Like it or not, developments in global equity capital markets affect the well being of domestic agricultural producers and the rural communities in which they live. Publicly-held behemoths like ConAgra, Sysco, Kroger, and McDonald’s, in their quest to maximize shareholder wealth, routinely make decisions to gain the favorable opinion of Wall Street investment bankers. While closing a rural agricultural processing plant, or sourcing raw commodity inputs from abroad, may help bolster a food company’s faltering stock price, these strategies may also adversely affect local farm production and marketing practices.

These changes need not always be harmful. Divestments in one geographic area may be offset by expansion in another. Moreover, nothing precludes residents of rural communities from becoming shareholders in publicly-held food companies and earning economic rents through capital gains and dividends.

The study of securities markets is neither new nor novel, but carefully reviewing the financial data of publicly-held food, beverage, and tobacco companies may yield new insights into the direction, magnitude, and speed of structural change during an era of increased agricultural industrialization. For example, the relative price of securities is often an indicator of impending merger and acquisition (M&A) activity. Observers may deduce corporate secrets on the adoption of just-in-time supply-chain management (SCM) by analyzing a firm’s inventory activity.

The former addresses the pressing issue of consolidation; the latter sheds light on the challenges faced by agricultural producers regarding production, harvest, and marketing decisions. Addi-
tionally, knowledge of publicly-held food companies, such as Archer Daniels Midland (ADM) and ConAgra, may help us anticipate the strategic decision-making of those huge, influential, privately-held agribusinesses, like Cargill, for which little data exists. The argument that changes in the structure of the food industry is related to corporate financial management strategies is gaining popularity too (Cotterill). Ultimately, this invaluable and very public source of clues may help indicate what’s next for agricultural producers.

Keeping Up With the (Dow) Joneses

The food and beverage industry has a relatively short history of raising capital in equity markets (Wheeler). While trading on the New York Stock Exchange began in 1792, the earliest publicly-traded food and beverage companies include Coca-Cola (1919), Postum Cereal (1922), Kraft Cheese (1926), Borden (1927), General Mills (1928), Beatrice Foods (1929), and Armour & Company (1930).

In 1997, 70 percent of the publicly-held food industry’s $722 billion total asset base was financed with common and preferred stock (Figure 1). The remaining 30 percent was financed with debt capital, such as corporate bonds and bank notes. In the last two decades, this mix of financing has remained relatively constant in the food industry, but recently the percentage of equity financing has ticked upward for food manufacturers. The implication for the entire food system is that equity markets matter.

In a sector where the investing public owns nearly three-fourths of the industry asset base, it is no longer sufficient for a food company to exceed its own past performance or that of a narrowly defined peer group. Food and non-food companies with similar capital and risk structures compete for the same financial resources. Thus, a firm’s cost of capital equals the risk-free rate plus the return that must be provided to keep the shareholder from investing money in a similarly risky stock — food or non-food. Once this fundamental principle is understood, it becomes clear that publicly-held food companies do not operate in a vacuum influenced only by other food companies, farm policies, and agricultural commodity prices. Management practices, such as M&A and SCM strategies, implemented by publicly-held non-food companies cannot be ignored. Otherwise, the food industry will fall behind the others and lose access to investors’ capital.

Merging in Heavy Traffic

During the last two decades M&A strategies have been popular means used to increase shareholder value and bring about an efficient allocation of financial resources. The publicly-held food industry has been no exception to this rule. The theory is simple. Eliminate redundant functions and employees through acquisition, and shareholder value is enhanced. Any organizational and marketing synergies, or other economies, are simply icing on the cake. Marauding Wall Street investment banking firms tested this theory in the 1980s, a decade characterized by hostile takeovers (Connor and Geithman). Rogers (2000) found M&As reached a near historical peak (between 550 and 650 deals per annum) for food businesses during this time, and M&A activity in the food sector has accelerated in the last half-decade (between 700 and 800 deals per annum).

Despite potential benefits of economies of scale and scope, industry consolidation through M&A activity naturally concerns policy analysts. Agricultural producers may face fewer buyers and processors for their commodities and possibly lower wholesale prices. Consumers may be confronted with higher retail prices, fewer places to shop, and a less extensive range of products offered in retail outlets.

IBP, Incorporated, the nation’s largest meat packer, represents a timely case study. Despite being structurally sound, IBP securities have been undervalued for some time, trading at only a fraction of their book value per share. “Over 10 years, the only thing treated worse than their [IBP’s] public shareholders have been their cattle,” said John McMillin, a food industry analyst at Prudential Securities (Kilman and Sherer). The short list of potential buyers, which included Cargill, ConAgra, ADM, Tyson Foods, and Smithfield Foods, was as much an agribusiness Who’s Who as a list of potential suitors. After various failed attempts to purchase IBP (which first included lesser-known Donaldson, Lufkin, & Jenrette, Inc., followed by Tyson, and then Smithfield), on August 27, 2001 the Securities and Exchange Commission (SEC) approved a merger...
between IBP and the Lasso Acquisition Corporation, a wholly owned subsidiary of Tyson.

A merger of this magnitude will alter the structure of the domestic beef industry and affect livestock producers. Tyson has a long history of managing supply chains using vertical integration and contracting. As a result, Tyson has “privatized” the price discovery function. This puts the writing on the wall for the beef industry, just as it once was for the poultry, hog, and vegetable industries.

Right Turns, Wrong Turns, and Inventory Turns

Financial efficiency refers to a firm’s ability to better manage its assets. Inventory turnover, cost of goods sold, and the value of average annual inventories are suitable financial performance metrics to quantify the impact of SCM strategies. Like M&A strategies, just-in-time SCM strategies have also been used by publicly-held food industries as they try to keep pace with non-food manufacturing, wholesaling, and retailing peers. Figure 2 shows trends in inventory turnover from 1980 to 1997. In each sector, both cost of goods sold and value of average annual inventories increased through time. Despite the hype regarding “Efficient Consumer Response” and “Category Leadership” between food manufacturers, wholesalers, and grocers, their trends have been flat. In less than 20 years, inventory turnover in the restaurant sector has almost doubled, increasing from 26 to 45 times per year. Restauranters now completely replenish their inventories every 8 days, down from the two weeks’ supply maintained in the early 1980s. Grocers and wholesalers replenish inventories approximately monthly, while food manufacturers restock about every 72 days.

These trends have far-reaching implications for the way business is conducted across the food system, especially in perishable commodities. Food consumed away from home makes up nearly half of all domestic consumer food expenditures (roughly $339 billion in 1997, according to recent USDA-ERS data), and the trend of consuming food away from home is unlikely to reverse in the near future. Publicly-held restaurant sales hover near $56 billion annually — roughly 17 percent of all food away from home expenditures. While restaurateurs’ just-in-time SCM practices reflect in part the response to the consumer’s demand for fresher foods, to a larger extent these strategies reflect the investment banker’s reluctance to tie up productive capital in slow-moving inventories. However, unlike a tire company supplying an automobile manufacturer, the lettuce grower may not simply be able to store the product until the next production run requires it. The tire manufacturer has only foregone the return of the capital tied up in the tires and incurred a storage cost. The lettuce grower loses that plus the future sale of the output if it spoils.

Since larger privately-held restaurants and restaurant chains must attempt to emulate the SCM strategies of publicly-held restaurants, the effect of closely managed inventories on agricultural producers may be even more dramatic. Additionally, by transplanting the restaurant industry’s SCM initiatives in the grocery, wholesaling, and manufacturing sectors, it is not unreasonable to expect higher inventory turnovers in those sectors in the coming years, moving the burden and risk of perishable inventory ownership further up the supply chain and thus continuing to transform the structure of the consumer food marketing channel.

Warning: Cash Cow Crossing

The fundamental business objective in a publicly-held company is to maximize shareholder wealth. Hence, CEOs are frequently evaluated on their ability to grow market capitalization (the product of stock price and shares outstanding). While there are many metrics available for measuring wealth creation, growth in market capitalization is perhaps the most popular.

Figure 3 shows that total market capitalization grew from $54 billion in 1979 to $1.03 trillion in 1997 (a 17 percent compound rate) for all 994 publicly-held food companies traded on North American securities exchanges. This rate of growth in food sector wealth is consistent with other estimates found in the financial industry. For the nine years ending in 1997, the Fidelity Select Food and Agriculture mutual fund, which represents a broad portfolio of publicly-held food and beverage manufacturers, wholesalers, and retailers, maintained a compounded annual growth rate of 18 percent.

Like wealth creation, the importance of corporate dividend policy in the food industry is underscored by its vast exposure in equity capital markets. Maintaining a compounded annual growth rate of nearly 10 percent from 1979 to 1997, combined
Prefered and common stock dividends rose to $17 billion annually in the food industry by 1997. This continual multi-billion dollar redistribution of funds, in the form of capital gains and dividends, is seldom reported or mentioned in mainstream food industry research (Sexton).

Agriculture’s Role in the Food Industry: Peering into the Future

The Securities Exchange Act of 1934 created the SEC and charged it with the task of increasing transparency in the financial reporting of publicly-held companies. This was accomplished through documents such as quarterly (10-Q) and annual (10-K) filings, along with information regarding M&A activity. Some of the financial performance metrics based on this data, either viewed at the company or industry level, represent concurrent and occasionally leading indicators of structural change in the food industry. Consolidation trends can often be linked to the relative prices of securities and SCM strategies to inventory turnover statistics. Classes of financial statistics not considered here, such as liquidity, profitability, and other financial efficiency and market-based measures, provide additional useful clues to other areas related to structural change in the industry. Careful study of the developments in global securities markets and the data collected on publicly-held food, beverage, and tobacco companies may improve our ability to gauge what challenges agricultural producers will face in future years.

For More Information

The perpetually low income of farmers has kept agricultural economists busy for most of the twentieth century. Policy after policy has been tried, rejected, then tried again in an attempt to solve the farm income problem. Ever since the New Deal, we have had price supports for many farm products. Since the Kennedy years, we have added direct payments to the relatively low price supports. All the while, supply control has been a part of most farm bills. None of this has provided a lasting solution to the problem of low farm income.

Some see the failure of public policy as evidence that we should get the government out of agriculture and embrace free market philosophies. Global competitiveness, level playing fields, farmer freedom, and increased efficiency became battle cries in the 1996 farm bill debate. Within a few years, government payments to farmers were at record high levels. Getting the government out of agriculture has proven to be more expensive than keeping it in agriculture. Policy experts around the country are now busily crafting ways to go back to the future.

Government or free markets, free markets or government? The dismal history of this debate does little to dampen enthusiasm for it. In spite of their polar differences, these two approaches have something important in common: they assume that

If stagnant farm profits are due in part to the economic power of agribusiness, collective bargaining may get agriculture a better seat — and a bigger serving — at the table.
farmers will not or can not work together to increase their own well-being. Government programs are based on the view that farmers are unable to act together in their own best interest; the government must act on their behalf. Free marketers see collective action as unnecessary and a general affront to individual freedom. As a result, the possibility of farmers acting collectively to take charge of their own economic interests has received virtually no attention in almost 70 years of farm policy debates.

**Bargaining Power for Farmers, or The More Things Change...**

(Editor's note: The following excerpt is from a 1968 paper by Vernon W. Ruttan, then Professor of Agricultural Economics at the University of Minnesota. Dr. Ruttan's paper was based on testimony presented at a hearing before the United States Senate Committee on Agriculture and Forestry April 10, 1968.)

Since the closing of the frontier in the last quarter of the 19th Century, the encounter with an increasingly dominant urban-industrial society has emerged as the major force in American agricultural development. The dramatic impact of this encounter during the last two decades has contributed to a crisis in social organization in both urban and rural areas. This crisis has resulted in intense concern by farmers and farm organizations over agriculture's changing role in the national economy. "Bargaining power for farmers" has turned into one of the leading issues in current agricultural policy discussion.

The milk holding action by the National Farmers Organization (NFO) in March 1967 dramatized, both to the general public and the national political leadership, the seriousness of the efforts some farmers were willing to make in order to achieve greater bargaining power in the marketplace.

In response to this new evidence of rural unrest Secretary of Agriculture Freeman took to the country for a series of "shirt-sleeve" conferences with largely hostile farm audiences across the Midwest. Task force studies and meetings with farm producers and marketing organizations to explore the interest and economic consequences of strengthening the power of farmers to bargain about terms of sale and market prices were conducted by USDA during the fall of 1967. In his January 1968 State of the Union Address and his February 27 Agricultural Message, President Johnson recommended that Congress give serious attention to legislation "to help farmers bargain more effectively for fair prices."

In February 1968 Senator Mondale of Minnesota introduced legislation that would amend the Agricultural Marketing Act of 1937 to (a) extend the collective bargaining procedures available under marketing order arrangements to a larger number of commodities (Title II); (b) establish a National Agricultural Relations Board to supervise bargaining between farmer marketing and purchasing committees (Title I); and (c) provide greater protection to farmers against coercion or discrimination by handlers or processors because of membership in a bargaining association (Title III). The objectives of Title III have essentially been achieved through the recent passage of the Agricultural Fair Practices Act.

