ERS Information

News on agriculture, food, the environment, and rural America

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Amber Waves *June 2003*

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Amber Waves magazine covers the full range of the agency's research and analysis, including the economics of agriculture, food, rural America, trade, and the environment. ERS publishes *Amber Waves* five times a year (in February, April, June, September, and November) both in print and on the Internet.

China's Growing Affluence: How Food Markets are Responding

The growth of supermarkets, restaurants, other retail food stores, food processing and marketing industries signals the advent of a consumer-driven food sector in China. The rapid changes underway in the country's food sector are opening new market channels for food exports to China and upgrading China's competitive potential in world markets. *H. Frederick Gale; (202) 694-5215; fgale@ers.usda.gov*

Plant Genetic Resources: New Rules for International Exchange

Plant genetic resources (also called germplasm) are critical to meeting rising public expectations concerning the quantity and the quality of food. All crops descend from wild and improved genetic resources from around the world. To make crops more resistant to pests and diseases and to improve other attributes, modern plant breeders must continually seek new genetic resources from outside the stocks with which they routinely work. To assure the preservation of diverse germplasm, some of which is endangered, and to facilitate equitable international exchange of germplasm, delegates from 116 countries voted in November 2001 to approve a new United Nations International Treaty on Plant Genetic Resources for Food and Agriculture. The treaty is certain to have effects on the United States, which has the largest national germplasm collection in the world and the largest investment in plant breeding. *Kelly Day-Rubenstein; (202) 694-5515; kday@ers.usda.gov*

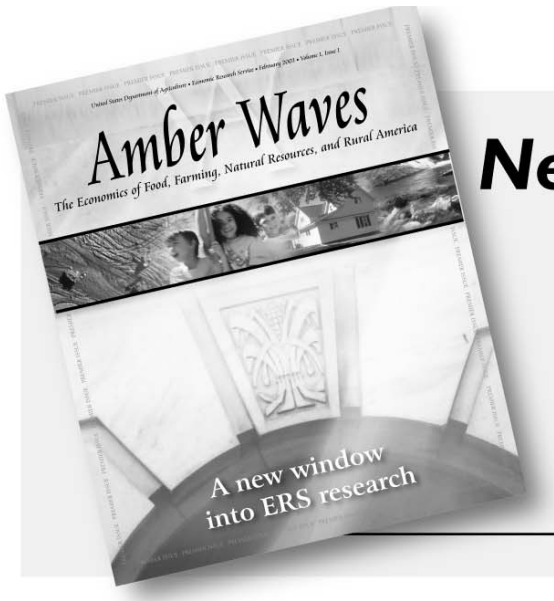
Aiming for Targets, Saving on Arrows: Insights from Two USDA Food Assistance Programs

The article describes four types of targeting decisions that are made in either the design or the administration of a food assistance program. It summarizes recent ERS research that examined benefits targeting (providing greater program benefits to households that have the lowest incomes) and operational targeting (low administrative and food procurement expenses). One study found that WIC cost-containment practices in six States were relatively inexpensive to administer and reduced food costs with few adverse impacts on WIC participants. Another study examined the effects of a reduction in a U.S. Department of Agriculture (USDA) subsidy for the meals that are generally served to higher income children (Tier 2 meals) in the Child and Adult Care Food Program. The subsidy reduction targeted program benefits more intensively on low-income children, as designed. *Mark A. Prell; (202) 694-5408; mprell@ers.usda.gov*

Rural Welfare Reform: Lessons Learned

Welfare reform has helped move many poor single mothers from welfare to self-sufficiency, but this successful transition depends in part on where welfare recipients live. A less positive picture emerges for some rural recipients, especially those in the poorest and most remote rural areas. *Leslie A. Whitener; (202) 694-5444; whitener@ers.usda.gov*

Inside



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How to Obtain a Report

The ERS reports and periodicals featured in this newsletter can be found at our Website—***www.ers.usda.gov***—by typing the publication url we've provided into your browser's address line or by typing the first four or five words of the report title into Search on our front page.

