



Five-Year Outlook for Iowa Agriculture

by Phil Kaus

Crop and livestock producers in the United States have been faced with one of the most challenging fall and winter seasons in recent memory. The price of corn fell to the lowest level in a decade, and soybeans, which had been buoyed by the price of oils, recently succumbed to decade lows also. Pork producers struggled through the worst December on record when the price of barrows and gilts fell to Depression era prices. Cattle producers, while seeing declining cattle numbers and after running in the red for more than a year, dealt with stiff competition from pork and poultry producers who were cranking out record production. They have been unable to turn a profit until recently, partly because of larger than expected beef production caused by record slaughter weights and overall large levels of meat available.

Against this backdrop, in January 1999, the Food and Agricultural Policy Research Institute (FAPRI) established its annual baseline projections for crop and livestock commodities produced in the United States and around the globe. A new outlook for

Iowa agriculture was generated from the results of these projections. The outlook period for Iowa is from 1999/00 to 2003/04. This baseline contains policy assumptions consistent with the continuation of the 1996 Farm Bill.

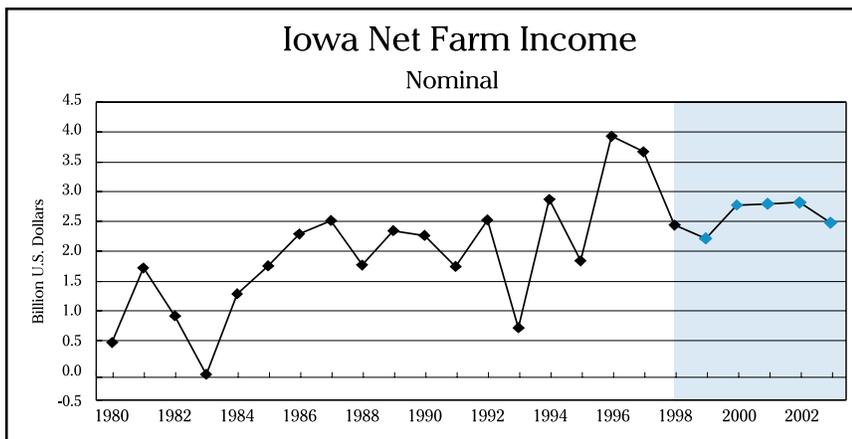
IOWA AND U.S. CROPS

Corn: U.S. producers are projected to trim corn planting to 79.7 million acres in 1999/00, then increase gradually over the period to 80 million acres in 2003/04. Corn trend yields increase over the period causing production to increase from 9.76 billion bushels in the first year to 10.1 billion bushel by the end of the period. The season-average farm price of corn is projected to increase from \$1.94 per bushel during 1998/99 to \$2.24 per bushel in 2003/04 as overall world supplies remain fairly large. Iowa corn plantings for 1999/00 are projected to dip to 12.58 million acres initially, increase to 12.705 million acres, and then settle to 12.695 million acres by the end of the period. Iowa corn yields continue to be well above average U.S. yields, and corn production is projected to increase from 1.73 billion

bushels in 1999/00 to 1.83 billion bushels by 2003/04. The season-average farm price for the marketing year in Iowa is projected to be \$1.91 per bushel during 1998/99 and increase steadily over the period to \$2.21 per bushel.

Soybeans: U.S. acres planted to soybeans are projected to increase 300,000 acres in 1999/00 to 72.7 million and then trend downward through the rest of the period to 70.3 million acres by 2003/04. The increased acreage in 1999/00 largely reflects a more favorable bean-to-corn ratio, especially in the loan rate. Soybean yield follows the trend over the period and production increases marginally from 2.81 billion bushels in 1999/00 to 2.88 billion bushels in 2003/04 as yield increases more than offset acreage decreases.

The season-average price of beans during 1998/99 is projected to be \$5.33 per bushel, dip to \$5.08 per bushel in 1999/00, and then increase to \$5.43 per bushel during 2003/04. Price recovery is hampered by increased production in South America. Iowa soybean plantings for 1999/00 are projected to increase 27,000 acres to 10.527 million acres initially, then decrease slowly throughout the period to 10.175 million acres. Iowa soybean yields continue to be above average U.S. yields, and soybean production is projected to drop slightly from the 1998/99 production, due to more normal growing conditions. Production then slowly increases from 487 million bushels in 1999/00 to 490 million bushels by 2003/04. The season-average farm price for the marketing year in Iowa is projected to be \$5.29 per bushel during 1998/99, drop to \$5.05 per bushel in 1999/00, and then



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Katie Thomas Managing Editor	Keith Heffernan CARD Assistant Director
Becky Olson Desktop Production	Phillip Kaus U.S. Analyst, FAPRI

Contact Betty Hempte for a free subscription, publication information, and address changes at: *Iowa Ag Review*, CARD Publications, Iowa State University, 578 Heady Hall, Ames, IA 50011-1070; Phone 515-294-7519; Fax 515-294-6336; E-mail CARD@card.iastate.edu; Web site www.card.iastate.edu

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increase steadily over the period to \$5.38 per bushel.

Hay and Oats: Statewide hay and oat production continues to trend downward. Season-average hay prices reflect large U.S. supplies in the short run and are projected to drop to \$94.23 per ton in 1998/99, dip to \$92.13 per ton in 2000/01, and then recover slowly to \$93.32 per ton by the end of the period. Season-average oat prices are projected to dip to \$1.12 per bushel in 1999/00 before trending upward to \$1.38 per bushel during 2003/2004.

