attempts to increase the efficiency of feeding practices, harvesting techniques, oxygen-delivery systems, and water- recirculation systems.

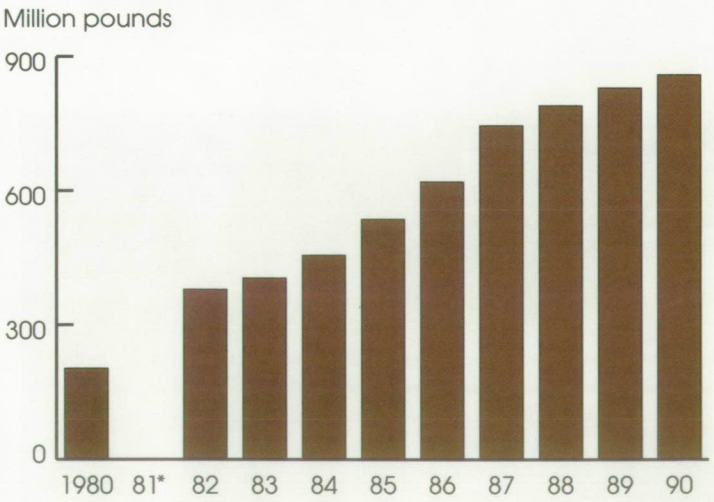
Efforts also are under way in a number of countries to develop deep-water ocean farming pens. Effective deep-water farming techniques would greatly increase the available space for marine aquaculture. Offshore sites would also reduce bottom fouling and visual pollution problems, two of the major problems with current ocean net-pen aquacultural projects. Researchers are also examining better methods of controlling or managing predators and using production sites where low-cost heat sources are available, such as near power generating facilities or geothermal sources.

Aside from improvements in production systems, the aquaculture industry is looking to improve the productivity of the fish and shellfish. Many of these changes stem from genetics or biotechnology. New developments are coming very rapidly in the areas of spawning behavior, gene transfer, and disease control.

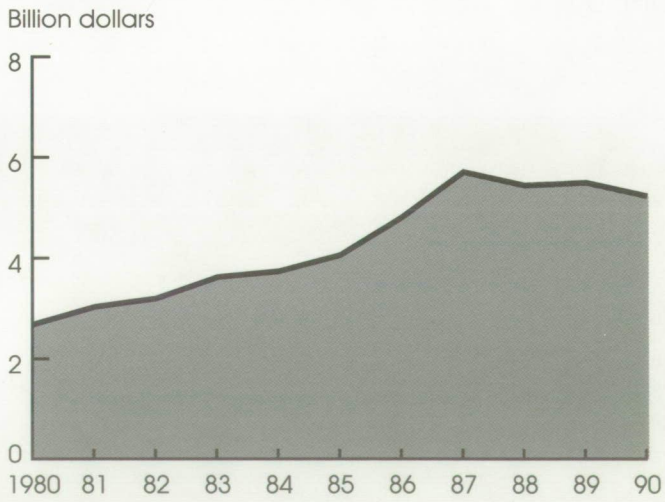
One area is the development of hormones to control spawning behavior. Hormonal controls are being developed in three areas. One area is the developing of hormones to achieve spawning in species that will not normally spawn in captivity. Another is using hormones and other techniques to get species to spawn more than once a year. A third area is using hormones or other techniques to achieve sex reversals or to sterilize populations. Sex reversal techniques are used to convert all the members of a population to the faster growing sex. Sterilized populations are used for two reasons. First, to either make a

U.S. Aquaculture: Poised for Growth

Domestic production steadily increased over the decade. . .



. . . Yet so did imports



*Note: No data for 1981.

Catfish May Be on Fast Food Menus

After a successful test promotion, catfish sandwiches may be returning to the menus of McDonald's in the Memphis region in the spring of 1992, reports the *Catfish Journal*. The sandwiches were test-marketed in February-March 1991. The new sandwich will consist of a 2.8-ounce fillet and coleslaw.

Test marketing may be expanded to the New Orleans region. While the sandwich would only be available on a regional basis, acceptance at McDonald's could represent an important new market for catfish at other fast food outlets.

species acceptable for growout in States that normally restrict nonnative species. Second, sterile fish or shellfish use energy for gains in size and weight instead of sexual development.

Researchers are also developing new therapeutic drugs to combat diseases affecting fish. However, there are questions of whether the market for many aquacultural products will be large enough to justify the product development and testing expenses.

The transfer of genes from one species to another is also a promising area of development. Research now underway is investigating the possibility of transferring genes that produce growth hormones to develop faster growing strains of fish. However, it may be some time before such developments can be used on a commercial basis.

Much of the media interest in the changes affecting aquaculture have focused on such high-tech issues as biotechnology and gene transfer. But there are still a great deal of productivity gains to be achieved through better nutritional programs. There are only a few basic kinds of fish feeds presently available—those developed for catfish and those developed for trout and salmon. Growers of other species are essentially using one of these two types of feeds or ones that have been only slightly modified.

Gains in nutritional advances will come on many fronts. First, development of feeds specifically tailored to the needs of new species will increase the productivity of those species. Second, new feeding strategies will promote better growth or cut down the amount of fat in the product. Third, experimental trials are under way to develop feed formulations that use lower cost ingredients or byproducts from other industries. Fourth, strategies will develop a product providing more health benefits for consumers. For example, studies are assessing ways to increase the percentage of omega-3 fatty acids in farm-raised fish by using special finishing diets. Consumption of omega-3 fatty acids has been linked with reduced incidence of heart disease. ■

The Ethics of Animal Agriculture

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The future course of animal agriculture may be determined more by the ethics of animal use than by technology.

What is the proper human-animal relationship? Views range from one extreme to another—from believing humans' unlimited rights over animals without constraint on their treatment of animals, to believing that animals are naturally entitled to the same rights as humans. Such differing ideologies cause controversy over such issues as genetic engineering of animals, using animals in laboratory research, confinement livestock production, using pesticides to kill insects, and even eating meat.

Concern About Animal Welfare Is Growing

Ethical issues are a crucial factor for the livestock industry today. At least 200 animal rights organizations in the United States press for stricter governmental control over the way animals are kept, used in laboratories, transported, and slaughtered. Producer concerns about the animal rights movement are represented by a coalition of 18 organizations. Changes in Federal and State laws and regulations reflect the growing importance of animal welfare as an issue.

Treatment of animals is monitored and regulated by such Federal agencies as USDA's Animal and Plant Health Inspection Service, the National Institutes of Health, and the Food and Drug Administration.

Sometimes persons with professional or economic interests in animal agriculture belittle ethical issues as unscientific or irrational. But such values are a basis for many legislative decisions. Clarification of ethical issues can help develop policies to better the environment for people and animals.

Ethical questions surround all aspects of animal use in our food system. For example, is confinement bad because it limits movement and freedom, or is it good because it provides for easier control of pests and disease?

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Assuming that society in general has some concern about the welfare of animals and believes that humans should not mistreat animals, the ethical debate is not over improving animal welfare. A problem arises in the difference in underlying philosophies (that are often not revealed or discussed) about human-animal relationships. As animal welfare is an emotional issue, the debate is heated, and often aggressive.

The contrasting approaches to the treatment of animals could be labeled "animal rights" and "responsible human actions." Although the two viewpoints are rooted in separate philosphic origns, people who have either of these views also share a common concern for animals.

History of Animal Welfare

It is easy to document a longtime concern about animal welfare. The American Society for the Prevention of Cruelty to Animals, for instance, was formed in 1864. England had humane-treatment legislation (first dealing with cattle) as early as 1822. That country's Cruelty to Animals Act of 1876 was an important step toward the humane treatment of all animals.