The issue of bargaining power for farmers is not new in the history of agricultural policy discussion. Farmers have long used organization as a means of improving their political and economic bargaining power. The National Grange, oldest of U.S. farm organizations (founded 1867), grew rapidly in response to the long period of rural distress in the 1870s. The Farmers Alliance Movement in the 1880s represented a second major attempt by farmers to organize themselves, an effort that led to the formation of the Populist Party in 1891. The Farmers Union, organized in 1902, drew heavily on the old Farmers Alliance-Populist movement for its leadership and support. In contrast to earlier political efforts, however, the Farmers Union placed major emphasis on achieving economic power through cooperative marketing.

The most dramatic effort by farmers to achieve direct marketing power occurred during the 1920s. Farmer cooperative associations achieved protection from antitrust action through the Clayton Antitrust Act (1914) and the Capper-Volstead Act (1922). Under the leadership of Aaron Sapiro of California, national commodity cooperatives for wheat, cotton, tobacco, peanuts, and many other crops were formed. The objective was to obtain control over a sufficient portion of the entire crop to become a dominant factor in the market. Control of producer deliveries were to be achieved by means of long-term contracts with members.

The success of the "monopoly cooperative model" Sapiro movement fell far short of its hopes, primarily because its organizers had underestimated the economic power necessary to withhold supplies of major agricultural commodities from the market in order to achieve price enhancement....
Market Efficiency...Or Economic Power?

The lion’s share of most non-farm sectors of the food system, from seed production to food retailing, is held by no more than four or five major corporations. For example, the October 23, 2000, issue of Business Week carried an article entitled “Will Agribusiness Plow Under the Family Farmer?” The article noted that the nation’s four largest beef packing companies hold 81 percent of the market (up from 36 percent in 1980), and that one of the four was a takeover target. This dramatic change in the structure of our food system is the most compelling reason to take a fresh look at collective bargaining by farmers.

Profits in agribusiness, compared to those in farming, are also high enough to raise concerns. Agricultural economist C. Robert Taylor gave testimony to the Senate Committee on Agriculture, Nutrition, and Forestry in January of 1999, demonstrating that the rate of return on equity for retail food chains and food manufacturers exceeded 17 percent during the 1990s. The corresponding figure for the farm sector was 2.39 percent. According to Taylor, “these comparative returns reflect comparative market power, and not relative economic efficiency.”

Economic power can be used to manipulate prices, to influence terms of contracts, and to affect the “rules of the game” set by government agencies at all levels. The end result of economic power is that those who have such power are able to earn profits that are not available to those who do not have it. In our present food system, farmers are the ones without economic power.

While size and monopoly can increase economic power, there is one thing that can certainly reduce it: competition. Of all the economic sectors of our food system, farmers are universally regarded as being the most competitive among themselves. In a world of giants, however, such competition works against farm income. For example, why do farmers rush to adopt technology that will benefit a few in the short run, but hurt everyone in the long run? The answer is competition among farmers. Why do farmers constantly strive to produce at levels that keep product prices relatively low? Again, competition. And why do farmers have such low economic power that they lose profits to landowners and agribusiness giants? Once more, the answer is competition.

Collective Bargaining: Scale in Response to Scale

Collective bargaining, unlike competition, has the potential to increase economic power in the farm sector (by “collective bargaining,” I mean face-to-face negotiation between a powerful farmer collective bargaining unit and some other food industry value chain powerhouse).

One type of bargaining might take place with a buyer of farm products. Farmers may reach an agreement with a certain company to sell grain to that company for no less than a certain price. Or, farmers might agree to sell no grain at all to a company that is investing in ways that will help foreign competitors. Success could bring about higher prices in the long run.

Collective bargaining could also be used with powerful input suppliers, not necessarily to use less of an expensive input — rather, to pay a lower price. Bargaining with seed companies over “technology fees” presents a clear opportunity. Farmers could also bargain to change the behavior of suppliers. For example, as long as a company charges less for seed in another country than in the U.S., a strong farmer group might boycott the products of that company.

Working conditions and benefits questions offer additional opportunities. A bargaining unit could come to an agreement with its members that no farmer would farm more than a certain number of acres. Or, collective bargaining with landlords could result in the landlords’ participation in paying for health insurance for farmers and their families. Farmers, as a group, might bargain with suppliers to make safer chemicals or with equipment companies to make safer equipment.

Finally, a strong farmer organization could bargain with the government for laws that would better suit their purposes. For example, a bargaining unit could negotiate for beneficial trade agreements rather than for government payments. Strong, well-enforced corporate farming laws would also be high on the list of legislative priorities. Or, organized farmers could demand that government food purchases for school lunches and other such programs be made only from farms that belong to the bargaining unit.

Are There Too Many Farmers to Organize?

Some say that one immediate obstacle to farmers working together is that there are just too many of them. The United States Department of Agriculture reported that there were slightly fewer than 2.2 million farms in the United States in 1999. This seems like a lot of people to organize into an effective bargaining unit, but a closer look at the data reveals a different picture. A “farm,” according to USDA, is “any establishment from which $1,000 or more of agricultural products were sold or would normally be sold during the year.” It is clearly not
necessary to organize rural residences with minuscule farm sales to achieve effective economic power.

In fact, there are no more than 350,000 family-sized farms that could possibly gross enough to make a decent living. These farmers would form the core of any bargaining unit.

Is this too many to organize effectively? The American Federation of Teachers has one million members. The National Association of Letter Carriers effectively represents the interests of 315,000 postal workers.

Consider, too, that all workers in an industry need not be in the same union: 59,000 airline pilots bargain together while others who depend on airlines for a living have other unions. How big is 59,000 members? For comparison, the American Soybean Association has roughly half as many members.

The number of family-sized farms appears to be within the range that could be organized into a powerful economic force. Organizing 350,000 farmers may be difficult, but the experience of many other industries indicates it is not impossible.

Uncle Sam or Joe Hill

A second objection to collective bargaining concerns the alternative of still more, and possibly different, government programs. Farmers have so long been dependent on Washington that even relatively conservative commodity groups routinely advance new ideas for farming the government. Could some new government program come to the rescue of farm income?

To be effective, new programs must give farmers economic power commensurate with agribusiness. This would involve what amounts to operating the entire food system as a public utility. With such an approach, profits in all sectors of the food system would be regulated to improve farm income. Even if such a system could overcome operational weaknesses inherent to command-and-control systems, the current trend toward privatization in the utility sector makes this scenario unlikely.

In today’s food system, low farm income results from weak economic power. Programs to improve farm income must increase the economic power of farmers. That power could come from collective bargaining, or through broad public utility regulation of the food system. Neither will be easy, but collective bargaining is, by far, more widely understood and (relatively) more politically acceptable.

The Interest Is Out There

In my writing and in speaking with farm groups on issues of market power and collective bargaining, I am constantly surprised by the level of interest shown by farmers. Survey after survey indicates that farmers think their current economic difficulties are, at least in part, caused by their lack of market power in a food system shaped by mergers and acquisitions. At the same time, most farmers equate “collective bargaining” and “supply control.” Such thinking ignores market power on the input side.

What collective bargaining organization among farmers would most effectively reallocate those profits to farmers? How can farmers bargain effectively with multinational corporations in a global economy? Much needs to be done before we can effectively address such questions. Most of us agree that a higher income for farmers is a worthwhile goal and that government programs are having increasing difficulty in reaching that goal.

The changing structure of the food system challenges academics, as well as farmers, to rethink traditional approaches to age-old problems. Our efforts to meet this challenge will be met with great interest among those we serve.

Don’t Mourn, Organize

Most economists, and many farmers, doubt whether farmers can work together for their collective economic interests. History is on the side of the doubters. Throughout the twentieth century, most efforts to organize farmers have eventually fallen victim to the farmer’s yearning for independence. The 21st Century, however, is different. There are fewer farmers. The farmers we have are better educated and better connected with information technology. And, most importantly, today’s farmers live in a world of economic giants. They have seen many neighbors driven out of business, and many others lose independence to contract relationships. They know that the future holds more of the same.

Will the new generation of farmers embrace collective action, or continue to try and make it on their own? Farmers, and only farmers, can answer this question. Choosing collective action will require a new way of thinking, a great deal of organizing effort to gain economic power, and economic analysis to learn how to use that power effectively. Success will mean renewed hope for farmers, a greater feeling of working toward a common purpose, and a larger share of the profits now reserved for more powerful guests at the food system table.

Richard A. Levins is Professor and Extension Agricultural Economist in the Department of Applied Economics at the University of Minnesota.
For the livestock and meat industry, the 1990s were a period of marked vertical integration. By the end of the decade, the use of production contracts, marketing agreements, and other ownership linkages between beef and pork producers and meat packers had provoked such controversy that Congress began to consider legislation to abolish many types of market linkages. We analyze the transition from cash markets in the beef and pork industries, the underlying forces driving the changes, and related issues.

Pork and beef packers have committed up to 40 percent of their output to customers under long-term arrangements. Because of this, at least in part, there are an increasing number of branded, case-ready consumer beef and pork products, along with merchandising programs and greater food safety concerns in both industries. More knowledgeable and demanding customers have raised the bar for raw product quality and consistency of supply.

Traditional spot markets in the pork and beef food chains have failed to offer incentives that provide sufficient high quality and consistency of supply to serve these new and more demanding product-market segments. Market failures, therefore, have driven changes in the relationships between packers and livestock producers — changes which include vertical integration.

**Hog Heaven: A Look at the Pork Sector**

The scope and prevalence of vertical linkages in the pork industry have changed dramatically in the last decade. Now, increased numbers of marketing contracts link packers with hog producers (Hayenga, et al.). Packers rarely moved into hog production until Smithfield Foods (the largest pork packer) acquired two of the largest hog producers: Murphy Family Farms and Carroll’s. Presently, about 18 percent of packer volume comes from either the packers’ own or contract producers’ facilities.

Packers building plants outside historic production regions had to build hog production facilities or meet the demand for expanded production through contract arrangements. The Smithfield acquisitions kept two large suppliers in business to supply their plants. The acquisitions also give Smithfield the
profits or losses from large scale, well managed hog production enterprises, and stabilize cyclical fluctuations of their packing plant profits.

Pork packers now control over 50 percent of total industry marketing contract volume. During the 1990s, the very large production units outside major hog production regions found long-term arrangements essential for financial security. Packers have significant incentives to use capacity fully and control costs. Marketing contracts proved to be a low cost way to stabilize the supply of hogs. Recently, the increasingly stringent quality demands of export customers and their own brand product managers have provided an even greater incentive to assure consistent high quality. Finally, the 1998-99 financial crisis in pork production probably stimulated more pork producers to seek contracts to stabilize their financial situations. As a result, cash market purchases account for fewer than 30 percent of all hogs.

A Look at the Beef Sector

The beef sector is significantly less vertically integrated than the pork sector. Slightly more than one-fourth of slaughter cattle come from long-term contracts and marketing agreements, and packers directly feed another five percent of slaughter cattle. While contract supplies have slowly increased their market share, packer-feeding has been stable for a long time.

Most beef packer feeding is a result of cattle producers (including producer cooperatives) buying packing facilities. Long term contracts between packers and cattle feeders have been used on a small scale for many years, but the number is gradually increasing.

Improved market coordination between cattle feeders and beef packers results in significant cost savings for beef slaughtering and processing. The cost savings have been passed on in part to cattle feeders and consumers. Packers ranked access to high quality and consistency in quality as the most important forces behind marketing agreements. Value-based pricing is becoming more commonplace in long-term fed cattle marketing agreements between beef packers and cattle producers, and is beginning to improve cattle quality. The recent growth of branded beef merchandising programs is likely to lead packers to demand even more long term supply arrangements with producers in order to facilitate the ability to track products through the system and reduce food safety risks.

Meaty Questions for Policy-Makers

In 1998, the USDA estimated that contract arrangements of one form or another were common among all...
types of U.S. farms, accounting for 35 percent of total farm production. More than two-thirds of this contract volume consisted of marketing contracts, the other third being production contracts. The beef sector is near this 35 percent norm. The pork sector is rapidly moving toward the vertical configuration of the broiler industry, where there is very little independent production.

Recent beef and pork packer surveys (Hayenga, et al.) suggest that food safety and associated liability concerns, the explosion of branded products, and more discriminating customers will lead packers to rely more on long-term linkages with both their customers and their key suppliers — livestock producers. Even though this is likely true, industry members — particularly producers not involved in contracts with packers — have voiced several concerns.

**A Voyage of Price Discovery**

As more cattle and hogs are sold under contract, a thinner cash market may become problematic. Until volumes sold in the cash markets become extremely small, the prices probably will still reflect supply and demand. Although hog volume in the cash market declines, a large volume is still traded. While the fed cattle cash market volume is proportionately much larger than the cash market for hogs, most transactions occur on one or two days each week, creating some concern regarding the liquidity of the market on other days.

The quality composition of cash market hogs and cattle is likely to change gradually as higher quality livestock are tied up in contracts or are sold using some variation of value-based pricing. Thus, more care may be necessary in the use and interpretation of reported prices; producers will need to focus on prices for specific quality classes to avoid being misled.