IOWA AND U.S. MEATS

Pork: After a tough year, U.S. pork producers will trim breeding herd numbers by 290,000 to 6.38 million head in 1999, then slowly rebuild their inventory to 6.63 million head by 2003. Hog slaughter will dip from 101 million head in 1998 to 95.4 million head in 2000 before coming back to 101 million head in 2003. U.S. pork production is projected to drop to 18 billion pounds in 2000 then increase to 19.4 billion pounds in 2003. The U.S. season-average farm price is projected to increase \$3.67 per hundredweight to \$35.41 per hundredweight in 1999, obtain its cyclical peak of \$44.47 per hundredweight in 2001, and then decline to \$36.52 per hundredweight by the end of the period.

Iowa pork producers are projected to trim the December 1 breeding herd inventory number by 57,000 head to 1.2 million head. Inventory numbers are projected to steadily increase through the period and finish at 1.246 million head in 2003. Market hog inventories are expected to follow a similar trend. They start the projection period at 13.37 million head and increase to 14.43 million head. Iowa pork slaughter for 1999 is projected at 27.952 million head, 1 percent under 1998 slaughter numbers. Slaughter in Iowa is projected to increase to 28.201 million head by 2003. Iowa season-average prices for barrows and gilts in

1999 are projected to be \$31.56 per hundredweight, 13 percent higher than the 1998 price. Barrow and gilt prices are projected to rise to \$43.32 per hundredweight in 2001 and then decline to \$35.62 per hundredweight by the end of the period. Sow prices for 1999 are projected to be \$25.41 per hundredweight, 20 percent higher than in 1998. Sow prices are projected to reach a cyclical peak of \$33.37 per hundredweight in 2001 and then decline to \$30.69 per hundredweight at the end of the period.

Cattle: The U.S. cattle numbers indicate a continued reduction of the beef herd. January 1 inventory numbers decline from 33 million head in 1999 to 32.7 million head in 2002 and then rise to 32.9 million head in 2003. The 1999 yearly average price for Nebraska Direct Steers is projected at \$65.71 per hundredweight, 7 percent above the 1998 price. Prices are projected to continue on a up note, peaking at \$75.72 per hundredweight before declining to \$74.56 per hundredweight in 2003. Iowa's January 1 Cattle on Feed numbers for 2000 are projected to be 971,000 and are projected to increase 4 percent by the end of the period. Cattle placed in Iowa feedlots are projected to decrease from 1.545 million head in 1999 to 1.521 million head in 2002 as U.S. inventories decline. The projected average-farm price for a fed steer in 1999 is \$65.15 per hundredweight, and it is projected to increase to \$75.02 per hundredweight by 2002, before dropping slightly in 2003. The season-average feeder steer price is projected to be \$84.56 per hundredweight in 1999, 7 percent above the 1998 price. Feeder steer prices are projected to peak at \$94.95 per hundredweight in 2003 and then decline slightly in 2003.

Meat Consumption: Iowa's beef and pork producers will face stiff competition from U.S. poultry producers in supplying U.S. consumer meat in the coming years. U.S. per capita retail meat consumption is projected to increase just over 1 percent between

1999 and 2003, from 213.1 pounds to 215.7 pounds. Per capita beef consumption is projected to decline from 64.8 pounds to 60.4 pounds. Per capita pork consumption is projected to decline slightly from 51.9 pounds to 49.8 pounds. Beef's share of consumption is projected to decline from 30.4 percent to 28 percent, and pork's share during the same period is projected to decline slightly from 24.4 percent to 23.1 percent. Beef and

pork's loss is poultry's gain, as poultry's share is projected to increase from 37 percent to 41 percent.

NET FARM INCOME

Iowa net farm income for 1999 is projected to be down another 9 percent from 1998 to \$2.22 billion. This is 15 percent below the five-year average of \$2.61 billion from 1993 to 1997. Net farm income is projected to rise rapidly to \$2.82

billion in 2002 before declining to \$2.48 billion in 2003. ♦

Recommended Daily Allowances (RDAs) Soon to Change

Recommended daily allowances (RDAs), commonly seen on packaged food, may soon be replaced. The Food and Nutrition Board of the Institute of Medicine is currently revising the RDAs for nutrient intake.

"The Food and Nutrition Board is working to establish new reference intakes for all nutrients, which will be called Daily Reference Intakes (DRIs)," Alicia Carriquiry, associate professor of statistics, said.

There are four DRIs for each nutrient: estimated average requirement (EAR), recommended daily allowances (RDA), adequate intakes (AI), and upper tolerance levels (UL). The DRIs will be concerned not only with inadequate intake levels, but also with excessive intake levels.

Many food intake surveys ask people what they normally eat, or what they eat in one day. However, there were concerns that these approaches didn't provide the information needed to set dietary policies; and therefore, researchers at Iowa State University developed new statistical methods to address these needs.

"We made a recommendation on the number of days for which information is collected," Carriquiry said. "When two days of dietary data are

available for some individuals in a sample, it's possible to estimate long-term average intake."

To implement the new statistical methods, the ISU team developed a software program, which initially was called Software Intake Distribution Estimation (SIDE). Since then, a more user-friendly Windows-based version, C-SIDE, has been developed and that version is the one currently being used by university and government researchers and nutritionists. A PC-based version of the software is under development.

"As more people began to use the statistical method, there was more interest in the software, and an increasing demand for a PC-based version," said Helen Jensen, Food and Nutrition Policy division head at the Center for Agricultural and Rural Development.

The SIDE or C-SIDE software is used to analyze a given population's intake of nutrients, Carriquiry said. From this analysis, specific population groups can then be identified as at risk for inadequate or excessive levels of nutrients, Jensen said. Those specific population groups identified could be

children, senior citizens, women, or those with low incomes, for example.

"Surveys can tell us the food-intake status of a certain segment of the population. The next step is to evaluate factors associated with food choices, the role of food preparers, and then make recommendations for changes," Jensen said. ♦

(Editor's note: Parts of this article were excerpted from the ISU College of Agriculture 1998 Annual Report, page 33.)