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Manure Management for Water Quality: Costs to Animal Feeding Operations of Applying Manure Nutrients to Land *(AER824)*

www.ers.usda.gov/publications/aer824
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U.S. farmers are world leaders in the production of animal products. But in supplying households with hamburgers, pork chops, and ice cream, livestock and poultry farms also generate more than 350 million tons of manure that must be disposed of every year. When used as a fertilizer, livestock and poultry manure can provide valuable organic material and nutrients for crop and pasture growth. However, those same nutrients—nitrogen and phosphorus—can degrade water quality if they are overapplied to land and enter water resources through runoff or leaching. A shift in the livestock and poultry industry over the past several decades toward fewer, larger operations and toward regional concentration has prompted public concern over the use and disposal of animal manure.

What Is the Issue?
Animal feeding operations identified as CAFOs (concentrated animal feeding operations, generally the largest) under the Clean Water Act are considered a point source of water pollution. As such, they are required to obtain a permit and show that they are not discharging waste into surface waters. In 2003, EPA further required that each CAFO develop and implement a nutrient management plan. Manure spread on land (the primary disposal method) must not be applied at greater than agronomic rates, or rates that oversupply nutrients to crops or other vegetation. In addition to these new requirements for CAFOs, USDA's stated goal is that all animal feeding operations develop and implement technically sound, economically feasible, and site-specific nutrient management plans.

Farmers are concerned that meeting a plan's requirements increases the costs of managing manure—developing a nutrient management plan, recordkeeping, testing the nutrient content of manure and of soil receiving manure, and possibly transporting and applying manure to more land. In this report, we examine how much costs increase and how net returns and prices adjust as a result. If animal operations are overapplying manure nutrients, the cost of moving manure to additional land can become a major expense. The availability of nearby land off the farm for spreading manure becomes a major concern for animal operations without enough land of their own.

How Was the Study Conducted?
We use survey data for hogs and dairy to estimate the short-term, farm-level implications of applying manure to land according to a nutrient management plan across U.S. regions. This analysis best captures the interactions between a farm's resource base and manure disposal decisions, including how much land livestock farms would require beyond what they currently control, as well as the cost of hauling manure to this land. Both nitrogen and phosphorus-based nutrient standards are assessed.

In some areas of the country, animal operations have become concentrated and land availability for spreading manure is insufficient. A regional model for minimizing manure transportation and spreading costs is developed and used to examine how the competition for land on which to spread manure influences the costs of spreading manure.

The impacts of a national policy are felt across regions, and these impacts can be transferred across the economy through the market system. We assess the broader impacts of improved manure management on the welfare of U.S. producers and consumers with a model of the U.S. agricultural sector. We estimate the impacts of meeting nutrient application plans on agricultural prices, crop and animal production, and the geographic distribution of production.

What Did the Study Find?
Meeting nutrient application standards will require CAFOs to spread their manure over a much larger land base than they are currently using, and most will need to move their manure off the farm. For example, only 18 percent of large hog farms and 23 percent of large dairies are currently applying manure on enough cropland to meet a nitrogen nutrient plan. Even if large hog farms spread manure over their entire land base, only 20-50 percent operate enough land to meet land application standards, depending on whether a nitrogen- or phosphorus-based plan is to be met. Similar results would be expected for beef and poultry.

Total livestock/poultry farms' annual net income could decline by more than $1 billion (around 3 percent), but the precise outcome depends greatly on the extent to which cropland operators are willing to substitute manure for commercial fertilizers, and the degree to which revenue from sales of higher priced animal products mitigates increases in production costs.

Competition for land on which to spread manure could be severe in regions with high concentrations of animals. Animal feeding operations in 2 to 5 percent of U.S. counties produce more manure nutrients than can be absorbed by total cropland and pasture in each county. Those counties are primarily in North Carolina, States surrounding the Chesapeake Bay (Virginia, Maryland, and Delaware), Southeastern States (such as Georgia, Alabama, and Arkansas), and in California. Operations in those regions would have to compete for land if all manure is to be spread at agronomic rates. This could extend travel and raise costs.

