On one hand, support for renewal of CRP is widespread because both farmers and the environment benefit from CRP. Farmers benefit from the market price increases pressing issue for the U.S. Congress in the new Farm Bill is the Conservation Reserve Program (CRP). The Resource and Environmental Policy Division, led by Bruce Babcock, has modeled a number of policy alternatives to improve targeting and reduce CRP costs.

Babcock testified before the U.S. Senate Committee on Agriculture, Nutrition, and Forestry in March of 1995, summarizing CARD research on policy alternatives for maintaining CRP benefits with reduced funding.

The following excerpts are from Dr. Babcock’s testimony.

CARD Researchers Assess Dietary Intake

Over the past 10 years, CARD and the Department of Statistics and Statistical Laboratory have collaborated on research related to uses of dietary intake survey data. Much of the research has been conducted under cooperative research agreements with the USDA Agricultural Research Service (ARS). Key research issues are the need for better statistical methods for using data from food intake surveys, analysis of the data for dietary assessments, and implications for survey design.

USDA Food Consumption Surveys Helen H. Jensen, head of CARD’s Food and Nutrition Policy Division, directs the research along with Stanley R. Johnson, director of CARD. Collaborators in the Department of Statistics include Wayne A. Fuller, Sarah Nusser, and Alicia Carriquiry, who is also affiliated with CARD. Other ISU faculty have contributed to aspects of the research related to nutrition, including James A. Olson of the Department of Biochemistry, and R. Dale Terry and Suzanne Hendrich of the Department of Food Science and Human Nutrition.

The USDA has conducted food consumption surveys every 10 years since 1936. In 1985 the department launched a survey series to collect timely data on dietary intake as part of a National Nutrition Monitoring System. That survey was continued on page 2
The Challenge of Dietary Assessment

The 1986 NRC report identified a need for improving information available on the distribution of nutrient requirements and of intake in order to better assess the nutrient adequacy of diets in the U.S. population.

There are two major difficulties with the approaches used to date. Both problems have to do with the underlying variation in the data. First, because people don’t normally eat the same amount of any given food every day, their nutrient intake varies day-to-day. The measure in which researchers are interested, however, is the usual dietary intake (intake observed over a long period of time) rather than that of a specific day.

Second, the amounts of diet components that individuals need vary from person to person, even when individuals have similar physical characteristics. Recommended Dietary Allowances (RDAs), the common measures used to evaluate dietary adequacy in the United States, are approximations of the amounts of dietary components people need to maintain health. Analysts commonly determine that a fixed cutoff point (the RDA or perhaps two thirds or three fourths of an RDA) indicates inadequate or excessive intake of a specific diet component. However, this approach can lead to imprecise estimates, in part because it fails to account for variability in requirements among individuals.

CARD Researchers Assess Dietary Intake, continued from page 1

called the Continuing Survey of Food Intakes by Individuals (CSFII). Data from USDA and the Department of Health and Human Services (DHHS) surveys are used in systematic evaluations of the dietary status and nutritional health of people in the United States.

The goal of the national system was to detect favorable and unfavorable changes and trends in the American diet.

While the methodologies used to conduct the surveys have changed over the years and the USDA surveys are used for many purposes, the intake surveys serve as a primary source of information on the quality of U.S. diets. The surveys provide information for agencies and programs concerned with food assistance, public education, food regulatory issues, and public health; for nongovernmental organizations concerned with nutrition, diet, and health; and for the private sector.

The current cooperative agreement between Iowa State University and ARS has its origins in a report—"Nutrient Adequacy: Assessment Using Food Consumption Surveys"—based on a 1986 study conducted by the National Research Council (NRC) to investigate the criteria used to evaluate nutrient adequacy when using dietary intake data. The research conducted as part of the agreement has been particularly concerned with the statistical foundations for the use of intake data to assess dietary adequacy.

From the Director

One of the articles in this report summarizes the main result of a long-term research program on assessment of dietary intake conducted cooperatively by CARD and the Statistical Laboratory of the Iowa State University Department of Statistics. The program has produced results that will lead to a fundamental change in the way human diets and diet status are assessed using food intake surveys. National, or specialized, food intake surveys provide a basis for designing and evaluating the food and nutrition policies of the United States and other nations.

The results of this research will essentially revolutionize the way the survey data are analyzed, providing much more accurate information on distributions of usual daily intakes of diet components. Previous methods used by the U.S. Department of Agriculture, U.S. Environmental Protection Agency, and U.S. Food and Drug Administration, and in scientific research on diet status, were developed when food and nutrition policy, and policy research, focused on widely available diet components like calories, iron, and protein.