Iowa's Agricultural Situation

—by Phil Kaus

The March World Agricultural Supply and Demand Estimates (WASDE) for the U.S. Department of Agriculture (USDA) show an increase in 1998/99 for U.S. soybean ending stocks by about 59 million bushels. They also show increases in the world's ending soybean stocks by 121 million bushels, when compared to February's projections. With little change in the world usage, the stocks-to-use ratio increases to 18 percent. This news, accompanied by increased likelihood of a bumper crop from South America and recent weakness in the oil sector, was not enough bearish news to stop a recent spring price rally.

During the last week of March, soybean futures on the Chicago Board of Trade (CBOT) were close to the March contract, ranging from \$4.80 to \$5.00 per bushel, \$0.50 above the contract lows experienced a few weeks earlier. In central Iowa, soybeans were trading in the \$4.37 to \$4.48 per bushel range, at least 25 percent below year-ago price levels.

The Food and Agricultural Policy Research Institute (FAPRI) projects a 300,000 acre increase in U.S. soybean plantings for 1999/00 and a 47 million bushel increase in production from 1998/99 levels. If the South American crop materializes and U.S. producers follow through with record soybean plantings, the central Iowa price for soybeans could test the \$4.00 per bushel level later this spring.

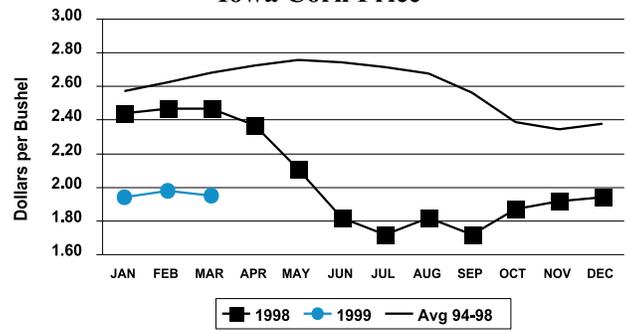
Corn prices seem to have stabilized about 20 percent below year-ago levels. The March WASDE had domestic use of U.S. corn unchanged, and ending stocks slightly lower due to a slight increase in exports. The world stocks-to-use ratio derived from this report is 16.29 percent, a jump of nearly 1.5 percentage points from last year's level. FAPRI projects this year's spring plantings of corn to be down nearly 500,000 acres and production to be down 250 million bushels. Normally this would be bullish news for corn; however, demand from the livestock industry has been slack due to the mild weather this winter. Nearby futures on the CBOT during the last week of March were trading in the \$2.20 to \$2.30 per bushel range, while elevator bids in central Iowa were between \$1.89 to \$1.96 per bushel.

The USDA's latest report on cash receipts from farming for the 1998 calendar year shows Iowa's crop receipts, livestock receipts, and total receipts all to be down nearly 14 percent from the 1997 calendar year. Also, the 1998 calendar year cash receipts from farming are almost 5 percent below the 1993 to 1997 five-year average.

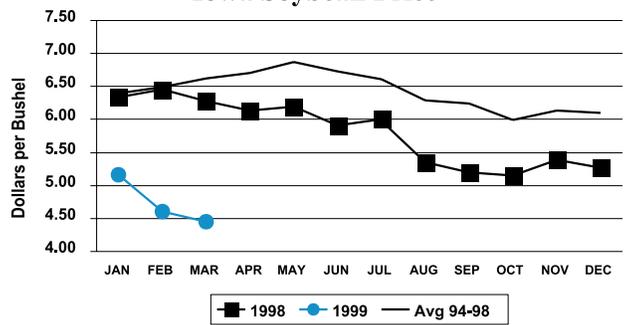
Federally inspected hog slaughter finally dropped below 2 million head per week during the last week in January and remained below that level through mid March. In Canada, the labor dispute at the Quality Meat Packers facility in Ontario was resolved, and some of the plant's 25,000 head per week capacity that had made its way to the United States were taken out of the

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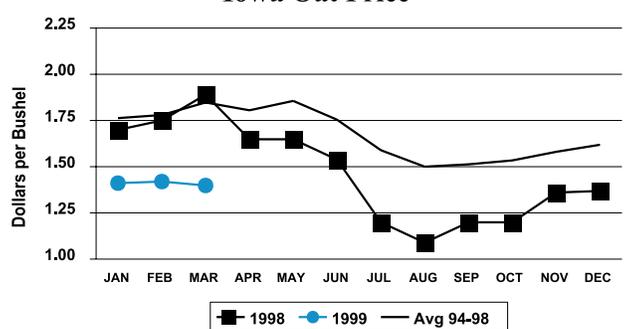
Iowa Corn Price