English law influenced U.S. legislation. The Animal Welfare Act of 1966 was focused primarily at the prevention of pet theft and the provision of humane treatment of animals used in research. The act regulated the transportation, sale, housing, and care of dogs, cats, nonhuman primates, guinea pigs, hamsters, and rabbits. The act was later extended to the use of animals for exhibition and sale as pets, and then to animals in commerce. Much legislation relating to the treatment of animals is considered every year by Congress and other lawmaking bodies.

The Economics of Agricultural Animal Welfare

Animal welfare concerns relate to feeding, housing, reproduction, confinement, health, research, and slaughter. These issues can be divided into three broad classes: treatment of animals on farms and ranches, treatment of animals in laboratories, and the overall relationship of humans to animals.

Ethical questions surround, and concerns focus on, all aspects of animal use in our food production system, including humane handling, sheltering, feeding, watering, castrating, dehorning, docking, breeding, transporting, slaughtering, and preventing and treating illness.

"From the abstractions and arguments will come policies, from policies will come rules, and from rules will come consciousness and behavior."

Is confinement bad because it limits movement and freedom, or good because it provides a comfortable environment and easier control of pests and disease? Is dehorning bad because it appears to be painful to the animal, or good because it prevents injury and death to other animals?

The arguments on either side of these questions depend on human judgment. The levels of human sensitivity are influenced in part by anthropomorphism—the tendency of people to impute human qualities of emotion, personality, and reasoning to animals.

Economics is one way to measure human judgment towards animal welfare. To consider the concept of animal welfare in economic terms, begin with the idea of an animal or animal product as an economic good, which provides utility to humans. The qualities of an economic good (such as the taste and color of a beefsteak) give it utility and determine its price.

If animal welfare can be perceived as a means to human ends, then it is possible to consider the comfort and well-being of an animal as a quality of a good. For example, a beefsteak, in addition to its physical qualities such as color and tenderness, can be described as "range-raised," "without steroids," "kosher," or "gently slaughtered." Such factors have a certain value to some consumers and could result in some premium-priced products.

Historically, economics and utilitarian ethics have ties. For example, Jeremy Bentham, an 18th century philosopher, provided many of the utilitarian roots of economics and also is known for asserting the rights of animals. However, economics is so rooted in utilitarian principles that any regard for animal welfare is basically

confined to that framework. And in the debate over animal welfare, the animal rights position is opposed to the means/ends aspects of utilitarianism.

Animal Rights or Responsible Action?

The more avid proponents of animal rights see such rights as analogous, if not equivalent, to the natural rights of humans—as expressed, for instance, in the U.S. Constitution and Declaration of Independence.

Tom Regan, a leading proponent of animal rights, rests much of his argument for animal rights on the "right to respectful treatment." He says that this right is inherent and its value is not dependent on the interests of others. Regan says that both moral agents (who take action) and moral patients (those acted upon or for, including children, invalids, and animals) have a right to respectful treatment.

Some of the arguments are more extensive, but the basic principle behind animal rights is that animal welfare cannot be ensured by reliance upon the good behavior of humans. Animals have rights and these rights should be correctly and unambiguously understood by humans. Because the rights of animals rest entirely on interpretations by humans, animal rights are the responsibility of some human who represents the animal and enforces its rights.

"Responsible action" rejects the idea of natural, inalienable animal rights as it depends upon interpretation and enforcement by humans. Instead it calls for humans to behave ethically towards animals: to give animals respect as well as humane treatment. The difference between animal rights and responsible action is largely between external and internal sources of authority for human behavior. Animal rights depend upon some authority to monitor how individuals treat animals. Responsible action uses one's internal code to guide one's behavior.

The argument for responsible action is that only humans are moral agents, and the treatment of animals is a moral issue. Accountability for behavior toward animals, beyond that of conscience, is to the community of other humans.

Responsible action is at once simpler and more complex than animal rights. Responsible action is simpler because the abstract principle of animal rights does not have to be explicitly defined and specified. Responsible action declares only that individuals "do right" by the animal. But "do right" is more complex for the individual, as the whole burden of understanding, weighing, and deciding what is the right behavior is internal to the individual. The individual cannot turn to a convenient list of "do's and don'ts."

Why Discuss Ethical Issues?

The purpose of discussing the arguments for animal rights and responsible action is to increase the understanding of basic values. Ethical reasoning helps to find rational solutions to moral problems.

Conflicts occur when the justification for similar conclusions arrived at differently is obscured by emotional reactions. Inflammatory rhetoric and destructive behavior may override common goals.

From the abstractions and arguments will come policies, from policies will come rules, and from rules will come consciousness and behavior. The policies, rules, and behavior may be rooted in animal rights, responsible action, or both.

Values drive habits of thought and behavior. Therefore, the ethics of animal use could have a far greater impact on agriculture than will mechanical, chemical, and biological tools.

Restrictions on the use of animals in research could have a major impact on laboratory procedures. The vegetarian perspective of food could affect the cattle industry more than the development and use of growth hormones. Opposition to animal confinement could affect poultry and veal production more than the technology of feeding and processing.

The ethics of animal agriculture is one subset of the ethics of animal use. Animals as pets, research subjects, zoo specimens, hunting and fishing quarry, and guards can initiate larger questions about relationships between humans and animals.

What are the responsibilities implied in the use of animals? Is responsibility adequately served by notions of humane treatment, or must responsibility include respect? The farmer, the shipper, the butcher, and the backyard barbecuer might think of Albert Schweitzer's words:

> "Whenever an animal is in any way forced into the service of man, every one of us must be concerned with the sufferings which for that reason it has thereby to undergo. Let no one regard as light the burden of that responsibility."

For Additional Information

The Animal Welfare Information Center of USDA's National Agricultural Library has an extensive collection of readings on animal welfare, animal rights, and related materials. The novice should begin

with *Ethical and Moral Issues Relating to Animals, January 1979-March 1990*, QB 90-48, Beltsville, MD: National Agricultural Library, May 1990; and *An Annotated Bibliography of Selected Materials Concerning the Philosophy of Animal Rights* (prepared by S. Gleason and J. Swanson), October 1988. See also: *Animal Welfare Legislation and Regulations, January 1979-February 1991*, QB 91-63, Beltsville, MD: National Agricultural Library, March 1991.

Aside from general ethics texts, there are many excellent books on animal rights. Tom Regan and Peter Singer, *Animal Rights and Human Obligations*, Englewood Cliffs, NJ: Prentice Hall, 1976, is a useful book of works, both historical and contemporary. Books by Regan and Rollins favor the rights position but also contain helpful appraisals and references on the "other side" of the arguments. See, for example, Tom Regan, *The Case for Animal Rights*, Berkeley, CA: University of California Press, 1983; and Bernard Rollins, *Animal Rights and Human Morality*, Buffalo, NY: Prometheus Books, 1981. S.F. Sapontzis's *Morals, Reason, and Animals*, Philadelphia, PA: Temple University Press, 1987, is a good balanced view of the animal rights issue. An excellent historical review, and a British perspective, is: Richard Ryder, *Animal Revolution*, Oxford, UK: Basil Blackwell, 1989. Also review the *Journal of Agricultural Ethics* (edited at the University of Guelph); and *Agriculture and Human Values* (edited at the University of Florida), both of which contain material on animal agriculture and ethics. ■

USDA Actions

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USDA regularly implements operational and regulatory changes that affect the status of food and nutrition in the United States. Here are some recent actions.

USDA Awards Grants for School Breakfast Programs in 30 States

USDA has awarded $5 million in Federal grants to school districts in 30 States to help start breakfast programs during the 1991/92 school year. More than 5,000 schools and 500,000 children have been added to the program nationwide since 1989.

The program is now available in more than 45,000 schools, and more than 4 million children participate daily. USDA's Food and Nutrition Service, which administers the School Breakfast Program, provided $3 million for 1990, and will make available $5 million for programs each year through 1994.