With advances in the understanding of human nutrition and the increased recognition of the importance of food policy, attention has been given to diet components that are less widely available in the food supply, such as various fats, minerals, and complex vitamins. The method developed by CARD and the Statistical Laboratory is more appropriate for assessing these diet components, and provides more accurate information on the “tails” of the distributions of usual daily intakes for individuals. Both of these features of the new estimation methods add in a major way to the information for designing, implementing, and evaluating improved food and nutrition policy.

The research on dietary assessment has produced a truly “big time” result. We wish to especially thank the USDA’s Human Nutrition Information Service and the Agricultural Research Service for the continuing support that has made the development and application of these new and improved dietary assessment methods possible. The research would not have been possible or perhaps successful without the funding and technical collaboration with USDA that was made possible by the cooperative agreement with CARD.

—Stanley R. Johnson
One outcome of the 1986 NRC report was a call to improve the methods and criteria used in evaluating nutrient adequacy with dietary data. An approach recommended for dietary assessment, the probability approach, requires better understanding of average requirements and their variability, information on whether requirements and intakes are independent, and improved estimates of the distribution of usual nutrient intakes. The ISU work initially addressed the problem of dietary intake data: how to estimate the distribution of usual nutrient intake from dietary intake survey data.

Recently, the concern over populations at risk for inadequate dietary intake has been extended to encompass the areas of excessive intake of food components and intake of undesirable dietary constituents, such as pesticide residues. Perhaps the best publicized example of this growing interest occurred with the release of the 1993 NRC study entitled “Pesticides in the Diets of Infants and Children,” which argued that while healthy adults may accommodate a certain amount of pesticide contamination in their food, the same cannot necessarily be said about children. One measure of key interest to researchers is the exposure of children to excessive levels of intake. Additional information and further research in this area are indicated.

Methods Developed at ISU
CARD and the Department of Statistics and Stat Lab began their collaborative work with ARS in 1986, building on Jensen’s participation in the deliberations of the Joint Nutrition Monitoring Evaluation Committee, an advisory committee sponsored by USDA and DHHS to improve existing data and the integration of data in the national nutrition monitoring system.

The methods developed at ISU for estimating the distributions of usual nutrient intake use data from the CSFII, which collects multiple days of intake data on individuals from a national sample. At least two days’ data are required for some individuals. The ISU research is published in the CARD Dietary Assessment Research Series.


The statistical approach of the ISU method is based on the assumption that individuals can more accurately recall the types and amounts of foods they ate during the previous day than over a longer period. Estimates of the long-term average intake are obtained by statistically removing the within-person (day-to-day) variation in intake and other survey-related effects, such as the day of the week of observation. The methods also account for the fact that the underlying dietary data are often skewed, with a small number of the observed individuals consuming very high levels of a particular food component.

Past, Present, and Future of the Project
Developing a sound statistical method for estimating nutritional intake has been challenging. How do you appropriately estimate highly skewed distributions and account for high day-to-day variability in intakes? How do you handle reported zero intake of a particular type of food in the period observed? How do you decide which nutritional standard should be used?
According to Jensen, “Accurately estimated distributions of usual daily intakes are important because they allow public resources to be better targeted to areas of need, and they correctly identify relative risks of inadequate nutrition or excessive exposures.” The estimates have wide application in regulatory areas, food policy analysis, and food assistance programs. Recently, Alicia Carriquiry briefed a working group of the National Academy of Sciences on the need for better data on nutrient requirements and on approaches to dietary assessment based on the research under way at ISU.

In the current phase of the project, the research team is extending the methods of estimating intake distributions to diet components for zero daily intakes, which are common. Improved measures of the distribution are useful, especially for assessing exposure to hazards associated with specific foods or food groups.

Jensen confirms that many dietary assessment issues remain unanswered. For instance, there are needs for refining the estimates of usual daily intake and dietary risk for relevant subpopulations: infants and children, the elderly, low income, ethnic, or regional groups. Also, there is little work on measures of lifetime exposure to foodborne contaminants.

Pesticide intake (along with the attendant issue of water intake) has garnered the attention of those concerned with associated health risk. The U.S. Environmental Protection Agency is using the methods analyzed by CARD and the Statistical Laboratory to measure relative risks and risk assessment from pesticides.

To make the methods developed at ISU accessible to researchers for use in other applications, software for estimating the intake distributions (referred to as SIDE) is under development. Several forthcoming publications will describe and apply the new methods.

Helen Jensen: hhjensen@iastate.edu

Food Safety Symposium Proceedings

Helen H. Jensen is a coeditor (with Tanya Roberts of USDA Economic Research Service and Laurian Unnevehr of the University of Illinois) of the new book Tracking Foodborne Pathogens from Farm to Table Data Needs to Evaluate Control Options. The 180-page volume is based on a conference held in January 1995 during which food-safety policymakers and scientists came together to evaluate data currently available for analyzing control of foodborne microbial pathogens. CARD was one of the cosponsors of the conference, and Jensen presented a paper on “The Economics of Regulation and Information Related to Foodborne Microbial Pathogens.”