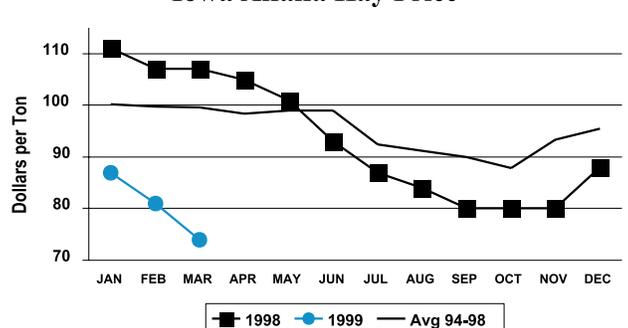
Iowa Soybean Price



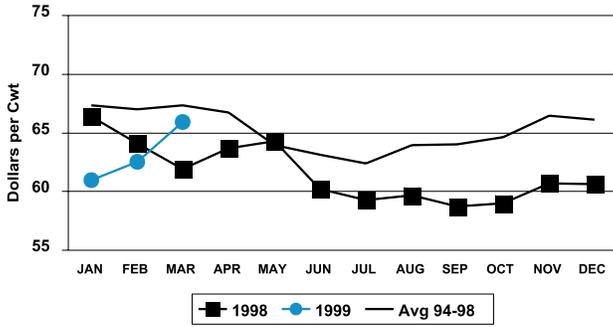
Iowa Oat Price



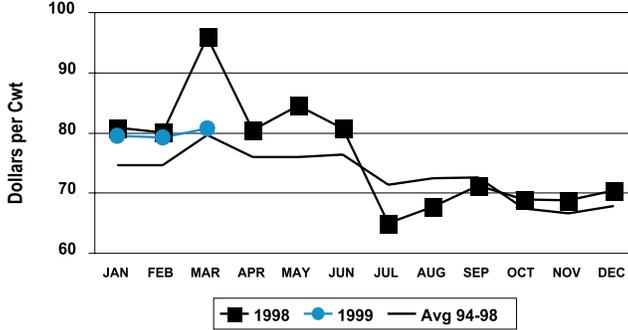
Iowa Alfalfa Hay Price



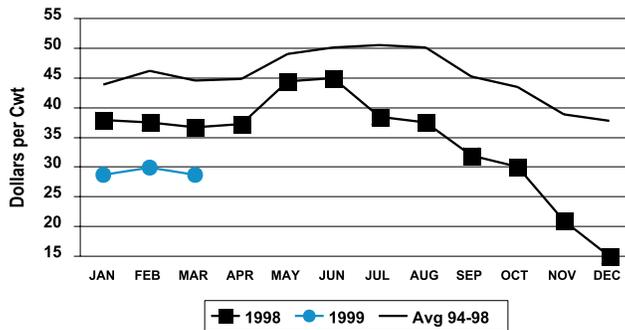
Iowa Steer and Heifer Price



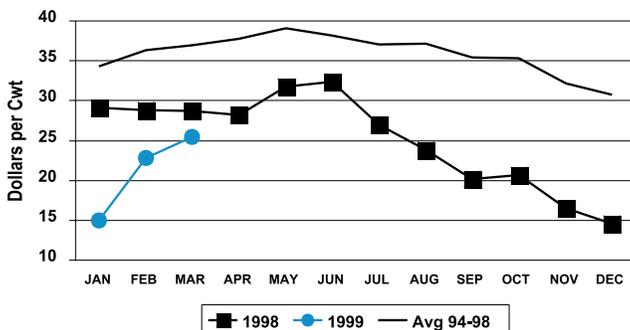
Iowa Feeder Calf Price



Iowa Barrow and Gilt Price



Iowa Sow Price



Iowa Cash Receipts Jan. – Dec. 1998

	1998	1997	1996
(Million Dollars)			
Crops	6,356	7,311	7,364
Livestock	4,778	5,530	5,385
Total	11,134	12,841	12,749

World Stocks-to-Use Ratios

	Crop Year		
	(March Projection) 1998/99	(Estimate) 1997/98	1996/97
(Percent)			
Corn	16.29	14.87	16.21
Soybeans	18.16	13.91	9.93
Wheat	21.33	23.57	19.56

Average Farm Prices Received by Iowa Farmers

	March* 1999	February 1999	March 1998
(\$/Bushel)			
Corn	1.95	1.98	2.47
Soybeans	4.45	4.61	6.28
Oats	1.40	1.42	1.89
(\$/Ton)			
Alfalfa	74.00	81.00	107.00
All Hay	73.00	80.00	104.00
(\$/Cwt.)			
Steers & Heifers	65.90	62.50	61.90
Feeder Calves	80.80	79.30	96.00
Cows	37.40	36.20	38.40
Barrows & Gilts	28.70	29.90	36.70
Sows	25.50	22.80	28.70
Sheep†	26.80	27.10	36.90
Lambs†	59.25	60.10	68.00
(\$/Lb.)			
Turkeys	0.37	0.37	0.39
(\$/Dozen)			
Eggs	0.44	0.37	0.52
(\$/Cwt.)			
All Milk	13.60	13.70	14.10

*Mid-month

†Estimate

Iowa's Ag Situation, cont. from page 4

U.S. slaughter mix. With these events, barrow and gilt prices have recovered to the mid-\$20 per hundredweight range on the Iowa-southern Minnesota market, which is still well below breakeven for Iowa's producers. All the pork slaughtered from November to January had to find a home somewhere, and it appears that enough ended up in cold storage to significantly increase stocks. The USDA's Cold Storage report for February indicated pork stocks were 16 percent above last year's levels and stocks of frozen bellies were 48 percent greater. Prices are not expected to move out of the mid-\$20 per hundredweight range by much until some of the supplies in storage are depleted. The March Hogs and Pigs report reported U.S. inventory down 4 percent from Decem-

ber. Breeding inventory was also down, 2 percent from December and 6 percent from year-ago levels. Iowa's breeding herd was down 6 percent from last year's numbers, but market hog numbers increased 5 percent. These numbers indicate that price recovery should continue into the summer months.

Feeder calves have led a price recovery in the cattle sector. This was due to greater demand as feed lots tried to fill open pen space. This resulted in fairly large placements in feed yards with 1,000 head or more, in Iowa and the United States. The March Cattle on Feed report had Iowa's February placements at 46,000 head, 70 percent greater than February 1998 levels, and February placements in the historic seven states were 20 percent greater than a year

ago. The Cattle on Feed number was slightly above year-ago levels. Yard managers seemed to market cattle aggressively during January and February, keeping front-end supplies fairly tight.

The large January and February placement numbers will weigh heavily on the fed cattle market through the seasonal lows this summer. FAPRI projects further declines in breeding inventories through 2001. If yard managers can continue to market fed cattle aggressively and bring slaughter weights down, this would suggest a tightening of cattle supplies that could help push fed cattle prices to the \$70 per hundredweight range by the fourth quarter. However, there is a lot of red meat out there that has to find its way to the consumer's plate. ♦

National Forum for Agriculture Climate Change Conference

by Donna Kain

On March 1 and 2, 1999, the National Forum for Agriculture annual conference took place in the Scheman Building at Iowa State University. This year's conference, "Climate Change and the Implications for Agriculture and Energy," focused on the science of global climate change and related policy issues affecting agriculture, the U.S. economy, and the world. Speakers and participants included representatives from the U.S. Department of Energy; the European Parliament; the White House Climate Task Force; the U.S. Senate Committee on Agriculture, Nutrition, and Forestry; the Iowa Utilities Board; MidAmerican EnergyCo.; Alliant Energy; Optimum Quality Grains; and several universities.