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Cheddar Cheese Added to Dairy Export Incentive Program

USDA announced that 41 countries are eligible to buy up to 32,550 metric tons of U.S. Cheddar cheese under the Dairy Export Incentive Program. Export sales under the program will be facilitated through the payment of bonuses in the form of commodities from the inventory of USDA's Commodity Credit Corporation. Sales of Cheddar cheese will be made through normal commercial channels at competitive world prices.

USDA Revises Standards For Bulk American Cheese

The revised standards for grades of bulk American cheese will reflect developments in cheesemaking technology. American cheese consists of four varieties of hard cheese made in the United States: Cheddar, Colby, granular cheese, and washed curd.

New Grade Standards for Dried Buttermilk

Effective August 23, 1991, USDA revised the U.S. grade standards for dried buttermilk to reflect changes in buttermilk marketings since the last revision in 1985. The changes extend the standards for buttermilk produced from sweet cream to include cream separated from whey (the liquid produced in cheesemaking) and cultured cream (sweet cream to which certain beneficial bacteria that produce lactic acid are added.)

The revision also establishes two major categories, "dry buttermilk" and "dry buttermilk product," which are distinguished by their protein content. "Dry buttermilk" has to meet a minimum standard

of 30-percent protein, and "dry buttermilk product" has less than 30-percent protein. USDA developed the revision based on the initiative of the American Dairy Products Institute. Details of the rule were published in the July 24, 1991, *Federal Register*.

Potato Research and Promotion Program Amended

USDA is amending the national Potato Research and Promotion Plan to add Alaska and Hawaii to the program, and to reflect certain provisions in the 1990 farm bill. Details of the amendments and the referendum appeared as a final rule in the August 14, 1991, *Federal Register*. Copies and additional information are available from Arthur L. Pease, AMS, USDA, Fruit and Vegetable Division, Marketing Order Administration Branch, Rm. 2525-S, PO Box 96456, Washington, DC 20090-6456.

Special California Citrus Crop Insurance

USDA announced availability of a special crop insurance policy for California citrus growers who are not currently enrolled in the Federal crop insurance program. USDA's Federal Crop Insurance Corporation is developing the policy offering for California citrus crops severely damaged during the December 1990 freeze.

Changed Pork Purchase Specifications

USDA will revise the Institutional Meat Purchase Specifications (IMPS) for cured, smoked, and cooked pork to reflect public interest in lower fat pork and to incorporate current processing technology.

Pork Order Import Assessments Increase

Effective July 10, 1991, USDA increased assessments on imported pork and pork products by 0.04 to 0.05 cent per pound (the equivalent of 0.09 to 0.11 cent per kilogram). The increase reflects 23-percent higher hog prices paid at major U.S. markets this past year. The assessment adjustment is authorized by the Pork Promotion, Research, and Consumer Information Act of 1985. ■

Food and Nutrition Legislation

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Since April 1, 1991, many bills affecting food and nutrition concerns have been introduced in the House and the Senate. Some of these bills are described below.

Food Safety and Quality

S. 1324, Sen. Howard Metzenbaum (OH)

This bill, the Poultry Consumer Protection Act of 1991, would amend the Public Health Service Act to require a study of the incidence of human infection resulting from the microbiological pathogenic contamination of food. The study would provide scientifically sound information regarding health risks to consumers resulting from such contamination. The bill would facilitate public and private disclosure of contamination information to maintain public health. It also would protect employees who report food safety violations.

S. 1353, Sen. Joseph Lieberman (CT)

The Pesticide, Health and Safety Act of 1991 would amend the Federal Insecticide, Fungicide, and Rodenticide Act provisions on the registration, reregistration, cancellation, suspension, and registration's expiration of pesticides. The act would ensure that hazardous pesticides are promptly removed from the market and that the health of all citizens, particularly children, is protected. The bill would also require that a pediatrician and public health scientist be included on the Scientific Advisory Panel.

H.R. 2058, Rep. James Hansen (UT)

This bill would amend the Import Milk Act to require any dairy product imports to meet applicable U.S. domestic standards of quality, residue levels, packaging, and processing facilities. The Secretary of Health and Human Services would be directed to establish standards for an imported dairy product when the application of existing domestic standards is not practicable. The bill would also prohibit imports of a dairy product that does not meet such standards.

H.R. 2397, Rep. Scott Klug (WI)

This bill, the Milk Nutrition and Labeling Act, would amend the Federal Food, Drug, and Cosmetic Act to require fluid milk labels to indicate the nonfat content of the milk and to prominently display the protein content of the milk. Under these regulations, skim milk would have to contain at least 9 percent milk solids not fat; lowfat milk, at least 10 percent; and whole milk, at least 8.7 percent.

The authors are agricultural economists. Lynch, formerly with ERS's Agriculture and Trade Analysis Division, is with the University of California—Berkeley. Green is in the Agriculture and Trade Analysis Division, Economic Research Service, USDA.

S. 1110, Sen. Robert Kasten, Jr. (WI)

The Healthier Milk Act would amend the Federal Food, Drug, and Cosmetic Act to develop milk standards that require whole milk to contain at least 3.25 percent milkfat and 8.7 percent milk solids not fat. Lowfat milk would have to contain at least 10 percent milk solids not fat; and skim milk would have to contain at least 9 percent milk solids not fat.

S. 898, Sen. Patrick Leahy (VT) and H.R. 2083, Rep. Mike Synar (OK)

Among other provisions, the Circle of Poison Prevention Act of 1991 would amend the Federal Food, Drug, and Cosmetic Act to require the Administrator of the Environmental Protection Agency to revoke any tolerance or exemption that permits the presence of a pesticide on food if that pesticide has been canceled or modified to prohibit its use on food. If a residue of a canceled or suspended pesticide will persist in the environment and may be present on food, a tolerance may be established that will permit the residue, but the tolerance level must protect public health. The bill would prohibit the importation of a raw agricultural commodity (including fruit, vegetables, meat, poultry, and eggs), unless the importer files a document identifying each chemical used in production. Agricultural attaches would have to annually report on the customary use of pesticides on food produced in foreign countries.

H.R. 1662, Rep. John Moakley (MA)

The Nutrition Advertising Coordination Act of 1991 would amend the Federal Trade Commission Act to require food advertising to meet the same requirements regulating nutritional labeling of food. Under this bill, a food advertisement could not characterize the level of any nutrient, the relationship of any nutrient to a disease or a health-related condition, or a serving size or portion unless these conformed with the nutrition labeling regulations. A food advertisement would be considered misleading unless it discloses the level of fat or saturated fat when a cholesterol claim is made, unless it mentions the level of cholesterol when a saturated fat claim is made, and unless it states the level of total fat if a claim of "high in dietary fiber" is made.

H.R. 1644, Rep. Leon Panetta (CA)

This bill would amend the Walsh-Healey Act, which legislates Government contracts, to cover contracts for processed foods. The bill would require that companies both in and outside the United States comply with the Fair Labor Standards Act of 1938 to be eligible for Government contracts.

S. 828, Sen. Thomas Daschle (SD)

This bill would amend the Federal Meat Inspection Act and the Poultry Inspection Act to require imports of meat and poultry products to be subject to the same inspection, sanitary, quality, species verification, and residue standards as products produced in the United States. The bill also would require imports to be inspected by U.S. inspectors.

S. 1074, Sen. Edward Kennedy (MA) and
H.R. 2342, Rep. Henry Waxman (CA)

The Safety of Pesticides in Food Act of 1991 would amend the Federal Food, Drug, and Cosmetic Act to give additional authority to the Environmental Protection Agency to regulate pesticide chemical residue tolerances. The bill would establish risk-based food safety standards consistent with other food regulatory procedures by eliminating economic benefits from consideration of whether a pesticide is safe for use on food. A standard of "negligible risk" of causing adverse human health effects would be defined. Then, all pesticides and chemicals used on food products must be found in quantities with less than a negligible risk. The bill would establish a mechanism to calculate "negligible risk" for children from infants to adolescents, taking into account their unique physiologies, limited diets, and low body weights. New and old pesticides would be required to meet the same standards.