The book opens with data regarding human illnesses associated with foodborne pathogens and moves through the food chain to examine pathogen data in the processing sector and at the farm level. Of special concern is the current inability to link pathogen data throughout the food chain. The book also discusses analytical tools designed to measure the impact of changing production and consumption practices on foodborne disease risks and their economic consequences. An evaluation of USDA’s Hazard Analysis Critical Control Point (HACCP) proposal was examined during a policymaker roundtable. Discussion also focused on the efficiency of current food safety databases and the necessity of a multidisciplinary approach toward improving food safety databases. Contributors to the proceedings include USDA officials, researchers from academia, representatives of food processors and restaurants, and researchers from the Centers for Disease Control and Prevention.

Tracking Foodborne Pathogens from Farm to Table (MP-1532) is available from the USDA for $18. Call 1-800-999-6779 for a credit card purchase, or send your check or money order (payable to ERS-NASS) to ERS-NASS, 341 Victory Drive, Herndon, VA 22070.
Work Completed on FAFSAS Project

Many of the world’s chief producers have made changes in their domestic agricultural policies, often including reductions in domestic support. How will this action affect developing nations that are dependent on agricultural assistance from larger, more industrialized countries? Answering “what if” questions regarding food aid issues will be easier thanks to a new computer model devised by CARD/FAPRI researchers working with staff from the U.S. Agency for International Development (USAID).

The Food Aid and Food Security Analysis System (FAFSAS) Project has generated a database and analytical system capable of monitoring and evaluating the impacts of changes in international markets and domestic policies on food availability and accessibility in developing nations, especially those that import food. This analytical framework assesses the results of changing global and agricultural trade environments on less-developed countries’ (LDC) domestic food security. Analysts can adjust the model to determine the effects of GATT, CAP Reform, NAFTA, and U.S. and LDC domestic farm policies.

The data from the FAFSAS project will support the field missions of USAID as well as the USDA and the U.S. Trade Representative. Information on the degree of success of food assistance programs in affecting LDC food security will allow better coordination of inter-agency activities and food aid resources. The agencies will also be able to develop analytical links to nutritional outcomes of significant dietary changes in food aid recipient countries.

The FAFSAS integrates a number of individual models, which provide results to feed into the country-specific systems. “The capacity to combine the worldwide data from the FAPRI models with country-specific information is the value of FAFSAS,” says Darnell B. Smith, managing director of FAPRI. “We can then make accurate and dependable recommendations for food policies in developing nations using information from our modeling system.” Analysts can provide outcomes based on data specific to developing nations to predict how particular population groups will be affected by changes in markets at the global level.

CARD postdoctoral research assistant Samarendu Mohanty and Smith—with assistance from Francesca Nelson of USAID—have already successfully applied the model for Jamaica. Researchers plan to adapt the system for Honduras, and eventually analysts hope to use the system to produce information on agricultural markets and food policies in other Central and South American nations.

Darnell Smith: rupri@iastate.edu

Food Safety in the Meat Industry

A new report estimates that foodborne illness from six major pathogens (of which approximately one-half are attributable to meat and poultry products) results in medical and lost productivity costs of $9.2 to $12.9 billion annually. There is widespread consensus that the current system of meat inspection in the United States has not adequately addressed the problem of these microbial foodborne pathogens. But a new approach called the Hazard Analysis Critical Control Point (HACCP) System (developed by engineers in the food processing industry) may offer some solutions. The application of HACCP systems to control and reduce the incidence of pathogens is included in proposed regulations for safety in meat products.

In a new CARD Working Paper, “HACCP as a Regulatory Innovation to Improve Food Safety in the Meat Industry,” HACCP is considered as an engineering concept and as a regulatory tool. Authors Laurian Unnevehr of the University of Illinois at Urbana-Champaign and Helen H. Jensen, of CARD, contend that the benefits of prevention (as implied by the HACCP) have not been adequately explored.

In contrast to the current system of organoleptic carcass-by-carcass inspection, the HACCP approach would rely on science-based risk assessment and prevention rather than the detection of hazards. The U.S. Department of Agriculture has embraced this new approach to reduce pathogen contamination. Meat packers and processors would be required to put HACCP plans in place, to conduct periodic tests for microbial pathogens, and to reduce the incidence of pathogens. Unnevehr and Jensen believe that HACCP, which combines control of process and product, offers a regulatory innovation when the costs of hazard detection are high and the exact benefits associated with particular standards are uncertain, but potentially large.