Conference presentations addressed perspectives on the scientific evidence of climate change; whether and how agriculture, energy industries, and other human activities contribute

to climate change; and the plans and goals that the United States and international community are beginning to establish to deal with the problem. Of particular interest to agriculture

"It is no longer sensible to leave this just as a question about which there is academic doubt—because your future as farmers, your future as farming companies is going to be influenced by this, whether you like it or not, whether you encourage the Congress, the Senate, to pass the Kyoto resolution. It is there, it is a reality."

*Thomas Spencer
European Parliament*

and agribusiness were discussions of the implications of climate change for plant and animal health, emissions trading, carbon sequestration, and the future of climate change-related policy for agricultural and energy busi-

nesses. Stan Johnson, vice-provost for Extension at ISU and conference organizer, said that "the most significant policy issue to affect agriculture and energy in the coming decade may well be the actions and regulations directed toward controlling global climate change."

The conference as a whole demonstrated that reaching consensus on the nature and effects of, as well as the solutions for, the problems of greenhouse gas emissions and climate change presents a number of challenges. Even when experts across fields agree about the extent and causes of problems created by the use of carbon-based fuels, it is difficult to achieve consensus on specific, appropriate measures by which to control and decrease harmful emissions and their consequences.

As several speakers noted, attempts to reach international accord on emissions control have already led to some differences. For instance, John Ruether of the U.S. Department



Former Iowa Governor Terry Branstad receives the Bob Pim Agricultural Vision Award presented by ISU President Martin Jischke.



Conference participants converse during a coffee break

Photos by Donna Kain & Katie Thomas



CARD Assistant Director Keith Heffernan (right) visits with Successful Farming's Dan Looker

of Energy Federal Technology Center said that the 1997 Kyoto Protocol, a plan that sets target levels and timeframes for reducing emissions of principal greenhouse gasses, has been criticized for not imposing limits on developing countries and because the plan will not achieve the emissions reduction necessary for stabilizing levels of CO₂.

One of the conference's keynote speakers was Thomas Spencer, chairman of the European Parliament's Committee on Foreign

Affairs, Security and Defense Policy; president of Global Legislators for a Balanced Environment (GLOBE) International; and vice-president of the Land Use and Food Policy Intergroup (LUFPIG). Spencer expressed concern that the United States has been slow to accept and respond to the issue of global climate change.

Dirk Forrister, chair of the White House Climate Task Force, National Climatic Data Center; and Michael MacCracken, executive director, National Assessment Coordination

Office, U.S. Global Research Program, were both on hand to discuss administration policies and initiatives. These include national emissions inventories, technology reviews, goals for emission reductions, and tax incentives and partnerships for energy saving, emissions reductions, and research and development, among others. Several speakers, including Cathy Kling, head of CARD's Resource and Environmental Policy Division, discussed market-driven mechanisms and incentives including

marketable emissions trading permits.

One of the conference's main themes was that climate change and climate change policy could have significant implications for agriculture. CARD Director Bruce Babcock discussed the considerable uncertainty about the effects of climate change on the environment and agriculture, and the difficulty that that uncertainty creates for establishing appropriate policy responses. Policy responses should, according to Babcock, promote "free trade and non-distorting subsidies." There are other steps that the agricultural community can take to deal with the problem, including expanding environmentally sound farming measures that are already in use and participating in carbon sequestration programs, Babcock said.

Kevin Herink, a Tama County, Iowa, farmer representing the Iowa Farm Bureau Federation, noted that Iowa farmers have been progressive in their adoption of precision farming and other conservation measures but are concerned about their ability to compete in a global market, where the playing field is not level. Clearly, the climate change debate stands to generate more research, discussion, and controversy.

Information about the conference, along with audio and text of selected presentations and links to related sites, can be found at the CARD website, <http://www.ag.iastate.edu/card/about/agforum/agforum99.html>.

Since 1990 the National Forum for Agriculture has promoted the discussion of national issues affecting

U.S. agriculture. Each year the forum focuses on a particular aspect of agricultural policy, technology, or economics issue—usually a combination of all three. Iowa State University organized the Climate Change conference. Sponsors included the U.S. Department of Energy, the U.S. Environmental Protection Agency, the Greater Des Moines Chamber of Commerce Federation, the Iowa Energy Center, ISU's colleges of Agriculture, Engineering, and Veterinary Medicine, ISU Extension, and the Center for Agricultural and Rural Development. ♦

Whole-Farm Revenue Insurance for Crop and Livestock Producers

by Bruce A. Babcock and Dermot J. Hayes

The collapse in hog prices in the fall of 1998 has renewed interest in using insurance as a means of providing an affordable safety net to U.S. farmers. One option that has received attention is to expand the U.S. Department of Agriculture's crop insurance program to include livestock producers. Because the ongoing financial crisis in the hog sector was not caused by production or disease problems, it is apparent that producers could have benefited from either price insurance or revenue insurance.

The creation of a price or revenue insurance program raises a number of practical issues regarding what to insure, how to insure it, and how much the coverage should cost. This article discusses some of the issues raised by an expansion of revenue insurance, and provides an example of a whole-farm insurance product that insures against revenue losses from a farm that raises corn, soybeans, and hogs.