More and more formula-priced animals are being sold for prices which are based on sales of fewer and fewer animals in the spot market. To compensate, some formula-based contracts consider prices from other markets such as wholesale meat prices or feed prices.

However, carried to extremes, the rapid growth and success of formula pricing may lead to its demise. Too little transparency in price discovery, preferential treatment of contract producers, and market manipulation were addressed by the mandatory spot and contract price reporting law USDA implemented in 2000. It is not clear how much that law will contribute in addressing these concerns.

**Captive Supply: How Many Captives?**

The issue of “captive supplies” owned directly or committed by contract to packers has primarily origi-...or is this the future of beef?

Some say the future of the beef industry will mirror the relatively recent history of the poultry industry.

photo courtesy USDA
nated from cattle feeders, despite the fact that the cash market for fed cattle is clearly dominant. Evidence suggests that cash market prices are slightly lower when the volume of captive cattle being slaughtered is high. Although the precise reason for this price effect has not been determined, it is probably partly attributable to cattle quality differences and contract cattle feeders (not packers) adjusting contract deliveries to benefit from short term price changes (Schroeter and Azzam; Hayenga et al.).

Undue Preference... Or Recognition of Value?

Prices received by contract suppliers often differ significantly from cash market prices. This should not be surprising as contracts offered by packers change in response to needs, market conditions and competitor behavior. Quality and transaction cost differences between cash market and contract animals may explain some or all of the differences observed. Some contracts, which offer a smoother short-term cash flow to producers, have provisions requiring that short-term gains and losses stemming from comparisons with cash market prices balance out.

Concern that packers held undue preference for contract suppliers spurred the USDA to file suit against one beef packer-cattle feeding group contract arrangement (Palmer, USA v. IBP, 1997). The courts found that the agreement was not in violation of the law — that the higher prices paid to contract suppliers were reasonable and justified by the added value received (greater capacity utilization, ability to buy only high quality animals, having first option on all cattle from certain suppliers, etc.).

Market Access: Depends on the Market

Cattle feeders have little cause for concern regarding market access. Most of what beef packers buy consists of cash market purchases. However, access to markets for independent hog producers is becoming limited. This is especially true outside the Midwest, where a very high proportion of hogs produced are owned by or contracted to packers under long term arrangements. In the Midwest — where a high proportion of the nation’s hogs are still raised — there is no real problem with market access except when slaughter capacity is reached, as occurred in 1998. Independent producers face the decision of linking with packers to capture part of the benefits of those vertical linkages (perhaps via farmer cooperative plants, marketing groups, or contracts with current packers), or being residual suppliers inherently bearing more risk in an increasingly thin market.

Can Independent Operators Compete?

Some in the pork sector express concern regarding the ability of independent operators to compete against ventures that are vertically linked by ownership or long term contract. A survey of packers suggested that packers linked to producers did not produce hogs at lower cost than independent producers. However, customer demand and merchandising programs, reduced quality and quantity risk, and related operating economies from tighter coordination may give vertically linked businesses a significant competitive advantage. This competitive advantage may be essential for the U.S. to compete with competitors like Denmark and Canada in key Southeast Asian export markets.

Implications: Taking Stock of the Livestock Industry

The beef and pork sectors are changing as they respond to new economic imperatives driving industry organization. This is stressful for many industry participants as they ponder their best competitive strategy. In the pork sector, the changes envisioned over 30 years ago (“Will the pork industry become another broiler industry?”) have only recently become reality as spot market volume declined rapidly when displaced by contract links and vertical integration. The beef sector has been much slower to change, but the expected introduction of large volume branded merchandising programs and the need for traceability through the value chain are likely to speed the beef sector’s evolution toward tighter coordination.
What are the pros and cons of relying less on the cash market? Producers, packers, and meat merchandisers involved in tighter linkages generally benefit. The industries become more effective competitors that serve consumers more effectively. These forces are likely to be stronger in the future.

But concerns about the effects of vertical arrangements continue. Are these concerns sufficiently important and supported by fact? The debate will focus on the comparative importance of these perceived problems and their consequences, versus the benefits from the vertical linkages in the beef and pork industries. What would we give up, and what would we gain through abolishing these tighter linkages? Who would win and who would lose? A continuing examination of and discussion on the consequences of the changing pricing and coordination system in these industries is worthwhile to assure both well-informed policy development and strategic planning.

For More Information


Marvin Hayenga is professor in the Department of Economics at Iowa State University. Ted Schroeder (not pictured) is professor of agricultural economics at Kansas State University. John Lawrence is an associate professor in the department of economics at Iowa State University. This paper is extracted from a much longer report (Hayenga, et al., 2000) which was supported financially by the American Meat Institute. See that paper for more in-depth discussion and more extensive references.
For decades the Pacific Northwest has been immersed in debate regarding the state of salmon runs in general — and lately, of wild salmon runs in particular. Since enactment of the Northwest Power Act in 1980, an estimated $4 billion has been spent to restore diminished Columbia River fish runs. Most observers consider the results disappointing. Except for a spasmodic burst of record-level runs last year and this year, many species of wild fish continue to decline or remain significantly below target levels of recovery.

Columbia River salmon runs once were reckoned the largest in the world. Before 1850, an estimated 10-16 million wild adult salmon returned from the ocean to the Columbia Basin each year. Today’s runs are significantly reduced, something on the order of one-fifth to one-eighth of historic levels. Furthermore, only 20 percent or so of the present diminished runs are considered “wild fish;” the remainder come from hatcheries.

Declining fish runs in the Columbia Basin are not a recent phenomenon. Estimates indicate that 60 to 90 percent of the decline in salmon runs since the mid-19th Century occurred before the 1930s when Bonneville Dam, the first major dam across the Columbia River, was constructed.

There are many stakeholders — Indian tribes, industries, state and federal agencies, cattle grazers, power producers, industrial power customers, navigation interests, environmentalists, irrigators, sport and commer-

The Trouble with SALMON

Among the issues are deciding which salmon are in trouble, and in describing just what the trouble is.

By Patricia Koss and Mike Katz
cial fishers, timber operators, farmers, and recreational users — and controversy rages among them as to causes and remedies. More, there is debate as to who should bear the costs of restoration, full or partial, if indeed restoration is feasible.

Many factors, alone or in combination, have been nominated for blame. Not everyone agrees on the causes of the diminished fish runs, but no one disputes that a partial list of the putative fish killers would include: forestry, farming, cattle grazing, fishing (sport, commercial, and tribal, both in streams and at sea), industrial activities, road building, logging and forest clearing, urbanization, dams, hatcheries, deterioration of culverts, predatory birds and sea mammals, and variations in ocean conditions. All and more have been cited as principal causes of the slump in salmon stocks to unsatisfactory levels. Some of these “causes” are susceptible to policy intervention; others are not. Fishing can be curtailed or prohibited; ocean conditions are more or less beyond human control.

There is debate, too, within the scientific community. Some of this debate stems from the very real uncertainties regarding scientific, economic, and social values. More unsettling is that salmon experts and scientific “facts” may be susceptible to manipulation by proponents of particular policy positions. Some salmon scientists candidly admit that it is extremely difficult to obtain funding for objective research.

The Decline and Fall of Salmon Populations

The abundance of the salmon population is determined by three principal factors: the reproductive potential of adults returning from sea to spawn; the production of offspring from natural reproduction in streams and artificial propagation in hatcheries; and sources of mortality. Each major stock of salmon is made up of sub-stocks that display variations in spawning timing, feeding behavior, ocean migration patterns, and so forth. A small fraction of adult salmon do not return to their stream of origin but stray to neighboring streams. The resulting genetic diversity facilitates the species’ survival of and recovery from disruptive events. Hence, preservation of diversity is a key to survival.

What events associated with the Columbia River Basin disrupted the salmon and their environment? We can identify five “encroachments” that impacted Columbia River salmon populations.

First, the advent of the commercial salmon fishery led to severe over-exploitation of salmon runs prior to the 20th Century. Second, salmon habitat began to suffer early in the 20th Century, when water diversion dams were built in sub-basins of the Columbia in order to irrigate agricultural land in the Pacific Northwest. Fish could no longer reach habitat upstream of barrier dams, and the dams altered the quality of habitat that remained accessible. A third encroachment was the introduction of non-native fish species during the 20th Century, which continue to occupy habitat and prey on salmon fry, fingerlings, and migrants.

Hydroelectric development imposes yet another adverse impact on native salmon populations. Between 1931 and 1984, a total of 61 major dams were built in the Columbia Basin for hydroelectric power and irrigation systems.

Hydropower has been successful, and has generated the cheapest electric power in the nation for the benefit of the Pacific Northwest. However, 60 percent of the Columbia Basin watershed became inaccessible to salmon and over 64 percent of the remaining mainstem has been changed into reservoirs, altering the migratory success of adults and juveniles. The reservoirs also changed the temperature profile of the Columbia mainstem corridor. These alterations of the river disrupted the relationship of the salmon with their habitat, which translated into reduced survival of those young salmon in the system unable to adapt.

The final encroachment on Columbia River salmon was the fisheries management process itself. An entire scientific discipline evolved for the purpose of determining the minimum number of fish that should not be harvested, but instead allowed to reach the spawning grounds to satisfy the replacement needs of the population. Management to minimize escape (and therefore maximize harvest) compromised the selective mechanisms that reinforced the genetic diversity essential to sustain a thriving salmon population.
How Many Salmon, and What Kind?

There have been numerous efforts to restore and enhance fish populations in the Columbia system, starting with the installation of fish ladders to assist returning adults when the first main-stem Columbia River dams were constructed. The primary response to the decline in natural or wild production has been to intensify hatchery programs. However, these programs were not designed around the biological needs of salmon. Therefore, the synchrony of the salmon with their native habitats was disrupted and the hatchery-produced fish did not always adapt to the streams into which they were released. The result was to further speed the decline in populations of wild salmon. At the same time, maintaining healthy stocks of wild salmon was not a priority. In fact, one of the reasons for the so-called lack of success in salmon recovery is that the objective has changed from salmon in general to wild salmon in particular.

There are three broadly-stated visions of a desirable outcome: (1) more salmon, (2) more salmon in the right places, and (3) more wild salmon in the right places. The magnitude of the problem and the range of policy prescriptions depend in large part upon which one subscribes. Because the dominant or popular vision has changed over time, the appropriate scientific questions have also changed. Moreover, the data and knowledge requirements to answer these questions are different, depending upon which version of the problem is examined. Monitoring programs, and the institutions implementing these programs, originally evolved when the recovery of wild stocks was not a priority.

Congress enacted the Endangered Species Act (ESA) in 1973 and added amendments through 1996. Under the statute, the National Marine Fisheries Service (NMFS) has the responsibility to administer the ESA for anadromous and marine species. NMFS has focused on “natural” or “wild” fish. There has been confusion and disagreement regarding the definitions of the terms “wild” and “species,” which has, to some extent, led to policy paralysis. Plainly, a “wild” salmon is one produced by natural spawning in fish habitat from parents that were spawned and reared in fish habitat. Conversely, a “hatchery” salmon is one produced by artificial spawning, usually accomplished in a hatchery.

At the extremes, the difference between “wild” and “hatchery” is clear. Between the extremes, there is a very large gray area. For example, how are fish that use artificial spawning channels classified? How are salmon produced by lake fertilization classified? What about salmon stocks which, over many generations, have been able to adapt and survive in highly altered aquatic environments? NMFS excludes hatchery fish from salmon populations considered for listing under the ESA, unless they are critical to the preservation of genetic diversity. It is generally accepted by scientists that interbreeding between hatchery-raised and wild fish will have a negative effect on fitness; but there exists no reliable prediction of the magnitude of decreased fitness. Moreover, in the absence of tagging, we cannot differentiate naturally-spawned second generation hatchery fish from wild fish.

Indeed, NMFS considers those progeny wild fish. Each salmon “species” is composed of many stocks — defined as self-perpetuating populations that spawn generation after generation in the same location. Debate over the “extinction” of wild salmon is usually focused on decline or loss of salmon stocks, not salmon species. A sizable part of the Pacific Northwest no longer supports runs of wild salmon, but it is unlikely that any species of salmon will entirely disappear from the region in the foreseeable future.

There are ongoing scientific debates about the level of genetic distinctiveness appropriate to define a stock. The way in which we do so has major policy ramifications. Unfortunately, the ESA does not define or provide a means of assessing population “distinctiveness.” That omission has fostered considerable confusion and debate in the Act’s application to salmon policy.

Some scientists argue that protecting every stock may not be necessary to preserve sufficient genetic variation to sustain each species. For example, the concept of an “evolutionarily significant unit” (ESU) was fashioned to describe a salmon population unit whose loss would be significant for the genetic or ecological diversity of a given salmon species. Using ESUs as the unit of concern in salmon preservation has been criticized because there is no established amount of significant “differ-

There are three broadly-stated visions of a desirable outcome: (1) more salmon, (2) more salmon in the right places, and (3) more wild salmon in the right places.
ence” among populations or stocks that is necessary to identify ESUs.