To receive a copy of CARD Working Paper 96-WP 152, “HACCP as a Regulatory Innovation to Improve Food Safety in the Meat Industry,” see ordering information on page 15.
In 1993, CARD and the Higher Institute for Agricultural Cooperation (HIAC) in Cairo, Egypt, joined in a collaborative project to educate students, train practitioners, and conduct research on the Egyptian agricultural and food system, reflecting a new economic environment in Egypt. The CARD-HIAC education, training, research, and communications project is designed to contribute to the economic evolution in Egypt.

The Agribusiness Research and Training Center (ARTC) project was established in 1993 to support Egypt’s transition to a more market-oriented economy. CARD Director Stanley Johnson says: “The accomplishments of this project are a model for the type of institutional change required for nations undergoing economic restructuring.”

The Egyptian Ministry of Higher Education and Ministry of Agriculture and Land Reclamation, and the Agricultural Counselor’s Office of the U.S. Department of Agriculture in the U.S. Embassy in Egypt were cooperating funding organizations of the ARTC. Fakhry Shousha, Rector of HIAC, and Stanley Johnson served as administrators of the ARTC. The project, which provided a solid basis for cooperation between HIAC and CARD, had three major components: education, training, and research.

The ARTC supplied:
- improved content for the undergraduate and Diploma programs at HIAC,
- language and short-term training at ISU for HIAC faculty and staff,
- an advanced computer laboratory for HIAC faculty,
- training programs for Egyptian agricultural professionals and practitioners,
- training for HIAC faculty at ISU and at the Economics Institute in Boulder, Colorado,
- improvements to the library at HIAC to support research, training, and education,
- a conference: “GATT: Potential Opportunities for Egyptian Agriculture,”
- ISU faculty and staff in Egypt to support changes in education, research, and training programs at HIAC,
- new training facilities,
- a research program in agribusiness during the Egyptian economic transition.

Throughout its existence, the ARTC project funded exchanges between HIAC and CARD. Faculty and staff from HIAC participated in educational programs at ISU, and faculty and staff from ISU participated in training at HIAC.

The Agribusiness Research, Education, Training, and Media Center

The Agribusiness Research, Education, Training, and Media Center (ARETMC) project continues a tradition of sharing between the two institutions and countries. The project was funded in 1995 as a continuing effort in the HIAC-CARD collaboration, and continues the work of the ARTC in several areas, including education and training. The ARETMC continues to support growth and development in the Egyptian agricultural and agribusiness sectors.

Egypt’s Ministries of Economics and International Cooperation, Agriculture and Land Reclamation, Higher Education, Planning, and Finance have authorized ARETMC. Funding is provided through the U.S. Agency for International Development and the Ministry of International Cooperation.

Dr. Youssef Wally, Deputy Prime Minister and Minister of Agriculture and Land Reclamation in Egypt, said that the ARETMC project “will contribute in solving many problems facing agricultural producers in Egypt.” The better education for the more than 15,000 students and practitioners at HIAC, and the newly available data and information from the research and media and information components, will help lead to a more effective system for the agricultural and food sector in Egypt.

Many of Egypt’s future agricultural leaders are educated at HIAC. HIAC was founded in 1960 as a training center for professionals working in cooperatives organized to support the planned economies. These cooperatives administer the plan for production, processing, and distribution in the agricultural and food sector.

Nearly 3,500 students graduate from HIAC annually, and HIAC works with approximately 4,000 agricultural practitioners each year through training and continuing education. The applied research program of ARETMC supports the education, extension, training, and information dissemination activities at HIAC, as well as contributing to participation in an emerging free market.
ARETMC will support HIAC in developing
1. **Agribusiness** by working with processing and distribution sectors of Egyptian food and agriculture to assist in the transition to a market economy.

2. **A Research and Data Bank** to assemble and organize data for assessing the transition of agriculture, agribusiness, and supportive public policy.

3. **Education** by arranging faculty exchanges and new educational materials and technologies to continue the changes in curriculum and course content at HIAC begun under the ARTC.

4. **Training** for agribusiness practitioners on processing, distribution, and marketing.

5. **Agricultural Media and Extension** by acquiring equipment, and offering computer training to facilitate an effective and technologically up-to-date dissemination of information.

6. **A Post Harvest Center** for practical training for HIAC students, and agriculture and agribusiness practitioners in advanced agricultural production, processing, and marketing technologies (opening in spring 1996). Rector Shousha commented that this facility “will be a training laboratory for farmers, graduates, and HIAC students transferring modern technology and business practices.”