LIVESTOCK RISK

All farm operations face two sources of risk that affect gross revenue: output price risk and production or yield risk. In addition, livestock producers are exposed to significant risk arising from changes in the price of inputs such as feed. Until 1996, the only form of insurance provided by the USDA was traditional crop insurance that protects farmers against yield losses. The question arises whether insurance programs should cover both production risk and price risk or just price risk?

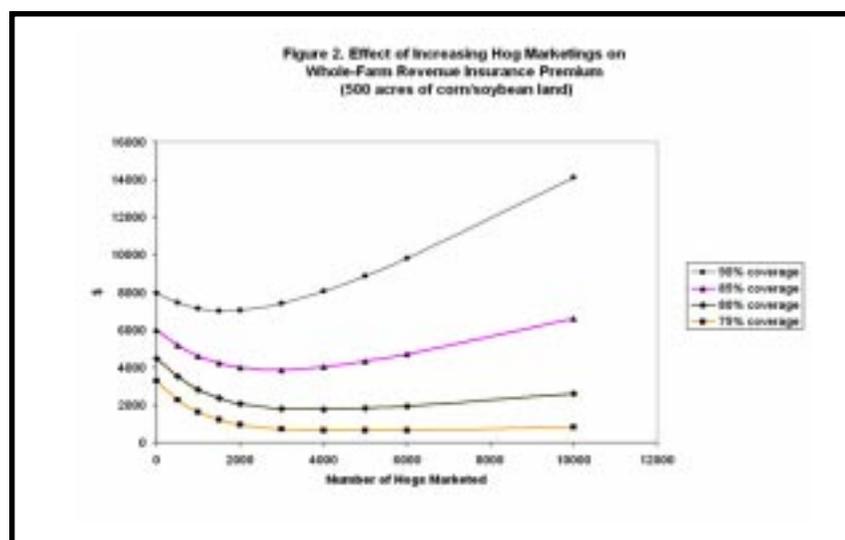
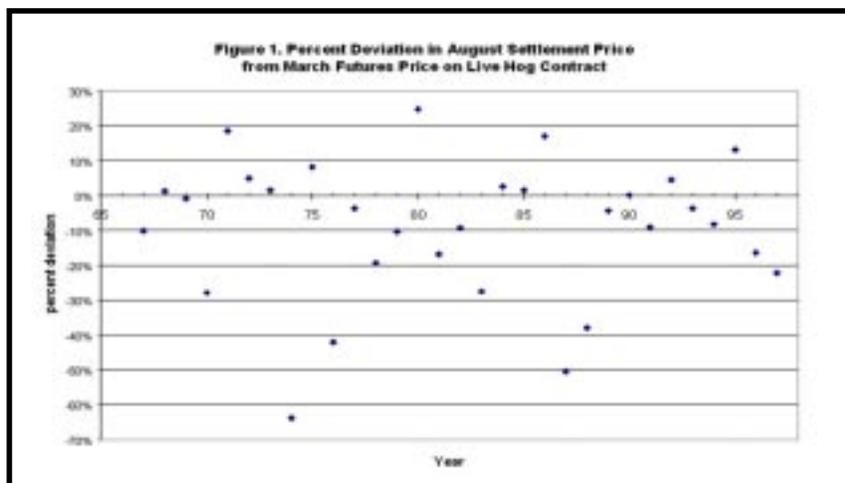
Producers generally face less risk in livestock production than in crop production. Livestock are more adaptable to variations in weather than crops, and modern operations attempt to insulate animals against stress caused by adverse weather conditions. Thus, production risk is relatively minor compared to price risk. Figure 1 illustrates the amount of price variability in the U.S. hog market and is an illustration of why it is difficult for a hog farmer to count on a certain price being available five or six months ahead.

Output prices and input costs are the two sources of most of the income risk faced by hog producers. And, variation in input costs particularly affects them. With the run-up in corn and soybean prices that began in the fall of 1995, hog production costs were much greater than anticipated. In these circumstances, an attractive insurance option would protect net revenue, i.e., output revenue less feed costs.

A WHOLE-FARM SAFETY NET

One term that occurs frequently in the debate about adding livestock revenue guarantees is the concept of a *whole-farm safety net* (or farm income safety net). In short, farmers care more about their end-of-year finances than about any of the components (enterprise-specific production levels, output prices, or input costs) that contribute to this year-end position.

From an insurance perspective, the concept makes sense because the fair insurance premiums of a whole-farm policy may be far lower than the



sum of insurance premiums on the individual components. Whole-farm policies can offer higher coverage levels as well, not only because they are more affordable due to lower risk, but also because the moral hazard problems that may occur when one component (such as yield) is insured are far less important when the policyholder has insured all enterprises on the farm. (Moral hazard is the possibility of the insurance company losing money from a claim). The possibility of protecting entire farm revenue at a high, but affordable, coverage level creates the safety net that is much in demand.

WHOLE-FARM REVENUE INSURANCE INCORPORATING LIVESTOCK

The most straightforward way to incorporate livestock into a farm safety net would be to add the output

price and input cost risk associated with livestock enterprises to an existing whole-farm crop or revenue insurance policy. To date, the only commercially available whole-farm, crop revenue policy is an option under Revenue Assurance (RA). This crop revenue insurance product is owned by the American Farm Bureau Insurance Services Inc., and is now sold in six states in the upper Midwest.

Before working out an example, we must account for some of the differences between crops and livestock. Crop farmers generally harvest once per year, at a predictable time, and the price used to value harvest is the price that occurs at harvest time. For example, for Crop Revenue Coverage (CRC) and RA, the price used to value harvested corn is the average November quote of the December futures contract on the Chicago Board of Trade. With livestock, however,

“harvest” can occur many times during the year. A livestock revenue insurance policy should be flexible enough to match the harvest price with livestock delivery.