Food Assistance

S. 757, Sen. Patrick Leahy (VT)

The Mickey Leland Childhood Hunger Relief Act would amend the Food Stamp Act of 1977 to: (1) ensure adequate food assistance, (2) promote self-sufficiency, and (3) simplify the provision of food assistance. Establishing transitional caps on benefits through fiscal 1995, the bill would remove the current cap on the "excess shelter" deduction for determining eligibility in the Food Stamp Program. The Secretary of Agriculture would be required to increase basic benefits at the beginning of each fiscal year, until they reached 105 percent of the cost of the Thrifty Food Plan.

The bill would promote self-sufficiency by allowing households to receive some child support without penalizing benefits. That is, the

first $50 in monthly child support payments to nonhousehold members would be excluded from consideration as program income. The limit on the fair market value of vehicles that program recipients may own would increase annually. The bill also would increase dependent care deductions and participant and State agency reimbursements for employment and training activities. The bill would simplify the provision of assistance by permitting related adults living in the same household to apply for separate program benefits under specified conditions. A participating family made up of or including an elderly or disabled member would be permitted to own $300 in allowable financial resources.

S. 973, Sen. Brock Adams (WA) and H.R. 1737, Rep. Marilyn Lloyd (TN)

The School Based Meals for Older Individuals and Intergenerational Programs Act of 1991 would amend the Older Americans Act of 1965 to establish a program to provide meals for older individuals volunteering in school-based programs. The bill would also establish activities for older volunteers to interact with elementary and secondary school students. The Commissioner on Aging would be directed to make grants to States for the establishment and operation of projects that: (1) are carried out in elementary and secondary schools; (2) provide hot meals to older volunteers while schools are in session, during the summer, and (unless waived by the State) on weekdays in the school year when the schools are not in session; (3) provide intergenerational activities in which older volunteers and students interact; (4) provide social and recreational activities for older individuals; (5) develop "skill-banks" that maintain and make available to school officials information on the skills and preferred activities of older volunteers, so that they may serve as tutors, teacher aides, living historians, special speakers, playground supervisors, lunchroom assistants, and in other roles; and (6) provide opportunities for older volunteers to participate in school activities and use school facilities.

H.R. 1460, Rep. Jim Moody (WI)

The Food for Young Children Act would amend the National School Lunch Act to make a private organization providing nonresidential daycare services eligible for aid under the Child Care Food Program, if at least 25 percent of the children it serves are eligible for free or reduced-price lunches.

H.R. 1714, Rep. James Traficant, Jr. (OH)

This bill would amend the National School Lunch Act to include children aged 13 to 15 in the Child Care Food Program.

H.R. 2258, Rep. Tony Hall (OH) and Rep. Bill Emerson (MO)

This extensive legislation, Freedom From Want Act, was introduced to help end hunger and human want. Notable provisions include increasing participation in the Special Supplemental Food Program for Women, Infants, and Children (WIC) and the Head Start Program.

The bill also would provide for a food retailing development program. Under this program, the Secretary of Agriculture could provide grants for up to 20 nonprofit, community-based organizations to carry out food retailing development projects. The projects would be funded to: (1) increase the access of individuals residing in communities underserved by supermarkets to more affordable and high quality food, and (2) strengthen the operation of existing retail food stores in underserved communities.

Policymakers have not adopted a standard definition of chronic hunger conditions in the United States, nor a formula for quantifying hunger problems. This bill defines hunger issues within the context of food security, which allows policymakers to more accurately describe and address hunger issues.

Competitive grants would be provided to seven land-grant colleges and universities to establish regional centers for community food security. The grants will be used to: (1) obtain from local communities information necessary or useful for developing methods for monitoring food security conditions, (2) assist local community agencies and groups in developing information management systems, (3) develop techniques and methods for monitoring local food security conditions, (4) coordinate the dissemination of food security information, and (5) analyze and disseminate information about food security from local sources to Federal, State, and local governments.

H.R. 2576, Rep. Jim Moody (WI)

The Hunger Prevention and Nutrition Assistance Act of 1991 would amend the Emergency Food Assistance Act of 1983 to authorize additional appropriations for fiscal years 1992-96 for the purchase, processing, and distribution of milk to eligible recipient agencies that provide needy persons with nutritional assistance during times of emergency and distress. ■

Food Labeling Regulations Changing

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On November 27, 1991, USDA's Food Safety and Inspection Service (FSIS) and the Department of Health and Human Service's (HHS) Food and Drug Administration (FDA) published proposed parallel regulations for mandatory nutrition labeling on food. FDA also published a final regulation on voluntary nutrition labeling, while FSIS published a proposed regulation on voluntary nutrition labeling. The two agencies estimate the costs of changing nutrition labels to be $2.8 billion. But the health benefits—estimated at $5.6 billion over a period of 20 years—greatly exceed these costs.

These efforts represent both agencies' responses to over a decade of consumer demand for better nutrition information on food. After a 90-day period for public comments, final rules are expected to be published by November 1992. New labels will be required on most packaged food products beginning May 1993.

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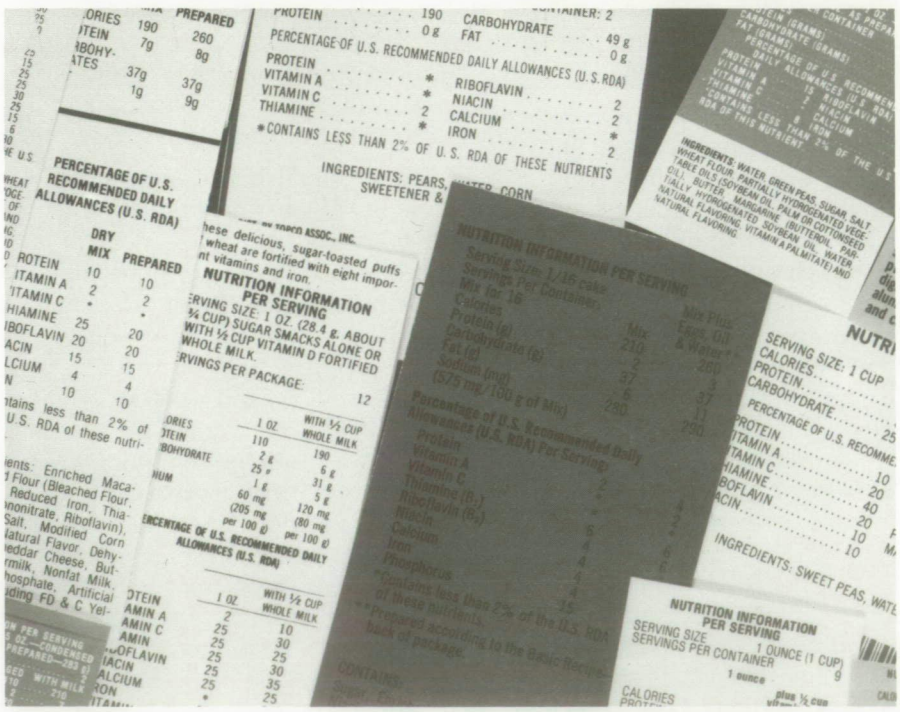
Present Labels a Source of Confusion

As awareness of the link between diet and health increases, consumers have expressed more concern about food choices. Industry has responded by developing "healthier" foods and by labeling the nutrition content, on a largely voluntary basis, for approximately half the processed food products sold.

However, consumers have complained that the ingredient and nutrition information available on food labels is not always useful. For example, many products do not list cholesterol and fiber contents, nutrients of interest to many



Some food labels present a barrage of information—from ingredients to nutrition information—but most people are left confused.

consumers today. And, differences in serving sizes make it difficult to compare the nutrition content of different products. Consumers also perceive health claims and product descriptors as confusing, such as when a product high in saturated fat is labeled as "low in cholesterol," or when a product light in color or texture is labeled as "light."