**Favorable Long-term Prospects for U.S. Meat Exports to China**

China’s population and economic growth may dramatically increase import needs. According to Dermot J. Hayes, head of CARD’s Trade and Agricultural Policy Division, “China will turn to international markets for added feed grains sometime between 1997 and 2000.” The United States will be in an excellent position to meet the demands of the Chinese corn and soybean oil markets, as well as the demands for beef, pork, and poultry products.

China’s increasingly prosperous consumers will eat more meat. China has recently become the number one destination for U.S. poultry exports and is an importer of beef and pork. The growth potential for pork consumption in China is substantial. Hayes says the increase in consumption could reach 10 kilograms per person, and “supplying a consumption increase of 10 kilograms per person in China would require 12 million metric tons of pork, more pork than is consumed in the United States, Canada, and Mexico combined.”

“Supplying a consumption increase of 10 kilograms per person in China would require 12 million metric tons of pork, more pork than is consumed in the United States, Canada, and Mexico combined.”
- Dermot J. Hayes

Conservative projections of income growth suggest that China will have to double its own domestic meat production to meet increased demand. It is not likely the Chinese will be able to meet this demand domestically, given that China’s current hog inventory is greater than that of the rest of the world combined, and that there is a serious problem of providing additional feed grains for increased livestock production.

Hayes and Clemens estimate that China will become a net importer of feed grains (or meat) in 1998. Because of China’s enormous size, the impact on the world market will be significant, equaling approximately 30 million metric tons of feed grains by 2003.

Sometime before the end of the century—possibly as early as 1997—China will find it economically advantageous to import added pork, beef, and poultry from the United States. The actual size of the market will be determined by the willingness of U.S. producers and exporters to fund promotions and lobby against political and competitive barriers. The ultimate size of the Chinese market, however, justifies sizable efforts to promote U.S. export opportunities.

**Dermot Hayes**: dhayes@iastate.edu
caused by CRP’s supply control effects and they benefit from direct CRP payments. The environment benefits from reduced soil erosion, enhanced water quality, and improved wildlife habitat.

On the other hand, it’s difficult to find even ardent backers of CRP who will not admit that the efficiency of CRP can be greatly improved. Given scarce budget resources, it is critical that CRP contracts be renewed in such a way that the environmental value per dollar expended is maximized.

Efficiency Gains from Environmental Targeting
The first question I would like to address is how efficiency of CRP can be increased. I see two sources of improvement. The first is to renew only those contracts that give good value to the public. . . . The second is to open up CRP to new land that offers valuable benefits. This method would increase efficiency by trading some CRP land that should be put back into production for land that should be taken out of production.

. . . Efficiency gains from better targeting depend on how the targeted environmental attribute is distributed across CRP and the relationship between the productivity of CRP land and the level of environmental benefit that one can obtain from that land.

Concentration and Cost of Environmental Benefits in CRP
. . . The more geographically concentrated environmental benefits are, the greater the efficiency gains from targeting. One of the most effective indicators of these benefits is surface water quality: one could obtain more than 98 percent of total surface water quality benefits currently available by enrolling less than 27 percent of CRP land. Wind erosion and groundwater vulnerability are also fairly concentrated: by enrolling 32 percent of CRP land one could achieve about 90 percent of the total benefits from either of these two indicators.

Water erosion is slightly less concentrated, but 90 percent of the total water erosion benefits could, nonetheless, be obtained by renewing only 43 percent of current CRP land. In other words, 57 percent of current CRP land offers less than 10 percent of the available water erosion benefits.

Wildlife habitat is the most uniformly distributed. The reason for this uniformity is simple: Wildlife habitat is enhanced by simply not cultivating land.
Cost and benefits. The other important factor affecting the size of efficiency gains from targeting is the correlation between cost and environmental benefits. Targeting wind erosive land is largely consistent with a policy of enrolling low-cost land. Thus the efficiency gains from environmental targeting should be relatively small. Conversely, water erosive land is the most positively correlated with cost, which implies that targeting water erosion benefits would enroll relatively expensive land.

Budget Scenarios. Because wind erosion is negatively correlated with cost and is also highly concentrated, a policy of enrolling low-cost land is likely to do a fairly good job of achieving wind erosion benefits. Targeting wildlife habitat—as measured by our index—will not likely result in large efficiency gains because wildlife habitat is quite uniformly distributed.

In the absence of exact policy guidelines, we analyzed four different budget scenarios for the four indicators: CRP spending limits of $250 million, $500 million, $750 million, and $1 billion. These limits translate into 15, 30, 45, and 60 percent renewal of CRP contracts entered through the 11th sign-up. We used two targeting schemes: enrolling land on the basis of the benefit-cost ratio and enrolling land solely on the basis of cost.