For hog producers, the Chicago Mercantile Exchange has seven futures contracts in a given year: February, April, June, July, August, October, and December. Typically, farmers have a good idea about both the timing of deliveries and the quantity that will be delivered each year. A sensible way of determining an expected hog price to use is to construct a weighted-average settlement price, with weights given by the number of hogs to be marketed in each contract month. For example, suppose a farmer plans on delivering 100 hogs in April, June, and August, and 200 hogs in October and December, and the current prices (adjusted to a per 100 pounds live-weight basis) on these contracts are \$50, \$50, \$40, \$45, and \$45, respectively. Therefore, the expected live hog price per 100 pounds used to value the average hog produced that year would equal \$45.71.

We would then need to adjust this expected live hog price for an expected feed cost. In the example cited, we use the corn and soybean futures markets to calculate an expected total ration cost for each hog. For example, if the December corn contract was trading at \$2.50 and the November soybean futures were at \$5.50, then our expected ration cost would equal \$0.176 per pound of live animal. The producer would then have expected net revenue of \$28.11 per 100 pounds. Actual futures market settlement prices would later be used to calculate the actual net revenue using the same methods. A component of the whole-farm revenue guarantee would then be the difference between actual and actual net livestock revenues.

The timing of the revenue guarantee is a factor to consider. For spring-planted crops in the Midwest, March 15 is the sales closing date for crop insurance policies. Correspondingly, CRC and RA use the average February

quote of the December futures contract for corn as the price used to set revenue guarantees for corn. In the example, we maintain a March 15 sales closing date and use the average of the first five trading days in March as the projected price for each of the live hog futures contracts.

The way this example contract is set up, the farmer has until March 15 to determine the number of hogs that will be guaranteed under each futures market contract. This will subsequently determine the whole-farm revenue guarantee. The amount of market revenue from hogs that will be added to harvest revenue from crops to determine whole-farm revenue can be determined only upon settlement of the last futures market. Waiting for the last futures contract to close may delay calculation of whole-farm revenue because crop revenue from corn is known on December 1, and payment of indemnities will have to wait if the farmer plans on delivering hogs under the December or February contract.

A REPRESENTATIVE CORN-SOYBEAN-HOG FARM

To show the effects of adding hogs to a corn-soybean whole-farm insurance contract, we look at a 500-acre farm in Webster County, Iowa, with 250 acres each of corn and soybeans. Projected local prices of corn and soybeans in the fall are \$2.10 and \$5.00, respectively. The approved yields are 135 bushels for corn and 40 bushels for soybeans. We determine the cost of coverage by calculating how much an insurance company would lose on average if it sold this producer this policy for 5,000 years.

Figure 2 shows how the introduction of hogs affects the actuarially fair whole-farm premium for this farm. When no hogs are marketed, the fair premium depends only on the percent of expected crop revenue insured. The formula for expected revenue from crops is springtime price \times expected yield \times acres for each crop—\$123,500

for the 500 acres. At 90 percent coverage, the whole-farm revenue guarantee is \$111,150, and the fair premium is \$7,936. At 85 percent coverage, the fair premium is \$6,004. At 80 percent and 75 percent coverage levels the fair premiums are \$4,479 and \$3,020. For a 500-acre crop farmer, a 90 percent premium of almost \$8,000 is probably not affordable and may raise concerns regarding moral hazard.

When we add 2,000 hogs to the mix, however, the whole-farm fair premium actually *declines* (see Figure 2) even though hogs greatly *increase* the level of the revenue guarantee. The premium decreases as the amount of insurance increases because a corn-soybean-hog farmer is more diversified than a corn-soybean farmer, and greater diversification means lower risk.

The premium rate declines because hog prices are largely uncorrelated with corn and soybean prices; that is, when corn and soybean revenue is low, there is a 50 percent chance that hog revenue will be greater than expected. Thus, adding hogs significantly lowers the probability that an indemnity will be paid on corn and soybeans. Additionally, because revenue from hogs is less variable than corn and soybean revenue, the premium rate continues to decline as a farmer specializes in that less risky enterprise.

Figure 2 shows that premium rates eventually rise as more hogs are marketed. The turning point depends on the coverage level. When 3,850 hogs are marketed at the 90 percent coverage level, the whole-farm premium with hogs equals the whole-farm premium without hogs. The difference is that the farmer who markets 3,850 hogs has \$239,663 more insurance coverage than the farmer who markets no hogs.

The break-even number of hogs at 85 percent coverage is 8,800 hogs. At 80 percent coverage, the break-even number of hogs is approximately 19,000. As shown, the power of diversification means that a

farmer can have a lower insurance premium even though the amount of insurance increases. A common response to this type of diversification is to increase coverage level. For example, if this farmer were to include 5,500 hogs in a whole-farm revenue insurance policy, the total fair premium at 85 percent coverage is approximately equal to the total premium at 80 percent coverage for a crop-only whole-farm policy. The fair premium is the same, but the whole-farm revenue guarantee increases by \$328,500, from \$96,700 to \$431,279.

THE NEXT PHASE

The U.S. agricultural insurance program has evolved from insuring only individual crop yields to insuring the combined revenues from several crops. The next phase may involve the addition of livestock. Here, we argue that the most effective way to insure livestock is to insure expected annual production against output price risk and input cost risk. We also argue that it would be technically feasible to add this livestock net revenue guarantee to existing whole-farm crop revenue guarantees.

These policies could complement existing financial instruments offered on the Chicago Mercantile Exchange and the Chicago Board of Trade. In some preliminary sample rates presented here, we show that the addition of livestock to whole-farm revenue guarantees can dramatically *reduce* both insurance rates and insurance premiums. These lower rates make 90 percent coverage affordable and economically justified. The availability of a 90 percent revenue guarantee would create a farm income safety net for large numbers of diversified family farms. ♦

New Uses for Soybean Products

by Keith Heffernan

U.S. agribusiness is constantly looking for new opportunities to expand markets for agricultural commodities and value-added products. With that in mind, a project called the Midwest Feeds Consortium, directed by the Center for Agricultural and Rural Development at Iowa State University, designed a study to link product development in agriculture with feed demand in aquaculture. What the consortium research found was that the demand for soybean oil meal and soybean products could be increased 2 percent annually. How? By providing up to 30 percent soybean product in the composition of aquaculture feeds used in the production of domestic fish and shrimp.