The absence of nutrition labeling on nearly half of all packaged foods, or labeling that is confusing, may partially explain the results of a recent study by USDA's Economic Research Service (ERS). The study found that groups of women with higher diet/health awareness changed their food selections but did not reduce total fat intake much more than other women. The study suggests that the women had difficulties making comparisons across food categories, and basically traded one source of fat for another (see "Diet/Health Concerns About Fat Intake" in the January/March 1991 issue of *FoodReview*). Thus, they were not successful in following USDA/HHS Dietary Guidelines to reduce consumption of fat.

If most food products contain clear and consistent nutrition labels, motivated consumers should find it easier to make changes in their food choices. For example, most consumers probably do not know how much fat a serving of 2-percent milk contains. But many have been able to translate the message to reduce fat intake by shifting consumption from whole milk to lowfat or skim milk.

Current Regulations

FSIS regulates the labeling of meat and poultry products, and FDA regulates the labels on all other food products. Both agencies have allowed manufacturers to include nutrition information, if it follows a prescribed format. However, nutrition labeling is required only if a nutrition claim is made, or, for FDA products, if a nutrient has been added to a food.

New regulations governing food labeling will provide consumers with uniform, comparable information about nutrients and product descriptors.

It is estimated that some 60 percent of FDA-regulated foods and 35-50 percent of processed, packaged meat and poultry products bear nutrition labels. Such labeling is not usually available on eggs, fresh produce, fresh or frozen meats, poultry, and seafood, or on foods sold in restaurants, fast food places, institutions, vending machines, and grocery store carryout bars. In addition, labels now provide information on some nutrients which are no longer of public health importance (such as the B vitamins), but are not required to provide information on nutrients of current interest to consumers, such as saturated fat, cholesterol, and fiber.

Background for New Labeling Regulations

In 1989, FSIS and the Department of Health and Human Services commissioned the Institute of Medicine (IOM) of the National Academy of Sciences to make recommendations on nutrition labeling (see box for details). On July 19, 1990, FDA published a proposal for new regulations in the *Federal Register*. Before FDA finalized these regulations, however, Congress passed the Nutrition Labeling and Education Act of 1990 (NLEA), which amends the Federal Food, Drug and Cosmetic Act, to make nutrition labeling mandatory for most FDA-regulated foods. FDA proposed regulations to implement this law on November 27, 1991. These regulations should become effective by spring 1993. They represent the first major change in FDA nutrition labeling regulations since their origin in 1973.

Although the NLEA does not cover meat and poultry products, FSIS has been working with FDA to develop parallel regulations for these products. FSIS published tentative positions for nutrition labeling as an advance notice of proposed rulemaking in the April 2, 1991, *Federal Register*. Keeping pace with FDA, FSIS also published proposed regulations for nutrition labeling in the November 27, 1991, *Federal Register*. FSIS proposes to establish mandatory nutrition labeling for processed meat and poultry products and to issue voluntary guidelines for nutrition information for single-ingredient, raw meat and poultry products.

Throughout the process of preparing these regulations, FDA has held public meetings around the country, often in conjunction with FSIS, to obtain input from both the public and the food industry.

Both sets of proposed regulations have a 90-day period for public comment, after which the final regulations will be prepared. (See box for a comparison of current regulations, the National Academy of Sciences' IOM recommendations, and FDA and FSIS proposals for nutrition labeling.)

The two agencies have emphasized their commitment to work together and provide consumers with the most uniform label possible. Thus, FSIS proposes to adopt the list of nutrients adopted by FDA, to define serving sizes consistent with those defined by FDA, and to follow the same definitions for product descriptors, such as "lowfat," "free," "light," and "reduced."

USDA proposes two additional descriptors unique to meat and poultry: "lean" and "extra lean." FSIS believes consumers need additional descriptors unique to meat and poultry, since these products tend to be higher in fat and cholesterol than many nonmeat products (thus few would be able to meet FDA's definition for lowfat and low-cholesterol). Since the amount of fat and cholesterol may vary greatly in meat and poultry products, unique descriptors would help characterize the fat level of these products and would help consumers make better informed selections.

The Controversy Over "Trans-Fatty" Acids

The new nutrition labels aim to inform consumers without confusing them. But as new information becomes available on the complexities of the diet/health links, a number of scientists question whether the new labels will be too simplistic to be useful.

For example, some recent studies indicate that dietary trans-fatty acids, like saturated fats, may be associated with increased serum cholesterol levels. Trans-fatty acids occur when a vegetable oil (a polyunsaturated fat) is hydrogenated or solidified into shortening, margarine, or commercial fats for deep frying.

Under the proposed regulations, the amount of trans-fatty acids will not be included in the information on saturated fats on food labels since the oil is not completely saturated during hydrogenation. Canada's labeling standards recognize trans-fatty acids as separate components, and require the amounts to be listed on food labels. Should FDA and FSIS change the regulations to do the same?

Are the Costs Worth It?

Costs of changing nutrition labeling are difficult to quantify, as are the health benefits associated with such changes. For FDA-regulated products, about 17,000 firms and 257,000 labels will be affected, with total costs to packaged-food producers running approximately $1.3 billion. Voluntary labeling in supermarkets and restaurants is estimated to cost $155 million and $116 million, respectively. For USDA-regulated products, nearly 9,000 federally- and State-inspected plants would be affected, at a cost of approximately $1.3 billion. Therefore, total cost for all affected businesses is estimated to be approximately $2.8 billion.

Analysts estimate that the new labeling regulations would save up to a staggering $5.6 billion over 20 years in death and health care costs related to cancer and coronary heart disease alone (the two largest public health problems in the United States). Decreased rates of cancer, coronary heart disease, osteoporosis, obesity, and hypertension are just a few of the benefits we would expect to see with mandatory labeling regulations. These benefits—measured as the monetary value of years of life saved from premature death—are estimated to greatly exceed the costs. The benefits were calculated using a study of how consumer behavior changes in response to additional nutrition information and were based on only the two largest public health problems, cancer and coronary heart disease. ■

A Comparison of Nutrition Labeling Regulations and Positions

	Current Regulations	National Academy of Sciences' IOM Recommendations (IOM)
Background	USDA's Food Safety and Inspection Service (FSIS) regulates labels for meat and poultry products through regulations and policy memoranda, which set out current requirements for nutrition labeling as required by the Federal Meat Inspection Act and the Poultry Products Inspection Act. The Department of Health and Human Service's Food and Drug Administration (FDA) regulates all other food products under legislation enacted in 1938. Nutrition labeling rules on packaged food labels were introduced during the last major revision of FDA labeling regulations in 1973.	In 1989, FSIS and FDA sponsored a study by the Institute of Medicine (IOM) at the National Academy of Sciences to provide options to improve food labeling. The study made a number of recommendations, described below.
Nutrition Labeling on Processed and Fresh Foods	Nutrition labels are voluntary for FDA products unless a nutrient has been added or the product label makes a nutritional claim. FSIS labels are also voluntary, unless a nutrition claim is made. FSIS does not permit fortification or the adding of nutrients to products. An estimated 60 percent of FDA-regulated products and 30-50 percent of FSIS-regulated products contain the voluntary nutrition labels. When a nutrition label is provided, it must follow a prescribed format.	IOM recommended mandatory nutrition labeling for all packaged foods, with some exemptions. The mandate would include institutional-size packages and commodities distributed through USDA food programs. It also recommended point-of-purchase nutrition label information for produce and for fresh and frozen meat, poultry, and seafood. IOM proposed exempting small packages and foods that have no nutritional significance (like chewing gum).
Label Approval and Compliance	FSIS requires that all labels used on, or in conjunction with, meat and poultry products be approved for their content and design before the product is marketed. Manufacturers must provide FSIS nutrition data to substantiate any nutrition claims. FDA, on the other hand, relies on manufacturers to comply with prescribed labeling regulations. Manufacturers of FDA-regulated products can use a new label and risk that FDA will challenge the product as being mislabeled (such as the recent challenge over the term "fresh" on some food labels). FDA has approved databases for use in generic labeling of certain products.	IOM questioned the adequacy of analytical methods for nutrient analyses. Current methods of food analysis do not permit precise measurement of nutrient values for many food components. IOM recommended flexibility in selection of analytical methods for label verification. It found FDA's system less costly than USDA's system of label verification. It favored FDA and USDA certifying databases containing representative values for use when labeling fresh food products.