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Comparisons of Metropolitan-Nonmetropolitan Poverty During the 1990's *(RDRR96)*

www.ers.usda.gov/publications/rdrr96

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Understanding how poverty is distributed across areas can help to target and improve the efficiency of poverty reduction policies. Although it is well documented that poverty is more prevalent in nonmetro areas, very little research examines whether poverty is more severe in these areas. This report examines differences in poverty between U.S. metropolitan (metro) and nonmetropolitan (nonmetro) areas throughout the 1990s.

There are many indexes of poverty, each providing different insights into its nature. The most common is the share of population living in poverty, often referred to as the headcount index or incidence of poverty. Two other measurements are examined in this report: the poverty gap and squared poverty gap indexes. The poverty gap index is considered to measure the depth of poverty because it is sensitive to changes in the average income of the poor. The squared poverty gap measures the severity of poverty because it is sensitive to changes in the inequality of income distribution of the poor.

The usefulness of these measures can be illustrated by a transfer of money from a rich person to a poor one. If the transfer is insufficient to lift the poor person out of poverty, it has no effect on the headcount index. It has, however, raised the income of the poor person, and this improvement in well-being is reflected in a reduction of both the poverty gap and squared poverty gap indexes. As another example, a transfer of income from a poor person to a poorer person will alter neither the headcount nor the poverty gap index, but it does improve the distribution of income among the poor, and so reduces the squared poverty gap index.

Previous research has shown that the nonmetro headcount index was 2.6 percentage points higher than the metro poverty incidence in the 1990s. Using Current Population Survey (CPS) data from 1991 to 2000, this report confirms that result, and further shows that this difference is highly significant statistically throughout the 1990s.

This study extends the literature on U.S. poverty in two ways. First, to test for statistical significance, it derives estimates of sampling variance for any additively decomposable poverty index. Through incorporating results from the well-established literature on sampling, the estimates of sampling variance for the poverty indexes are corrected for sample design characteristics. In the international literature on poverty measurement, the importance of this methodological issue has been established, but in the U.S. literature, the importance of the correction has not been well recognized. The results of the study show that across the 60 poverty estimates considered (the 3 indexes estimated over 10 years for metro and nonmetro areas), the correction for sample design characteristics more than doubles all standard errors. The implication is that poverty estimates based on unadjusted standard errors will underestimate confidence intervals by more than half the true size.

Second, this study shows that the magnitude and significance of metro-nonmetro differences in poverty are sensitive to the measure of poverty considered. While the nonmetro incidence is larger than the metro rate in all 10 years of the 1990s, the depth of poverty as measured by the poverty gap index is significantly higher statistically in only 6 of the 10 years. In terms of the severity of poverty, the squared poverty gap index is higher in nonmetro areas during only 3 of the 10 years. These results suggest that the observed metro-nonmetro differences in poverty during the 1990s (as measured by the headcount index) are not robust to alternate measures of poverty.

ERSnippets

View the updated **State Export Data,** which provide annual estimates of U.S. exports by State and commodity group based on each States' share of U.S. agricultural production. Visit www.ers.usda.gov/data/stateexports/

The **Interstate Livestock Movements Data** set is a one-time collection of annual shipment data compiled from USDA's National Agricultural Statistics Service (NASS) and State animal health departments. The data include total numbers of cattle, hogs, and sheep shipped into States (10 years of annual data from NASS), as well as an annual approximation of state-to-state and regional livestock flows (2001, from State animal health departments). Find this data set at www.ers.usda.gov/data/interstatelivestockmovements/

Conference on WTO: Competing Policy Issues and Agendas for Agricultural Trade. On Wednesday, September 17, from 8:00 a.m.-5:30 p.m., ERS and the Farm Foundation will convene researchers, policymakers, and industry representatives to address current trade policy issues and their implications. In addition to the World Trade Organization (WTO) negotiations, other trade policy developments such as proliferation of bilateral free trade agreements and enlargement of the European Union are likely to have lasting impacts on agricultural producers, consumers, industry, and global food markets.

Attendance is limited to the first 100 to register. Advance registration required.