At the $500 million budget level, water erosion benefits purchased by CRP could be increased by almost 300 percent. In contrast, targeting wind erosion achieves a relatively small efficiency gain of 36 percent at the $500 million level. This difference is caused by water erosive land's being relatively expensive, and wind erosive land's being relatively inexpensive.

The map below demonstrates a large disparity between 1994 cropland cash rents and past CRP bids. Cropland cash-rent data should reflect the actual value of cropland in production; whereas, the CRP bid data reflect what was actually paid to enroll land. For much of the Northern and Southern Plains regions, CRP bids are much higher than cash rents. For Iowa and Illinois, cash rents are generally higher than CRP bids. This disparity explains why 90 percent of the water erosive land in the Great Plains was placed in CRP; whereas, only 40 percent of water erosive land in the Corn Belt was enrolled. Farmers in the Great Plains found that CRP payments were more attractive, relative to net returns from farming, than did Corn Belt farmers.
significant environmental benefits whereas a policy of environmental targeting would. But even greater improvements are possible if CRP is opened up to new land.

Supply of Environmental Benefits in CRP

... Groundwater vulnerability is highest on land with crops that require intensive applications of fertilizer and pesticides, such as corn, soybeans, wheat, and cotton. CRP does not enroll a significant proportion of land on which these crops are grown. Furthermore, there is no reason to believe that the benefits are extraordinarily large from enrolling a small proportion of land vulnerable to groundwater contamination. It makes little sense to use CRP as the means to protect groundwater.

**Targeting wildlife habitat.** It still might make sense to target wildlife habitat because the marginal returns might be fairly large. That is, very large payoffs from converting riparian and some grassland from agricultural uses are likely. U.S. residents have indicated that they are willing to pay to save species, but they are reluctant to pay to expand populations of non-threatened species. ... Wildlife habitat targeting could be accomplished by targeting land that has a high probability of saving species, perhaps in conjunction with the Endangered Species Act.

**CARD Publications on the CRP**

*Working Papers*


*Briefing Papers*


*Online Publications*
“Freedom to Farm or 30 Percent Flex? An Analysis for Corn and Cotton.” Bruce A. Babcock and Demot J. Hayes. [http://www.ag.iastate.edu/card/freedom.html](http://www.ag.iastate.edu/card/freedom.html)


**Targeting existing CRP land.** The USDA did a good job of enrolling land subject to high water erosion rates through the 11th sign-up. CRP contains 68 percent of total U.S. cropland that has water erosion rates of 20 tons or more. We calculate that in the Northern and Southern Great Plains, 90 percent of cropland with erosion rates greater than 20 tons is enrolled in CRP. In the Corn Belt, about 40 percent of such cropland with this erosion rate is enrolled. If reducing water erosion is a top priority, then targeting existing CRP land will achieve significant national benefits.

Enrolling Erosive and Riparian Land

... While I do not advocate enrolling land simply on the basis of environmental benefit without regard to cost, [our] estimates provide some idea of the benefits from opening up CRP to new land. We calculated two sets of cost estimates: one using county-average CRP bid rates,
and the other from actual cash rent data for 1994. Results suggest that farmers in the Great Plains felt that CRP payments were more attractive—relative to net returns from farming—than did Corn Belt farmers.

Renewing the 14.9 million acres of current CRP land that meets at least one of the three benefit criteria (water erosion, wind erosion, and riparian land) would cost between $566 million and $710 million. Enrolling all U.S. cropland with water erosion rates greater than 20 tons per acre and all riparian land would cost less than $1.3 billion. Adding in all U.S. cropland with wind erosion rates greater than 20 tons per acre would add about $400 million to annual cost. This would result in about 36 million acres of U.S. cropland in CRP, which would be about the same size and the same cost as the current CRP. Although the cost and size of this targeted program may be the same, the enrolled land would offer far more environmental benefits. For example, the average water erosion reductions of current CRP land is 20 tons per acre. This rate could be the minimum rate in a more targeted program.

Distributional Consequences of Improved Targeting

... The largest changes for the major CRP states from renewing land only on an environmental threshold basis are in North Dakota, which would lose about 80 percent of its CRP land; Washington, which would lose about 99 percent of its CRP land; and South Dakota, which would lose 97 percent. CRP acreage in Texas would be only about 4 percent smaller than it is now.

The changes are equally dramatic if new land is allowed to come into CRP. The total size of CRP would remain fairly constant if all U.S. water and wind erosive land and riparian land were enrolled. But there would be major shifts in the location of CRP land. Kansas and North Dakota would each lose about 2 million acres; South Dakota about 1.5 million acres; and Washington about 500,000 acres. Texas would gain about 4 million acres. Other large gainers would be states with large areas of riparian land, including Tennessee, Kentucky, Louisiana, Illinois, and North Carolina.