Food and Drug Administration (FDA) Proposals

In 1990, FDA published in the *Federal Register* several proposed rules related to nutrition labeling. These have been superseded by passage on November 8, 1990 of the Nutrition Labeling and Education Act of 1990 (P.L. 101-535), which amends the Federal Food, Drug, and Cosmetic Act. On January 11, 1991, FDA published a notice recognizing the impact of NLEA. In the summer, FDA published proposals on the listing of ingredients in "standardized foods," the declaration of the percentage of fruit and vegetable juices in beverages, and voluntary nutrition labeling for the 20 most commonly consumed raw vegetables, fruit, and fish. On November 27, 1991, FDA published in the *Federal Register*, 22 more proposed rules, one final rule, and two notices. These defined the requirements for nutrition labeling, listed "reference amounts" for broadly defined food categories, and established procedures for determining serving sizes. These also defined descriptors such as "low-fat," approved certain health claims, and described the technical provisions that tie the program together. Regulations are proposed to become effective May 8, 1993.

Nutrition labeling will be mandatory for most FDA-regulated packaged food products and voluntary for 20 of each of the most frequently consumed varieties of raw vegetables, fruit, and raw fish. If retailers fail to comply substantially with the guidelines for voluntary nutrition labeling, they could become mandatory after the spring of 1995. Exemptions are provided for foods of minimal nutritional value, small packages (less than 12 square inches available for labeling), restaurant food, and food produced by small businesses (annual total gross sales below $500,000 or annual gross sales of food below $50,000).

FDA set forth procedures for determining labeling compliance. FDA is updating its compliance manual, which contains information on database development and nutrition label computations. FDA proposed to exempt products from certain procedures for determining label compliance when: nutrition information is founded on an FDA-approved database, the label was computed following FDA guidelines, and the food was handled according to current good manufacturing practices to prevent nutrition loss.

Food Safety and Inspection Service (FSIS) Proposals

On April 2, 1991, FSIS published an advance notice of proposed rulemaking in the *Federal Register*, and requested comments, information, data, and recommendations from consumers, industry, public health officials, and other interested parties. In response to the comments received, and parallel to FDA's proposed regulations, FSIS published in the November 27, 1991, *Federal Register* a proposal to amend the Federal meat and poultry inspection regulations to permit voluntary nutrition labeling on retail cuts of single-ingredient, raw meat and poultry products (such as ground beef and chicken breasts); and establish mandatory nutrition labeling for most processed meat and poultry products.

FSIS proposes to establish mandatory nutrition labeling for most processed meat and poultry products, but will allow nutrition labeling to be voluntary for single-ingredient, raw meat and poultry products (paralleling FDA's approach). For example, ground turkey with one natural flavoring would fall under the mandatory program. FSIS proposes to exempt from package nutrition labeling small packages (less than 1/2-ounce net weight) and other than consumer-size packages if nutrition information for these foods is made available through alternative means, such as posters or pamphlets. Wholesale foods that are not sold directly to the consumers and are intended for further processing--such as bulk cooked sausage crumbles--would also be exempt. In lieu of a small business exemption, FSIS is considering various ways to minimize compliance costs for all companies.

FSIS will require manufacturers to maintain records to support the information on nutrition labels, and to make this information available for review upon request. FSIS anticipates that approved databases will be the source for the voluntary nutrition labeling of single-ingredient, raw meat and poultry products.

more—

A Comparison of Nutrition Labeling Regulations and Positions—*Continued*

	Current Regulations	National Academy of Sciences' IOM Recommendations (IOM)
List of Nutrients	In 1973, FDA adopted a regulation recodified in 1977 for a specific label format when nutrition information is listed per serving size. Required components include calories, protein, carbohydrates, fat, sodium, calcium, iron, vitamin A, vitamin C, thiamin, riboflavin, and niacin. Information on other nutrients may also be provided, but disclosure of fiber, cholesterol, and fatty acid composition is not required. FSIS allows nutrition information to be presented in this same format and style. FSIS also permits an abbreviated labeling format that includes calories, protein, carbohydrates, and fat.	IOM recommended required disclosure of calories, carbohydrates, fiber, total fat, saturated and unsaturated fat, cholesterol, and sodium. Required information on calcium and iron would use descriptors (like "very good source of"). IOM recommended optional disclosure of complex carbohydrates and sugars. Foods high in complex carbohydrates are desirable for being low in fat and calories and high in fiber. Concerns about sugar derive from dental effects, nutrient dilution, and excess calories rather than contribution to disease conditions.
List of Ingredients	FSIS regulations require ingredients that are fabricated from two or more ingredients be listed on the product's label by their common or usual names in descending order of predominance. FSIS requires full ingredient labeling on all meat and poultry products. FDA exempts products subject to standards of identity (official recipes used to define the composition of standard products, such as peanut butter, mayonnaise, and orange juice) from having to provide full ingredient labeling. Both agencies allow disjunctive labeling of fats and oils and use of the general term "vegetable oil" when "and/or" labeling is used. This allows processors to adjust ingredient content based on current costs and prices.	IOM recommended that even foods under a standard of identity should be required to provide full ingredient listings. IOM favored grouping all sugars together and listing components parenthetically. It also recommended use of "and/or" labeling for sugars and for fats and oils in the ingredient statement to increase producer flexibility and reduce costs. Full nutrition labeling would list the saturated fat content at the highest possible level that would be achieved with any mixture of the listed fats and oils.
Serving Size	Nutrition information is provided as the amount per serving. Manufacturers determine the serving size, which need not be uniform within or between product categories, making comparisons among products difficult. In addition, serving sizes are sometimes expressed in units that consumers do not understand.	IOM determined that serving sizes should be standardized, so that nutrition information would be comparable within and across product categories. IOM recommended that FDA and FSIS jointly establish serving sizes for limited, broad categories of foods to help consumers make product comparisons. IOM suggested basing the standard serving sizes on dietary guidance recommendations rather than on amounts consumed. These suggestions are to make their use in educational programs less difficult and to permit consistency among serving sizes shown in dietary guidance material and on the food label.
Descriptors	FSIS permits nutrition information, such as claims that a product is "95% fat-free." Several policy memoranda outline FSIS criteria for expressions such as "low calorie," "low sodium," "low fat," and "lean." FSIS has no regulatory definitions. FSIS does not now permit health claims linking food attributes to disease or health-related conditions. FDA has regulatory definitions for descriptors about calories and sodium. FDA has developed informal policy for trial shelf-labeling programs covering descriptors for fat, fiber, and calcium, and for defining expressions such as "good source of."	IOM recommended that FDA and USDA define and standardize the terms "light," "lite," and "diet." It also suggested using quantitative descriptors of nutrient content, limited to two categories--low and very low, or high and very high--with specific levels of nutrients established for each descriptor. IOM recommended against allowing descriptors to claim the absence of an undesirable component (such as "cholesterol-free") in foods that do not normally contain that component. IOM emphasized the importance of consistent, established definitions for both USDA and FDA.