It is clear that the vague objective of “restoration” takes a variety of meanings to the assortment of salmon scientists, decision officials, and policy advocacy groups. At one extreme, restoration may mean the rebuilding of wild salmon runs to levels that existed prior to 1850 (in other words, runs sufficiently large to support intense, but sustainable, fishing by commercial, recreational, and Indian fishermen). To others, recovery efforts would be deemed successful if we were able to maintain stocks at levels where extinction was unlikely. Some people argue that most salmon habitat has been altered beyond rehabilitation, and condone a significant role for hatcheries. Still others are willing — even eager — to eliminate commercial and recreational harvest, close all salmon hatcheries, and breach major dams. Without the articulation of a rational and realistic goal for wild salmon in the Columbia Basin, programs funded to recover wild salmon and steelhead have little or no basis on which to judge success.

One Thing Is Certain: There Is Much Uncertainty

Which solutions, alone or in combination, will enhance fish runs is surrounded by uncertainty. There are significant uncertainties as to the benefits of efforts to date in the areas of habitat restoration, harvest management, mitigation through hatcheries and modifications to hydropower production. Specifically, there is uncertainty regarding the relation between habitat restoration actions and habitat quality, the relation between habitat quality and fish production, appropriate levels of coordination and enforcement, and the appropriate decision-making structure. The key uncertainties about harvest management are how to limit the effects of mixed-stock fisheries on weak stocks, coordinate ocean and in-river harvests, coordinate interstate and international management actions, develop mechanisms to protect listed stocks, and accommodate scientific uncertainty about ocean effects on productivity, population dynamics, and genetic diversity.

The uncertainties underlying the mixed-at-best success of hatchery programs include incomplete knowledge about the effect of interbreeding of wild and hatchery fish, the extent to which genetic diversity must be protected, and the effect of habitat carrying capacity and numbers of hatchery releases on wild fish recovery. Finally, the key uncertainties about the effect of hydropower dams on salmon are how to manage the levels of indirect mortality induced by upstream and downstream passage, the effectiveness of measures taken to mitigate the harmful effects of dams, and the economic impacts of altering dam operations. Major questions surround the efficacy, not to mention the practicality, of dam breaching.

These uncertainties and the complex patterns of human activities in the Columbia River Basin make clear the complexity of the issue, and the difficulty of the coordination tasks. Actions on policy, regulation, and implementation for each of the restoration options are taken in many separate decision arenas, each with its own set of objectives and priorities.

Salmon in Sum

Proposed solutions to salmon recovery problems range over a broad spectrum. Different solutions impact different constituencies differently. The region has become increasingly polarized, and because no one sees how the issues will ultimately play out, stakeholders tend to stake out the most extreme positions at the outset. This atmosphere has been evident for years but seems to be intensifying.

Even if there was agreement among decision-makers as to the goal of salmon recovery efforts, and even if the aforementioned uncertainties were not so prevalent, the jurisdictions of agencies and organizations that are charged with making resource decisions are complex and fragmented. Decisions about marine salmon harvests, in-river harvests, power sales, dam operations, irrigation withdrawals, fish passage, hatchery production, and habitat protection are the responsibility of entities with overlapping boundaries, competing objectives, and incomplete authorities to accommodate the full scale of causes or effects.

Policy debates over salmon recovery tend to focus on narrow, relatively insignificant technical or scientific issues. For example, there are over 250 major dams in the Columbia Basin. Arguments over removal of a few dams, or the options for transporting smolts around dams, are interesting and controversial technical debates. However, it remains true that aquatic and terrestrial
habitats have drastically changed in the Columbia Basin over the past 150 years. It is highly unlikely that the historically large runs of wild salmon can be supported in this modified environment. Society may well choose to make the trade-offs necessary to maintain a relatively small number of wild salmon, assuming such trade-offs can be identified, quantified and accurately communicated, but scientists should be realistic and candid about the actual number of wild salmon that can be expected from ventures such as dam-breaching and hatchery programs.

Adding markedly to the uncertainty is the recent unexpected robustness of Columbia River salmon runs. Runs in 2000 for several key species broke all records since fish counting began in 1937. Runs in 2001 are expected to be larger still. For example, adult spring chinook returning to the upper Columbia Basin in 2001 are expected to total 365,000 compared with about 100,000 when the Snake River dams were completed in the 1970s. Most of these fish are hatchery fish, but recent runs of wild fish are also dramatically improved.

Why? Speculation focuses on improved ocean conditions, which are not expected to persist, or to heavy spring runoff in 1998 and 1999. No matter. The important conclusion to be drawn is that uncertainty and lack of agreement as to what constitutes the desirable outcome with respect to numbers, species, and genetic diversity, are the issues, perhaps more than any others, which should dominate the Great Salmon Debate.

For More Information
This article was based largely on the following papers presented at the Portland State University Salmon Symposium, July 7-8, 2000: What We Don’t Know About Pacific Northwest Fish Runs: An Inquiry into Decision Making Under Uncertainty.

Brannon, Ernest L. “The Salmon Crisis: A Lesson in Semantics.”


Hanna, Susan. “Institutional Redesign for Pacific Northwest Salmon Ecosystems.”

Huppert, Daniel. “Columbia River Salmon Recovery: Where are We Going? And How do We Get There?”


Lackey, Robert T. “Restoring Wild Salmon to the Pacific Northwest: Chasing an Illusion?”

Patricia Koss is Assistant Professor of Economics and Program Director, Graduate Certificate Program in Applied Energy Economics and Policy at Portland State University in Portland, OR. Mike Katz is Adjunct Professor of Economics at Portland State University.

Make Your Voice Heard in the Review of Agricultural Economics
◆ Have you been thinking about the economic implications of current issues?
◆ Have ideas about how economists can use their analytical tools to advance understanding of those issues?
◆ Would you like to communicate with a broad audience of colleagues?

Please consider a submission to the Review of Agricultural Economics. For details on submissions, see the AAEA website (http://www.aaea.org/fund/pubs/rae/raesubmissions.cfm).
On September 18, 2000, a news headline reported that some taco shells sold in retail stores contained a protein from StarLink™ corn, a genetically engineered variety that was approved only for domestic feed and non-food industrial uses but not for human consumption. This discovery quickly rippled through the mass media and became yet another cause celebre for opponents of agricultural biotechnology. It also had significant repercussions throughout the grain handling and processing sectors, as well as in global grain trade during the 2000-2001 marketing year.

How Did That Get There?

StarLink corn was developed by Aventis CropScience (Aventis), a multinational firm based in France. This Bacillus thuringiensis (Bt) variety was grown on less than 1 percent of the total U.S. corn acreage in 2000 (about 362,000 acres), with 40 percent of the acreage concentrated in Iowa. StarLink corn has been genetically engineered to express a protein known as Cry9C, which is toxic to European corn borers and certain other insect pests. The Environmental Protection Agency did not approve the protein for human consumption due to lingering questions about Cry9C’s potential to cause allergic reactions. A testing lab indicated that it found the presence of the Cry9C protein in a sample of Taco Bell taco shells. Kraft Foods, Inc., the company that produced the taco shells, recalled all of its taco shells after further testing confirmed the initial results. The incident led to the recall of nearly 300 food products, including more than 70 types of corn chips, more than 80 kinds of taco shells, and nearly 100 food products served in restaurants, a precaution taken by food manufacturers. More recently, StarLink was found in additional corn products, including corn dogs, corn bread, polenta, and hush puppies.

To contain the extent of commingling, Aventis reached an agreement with the U.S. Department of Agriculture (USDA) on September 29, 2000, to launch a buyback program. This program offered producers a 25-cents-per-bushel premium above the posted county price to ensure that StarLink corn is fed to farmers’ own animals, sold to feed out-
lets, or sold to the Commodity Credit Corporation, with Aventis providing reimbursement for extraordinary expenses (including extra transportation charges). This program, however, did not address the 1999- and 2000-crop StarLink corn that had already been delivered to local elevators. In mid-October 2000, Aventis reached an agreement with 13 state (including Iowa) attorneys general to extend compensation coverage to grain elevators. Then, in November 2000, the U.S. and Japanese Governments reached an agreement that establishes testing protocols, which would be implemented through sales contracts, for detecting StarLink in U.S. food-grade corn shipments to Japan.

Early in fall 2000, Aventis voluntarily withdrew the registration for StarLink, in effect removing StarLink corn from the marketplace for 2001-crop plantings. USDA also worked with the seed industry to ensure that hybrid corn seed sold and planted in 2001 was tested for the presence of the Cry9C protein. To further support this effort, Aventis and USDA reached an agreement in March 2001 to launch a seed corn buyout program that would purchase seed containing Cry9C from seed companies.

**Domestic Disruption**

Disruptions in the U.S. corn market occurred when shipments destined for food use or export markets tested positive for StarLink and had to be rerouted to approved uses. Players kept market disruption to a minimum by directly channeling the commingled corn to feed use, which accounts for about 60 percent of U.S. corn disappearance. Alternatively, commingled corn was channeled to certain non-food industrial users, such as dry-mill ethanol plants. Dry-mill alcohol fuel use accounts for about 2-percent of U.S. corn disappearance.

How much commingling of StarLink with other corn may have occurred in the marketplace? USDA’s Economic Research Service (ERS) estimates the potential (upper-bound) volume of marketed StarLink-commingled corn from the 2000 crop located near wet and dry millers prior to October 1, 2000, at 124 million bushels (Lin, Price, and Allen). Most of the “hot spots” — areas with large StarLink acres or significant amounts of marketed commingled corn — are in the Midwest (especially Iowa and Illinois) and nearby states, such as Nebraska, Tennessee, and Kentucky. The volume of commingled corn could be significantly larger if the 1999 crop is also taken into consideration. Aventis’ own estimate indicates that the commingled corn stored at grain elevators as of March 2001 was in excess of 430 million bushels (3.7 percent of total corn supplies), mostly from 1999.

In response to the potential commingling of StarLink with other corn in shipments, local elevators owned by large grain companies, which own and operate both grain handling and processing facilities, have begun testing inbound corn shipments for StarLink. In addition, many other local elevators, which normally do not test for the presence of biotech content in corn shipments, are conducting StarLink tests as well because of the compensation provided by Aventis.

The extent to which corn shipments have tested positive is an indication of the degree of market disruption. According to the grain industry, the positive shipments vary by mode of transportation. In the case of truck shipments, the share of shipments testing positive has averaged about 5 percent. In contrast, the percentage is lower for barge shipments and higher for rail shipments. The zero tolerance for StarLink corn adopted by buyers in major export markets (mainly Japan) and domestic food processors raises the question of whether the grain industry can segregate crop supplies consistent with this tolerance. A recent ERS study estimated the cost of segregating non-biotech corn to be around 22 cents per bushel (from country to export ports) if segregation follows the handling process for high-oil corn, which typically meets a tolerance level of about 5 percent (Lin, Chambers, and Harwood). A zero-tolerance policy is likely to raise the cost of segregation even more.

The real problem is that the price premium for StarLink-free corn does not cover the costs of segregation. According to trade sources, price differentials between StarLink and StarLink-free corn ranged between 7 and 12 cents
per bushel and, in some rare instances, reached as high as 15 to 20 cents during the early stages of the incident. Premiums for StarLink-free corn eroded quickly as the U.S. grain handling industry became more knowledgeable in addressing the issue and in delivering StarLink-commingled corn to approved uses. Buyers were able to source StarLink-free corn, the Aventis-state attorneys general agreement extended compensation coverage to grain elevators, and testing protocols improved. At present, the price differentials are small or nonexistent.

Foreign Commotion

The presence of StarLink in U.S. corn exports temporarily disrupted shipments to Japan and South Korea during the first half of 2000-2001. The first wave of disruptions occurred during late October and early November 2000 before the U.S. and Japanese Governments reached an agreement on testing protocols to be implemented through sales contracts (Figure 1).

The disruption continued over the next few months as discrepancies over StarLink testing results arose. U.S. corn exports to Japan from September 1 to the week ending December 28, 2000, for example, were down about 11 percent from a year earlier (USDA). This decline was narrowed to about 7 percent by mid-April and then widened to about 10 percent by mid-July 2001. Outstanding sales of U.S. corn to Japan at the end of calendar 2000 were down 21 percent from a year earlier. The gap widened to 44 percent by mid-April but closed by mid-July 2001 (Figure 2). Accumulated U.S. corn exports and outstanding sales to Japan together were down about one million metric tons from a year earlier, as of August 16, 2001, a decline of 6 percent.

StarLink Trade Effects

The markets most affected by StarLink have been those for non-feed corn in Japan. Import statistics from Japan and South Korea show a sizeable decline in the U.S. share of corn imports that are purchased for non-feed use. From November 2000 through June 2001, Japan’s imports of U.S. corn for starch manufacturing were down 35 percent from a year earlier, a drop of 0.8 million tons. As a result, U.S. share of corn imports by Japan for starch use declined from 100 percent last year to 69 percent. Corn from South Africa, China, Argentina, and Brazil made up most of the difference.