For more information, visit www.ers.usda.gov/features/wto/conference

Linking Land Quality, Agricultural Productivity, and Food Security *(AER823)*

www.ers.usda.gov/publications/aer823

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As rising populations and incomes increase pressure on land and other resources around the world, agricultural productivity plays an increasingly important role in improving food supplies and food security. Agronomic studies and conventional wisdom have long recognized that land quality affects agricultural productivity, but it has been difficult to disentangle land quality's effects from those of other factors, such as changes in input use. Advances in spatially referenced data and geographic information systems offer new insights on land quality's role in shaping patterns of agricultural productivity and food security.

First, econometric analysis using new data on soils and climate, and controlling for the effects of agricultural inputs and other measures of resource quality, confirms that differences in land quality contribute to significant differences in agricultural productivity among countries. Some of these differences can be mitigated (e.g., by increasing fertilizer use to reduce or reverse soil nutrient depletion in Sub-Saharan Africa), but others may not be reversible at reasonable economic or environmental cost.

Second, land degradation appears to generate productivity losses that are relatively small on a global scale (although their relative importance may increase if productivity growth continues to slow). New estimates of productivity losses are consistent with the lower range of previous estimates. For example, potential yield losses to erosion estimated in the soil science literature average 0.3 percent per year across regions and crops. These estimates focus on biophysical relationships in the absence of behavioral response; actual yield losses will be lower to the extent that farmers act to avoid or reduce these losses.

Third, farmers' responses to land degradation affect how potential impacts on yields may translate into actual impacts on agricultural productivity. Econometric and simulation analyses show how differences in land tenure and other factors that affect farmers' planning horizons combine with differences in land quality to influence farmers' decisions to adopt practices that reduce erosion and nutrient depletion. Actual losses under optimal practices will typically be lower than potential losses derived from agronomic studies. Actual losses under optimal practices are difficult to estimate but are generally less than 0.1 percent per year in the north-central United States.

These findings do not imply that degradation-induced yield losses are unimportant—just that they have historically been masked by yield growth (which has averaged over 2 percent per year in recent decades for the world as a whole) spurred by improvements in technology and increases in input use. Degradation-induced yield losses may become more significant in relation to yield growth in the future, as yield growth rates are projected to fall below 1 percent per year over the next few decades. Land degradation's effects on productivity are likely to be more severe in some regions and local areas, due to a combination of resource factors (terrain, soils, and precipitation) and economic factors (poverty, tenure insecurity, and lack of infrastructure).

Finally, land degradation's impacts on productivity may affect food security in some areas both through losses in aggregate production (and thus higher food prices for all consumers) and through losses in income for those who derive their livelihoods from agricultural land or agricultural labor. Model results suggest that the number of people with nutritionally inadequate diets in low-income developing countries would decline by 5 percent if average annual yield losses to land degradation in those countries were reduced from 0.2 percent to 0.1 percent over the next decade. Such improvements would contribute to meeting the 1996 World Food Summit objective of halving the number of undernourished people in the developing world by 2015 but would not be sufficient to meet the Summit goal entirely.

These results suggest that when markets function well, private incentives to reduce land degradation are generally sufficient to address onfarm productivity losses. When markets function poorly (e.g., when property rights are insecure or credit is expensive or unavailable), private incentives to address productivity losses are diminished. In either case, private actions are unlikely to adequately address land degradation's other, and perhaps more significant, effects: offsite impacts on both economic performance and environmental quality. Priorities for further progress in understanding and addressing the links between resource quality, agricultural productivity, and food security include targeted improvements in data, analysis, technology development, and policy.

Exploring Food Purchase Behavior of Low-Income Households: How Do They Economize? *(AIB747-07)*

www.ers.usda.gov/publications/aib747

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Walking down the aisles of a supermarket, low-income shoppers must consider a number of factors including quantity, price, quality, and nutritional differences when selecting food products. Food purchase decisions by the poor often entail tradeoffs among taste, preference, and quality factors—either real or perceived—to meet spending constraints. Within broad product categories such as cereal, cheese, meat and poultry, and fruits and vegetables, shoppers can choose among many substitutable products. This *Current Issues* investigates the food purchase behavior of low-income households, contrasting it with that of higher income households, in order to get a better understanding of the economizing practices of the poor.