Food and Drug Administration (FDA) Proposals	Food Safety and Inspection Service (FSIS) Proposals
FDA's proposed regulation focuses on nutrients currently accepted as significantly affecting consumer health. The amount per serving of the following nutrients is proposed to be included on labels: calories, calories from total fat, total fat, saturated fat, cholesterol, total carbohydrates, complex carbohydrates, sugars, dietary fiber, protein, sodium, vitamin A, vitamin C, calcium, and iron. Listing thiamin, riboflavin, and niacin, among other nutrients, is optional. Nutrition information must be presented as quantitative amounts or as percentages of a daily reference value. A simplified nutrition label format is allowed for foods containing insignificant amounts of more than half the required nutrients.	FSIS proposes to adopt FDA's proposed list of nutrients. As with FDA, additional nutrients would be required to be listed if the label makes any claims about them. Certain optional nutrients would also be permitted. FSIS would allow a simplified format when more than half of the 15 required nutrients are present in insignificant amounts. At a minimum, the abbreviated label would include total calories, total fat, total carbohydrates, protein, and sodium.
FDA's proposal, published June 21, 1991, requires full ingredient labeling even if the food is covered by a standard of identity. Food labels must explain that ingredients are listed in descending order of predominance by weight. Beverages containing vegetable or fruit juice must state on the label the percentage of vegetable or fruit juice in the drink. All FDA-certified color additives must be listed by name. All sweeteners must be listed together in the ingredient list. Labels must declare protein hydrolysates and specify the source of that additive (such as from hydrolyzed milk protein). To assist people with allergies to milk protein and sulfites, labels must identify caseinate as a milk derivative when used in nondairy foods, such as coffee whiteners, and declare use of sulfiting agents. Final rules are expected in spring 1992.	FSIS will continue requiring full ingredient labeling on all meat and poultry products, whether or not the food is covered by a standard of identity.
On November 27, 1991, FDA proposed a regulation on serving sizes that would require nutrition content to be based on amounts customarily consumed (as required by the NLEA) and to be expressed in common household and metric measures, such as "1 cup (240 ml)." The proposal includes "reference amounts" for 131 broadly defined food categories, based on food-consumption survey data on amounts of food commonly consumed per eating occasion by persons 4 years of age and older. Manufacturers must follow the proposed procedures to convert the reference amounts to serving sizes appropriate for their specific products. Any package containing less than two servings would be considered a single-serving container.	FSIS has worked closely with FDA to establish broad product categories, appropriate reference amounts, and procedures for determining serving sizes. This consistency between agencies will provide consumers with a uniform labeling system and facilitate comparisons between USDA-regulated and FDA-regulated foods (such as between beef vegetable soup and vegetarian vegetable soup). Of the 131 food categories above, there are 23 meat and 22 poultry product categories, with corresponding reference amounts in grams, to be declared in common household and metric measures. If household measures (such as "1 cup") are not applicable, units of the whole piece or package should be used. Serving sizes for meal-type products would refer to the product in its entirety. For products packaged in individual units or pieces (such as hot dogs), FSIS proposes that serving sizes refer to the number of whole units closest to the reference amount.
On November 27, 1991, FDA proposed definitions for nine terms that could be used to describe a food. These are "free," "low," "high," "source of," "reduced," "light" or "lite," "less" (or, for calories, "fewer"), "more," and "fresh." Claims for cholesterol are tied to levels of saturated fat in the food. Meal-type products may not use the term "reduced." The current proposal allows health claims on food labels for only four nutrient/disease relationships: calcium and osteoporosis, sodium and hypertension, fat and cardiovascular disease, and fat and cancer. It also sets nutrient levels beyond which a health claim cannot be made.	FSIS proposes to adopt FDA's definitions for descriptors. In addition, FSIS believes that it is in the best interest of the consumer to establish descriptors unique to meat and poultry products that will differentiate between products with lower levels of fat and cholesterol. FSIS proposes to define two--"lean" and "extra lean"--that would be used only for meat and poultry products. FSIS will publish at a later date a separate proposed regulation on health claims in line with FDA's proposal.

Domestic Food Assistance Costs Are Rising

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Participation and program costs discussed in this article compare the second quarter of fiscal year 1991 (January-March) with the same period in 1990. Recent data are reported as of April 1991 and are subject to revision.

Federal expenditures for the 13 USDA domestic food assistance programs for the second quarter of fiscal 1991 increased 13.8 percent over the same period in 1990, from $6.2 billion to $7 billion (table 1). The higher outlays primarily reflect greater participation in the Food Stamp Program and higher benefit levels for most of the food assistance programs.

All programs reported gains in numbers of participants, especially the Food Stamp Program. Food distribution costs climbed slightly due to the increased amount of commodities provided to the School Lunch Program. Costs for other food distribution programs fell from the previous year.

Food Stamp Program

Average participation in the Food Stamp Program rose 11.9 percent, from 20.1 million to 22.5 million persons due to the continuing economic slowdown and higher unemployment. Benefit costs and total program expenditures rose over 21 percent above levels reported in 1990, with benefits totaling $4.3 billion for the quarter and expenditures reaching $4.6 billion.

Each school day in the second quarter of fiscal 1991, an average of 24.2 million students received free or reduced-price meals under the National School Lunch Program.

Average monthly per capita benefits increased from $58.90 to $63.96. These benefits, designed to help low-income households purchase a nutritious diet, are adjusted annually based on income, household size, and the June cost of the Thrifty Food Plan (TFP) for a family of four. The plan is the least costly of four representative food plans developed by USDA's Human Nutrition Information Service. TFP specifies the types and quantities of food that households may use to provide nutritious diets for their members.

Child Nutrition Programs

An average of 24.2 million students participated in the National School Lunch Program each school day during the second quarter of fiscal 1991, approximately the same level as the previous year. Eligibility for free and reduced-price meals, which are designed to provide approximately one-third of the recommended dietary allowances for school age children, is based on household income and size. Lunches served during the quarter fell from 1.32 billion to 1.26 billion, due primarily to fewer

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USDA Food Assistance Benefits Have Risen Over the Last Two Quarters[1]

Programs	1989	1990	FY 1990 quarters* I	II	III	IV	FY 1991 quarters* I	II
			Million dollars					
Family food:								
Food stamps	11,676	14,191	3,506	3,549	3,563	3,574	4,090	4,296
Puerto Rico[2]	912	940	235	235	235	235	242	242
Food distribution:								
Indian reservations	51	51	12	13	13	13	12	13
Schools[3]	771	620	193	243	96	88	216	279
Other[4]	208	183	45	51	43	43	46	43
TEFAP[5]	231	209	51	56	56	45	44	39
Cash-in-lieu of commodities[6]	153	156	38	39	40	38	38	39
Child nutrition:[7]								
School lunch	3,005	3,210	958	1,045	773	434	1,066	1,079
School breakfast	507	594	173	190	147	84	203	204
Child care and summer food	744	865	172	188	217	288	203	207
Special milk	18	19	5	5	4	4	5	5
WIC[8]	1,906	2,116	500	548	518	549	521	567
Total[9]	20,183	23,153	5,889	6,163	5,705	5,397	6,686	7,012

*Preliminary and quarterly data may not add to annual total due to rounding. [1]Administrative costs are excluded unless noted. [2]Puerto Rico transferred from the Food Stamp Program to a substitute Nutrition Assistance Program on July 1, 1982. Data represent appropriated amounts. [3]National School Lunch, Child Care Food, Summer Food Service Programs, and schools receiving only commodities. [4]Commodity Supplemental Food Program and Elderly Feeding Pilot Projects, excluding bonus commodities and donations to charitable institutions. [5]Initiated December 1981. [6]Child nutrition programs and Nutrition Program for the Elderly. [7]Cash expenditures. [8]Special Supplemental Food Program for Women, Infants, and Children. Includes administrative costs. [9]May not add due to rounding.
Source: Food and Nutrition Service, Program Information Division.

days of operation. Free and reduced-price meals increased, and paid meals declined proportionally over the levels of the previous year.

Schools receive both cash and commodities. They received 14.0 cents worth of commodities per meal in the 1991 school year, in contrast to 13.25 cents in 1990. Schools also receive bonus commodities, depending on the availability of surplus Government stocks. In the second quarter of 1991, $29.0 million worth of bonus commodities were delivered to schools, in contrast to $54.4 million in 1990. This 46.7-percent drop was due to the continuing reduction in the level of Government surplus stocks.