Similarly, South Korea’s imports of U.S. corn for food manufacturing (mostly starch) during this same period were down 34 percent from a year earlier, a decline of over 400,000 tons. U.S. share of corn imports by South Korea for non-feed uses declined from 90 percent last year to 60 percent.

Testing... Food processors (including dry and wet corn millers) test inbound corn delivered to their facilities. The most frequently used test is the protein-based enzyme-linked immunosorbent assay (ELISA) method, which determines whether the Cry9C protein found in StarLink is present in the sample with a “yes” or “no” response. USDA’s Grain Inspection and Packers and Stockyards Administration (GIPSA) has evaluated the performance of some test kits and verified that they are capable of detecting the presence of Cry9C. The detection sensitivity reaches 0.125 percent (1 StarLink kernel in 800) for most of the test kits and 0.01 percent (1 StarLink kernel in 10,000) for two highly-sensitive ones. A common practice (for example, under the Japan food corn protocol) is to test three 800-kernel sub-samples. If all three tests (2,400 kernels) are negative, there is a 99-percent probability that the sample does not contain more than 0.2 percent of StarLink corn.
Virtually all the decline was offset by imports from non-U.S. origins for food manufacturing. However, as of August 16, 2001, cumulative U.S. corn exports and outstanding sales together to South Korea for all uses during 2000-01 were actually ahead of a year earlier.

Competing exporters’ trade data from November 2000 to June 2001 give similar results. While StarLink has had a negative impact on U.S. corn exports, most of the reduction is due to Japan’s increased purchases from South Africa, China’s decision to continue to subsidize exports, increased competition from the large back-to-back crops in Argentina, and a record Brazilian crop. The net effect of StarLink on U.S. corn exports has been reduced somewhat as U.S. corn that otherwise would have been exported to Japan was diverted to other markets.

Was This a “Teachable Moment?”

The StarLink incident illustrates the complexity of isolating crop varieties within the grain marketing system. Contrary to value-enhanced crops where producers follow an identity preservation (IP) program to segregate them from bulk commodities in exchange for price premiums, no market incentive mechanism exists for StarLink corn. Instead, the Aventis-USDA buyback program and legal arrangements with the state attorneys general have provided a mechanism for channeling StarLink corn to feed or non-food industrial uses.

IP or segregation is likely to become crucial in the release of future biotech crops, especially biotech food grains (such as herbicide-tolerant wheat). Channeling commingled StarLink corn to feed use significantly mitigated the supply impact on food producers and exporters. However, in the case of the future release of herbicide-tolerant wheat, the commingled volume could be limited to flour milling in the domestic market because of price disparity between food and feed uses. Having a workable IP system in place prior to the commercial release of these biotech crops is essential to minimize market disruptions.

Zero tolerance, which applies to any use of StarLink corn in Japan and food use in South Korea as well as domestic food use, compounds the difficulties in segregation and IP. Segregation to meet zero tolerance is impossible, given limitations of production and handling processes and testing technology. For example, based on USDA’s GIPSA and the Food and Drug Administration sampling and testing recommendations, if StarLink were present in concentrations of 0.2 percent, there would be a 99-percent probability that a lot of corn would be rejected using a 2,400-kernel sample size.

Institutional arrangements play a strategic role of preventing further commingling of StarLink corn and facilitating trade. What is less clear is whether it is necessary for USDA to become involved in certification of IP systems, or whether large grain companies or private firms can adequately perform the task.

For More Information


William Lin, Gregory K. Price, and Edward Allen are agricultural economists with the Economic Research Service of USDA. The opinions expressed here are those of the authors and do not reflect the views of the U.S. government.
Can’t get ahead for falling behind. The powerlessness this phrase evokes applies as much to development assistance as it does to the people that the assistance is meant to help. These two kinds of powerlessness are related. The longer individuals remain in poverty, the more vulnerable they become to natural disasters and civil strife, and the more likely that overseas aid for them will come only as humanitarian relief efforts. And as aid becomes concentrated in relief efforts, fewer resources are available to address the structural causes of chronic poverty. A vicious cycle ensues. Escape from these poverty and relief traps will require serious efforts to increase and retarget development assistance in order to remedy market deficiencies and to enable families to invest productively in their futures.

The Relief Trap For Development Assistance

The past ten years has brought a sharp decline in aid flowing to low-income countries. OECD data show that after growing more than 20 percent through the 1980s, real (inflation-adjusted) global aid to developing countries fell sharply through the mid-1990s (Figure 1). Real aid peaked at $60.4 billion (in 1998 dollars) in 1992, then fell to $47.5 billion in 1997. The recent partial recovery is attributable to sharp increases in emergency spending, continuing the trend toward an increasing concentration of foreign assistance on establishing refugee camps, emergency feeding programs, and other responses to humanitarian emergencies. The share of global aid spent on structural development and change – education, health, economic infrastructure, agricultural production technologies, and the like – fell from 47 percent in 1993 to 31 percent in 1999 (Figure 1).

Foreign aid from the United States mirrors these global patterns. Real aid flows that had averaged more than $16 billion in the mid-1960s, slipped to $13 billion by 1990-92, and to only $8 billion in 1997-99 (Figure 2). The decline in American aid flows is more rapid still when measured as a proportion of real U.S. GDP (Figure 2). The United States’ 1999 aid ranked last among the 22 nations in the OECD’s Development Assistance Committee (DAC), barely a quarter the 22-country average of 0.39...
percent of GDP, and barely a seventh of the United Nations’ target contribution rate of 0.70 percent.

It also appears that the share of U.S. foreign aid earmarked for humanitarian emergencies has increased significantly over this same time period. For example, a majority of Public Law 480 (PL480) food aid now goes for emergencies, where less than 20 percent flowed for humanitarian purposes a quarter century ago. Spending on agricultural development has suffered disproportionately, falling from $900 million in 1990 to $300 million in 1999.

Because the reduction in foreign aid is heavily influenced by geopolitical objectives, donor country exports, or macroeconomic policy reforms, the amount of untied, non-emergency aid available for structural development has fallen precipitously. A pattern of emergency and response, followed by incomplete recovery, produces a vicious cycle in which reactive relief efforts further undermine already-fragile market and social institutions. Populations become even more vulnerable to the next shock. Meanwhile, funding for necessary development expenditures dwindles. Extraordinary efforts must be made to break this cycle of vulnerability and reactive aid: emphasis must be moved from reaction and recovery to mitigation.

Donor nations have tried to respond to increased emergency demands on reduced aid budgets by developing strategies to link relief and development. While the principle is laudable, there is little evidence that it works. The task is daunting, because the effectiveness of aid depends in part on a sound institutional and policy environment in the recipient nations—things that are frequently missing during emergencies.

Recovery through emergency assistance also depends on effectively targeting needy recipients. Unfortunately, the evidence on targeting aid indicates that there is at best a weak correlation between need for aid and receipt of aid. For example, at national levels, food aid historically is uncorrelated with changes in nonconcessional food availability. At the micro level, food aid is as likely to reach relatively wealthy households as it is to reach the poorest households.

In theory, development-oriented relief is attractive. Especially attractive is the idea of self-targeting transfers that provide both income insurance and labor-intensive investment in crucial public goods, such as roads and irrigation systems.

The record in practice remains mixed. Food for work (FFW) programs that employ able-bodied recipients in public works initiatives have grown especially popular. Too often, however, complementary inputs such as tools, cement, or transport are unavailable. The productivity of the effort proves low or the asset created proves unsustainable—for example, roads that are not maintained. Moreover, when rural markets fail, the poorest can have a higher marginal productivity of labor than the wealthiest, thereby inducing the most needy to choose not to participate in FFW schemes intended to benefit them, as has recently been demonstrated in Ethiopia.

More creative uses of aid to address rural market failures are possible and may help eliminate the mechanisms that perpetuate poverty and vulnerability in low-income communities. For example, in the Greater Horn of Africa, where relief packages are common because of drought and war, investments to reduce livestock mortality and to market a fraction of the saved animals could dramatically reduce economic vulnerability among livestock herders.

Some small-scale initiatives have been launched to accomplish this objective, and some successes have been recorded. Food-aid-based school feeding programs have proved quite effective, especially for getting and keeping girls in school. Considerably more must be done to tailor emergency assistance toward the structural sources of vulnerability among target populations. Providers must restore real development assistance in order to break the recurring cycle of disaster and relief.

Poverty Traps: Institutionalizing Poverty and Vulnerability

What perpetuates poverty and vulnerability and keeps foreign assistance in relief mode? A good answer requires some updating of conventional definitions of poverty, following the World Bank’s World Development Report 2000-1. Poor people most commonly define poverty in terms of insecurity, rather than low income. While many recognize that poverty breeds insecurity, the reverse is also true because insecurity distorts asset accumulation strategies. For example, in Africa, farmers cut the forests and deplete soil nutrients in response to price and yield risks. Food traders limit employment of able-bodied workers and sleep with their inventories for fear of theft, and
families reduce food intake to cope with shocks, thereby diminishing children’s educational attainment.

The common denominator to these examples is that poor people respond to insecurity today in ways that compromise their capacity to build a better life tomorrow. Such behavior is rational. It reflects the constraints that affect the poor’s capacity to break out of the poverty traps that have captured them and the relief traps that have stymied contemporary development policy.

Imperfect factor markets, such as credit markets accessible only to the wealthy, make it hard for the poor to put the few productive assets they do own to good use and limit their access to high return niches in emerging markets. In the textbook world of full, complete, and transparent markets, households that lack needed resources simply rent or purchase them. In the real world, some assets and opportunities can only be utilized effectively when they are matched by holdings of imperfectly tradable complementary assets. For example, land can only be used effectively when matched by capital that the poor cannot borrow. Poverty then turns not only on asset endowments, but also on factor markets that constrain the use of those endowments.

Child labor shows how market failure baits the poverty trap. When families are struck by crisis and have insufficient access to credit or insurance, or when adult unemployment is high, or wages low, families withdraw children from school and put them to work full-time. Because there is an inverse relation between full-time child labor and the child’s productivity later in life, the adult labor market and credit market failures transmit poverty and vulnerability across generations.

Recent literature on the economics of poverty emphasizes the need to distinguish between families whose incomes are transitorily low and those who are structurally trapped at low levels of welfare. When poverty is primarily transitory, time rows classify 1200 sample households by their 1993 household expenditures per capita (scaled for household subsistence needs), and the columns show their 1998 per capita expenditures. The northeast cell shows those households that were below the poverty line in 1993, but above it in 1998. The southwest cell shows those households that went from being non-poor to poor, while the remaining two cells show households that did not change their status. In the sample, 18 percent of households were poor in both time periods, 10 percent got ahead, and 25 percent fell behind. A majority were poor at some point.

A closer look at these poverty transitions shows that more than half of the ten percent of the population that escaped poverty recovered from prior ill fortune. However, no more than 42 percent of these households (less than 5 percent of the overall sample) escaped from structural poverty through asset accumulation. Only a small fraction (15 percent) of the segment of the population that fell into poverty over time appear to have done so on a temporary basis as of 1998. The remainder of these households that fell behind are probably structurally poor.

These are households that literally could not get ahead. Well over half suffered significant loss of productive assets between 1993 and 1998. The results indicate that more than two-thirds of the South African poor in 1998 may be trapped in structural poverty.

Although the passage of time may permit some members of this group, and equivalent groups in other countries, to escape poverty, the challenge of poverty reduction demands more than just patience. In the South African study, time appears to be the enemy rather than the ally of the poor. Time merely oversees the chronic perpetuation of a poverty class. Merely responding to crises does not constitute a concerted effort to put the poor on a pathway to wealth accumulation and a better future.
Redirecting Development Assistance

As we begin to better understand the structural features of chronic poverty, it is important to de-emphasize reactive aid and increase support that firms up the factor markets that underlie both the production and perpetuation of poverty. Stocks of financial, natural, manmade, and social capital help individuals manage risk so as to prevent vulnerability. Vulnerability goes hand in hand with asset poverty. Yet asset ownership is only a necessary condition against vulnerability. The poor cannot eat currency, or soil, or the goodwill of neighbors or governments. They must have access to markets and technologies that enable them to turn their assets into a sustainable income sufficient for a healthy life. International investment in low-income communities and in basic market infrastructure has fallen sharply over the past decade as real aid budgets have dwindled and been increasingly absorbed by emergency relief, tied exports, and macroeconomic policy conditions. Aid providers must reverse this trend.

The past two decades’ emphasis on extricating government from markets has not been matched by equally necessary emphasis on fostering efficient and fair markets in which the poor can fully participate. Further liberalization and preferential trading arrangements that open OECD markets to exports from low-income countries will surely help those who enjoy the necessary access to technology and domestic factor markets.

However, these measures are unlikely to assist the structurally poor whose condition is defined by exclusion from these markets. Relief of debt that was not being serviced in the poorest countries will do little to stimulate investment in creating market-based opportunities for the poor. Both debt relief and trade policy reform attempt to address poverty problems without committing the real resources needed to unlock poverty and relief traps. Providers must restore real developmental aid to previous levels and focus more on crisis mitigation — in other words, development — than crisis response.