CARD publications related to our ongoing evaluation of CRP policies are available. For information on ordering, see page 15.

Bruce Babcock: babcock@iastate.edu

International Journal Edited by Stanley Johnson

In July 1994, Stanley Johnson accepted the editorship of Agricultural Economics, the journal of the International Association of Agricultural Economists. The journal contains articles covering the range of agricultural economics research and is published by Elsevier Science in the Netherlands.

When Johnson assumed the editorship, the editorial office of Agricultural Economics also shifted to CARD. Authors wishing to submit manuscripts to Agricultural Economics should address them to Stanley R. Johnson, Editorial Office of Agricultural Economics, Iowa State University, 578 Heady Hall, Ames, IA, 50011.

For further information on the journal or the International Association of Agricultural Economists, see the Agricultural Economics Home Page at the following URL: http://www.ag.iastate.edu/journals/agecon.
Few topics have generated more controversy in Iowa recently than the future of the state's pork production industry. Iowa's national ranking as a pork producing state is on the line. Attempting to shed some light on what has become a politically heated situation, a CARD Briefing Paper examines some of the often-overlooked economic benefits that livestock operations can generate, both for the local communities and the state as a whole.

"Pork Production in Iowa: An Industry at a Crossroads" (96-BP 10) was written by Dermot J. Hayes, of CARD's Trade and Agricultural Policy Division, Daniel M. Otto, professor of economics, and John D. Lawrence, associate professor of economics at Iowa State University. The paper takes a hard look at why Iowa has lost ground in livestock feeding enterprises—and what needs to happen to ensure that the pork production industry does not experience decline. Two keys to understanding movements in the livestock feeding sector are identified: the relative costs of moving grain vs. moving the final livestock product, and the impact of government feeding policies.

Until 1990, government policies worked against Iowa-based livestock feeding. Since then, policies such as GATT, NAFTA, and the decoupling of U.S. farm programs have favored growth of Iowa-based livestock feeding. There is renewed interest in constructing new livestock-feeding facilities in Iowa. Conditions in international meat markets strongly favor U.S. livestock producers, and U.S. livestock feeding will continue to expand. Much of this additional meat production could be located in Iowa.

The enormous worldwide demand for livestock products plus continued moderate growth in U.S. domestic markets means that, under certain circumstances, large areas of Iowa's grain and livestock production may come into balance in the next ten years. Some of the benefits associated with these trends include a fivefold increase in value added when processed livestock products are exported in lieu of grain. In certain agriculturally dependent counties in Iowa, this could mean as much as a 50 percent increase in total economic activity.

In general, grain producers in the regions farthest from export ports receive some of the lowest local grain prices. Since Iowa corn producers currently receive some of the lowest grain prices in the world, they have much to gain from geographically balancing livestock production to grain production. (The state currently feeds 57 to 71 percent of the grain that it grows.) If parts of the state lose their dependence on international grain markets (i.e., they feed grain locally), then prices in these counties will rise. If, on the other hand, the county remains dependent on export markets, prices of all grain sold in the area will equal U.S. Gulf prices minus transportation costs to the Gulf.

Iowa's problem is that the emerging livestock industry paradigm hinges on a small number of operators who produce large numbers of hogs. Much attention has been focused on the perceived negative environmental, economic, and social aspects of these new firms. Hayes, Otto, and Lawrence point out that typically those who oppose new industries are initially more vocal than those who stand to gain because the benefits of the new industry will not appear until the industry has developed. But they also stress the importance of addressing and solving the social and environmental concerns that could halt industry growth.

To receive a copy of CARD Briefing Paper 10, see ordering information on page 14.
CARD Profile: Jean D. Opsomer

When Jean Opsomer came to the University of Chicago from Kortrijk, Belgium in 1986, he was on exchange from the University of Louvain and expected to return to Belgium when he graduated. Shortly after earning his MBA from the University of Chicago, however, he was employed by the Alliance Consulting Group of Cambridge, Massachusetts. After a time in Cambridge, Jean returned to Belgium to perform his one-year mandatory military service, and soon after his discharge, he was rehired by Alliance.

Later, Jean enrolled in the Operations Research Ph.D. program at Cornell University (Ithaca, NY), beginning an interdisciplinary program in environmental statistics. Jean minored in both environmental economics and environmental toxicology, and he graduated from Cornell in May of 1995.

Jean began his employment at Iowa State University in August of 1995. His appointment allocates 40 percent of his time to the Department of Statistics, 30 percent to the Survey Section (Statistics), and 30 percent to CARD.

A good deal of Jean’s time has been spent collaborating with Wayne Fuller, ISU distinguished professor of statistics, on the National Resources Inventory (NRI). The NRI originated as an effort to measure erosion on agricultural land, but over the years it has become a much broader project. Jean describes it as “a nationwide survey that measures the health of the agricultural base in the United States.”