The School Breakfast Program provided subsidized breakfasts to an average of 4.4 million children during the second quarter of fiscal 1991, a 6.4-percent increase over the same period in fiscal 1990. This program has grown steadily since the early 1980's. Total breakfasts served during the second quarter increased from 228.1 million to 231.7 million between 1990 and 1991. Numbers of free, reduced-price, and paid meals also rose from the previous year. Expenditures for the program increased 7.2 percent, from $190.0 million to $203.6 million.

Meals served in the Child and Adult Care Food Program increased from 254.6 million in 1990 to 266.3 million in 1991, a 4.6-percent rise. The recently instituted adult care component of this program has increased significantly with a daily average of 22,600 being fed, up from 16,900 in 1990. Costs for this component rose similarly, from $1.9 million to $2.7 million. Total quarterly costs for the Child and Adult Care Food Pro-

gram increased 10.4 percent, from $211.7 million in 1990 to $233.6 million in 1991.

The number of half pints served under the Special Milk Program fell 7 percent, from 52.0 million in 1990 to 48.3 million in 1991. Costs dropped slightly from $5.45 million in 1990 to $5.42 million in 1991. This program serves schools, child care facilities, and summer camps.

Supplemental Food Programs

The Special Supplemental Food Program for Women, Infants, and Children (WIC) reached an average of 4.76 million persons in 1991, a new high. This growth continues a trend for the last 10 years, reflecting added attention and increased appropriation levels every year. WIC participation increased in all categories, with the number of infants showing the greatest gain. Total program costs increased 3.4 percent, from $548.4 million in 1990 to $567.2 million in 1991, while benefits per person dropped from $31.08 to $30.63.

The Commodity Supplemental Food Program provides monthly food packages to supplement the diets of needy women, infants, children, and the elderly. The number of participants increased slightly from 282,500 in the second quarter of fiscal 1990 to 285,400 in the same period of 1991. Program costs dropped from $17.5 million to $15.6 million, primarily because the value of the food issued declined each month.

Food Distribution Programs

Needy families on Indian reservations and in the Marshall Islands received $12.7 million worth of commodities in 1991, compared with $13.0 million the previous year. The lower benefits stem from a $600,000 decline in distribution of bonus commodities and only a $300,000 increase in entitlement commodities. Participation also dropped, from a monthly average in 1990 of 143,200 to 134,500.

Surplus foods valued at $21.6 million were distributed to charitable institutions in 1991, 22.7-percent less than the $27.9 million in 1990.

USDA provides food and cash-in-lieu of commodities to the Nutrition Program for the Elderly, which is administered by the Department of Health and Human Services. In 1991, USDA provided $35.1 million to this program, compared with $35.6 million provided in 1990. This program served an average of 910,000 meals daily in 1991, compared with 929,000 in 1990.

Food distributed under The Emergency Food Assistance Program (TEFAP) declined to $39.2 million in the second quarter of 1991 from $56.4 million in 1990, primarily because Government stocks were depleted. Some Government surplus foods are available for limited distribution. Other commodities are purchased specifically for distribution under this program. ■

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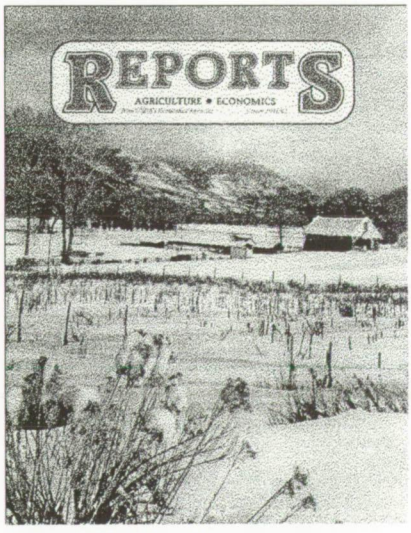

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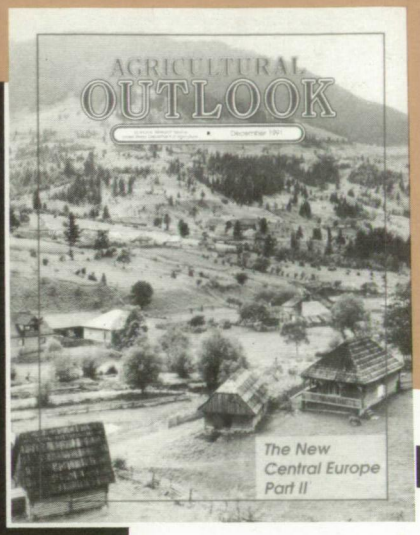

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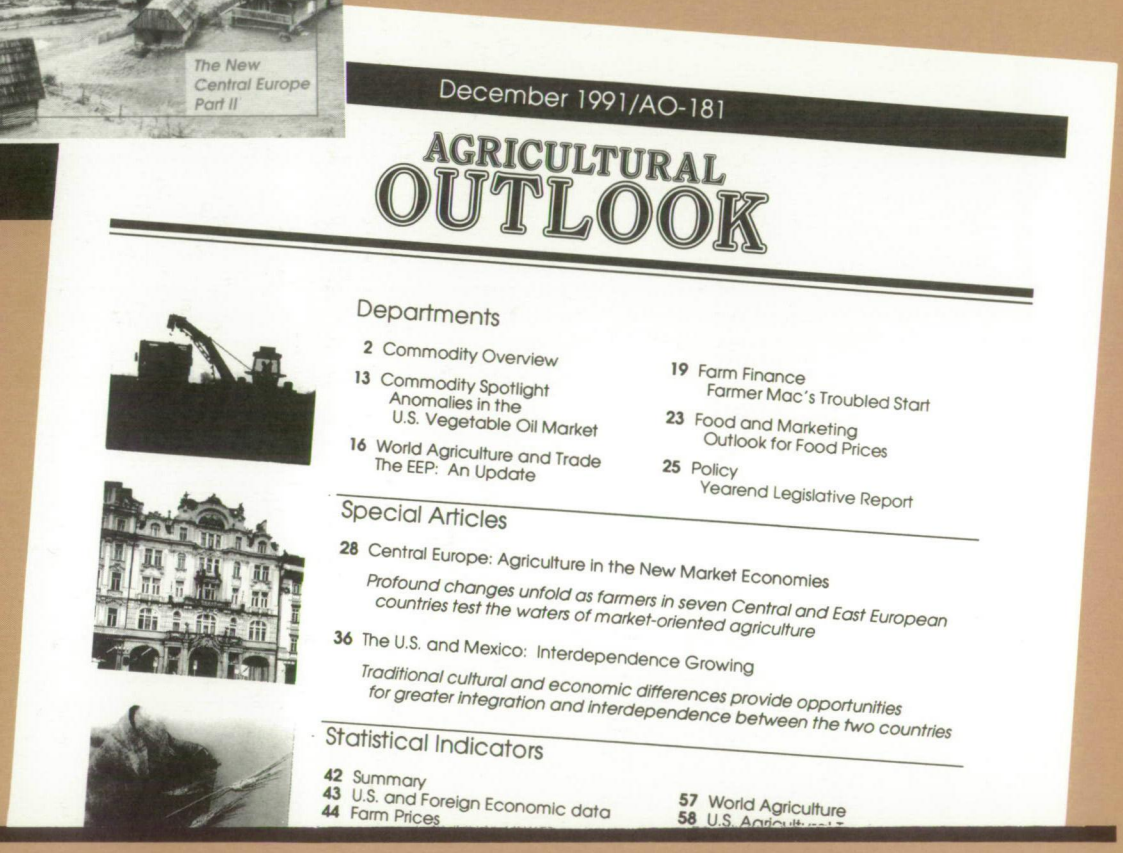

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