In the short term, the need for emergency assistance is undeniable. This implies the need for extraordinary short-term increases in development assistance if serious efforts are to be made at crisis mitigation without reducing crisis response efforts. If this is not done, more than one billion people living in extreme poverty — on less than one dollar per day — will not escape the vulnerability and poverty traps in which they are currently caught, and aid programs will remain ensnared in related relief traps.

For More Information


Christopher Barrett is Associate Professor in the Department of Applied Economics and Management at Cornell University. Michael Carter is Professor of Agricultural and Applied Economics at the University of Wisconsin. The authors wish to thank Kevin Heisey for research assistance, and acknowledge the support of the U.S. Agency for International Development. All views, interpretations, recommendations, and conclusions expressed in this paper are the views of the authors, and not necessarily those of the cooperating institutions.
Poor diet contributes to over 300,000 deaths a year in the United States. About one-third of all cancer deaths are attributable to poor diet, and four of the top ten causes of death in the United States — heart disease, cancer, stroke, and diabetes — are also associated with poor diet. Diet-related health conditions cost society an estimated $250 billion annually in medical costs and lost productivity (Frazao). In an effort to make nutrition information available to consumers, new nutrition labeling regulations mandated by the Nutritional Labeling and Education Act (NLEA) went into effect in the United States in May 1994.

The law requires disclosure of the nutritional content of foods on a standardized label (Savur, Lipinski, and Nayga). The regulations update the list of nutrients that appear on the nutritional facts panel, standardize serving sizes, define nutrient content claims, and provide a mechanism for evaluating health claims. Prior to implementation of the NLEA, nutritional information was provided on a voluntary basis by food manufacturers. Government regulations related to nutrient content and health claims were much less stringent. The Food and Drug Administration estimated that the NLEA would cost industry $1.4 billion to $2.3 billion and the government $163 million over the next 20 years, beginning in 1994.

The objective of the NLEA is to provide consistent, understandable, and usable labels that can help consumers choose healthier foods. The main question is whether nutritional labels affect consumer choice and improve nutrient intake and diet quality among Americans. We used data from the U.S. Department of Agriculture’s 1994-96 Continuing Survey of Food Intakes by Individuals, and the companion, Diet and Health Knowledge Survey, to estimate the effect of nutritional label on Americans’ overall diet and their intake of specific nutrients (total fat, saturated fat, cholesterol, dietary fiber, and sodium) (see Kim et al.). Diet quality is measured by the USDA’s Healthy Eating Index (HEI) which measures how well the diets of Americans conform to the recommendations of the Dietary Guidelines for Americans and the Food Guide Pyramid.
HEI shows the type and quantity of foods people eat, their adherence to specific dietary recommendations, and the variety in their diet.

The HEI scale ranges from zero to 100 with higher numbers indicating a higher quality diet. The HEI is based on ten components, each representing different aspects of a healthful diet. Components one through five measure the degree to which a person’s diet conforms with USDA’s Food Guide Pyramid serving recommendations for the five major food groups — grains, vegetables, fruits, dairy products, and meat. Components six and seven measure total fat and saturated fat consumption as a percentage of total food intake. Components eight and nine measure total cholesterol and sodium intake, and component ten examines variety in a person’s diet. We assessed variety by totaling the number of different foods that individuals ate in sufficient amounts to contribute at least half a serving of a particular food group. Each component has a possible range of zero to ten (see Table 1 and Bowman et al. for details). The mean HEI for data used in this study was about 64, which is lower than the minimum threshold level of 80 that USDA recommends to have a good diet.

**Counting Calories**

Table 2 presents the effects of nutritional label use on the intake of selected nutrients. Nutritional label use decreases individual average daily intake of calories from total fat by seven percent, calories from saturated fat by two percent, cholesterol by 68 milligrams, and sodium by 30 milligrams. In addition, nutritional label use increases average daily fiber intake by about eight grams.

These results generally indicate that nutritional label use improves consumer intake of selected nutrients. In terms of the Dietary Guidelines for Americans, nutritional label use increases the percentage of individuals meeting the guidelines for calories from total fat by just over two percent, calories from saturated fat by about nine percent, and cholesterol by 34 percent (Figure 1). Nutritional label use increases the percentage of individuals whose fiber intakes are between 15 and 25 grams (just under the recommended dietary guideline of 25 grams or more per day) by about 63 percent. Those already meeting the guideline apparently did not increase fiber consumption. We also observed a slight reduction (four percent) in the percentage of individuals meeting the guideline for sodium. It appears that nutritional label use has the largest effect on cholesterol intake, in terms of increasing the number of consumers who meet dietary guidelines.

**Quality Control**

Figure 2 shows the effects of consumer use of different types of information on nutritional labels: (a) lists of ingredients, (b) nutrient content claims such as “low fat” or “light,” (c) nutrition panels that tell the amount of calories, protein, fat, etc., (d) serving size information, and (e) health claims that describe health benefits of nutrients or foods on diet quality. These findings indicate that nutritional labels provide measurable benefits by improving the diet quality of Americans, as measured by the HEI, from a range of 3.5 points (list of ingredients) to 6.1 points (health claims), depending on the type of label information.

In an effort to evaluate the overall quality of the American diet, USDA developed a grading scale. HEI scores greater than 80 are rated “good,” scores of 51 to 80 are rated “needs improvement,” and scores less than 51 are rated “poor.” Do nutritional labels help consumers make healthier food choices? Our findings suggest that nutritional labels provide some improvement in dietary qual-
ity of consumers. However, the magnitude of these improvements appears to be rather small.

Whose Diet Is It Anyway?

There are also some differences in diet quality among consumers having different characteristics. For instance, age of both nutritional label users and non-users is positively related to HEI for all types of label information. African-American label users and non-users have HEI scores that are about three or four points lower than the HEI scores of Caucasian label users and non-users, respectively. Male users of nutrient content claims or serving sizes have higher HEI scores than female label users.

Interestingly, employed label users have lower HEI scores than unemployed label users which may reflect the opportunity cost of the time differential between employed and unemployed individuals. Finally, non-label users from central cities have HEI scores that are about two points higher than non-label users from suburban areas.

Some Perspective

The NLEA has three major aims: (1) to enable consumers to make more healthful food choices, (2) to promote consumer nutritional education, and (3) to provide incentive to the food industry to create innovative and healthier new products for consumers. The findings discussed here provide some evidence that the NLEA is achieving the first aim. This is of great importance in terms of public policy because improved diets can provide society with dramatic health benefits resulting in life-year gains and medical care cost savings.

However, considering the relatively small magnitude of diet quality improvements from label use, it appears possible that even when consumers read labels, they do not always understand them. Mojduszka found that food markets did not reliably signal nutritional information prior to the implementation of the NLEA. Therefore, according to the second aim of the NLEA, relating to education, it might be beneficial to complement the law by consumer education on how to understand and use the information on nutritional labels. It would then be interesting to determine whether such a campaign actually helps consumers improve the quality of their diets through nutritional labels.

As for the third aim, there are doubts as to whether the NLEA has provided an incentive to the food industry to create innovative and healthy new products for consumers. Data on the nutritional quality of products from food manufacturers pre- and post-NLEA are needed to allow the examination of this issue. A very important question remains: Does reading nutritional labels pay off and if so, by how much? The results presented here have not been extended to suggest that the benefits of the NLEA outweigh the costs to government, the food industry, and to consumers. This is indeed an important topic for future efforts.
Table 1. Components of Healthy Eating Index

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Range of Scores</th>
<th>Perfect Score of 10(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grains</td>
<td>0 to 10</td>
<td>6-11 servings</td>
</tr>
<tr>
<td>2. Vegetables</td>
<td>0 to 10</td>
<td>3-5 servings</td>
</tr>
<tr>
<td>3. Fruits</td>
<td>0 to 10</td>
<td>2-4 servings</td>
</tr>
<tr>
<td>4. Milk</td>
<td>0 to 10</td>
<td>2-3 servings</td>
</tr>
<tr>
<td>5. Meat</td>
<td>0 to 10</td>
<td>2-3 servings</td>
</tr>
</tbody>
</table>

**Dietary Guidelines**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Score Range</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Total Fat</td>
<td>0 to 10</td>
<td>30% or less energy from fat</td>
</tr>
<tr>
<td>7. Saturated Fat</td>
<td>0 to 10</td>
<td>less than 10% energy from saturated fat</td>
</tr>
<tr>
<td>8. Cholesterol</td>
<td>0 to 10</td>
<td>300 mg. or less</td>
</tr>
<tr>
<td>9. Sodium</td>
<td>0 to 10</td>
<td>2400 mg. or less</td>
</tr>
<tr>
<td>10. Variety</td>
<td>0 to 10</td>
<td>16 different food items over 3-day period</td>
</tr>
</tbody>
</table>

\(^1\)Depends on recommended energy intake; all amounts listed are based on a per day basis with the exception of food variety (Source: Bowman et al.).

Table 2. The Effect of Nutritional Label Use on Average Daily Intake of Selected Nutrients

<table>
<thead>
<tr>
<th>Nutrient Intake</th>
<th>Net Change (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories from Total Fat</td>
<td>-7 percent</td>
</tr>
<tr>
<td>Calories from Saturated Fat</td>
<td>-2 percent</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>-68 milligrams</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>+8 grams</td>
</tr>
<tr>
<td>Sodium</td>
<td>-30 milligrams</td>
</tr>
</tbody>
</table>

For More Information:


Rodolfo M. Nayga, Jr. is Associate Professor in the Department of Agricultural Economics at Texas A&M University.

**GOOD ENOUGH TO USE?** Rosenwein worries that “…rarely has the economic climate changed so radically from one year to the next, as it did in 2001. So the question naturally arises: What do you do with the Census Bureau’s findings contained in two reports, “Money Income in the United States, 2000” and “Poverty in the United States, 2000?” What relevance, if any, do they have today and how can economists, demographers, and business executives best use these numbers?” Rosenwein, R. “2000 Data in a New World.” *American Demographics*, January 2002, page 18.

**FOOD FOR THE CHILDREN:** Summarizing an extensive study, L.C. Smith and L. Haddad say, “…as per-capita food supplies are increased in any country, they become an increasingly blunt tool for reducing malnutrition [among children]. The effect is very strong for countries with per capita dietary energy supplies below 2,300 kcal. Between 2,300 and 3,120 kcal it is still significant, but above 3,120 kcal, further increases in per-capita food availability are likely to have little impact….” Smith, L.C. and L. Haddad. “How Important is Improving Food Availability for Reducing Child Malnutrition in Developing Countries?” *Agricultural Economics*, 23(December, 2001):191-204.
Globalization is, to coin a phrase, everywhere. It certainly has become an important dimension of the changing agricultural sector. Export growth for United States agricultural products is a fundamental premise of U.S. farm policy, and an indicator of the business climate for farm and agribusiness firms. U.S. policy has sought to facilitate the trend towards a higher proportion of high-value and processed food products in agricultural trade.

But do we really understand globalization — the changing dimensions; the drivers; the interrelationships among technology, capital and financing, goods trade, and markets across the national and international economy? While our interest is ultimately globalization’s impact upon agriculture and related sectors, globalization is driving and being driven by a range of related factors that influence all sectors. The focus of this discussion will therefore be on the broader economic integration and globalization of industry and business.

Perceptions and Facts About Globalization

First, some observations on what globalization is and is not. Globalization should not be equated with trade liberalization (IFPRI). Trade liberalization is only one of many facets of globalization. Globalization is about broad economic integration that involves capital flows, foreign direct investment, trade in services, immigration rules, and special treatment for the migration of highly skilled workers. Globalization gives strong incentives to firms to restructure and to change behavior. This in turn changes the way business is done.

Contrary to popular perception, trade as a proportion of world GDP is not much greater than it was at the beginning of the last century (Rodrick and Krugman). Other components of globalization tell a different story — movements of financial resources, to name one. Financial capital flows, often speculative, vastly exceed the value of trade flows (Table 1 and Rodrick).

The composition of trade is also different. Agricultural trade is increasingly dominated by high value products. Bulk commodities, which dominated much of colonial trade a century ago and led the boom in agricultural trade of the late 1970s, are now an increasingly smaller proportion of the value of trade (Henderson, Handy and Neff).

Firms have changed the way they participate in trade and the global economy. Market opportunities in the rest of the world contrast with the slow growth of mature markets in Europe and the U.S. This has encouraged firms in the food production and distribution industries, from Deere & Co. and Du Pont/Pioneer to McDonald’s and Wal-Mart, to emphasize global expansion strategies. Mergers and expansion have
led to highly concentrated industries (Connor and Sheik). Vertical coordination has increased, particularly across borders. Sales through subsidiaries, affiliates, or through alliances dominate trade as a way to go global (Henderson, et al.). Intra-firm trade and sales by affiliates abroad are also increasingly the market entry model for manufacturing, including the food processing and agricultural input industries (Table 2).