Low-income shoppers can stretch their food dollars in a number of ways: they may shop in discount foodstores; they may purchase and consume less food than higher income shoppers; they may purchase low-priced (and possibly lower quality) food products; or they may rely on some combination of all three. A better understanding of how the poor economize in food spending addresses important policy questions raised by researchers, nutrition educators, and food assistance program managers. Understanding food choices of the poor, for example, is critical to the success of policies that provide educational material on consequences of alternative dietary intakes.

Whether the poor face significantly different food prices due to where they shop for food remains an unresolved empirical question. Extensive research has accumulated over the years trying to answer the question: "Do the poor pay more for food?" In 1997 ERS reviewed the results of studies comparing price differences in grocery stores across different income levels and combined these with current census data on the distribution of low-income households by urbanization type. The ERS study concluded that, in general, the poor face higher prices due to their greater representation in urban and rural locations (as opposed to suburban locations), where food prices tend to be higher.

Based on results from household surveys, ERS also found that despite facing higher prices, low-income shoppers spend less than higher income shoppers for food purchased in foodstores. Due to their level of aggregation and lack of instore sales and promotion information, such surveys cannot shed much light on the economizing practices of households. To learn more about how low-income shoppers spend less for food despite facing higher prices, we obtained foodstore purchase data that incorporate per-capita quantity and expenditure measure equivalents (household measures adjusted for household size) across income levels. The resulting comparisons describe how individuals with different levels of income vary in their food-spending patterns. By using actual transaction data, we obtained detailed information about the product purchased (for example, price, product description, package size, and brand name) as well as the condition of purchase (promotion, coupon, or sale item). From these, we calculated the average unit cost (per ounce, per pound) for each item.

This report compares food purchases by U.S. households of different income levels and finds that low-income shoppers spend less on food purchases despite some evidence that they face generally higher purchase prices. Households can economize on food spending by purchasing more discounted products, favoring private-label (generic) products over brand, pursuing volume discounts, or settling for a less expensive product (for example, less lean beef) within a product class. A 1998 sample of foodstore purchase data shows that low-income households adhere to these practices when possible, but that the typically smaller size of foodstores in urban and rural locations may sometimes preclude them from doing so.

Manure *Continued from page 3*

Crop producers' willingness to accept manure is a very important determinant of manure spreading costs. In all analyses, costs decrease when more crop operators are willing to use manure. A number of factors impede greater use of manure, including uncertain nutrient content, soil compaction associated with heavy manure application machinery, and odor. Research on how these impediments might be overcome, education assistance on the benefits of using manure, and financial assistance for crop farmers using more manure could reduce farmers' manure management costs and secure better water quality.

The costs of complying with manure management requirements could instigate structural and geographical shifts in the livestock and poultry sectors. Our analysis indicates that the highest per-unit costs for meeting a nutrient-based manure management plan are often borne by the largest operations. Sectors such as swine and poultry have seen a significant move toward integration, the use of production contracts, and larger farms, primarily because of the efficiencies these structural changes bring. The impacts of manure management costs on the potential benefits from this structure could influence whether such trends continue, whether smaller operations (non-CAFOs) not affected by current regulations become more competitive, and the degree to which location will be considered in expansion decisions.

Also Off Press

Find the latest ERS outlook reports on the web at: www.ers.usda.gov/publications/outlook

In addition to the reports fully summarized in this issue of ERS Information, the following reports were recently released.

Agricultural Exports From Grain and Soybean Producing States Rose in Fiscal 2002 (6/30)
Fiscal 2002 U.S. agricultural exports rose slightly from 2001. Most of the gain occurred in soybeans, feed grains, and wheat, as prices of those commodities increased. As a result, soybean and feed grain or wheat exporting States, such as Illinois, Iowa, Kansas, Nebraska, and Indiana, increased exports in 2002.