The consortium recently completed a study to determine the feasibility of substituting soybean oil meal and other vegetable oil and grains for fish meal in aquaculture diets. The intent was to find alternative sources of aquaculture feed that would lead to a decrease in the dependence of U.S. agriculture and the aquaculture feed industries on imported marine protein meals. Worldwide, feed industries have been

using approximately 5.6 million tons of fish meal annually.

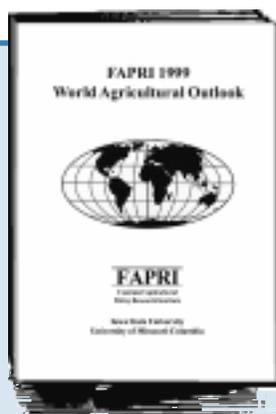
A key objective of the project was to determine the biological feasibility of products developed and the characterization of digestibility values for feed formulation. A specified diet was fed to four fish species representative of diverse aquaculture sectors and economic opportunities. Broiler chicks were used as a reference terrestrial animal.

The feeding trial results indicate a clear opportunity for the United States to position itself to meet the demand created by a marine protein gap projected for the longer term. The research provided evidence suggesting that, through innovative, value-added processing technologies, viable, co-product ingredients can be used in the aquaculture feed industry. A fish diet consisting of up to 30 percent soybean-based products can decrease feed costs without hindering performance. Tests conducted using corn gluten meal were not as promising, and indicated that the feasibility for substitution was marginal at best.

There is consensus that world

fish stocks used in fish meal are being harvested at or above their sustainable yield. With world aquaculture feed production estimated to increase from approximately 8.6 million metric tons (mmt) in 1995 to 15.6 mmt by the year 2000, industries dependent on fish meal will need to find efficient substitute feed components in order to continue growing. The Midwest Feeds Consortium study provides a positive answer to this problem and identifies an opportunity for U.S. soybean growers and processors.

The Midwest Feeds Consortium was funded by the U.S. Department of Agriculture; the other collaborators in addition to CARD were the Animal Ecology Department and Food Science and Human Nutrition Department at Iowa State University; the Oceanic Institute of Hawaii; Kansas State University; Purdue University; and the Greater Des Moines Chamber of Commerce Federation. ♦



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Continuing Development of the CARD Website

The CARD staff has recently been expanding information available via the web. In addition to information about CARD divisions, activities, staff, and listings of publications, the site now includes the full texts of briefing papers and working papers published since November 1998, and recent staff reports. We will continue to provide full texts of papers online as they are published.

In addition to expanding the number of full texts available online, we are adding text and audio of a number of presentations given at conferences

that CARD sponsors. Presentations currently online include the full texts and audio of presentations delivered by CARD staff and keynote speakers at the 1999 National Forum for Agriculture: "Climate Change and the Implications for Agriculture and Energy." Full texts of all presentations from the 1998 Fall Policy Conference, which focused on contracts and alliances in agriculture, are also online.

As they become available, the PowerPoint slides of conference and seminar presentations by CARD Director Bruce Babcock can be

accessed online. Two PowerPoint presentations are currently available: "How Government Programs Affect Crop Insurance" and "Making the Best Crop Insurance Decisions for Your Farm."

Look for more new features as we update the look and content of the website over the next few months. You can log-on to CARD at <http://www.card.iastate.edu>. ♦

Meet the Staff

John Beghin, associate professor of Economics, is the Trade and Agricultural Policy (TAP) Division head at the Center for Agricultural and Rural Development (CARD). He began working at CARD in January 1999.

"I enjoy the ability to define and shape the research program of the Division. The work has to be relevant and forward looking to be ready to address policy questions that will arise in the future. And, the work has to be good enough to be of academic value," John said.

His own area of research looks at the linkages between the environment and international trade. For example, how government regulations affect the competitiveness of the U.S. hog industry in the world marketplace, and how labeling and phytosanitary regulations may impede the trade of agricultural products.

Along with his responsibilities as TAP Division head, John is also the director of the Food and Agricultural

Policy Research Institute (FAPRI) at Iowa State.

"I want FAPRI to be a central voice and a focal source of information in the upcoming World Trade Organization's (WTO) agricultural trade negotiations and in the debate on U.S. farm policy," he said. For example, FAPRI is initiating an international dairy symposium this fall, with the expectation that dairy production will be a central issue in the next WTO round of trade negotiations.

At home, John and his wife, Yalem, like to cook spicy food and "search for that great red wine bottle under \$10—a challenge in Ames," he says. He also enjoys running and playing Legos with their three-year-old daughter, Carla.

"We find Ames and ISU to be very welcoming and a great environment to raise a child," he said.

Originally from Belgium, John studied economics at both Université



*John Beghin, CARD Division Head
Trade and Agricultural Policy (TAP)*

de l'Etat de Mons and Université Libre de Bruxelles. He has a master's degree in agricultural economics from North Carolina State University and a doctorate in agricultural and resource economics from the University of California at Berkeley. ♦

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- 99-BP 21. "Eligibility and Payment Requirements of the Disaster Assistance Package." Chad Hart. January 1999. On-line only.
- 99-BP 22. "Whole-Farm Revenue Insurance for Crop and Livestock Producers." Bruce A. Babcock, and Dermot J. Hayes. February 1999.
- 99-BP 23. "Provision of a Safety Net for U.S. Agriculture." Bruce A. Babcock. April 1999.

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CARD
Iowa State University
578 Heady Hall
Ames, IA 50011-1070