Globalization is more about firms finding innovative ways to cross borders and financiers making deals on their cell phones than it is about goods crossing oceans in boats. In spite of massive international capital flows and the perception of globalization as dominant in finance, we still have a home bias in consumption and investment (Obsfeld and Rogoff). We see low “net” capital flows in spite of larger “gross” flows — the exception being capital inflows into the U.S. as a safe haven following the Asian financial crisis. Exchange rates also tend to “overshoot” in adjustments they bring to changing conditions. Agriculture is recognized as one of the most flexible sectors, whose pricing is highly sensitive to exchange rate fluctuations (Rausser and Stamoulis).

Globalization is not uniformly manifest around the world. It is strongest in the U.S., Japan, Europe, and East Asia, followed by South America, Eastern Europe, and South Asia. In contrast, we see little in sub-Saharan Africa or the former Soviet Union.

Globalization has been spurred by the move toward more market-based economies. Some countries are embracing more market orientation in part because they have been subject to the golden strait-jacket enforced by the International Monetary Fund (IMF), World Bank, and conditions placed on U.S. Agency for International Development (USAID) funds (Friedman). These countries are forced to meet international conditions intended to reduce trade deficits and shrink international debt. International institutions, such as the World Trade Organization (WTO), increasingly influence domestic policy issues such as the environment, labor standards, and food safety. These actions represent the attempts of the powerful to impose their values on the less powerful, and mirror the actions of multinational corporations to impose their wills on local communities in different parts of the globe.

Globalization and more complete economic integration should, in theory, bring about more equality of income distribution (Winters, BenDavid). In fact, however, income distribution is becoming more unequal, in both developed and developing economies (Pritchett). In many countries during the process of integration, rural areas are increasingly left behind when the agricultural sector does not keep up with sectors that trade higher-value products. Within developed countries, unskilled and low-skilled labor comes under increasing pressure from low-cost labor in less developed countries. Some might explain increasing income divergence by arguing that we are only in the painful transition to a better world that will emerge after full integration. Others contend that multi-national firms have come to dominate globalization, and thus influence — if not dictate — the distribution of income.

---

Table 1. Balance of Payments - Trade and Investment Flows

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>226</td>
<td>394</td>
<td>775</td>
<td>1,003</td>
<td>460</td>
<td>122</td>
</tr>
<tr>
<td>Imports</td>
<td>245</td>
<td>495</td>
<td>1,224</td>
<td>991</td>
<td>343</td>
<td>98</td>
</tr>
<tr>
<td>Current Account Deficit =</td>
<td>2</td>
<td>-80</td>
<td>445</td>
<td>32</td>
<td>-117</td>
<td>21</td>
</tr>
<tr>
<td>Foreign Direct Investment</td>
<td>-2</td>
<td>12</td>
<td>136</td>
<td>-6</td>
<td>-24</td>
<td>4</td>
</tr>
<tr>
<td>Inflow</td>
<td>17</td>
<td>49</td>
<td>288</td>
<td>305</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Portfolio Investment</td>
<td>11</td>
<td>-7</td>
<td>144</td>
<td>-131</td>
<td>-36</td>
<td>-6</td>
</tr>
<tr>
<td>Inflow</td>
<td>14</td>
<td>22</td>
<td>269</td>
<td>252</td>
<td>47</td>
<td>-7</td>
</tr>
<tr>
<td>GDP</td>
<td>2,795</td>
<td>5,803</td>
<td>9,873</td>
<td>6,431</td>
<td>4,749</td>
<td>406</td>
</tr>
<tr>
<td>Gross Investment</td>
<td>484</td>
<td>847</td>
<td>1,778</td>
<td>1,372</td>
<td>1,197</td>
<td>113</td>
</tr>
<tr>
<td>% from Abroad *</td>
<td>0.4%</td>
<td>-9.4%</td>
<td>25.0%</td>
<td>2.3%</td>
<td>-9.8%</td>
<td>18.2%</td>
</tr>
<tr>
<td>% FDI - Inflows **</td>
<td>3.5%</td>
<td>5.8%</td>
<td>16.2%</td>
<td>22.2%</td>
<td>0.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>- Net **</td>
<td>-0.4%</td>
<td>1.4%</td>
<td>7.6%</td>
<td>-0.4%</td>
<td>-2.0%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Trade as a Share of GDP +</td>
<td>16.9%</td>
<td>15.3%</td>
<td>20.2%</td>
<td>31.0%</td>
<td>16.9%</td>
<td>54.3%</td>
</tr>
</tbody>
</table>

Figures are billions of current U.S. dollars.

Source: International Monetary Fund, International Financial Statistics

---

In spite of the move toward freer trade, there are still unexplained price differentials and incomplete transmission of prices across borders. These persist in the face of exchange rate movements (Knetter and Goldberg). Such “unexplained” price differentials between the U.S. and Canada, for example, are the equivalent of an additional 700 miles of transportation at the border (Knetter). Exchange rates also tend to “overshoot” in adjustments they bring to changing conditions. Agriculture is recognized as one of the most flexible sectors, whose pricing is...
Driving the Globalization Express

Why has globalization taken the shape we see today? Why has the agricultural sector only been a partial participant? Among the reasons: The information technology explosion has expanded the geographic reach of firms as well as lowering the costs of assessing consumer demands and delivering products from producers to consumers.

At the same time, firms have reaped the benefits of dramatic improvements in transportation, including logistics, scheduling, and delivery. Parts of the globe that could not previously obtain or supply products are now able to do so. A “global economy consumer” can get anything from fresh flowers grown in Holland to computer parts from Thailand — all based on just-in-time delivery. Equally important, advances in containerization, climate control, shock-proof packaging, and other technologies have dramatically improved speed to market, quality, and delivery reliability (USDA).

Lower transaction costs, due in part to more globally accessible information, make financial and speculative capital increasingly mobile. Firms’ ability to expand production and processing capacity and countries’ ability to finance government deficits are no longer necessarily constrained by domestic savings behavior.

Technology, including food production and processing as well as manufacturing technology, is less geographically bound. It moves across country borders more within firms through foreign direct investment (FDI) and subsidiaries, and less from direct international technology transfer or from organizations such as the International Rice Research Institute and similar institutions.

A New Playing Field

What is occurring is a rewriting of the parameters of comparative advantage. Globalization has the potential to narrow the gap between the productivity of those parts of the world that have traditionally dominated, by increasing the efficiency of new locations. This drives the growth of world-wide sourcing and selling strategies. The locus of production or manufacturing no longer is an important factor, and existing production bases no longer have a guarantee of survival. This is what fuels many of the objections to globalization.

The model used by the agricultural sector to enter international markets in part mirrors that used by manufacturing, but with some important differences for food processing and production agriculture (Table 2). Input industries look most like manufacturing, relying more on intra-firm trade and FDI to enter foreign markets. Food processing, on the other hand, exhibits a tendency to source raw materials abroad and rely more heavily on FDI for marketing and distribution. However, bulk commodities largely continue to be traded in “arms-length” transactions between unrelated firms.

Globalization actually encourages the industrialization of agriculture. The drivers of globalization — information, improved logistics, lower transaction costs, and more mobile capital — are allowing firms to profit by industrializing the last “cottage industry” sector of the economy. Globalization is lagging behind in most of production agriculture, relative to manufacturing and agribusiness.

Some countries are embracing more market orientation in part because they have been subject to the “golden straitjacket” enforced by the IMF, World Bank, and...U.S. Agency for International Development....

Making the World Safe for Ag Technology

The technology needs and biases of agribusiness also change with globalization. What is wanted by the big multinational players is applied research for adaptation, not basic research. Some of this is driven by food safety concerns and questions of acceptability for genetically modified organisms (GMOs) and hormones. Intellectual property rights and their enforcement overseas become a critical issue for those in the private sector doing agricultural research, and to those wanting exclusive rights to products. Concerns in these areas lie behind much of the controversy and criticism of agribusiness, including the push by the U.S. for increased GMO trade (and liberal rules), and for the use of “terminator genes” by seed companies.

The simplistic notion that free trade will provide continuing tangible benefits for production agriculture is being called into question (Ray). If agriculture is defined as raw commodity production, increased globalization (that is, trade liberalization) has done relatively little for producers. This is especially true in a world where one can obtain raw commodities nearly anywhere. Trade policy is being drawn into different arenas — such as environmental standards, labor standards, and human rights — that make reducing trade barriers more difficult.

We also see domestic agricultural policy running head on into globalization. Problems in agriculture may end up holding global trade negotiations hostage, as was the case when the U.S. attempted to open the Japanese rice market during the General Agreement on Tariffs and Trade Uruguay Round. Recent U.S. farm legislation (specifically, supplemental Agri-
cultural Market Transition Act payments) has brought the U.S. dangerously close to violating its own WTO commitments from the Uruguay Round.

The emphasis on counter-cyclical payments in the current farm bill proposals and the bills recently passed in the U.S. House of Representatives and the Senate contradict the 1994 agreement on agriculture and are inconsistent with U.S. proposals in ongoing WTO negotiations. Trade agreements often require little change when adopted, but were thought to prevent future administrations from backsliding on reform commitments. It appears U.S. farm policy may be caught by this constraint today, unless it chooses to abandon those commitments, as the October 2001 House version of the Farm Bill suggests (FAPRI).

Postscript: The World Since September 11

September 11 clearly has had an impact on globalization. The economic downturn, already underway, has been accentuated by the attacks and their aftermath. There will be major additional costs in logistics and in the movement of goods that will be internalized and passed on to consumers. This will slow the globalization process. However, other major forces driving globalization need not be impeded. The increasing use of foreign subsidiaries or partnerships to gain market access and source goods may expand faster to make up for some of the impediments to trade resulting from September 11.

Globalization is about all those things that affect the reach and influence of firms, as well as governments, as they expand their horizons internationally. If September 11 results in a war footing or bunker mentality for developed economies, there is the danger of a parallel to the retrenchment that followed both world wars (Kriegman). Globalization engenders increased international vulnerability. If threats or actions make this vulnerability dangerous, then those forces that drove globalization and increased vulnerability will lead governments as well as businesses to turn inward.

Phil Abbott, Mike Boehlje, and Otto Doering are Professors in the Department of Agricultural Economics at Purdue University.
Technological innovation and competition have led to improvements in supply chain management for food products. Supply chain improvements reduce inventories, waste, and costs, and thus increase efficiency within the firm and the market channel.

Achieving these gains requires mobility and flexibility in the scheduling and location of production processes, inventories, and distribution. This can be achieved through supportive and cooperative supplier-buyer relationships sometimes called “vertical coordination.”

Inventory management in production agriculture, however, is a special challenge. Inventory and production decisions lag behind demand signals because of the lead time required, and products are usually perishable. The objective of this article is to discuss the impact of delivery schedules on the inventory management of the Florida Dairy Marketing Cooperative (FDMC).

The Dairy Case

The FDMC uses full supply contracts to provide farm or unprocessed milk to fluid milk processors. Processors place orders with the FDMC for varying daily quantities of milk, to be delivered in the following week. Processors may also order additional deliveries or cancel already scheduled deliveries with 24 hours’ notice. The FDMC buys and sells unprocessed milk when it is unable to maintain optimal inventory levels from local member production.

FDMC sells surplus milk to manufacturers of butter, cheese, and non-fat dry milk, receiving four to five dollars per hundredweight less than milk sold to Florida fluid milk processors. This price is further reduced by the cost for transporting the milk to manufacturers in other states.

When inventory levels are low, the FDMC buys milk from non-FDMC members at a premium of one to eight dollars above that paid by Florida fluid milk processors. The FDMC negotiates with processors to offset part or all of the higher prices.

The length of time unprocessed milk can remain in inventory is tightly regulated by state and federal agencies. The FDMC has 72 hours to deliver milk to a fluid milk processing plant. The fluid milk processor then has 72 hours in which to produce packaged fluid milk products, which must be sold to consumers at retail before the “sell by date” stamped on the package by processors.

Weekly Delivery Schedules

Some processors negotiate to receive milk on a “non-continuous” basis, or fewer than seven days per week. Seven-day delivery schedules may not be any easier to manage — the quantity of milk delivered often differs from one day to the next, in such a “continuous non-uniform” schedule.

During the 1990s, the FDMC encouraged processors to accept deliveries of milk on a continuous uniform (equal quantities delivered seven days per week) schedule by offering a price incentive ($0.35 per hundredweight as of 1998). However, a continuous non-uniform schedule evolved over time, even though the price discount remained in effect. This served to raise inventory management costs without increasing revenue.
Non-continuous and non-uniform milk delivery involve additional transportation, storage, transaction, and management costs to the FDMC. For example, compare two of many possible delivery schedules with a benchmark schedule. The benchmark schedule represents the least-cost or "natural" timetable for the FDMC deliveries, where uniform quantities of milk are delivered to processors every day. The two alternative schedules consist of a non-continuous uniform schedule and a continuous non-uniform schedule. All three schedules deliver the same volume of milk.