Interstate Livestock Movements (6/26)
Hog inshipments have increased dramatically since the early 1990s and now surpass cattle inshipments. The dominant flow in hog shipments is into (and within) the Corn Belt. Cattle inshipments have declined slightly since the early 1990s. Movements of cattle occur throughout the United States, but especially into (and within) the Northern and Southern Plains.

Vegetables and Melons Outlook (6/20)
Per capita consumption of all vegetables and melons (on a fresh-equivalent basis) is expected to increase 1 percent to 445 pounds in 2003—up about 6 pounds from 2002. Gains are expected to be spread across fresh and processing items, led by potatoes, tomatoes, and sweet corn.

Floriculture and Nursery Crops Yearbook Summary (6/18)
While grower sales of floriculture crops increased 1.6 percent in 2002 from 2001, nursery crop sales fell by a marginal amount. Together, floriculture and nursery crops, also known as the green industry, reached $13.8 billion in sales in 2002, up from $13.7 billion in 2001.

Livestock, Dairy, and Poultry Outlook (6/17)
The recent discovery of bovine spongiform encephalophathy (BSE) in Canada resulted in the United States placing a ban on imports of ruminant animals and products from that country as of May 20. Due to the uncertainties as to the length of the ban, the impact of BSE in this report is limited to impacts of the ban through June 11.

U.S. Agricultural Trade Update (6/16)
Fiscal 2002 U.S. agricultural exports rose slightly from 2001. Most of the gain occurred in soybeans, feed grains, and wheat, as prices of those commodities increased. As a result, soybean and feed grain or wheat exporting States, such as Illinois, Iowa, Kansas, Nebraska, and Indiana, increased exports in 2002. North Dakota particularly benefited from increased wheat exports.

Feed Outlook (6/13)
Forecasts for U.S. corn exports remain unchanged for 2003/04 but drop 1.0 million tons to 41 million for October-September 2002/03 because of sluggish sales and shipments. This year Argentina and Brazil have been marketing and shipping corn at a faster rate than previously expected, boosting their forecast corn exports 0.5 million tons each.

Wheat Outlook (6/13)
Projected U.S. 2003/04 ending stocks of wheat are up 93 million bushels from last month due to larger supplies and unchanged use. Forecast winter wheat production is 63 million bushels above last month because of higher yields, especially in several major hard red winter (HRW) producing States. Forecast carryin stocks and projected imports are also increased from last month.

Cotton and Wool Outlook (6/12)
The latest U.S. Department of Agriculture (USDA) forecast shows U.S. cotton exports exceeding the previous record of 11.3 million bales set in 1926/27. While this month's 400,000-bale increase in the 2002/03 export forecast to 11.4 million bales may seem somewhat extraordinary this late in the season, the recent and strong export sales and shipment activity have been just as remarkable and prompted the new estimate.

Oil Crops Outlook (6/12)
A higher carryover raised the 2003/04 U.S. soybean ending stocks forecast by 5 million bushels to 250 million bushels. The reason for that upward revision in expected carryover stocks was a reduction in the 2002/03 soybean crush forecast from 1,615 million to 1,610 million bushels. USDA expects the domestic disappearance of soybean meal to total 32.15 million short tons, down from the May forecast of 32.3 million tons.

Rice Outlook (6/12)
This month, USDA raised its 2003/04 U.S. rice import projection 500,000 hundredweight (cwt) to a record 14.5 million cwt based on stronger 2002/03 imports. Total supplies were raised 2.5 million tons to 236.7 million due to a higher carryin and the larger import forecast. On the use side, USDA raised its 2003/04 export forecast 2 million cwt to 88 million based on expectations of carry-over of 2002/03 outstanding sales into 2003/04.

Contracting in Tobacco? Contracts Revisited (6/12)
Contracting is the new mode of selling U.S. grown flue-cured tobacco. In 2002, 79 percent of flue-cured tobacco was sold under contract; just 4 years earlier, tobacco contracts had not been used at all. This article discusses the recent increase in tobacco contracting and the benefits of contracting. It also compares contract tobacco prices with auction market prices.

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