The NRI initially covered the lower 48 states; Alaska has recently been added to the survey. The Alaska data have been gathered from a variety of sources using several different methods, and Jean has been occupied with organizing these data.

Jean has also collaborated on projects with Bruce Babcock of CARD’s Resource and Environmental Policy Division. And he will soon begin working with Alicia Carriquiry, associate professor of statistics and CARD adjunct faculty member, on research explaining CARD’s geographic modeling for analysis of the problems of nitrogen and phosphorus runoff in the corn- and wheat-producing states of the United States.

The geographic model is a critical component of a broader modeling approach designed to assist policymakers. Researchers can introduce proposed agricultural policies into the model and generate pollution impacts. Jean and Alicia will soon examine the design of the metamodel in more detail, and they intend to publish a paper that will gain recognition for CARD as an agency that not only uses statistics in analyses, but that also originates statistical work.

Jean is married to Carolyn Opsomer, who has been the ISU Foundation Director of Development for the Parks Library since September 1995. He and Carolyn own a tandem bicycle, and according to Jean, the terrain around Ames is ideal for this pastime.

Jean Opsomer: jopsomer@iastate.edu

William H. Meyers, CARD associate director and FAPRI codirector, presented a paper on “Perspectives for Agricultural Commodities” in a session on the World Economic Outlook at the Project LINK Fall Meeting. Meyers is the CARD representative to Project LINK. Approximately 100 economists, industry representatives, and government officials attended the event held September 25-29, 1995, at the University of Pretoria, South Africa.

In addition to a broad-based world economic outlook, the meeting also offered viewpoints on regional economic concerns, European monetary issues, and compelling issues in international economics, and seminars on modeling. Sponsors for the meeting ranged from the Bank of Japan to the British High Commission to Panasonic. The Pretoria meeting was one of two yearly Project LINK gatherings. The group usually meets in New York in the spring and in one of the member countries in autumn.

Meyers reports that FAPRI currently uses Project LINK data in preparing its commodity and market projections, and LINK analysts use agricultural price information generated by FAPRI. The ultimate goal of the organizations’ efforts is to strengthen the connections between FAPRI and Project LINK, which compiles economic data from nearly 80 nations. Project LINK is a global macroeconomic forecasting group organized over the last 30 years by Nobel Laureate Lawrence Klein of the University of Pennsylvania. It is now coordinated by the United Nations Department of Economic and Social Information and Policy Analysis and the University of Toronto Institute of Policy Analysis.

William Meyers: wmeyers@iastate.edu
Recent CARD Publications

The following publications are available through CARD. Contact Betty Hempe for price information or a current catalog: CARD Publications, Iowa State University, 578 Heady Hall, Ames, IA 50011-1070; phone (515) 294-7519; fax (515) 294-6336; email card@card.iastate.edu.

**Briefing Papers**


**Baltic Reports**


**Statistics Department and CARD Collaborate on Stochastic Volatility Research**

A key element of modern financial market trading strategies is volatility. Returns on stock or futures investments are considered too volatile when their behavior changes in short periods of time. In more formal terms, it is said that returns are volatile when their variance is time dependent.

In recent years, researchers dealing with modeling volatility have focused on two main approaches: Auto-Regressive, Conditionally Heteroscedastic (ARCH) processes and several variations, and Stochastic Volatility (SV) processes. In SV, volatilities are considered random variables generated by an underlying stochastic process.

A research team of Iowa State University faculty—F. Jay Breidt, assistant professor of statistics; Alicia Carriquiry, associate professor of statistics and CARD adjunct faculty member; and Wayne A. Fuller, distinguished professor of statistics—is conducting research on the modeling and estimation in stochastic volatility models.


In a second paper, “Alternative Estimation Procedures for Stochastic Volatility,” presented at the Joint Statistical Meetings, American Statistical Association last August, Breidt, Carriquiry, and Fuller demonstrate that the method proposed by Breidt and Carriquiry can be further improved if additional structures on the distribution of the sum of the random variables is introduced. These findings are welcome news: when simplicity and speed of implementation are an issue, the method proposed by the ISU researchers is the method of choice.

The method proposed by Breidt and Carriquiry is much easier to implement than others. Most commercial statistical software packages, such as SAS or S-Plus, can be used to obtain the estimate researchers need to complete their calculations. In addition, the adaptive transformation proposed by Breidt and Carriquiry has recently been added as an option in STAMP, software developed and marketed by the London School of Economics.
Because the following publications are not originally published by CARD, they are not available through the publications secretary unless designated as a CARD Journal Reprint (RP).

**Books**

**Journal Articles**