### Delivery Costs Tabulated

The table shows the additional transfer costs associated with a non-continuous uniform delivery schedule. A total 193,920 hundredweight of milk (57.14 percent of average total weekly volume) moved under this schedule. Compared to the benchmark schedule, total transfer costs increased by $0.1067 per hundredweight, or $36,217 per week at the time (1998) of this analysis. Fixed costs represented almost two-thirds of this increase. Variable costs increased by $0.0370 per hundredweight.

The seven-day non-uniform schedule resulted in a much smaller cost increase of just $4,752 per week for the FDMC, because only 27,360 hundredweight were in inventory. As a result, the cost increase on a unit basis was only $0.0140 per hundredweight.

### Summary and Conclusions

Technological innovations and competitive pressures have encouraged retailers and processors to improve supply chain management for agricultural products. This often requires more refined vertical coordination and inventory management between stages in the market channel. Inventory management in production agriculture, however, is a challenge because producers must set production well before they can determine actual demand.

We found that a non-continuous (five-day) delivery schedule with uniform deliveries increases transfer costs for the dairy marketing cooperative by $0.1067 per hundredweight of total milk volume. A continuous non-uniform delivery schedule increased transfer cost by $0.0140 per hundredweight.

Over time, the movement from a five day to a seven day delivery schedule has reduced the costs associated with inventories and has increased the freshness of inventory at the processor level, demonstrating that supply chain management can have an impact on the FDMC and its members.
GLOBALIZATION IS GOOD: Amartya Sen talks about a popular theme by saying, “[Globalization] is, in fact, neither new nor necessarily Western; and it is not a curse. Over thousands of years, globalization has contributed to the progress of the world through travel, trade, migration, spread of cultural influences, and dissemination of knowledge and understanding (including that of science and technology). These global interrelations have often been very productive in the advancement of different countries. They have not necessarily taken the form of increased Western influence. Indeed, the active agents of globalization have often been located far from the West.” Sen, A. “Global interchange is good; but the present set of global rules needlessly hurts the poor.” The American Prospect, Special Supplement, Winter 2002, pp. 2-6.

WHOSE PROPERTY RIGHTS? Cole and Grossman get right to the point by saying, “Law & Economics has become a highly successful interdisciplinary field for several reasons, including the fact that public policy issues invariably arise at the intersection of law and economics. Those issues can only be fully understood by scholars willing to cross disciplinary boundaries. To facilitate interdisciplinary contact, the economists and legal scholars who comprise Law & Economics have endeavored to construct a common conceptual apparatus and vocabulary. The endeavor has not been completely successful, however. Economists have not been able to agree among themselves, let alone with legal scholars, on a common, consistent definition of property rights.” Cole, Daniel H., and Peter Z. Grossman. “The Meaning of Property Rights: Law vs. Economics.” Land Economics, in press.

DISTANCE STUDENTS ONLINE: Kazmer and Haythornwaite say, “Increasing involvement in an online environment is more complicated than a simple, unconscious transfer of attention from offline time. Students actively prioritize what and who needs to be dealt with first…Children get high priority, but spouses, parents and friends have to wait. Personal entertainment [is] dropped and household chores are left until later. … Work — paid work — fades to the background.” Kazmer, M.M. and C. Haythornwaite. “Judging Multiple Social Worlds: Distance Students Online and Offline.” American Behavioral Scientist. 45(November, 2001):510-530.

IMMIGRANTS VOTE WITH THEIR FEET: Borjas says, “Migration costs prevent many native-born workers from moving to those states that offer the best economic opportunities. Immigrant workers, in contrast, form a self-selected sample of persons who have chosen to incur those migration costs. As long as migration costs are mainly fixed costs, newly arrived immigrants in the United States will choose to live in those states that offer them the best economic opportunities. As a result, new immigrants should be clustered in those states that offer them the highest wages, and the location decisions of immigrant workers should be much more responsive to interstate wage differentials than those of natives.” Borjas, G.J. “Does Immigration Grease the Wheels of the Labor Market?” Brookings Papers on Economic Activity, William C. Brainard and George L. Perry, ed., 1(2001), p. 69.

AGRICULTURAL ECONOMICS IN AUSTRALIA: After 35 pages of narrative on the recent history of Agricultural Economics in Australia, Godden closes by saying, “Writing history (like doing economics) reveals as much about the writer as it does about the subject. While some of the limitations of the preceding story stem from the lack of readily available information, others stem from the limitations, perspectives and prejudices of the writer. Some, perhaps many, readers will disagree with part — or perhaps much — of the account. Unlike neoclassical economics, where the conclusions are mere logical consequences of the assumptions chosen, there is no unique historical narrative or analysis, especially within the confines of a single journal article.” Godden, D. “Elegy, ode or panegyric? Practicing agricultural economics in Australia.” The Australian J. of Agricultural and Resource Economics 45(March 2001):5-38.

TAXING THE LAND: Netzer revives an old theme by saying, “[Henry] George attracted many followers with the proposition that land value taxation would alleviate poverty and the unequal access to economic resources. Economic theory and even superficial observation suggest that this must be so…. But how much is this so, in our world, where two-thirds of households are owners of the urban land under their houses and people of moderate means have substantial ownership … of corporate assets, including land and other natural opportunities? To the extent that the proposition is true (that the poor own few assets), a shift from a relatively proportional national tax system to land value taxation … would make the distribution of tax burdens by income class more progressive.” Netzer, D. “What Do We Need to Know about Land Value Taxation?” The American J. of Economics and Sociology. 60( Supplement 2001):97-120.
As this issue of CHOICES goes to press, Congress, the Bush administration, and several powerful interest groups are debating the next Farm Bill. The policy debate centers on disagreements about who should benefit from the bill, and for what they should benefit. On one hand, the House has passed legislation that would pump $170 billion in payments to commodity producers over 10 years, thus embracing the decades-old objective of mitigating risk for a handful of large operations. On the other hand, the administration and several senators from both parties have proposed versions of an overhaul that emphasize greater equity among producers, conservation incentives, and rural development.

More than ever before, this round of farm policy debate reflects major changes in the value America places on its rural citizens and communities. Take the example of Paul Romrell, whose family has been farming within sight of the Grand Teton mountains since 1901. His story is familiar in U.S. agriculture. He stays in farming by piecing together several sources of income — from his job as county coroner, and from raising potatoes, cattle, and grain (for which he receives program payments that make up about 10 percent of total farm revenue).

What makes this story important is that when potato prices recently took a nose-dive, Mr. Romrell held on to the farm by selling something the nation's urban residents value more than potatoes. He enrolled half his farm in USDA's Wetland Reserve Program. In return for a permanent conservation easement on the land, he received a lump sum payment and is partially reimbursed for maintenance expenses. He manages the restoration of wetlands and wildlife habitat himself.

Mr. Romrell is blunt about what the restoration payment has meant. “We could not have kept the farm without the wetlands program.” Consequently, a farm that’s been in the family for four generations remains an economically viable business, at least for a time. Equally important, the more marginal farmland that went into the program will not be sold to developers eager to get their hands on this scenic piece of Idaho real estate.

Enrollment in the wetlands program is currently capped at 1,075,000 acres, so the Romwell story is uncommon. Nevertheless, it symbolizes a profound change in how this nation is beginning to think about agricultural policy and the broader issues related to the survival of rural America.

Consider where policies of the past — not to mention world markets of today — have taken us. Just two percent of the nation’s farms produce half of all food and fiber. Between 1996 and 1998, federal subsidies for farmers totaled $22.9 billion, and just 144,000 participants received 61 percent of the money. Only two percent of rural residents are engaged in farming as their primary occupation. Ninety percent of farm family income comes from off-farm sources.

Past policies have succeeded in encouraging efficient production of an abundant food supply and low prices but not in ensuring farm household income or in strengthening rural America. The old way of thinking is out of touch with the reality of today’s diverse rural America, where regions that depend most heavily on agriculture lag other rural areas in terms of population and job growth, where pockets of poverty have little economic activity at all, and where urban-adjacent and high-amenity rural places face challenges related to growth rather than decline.

Policy in touch with today’s rural America would focus on issues related to efficiency and new competitive advantages, as well as equity and public goods. It would be place- rather than sector-based. It would support investment in human capital, entrepreneurship, risk taking, and advanced communications infrastructure. As European rural policy does, it would support local and regional initiatives and institutions. And it would give urban America something in return — not only affordable food and fiber but also heritage, recreation opportunities, environmental benefits, and healthy, well-educated young adults who may well move to cities in the future.

The Senate and Bush administration have proposed an important new direction in agricultural policy. Now let’s see equivalent innovation and courage around rural policy.

Priscilla Salant is Adjunct Professor in the Department of Agricultural Economics and Rural Sociology at the University of Idaho. Karl Stauber is President of the Northwest Area Foundation in St. Paul, Minnesota.
Letters to the Editor

Editor:

Thank you for publishing our work on beef markets in the Third Quarter, 2001 issue of CHOICES magazine. We find two serious errors in the published article that were not in the earlier drafts. These errors will be misleading to uninformed readers.

The graph that opens the article (page 30) compares the historic prices obtained by four exporters, the U.S., Australia, Argentina, and Uruguay. The title of this chart in our manuscript was, “Average price of fresh beef exports for major world exporters, U.S.$FOB/ton (in 2000 constant dollars using U.S. PPI).” The published chart shows the title as, “Beef Exports, selected countries. 1980-1999.” This title is misleading because the chart shows prices; not quantities exported. The prices shown on the vertical axis are expressed in dollars (F.O.B. price) per ton of fresh beef.

Further, the note placed next to the chart will lead to even more confusion. It says, “Argentina and Uruguay are fast becoming powers in the beef export market, with Argentina often exporting more beef than the U.S. in several recent years.” The statement is inaccurate. Argentina last exported more beef than the U.S. in 1983, nearly two decades ago.

Sincerely,

Lovell (Tu) Jarvis, Jose E. Bervejillo, Javier Ekboir,
Daniel A. Sumner, William Sutton

CHOICES apologizes for the errors and any misinterpretations or misunderstandings that they may have caused. — PWB

Editor:

Ken Tefertiller’s article, “Environmental Racism and Jobs: Where You Stand Depends on Where You Sit,” (Q3) is thought provoking and filled with policy questions that developmental economists and environmental groups should be debating. The author’s use of indifference curves to analyze these trade-offs is intriguing. The analysis illustrates one possible case but not all situations and therefore may lead to inappropriate conclusions. A poor person’s indifference map may be arranged so that ... the preferred point of consumer equilibrium is ... where the quantity of preferred environmental services is greater than those preferred by the rich person.

However, every individual, rich and poor, can be said to have an indifference or preference map which is identical to that person’s welfare map. As Tefertiller asserts, all budgets situated on the same indifference curve for that individual are equivalent; all budgets lying on a higher indifference curve are preferred. A rich individual ... can consume a greater quantity of environmental services and all other goods than the poor person.

This is precisely where Tefertiller’s illustration breaks down. He has made a transition from individual to group welfare in his indifference maps, where he conveniently groups relatively high-income consumers into a single indifference curve and all relatively low-income consumers into another lower indifference curve.... He reaches his appealing conclusion by constructing social welfare functions — functions that he labels “indifference curves.” The problem is, he assumes every poor person has an identical preference map to that of every rich person.

He does, however, illustrate in a very real way the potential unintended side effects of policy changes that are shaped by those who presume to be acting on behalf of the common good. As Dan Bromley so aptly states, “economists can make a contribution by the questions asked rather than the answers provided.” The question posed in the Tefertiller article — “who really pays environmental program costs?” — is an appropriate question for economists to pursue using economic theory and empirical methods.

Sincerely,

Roger J. Beck, Professor
Southern Illinois University

Editor:

CHOICES is often far more lively, controversial, and interesting than I would have suspected. Thanks for including me on the mailing list.

As an organic farmer for the past 14 years, with 24 years of business and military management experience prior to that, it continues to amaze me how academia typically has treated organic ag as a form of leprosy — something to ignore or occasionally abuse, but rarely to observe in a scientific spirit of inquiry. Happily, that has changed just a bit in the last few years.

One of the central myths about organic ag surfaced again in Dr. [Luther] Tweeten’s letter to the editor in the third quarter 2001 issue — that is, that organic production is inherently less productive than high-input ag. ...[T]hat simply is not true: many farmers around this country have been reporting consistent organic results at or ahead of county averages since the ’80s.

...[M]ost recently, Dr. Bill Liebhardt of the University of California at Davis, in the Summer 2001 issue of the Organic Farming Research Foundation’s Information Bulletin...summarized that, “for a total of 154 growing seasons for different crops, grown in different parts of the US on both rain-fed and irrigated land, organic production yielded 95% of crops grown under conventional high-input conditions.” That was across the board. There were crops and long term organic farms that did 100% or better than the average, suggesting that the longer one farms organically, the better the results.... [T]here is much anecdotal evidence to support such a conclusion. I believe the full text of this article...is still on the Research Foundation’s website, www.ofrf.org. Organic methods are well worth academia’s interest: not only are they productive, but they help in many ways successfully to put the farmer back in charge of his destiny.

Sincerely,

Bob Gregson
Island Meadow Farm, Vashon Island, WA
Member, King County Ag Commission