History, Current Status, and Emerging Issues in Public Outlook Program

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The issues with which I am to deal are not new ones. There is a long history of public involvement in the providing of economic information. There is an equally long controversy over whether the public should be involved and, if it is, how that involvement should manifest itself.

There is a need, then, to make some choices and impose some constraints on the coverage of the history of public involvement in economic information in general, and outlook information in particular. I conclude there is only limited current value to the writings, dialogue, and analyses surrounding this broad issue prior to the 1970s. It was in the decade of the 1970s that risk and uncertainty, especially price and market-related risk and uncertainty, burst onto the scene in American agriculture. When the intra-year price range for corn in a particular year in a specific market is 10¢ per bushel or less, as was often the case in the 1950s and 1960s, there is no great urgency associated with efforts to improve access to, and the quality of, planning information. Policies to deal with issues surrounding public involvement are not the first priority. When the intra-year price range exceeds $1.00, as was sometimes the case during the 1970s and 1980s and perhaps in 1993-94, production, stocks, flows, and marketing information become much more important.

In an overall appraisal, Bonnen (1977) identified a number of reasons for increased concern. The marketplace had changed, had become much more variable; but the information system serving the markets had not changed. Bonnen was concerned that some observers treated data and information as one and the same, that conceptual obsolescence was rampant in that "concepts" that fit earlier needs were no longer appropriate, and that survey techniques were not keeping pace with institutional and market structure changes. He closed his coverage with observations that would appear to be equally appropriate today, and they are repeated here as a baseline on which further discussion can be developed (p. 407):

> Information is an expensive commodity as well as a valuable one. Returns to careful decisions about data and information are high. In the search for an effective information system the economic and statistical models, the estimation and optimization procedures, and the corresponding inferences and choices are interdependent links in the information chain. The opportunity decision cost of considering any one of the above ingredients in isolation is very high . . . . The cost of poor decisions and subsequent lack of appropriate information is extremely high. The foundation of effective information management for agricultural decisions is careful design of data and information.

The concerns that Bonnen voiced so eloquently are with us in 1994. The accuracy and reliability of USDA reports, the major source of data and information for outlook analyses and efforts, are being subjected to severe, often harsh, criticism. The marketplaces discovering corn and soybean prices for the weather-ravaged crops of 1993 waited, and waited, for "official" confirmation that the crops had in fact been significantly damaged. That information did not come until the mid-November report was released, after the bulk of the harvests, and showed significant decreases from earlier estimates, especially for corn. Since the December report involved no survey information, it will be the January 12, 1994,

report that brings some closure to the issue and resolves some of the uncertainty.

The June 1993 quarterly *Hogs and Pigs Report* shocked the market, showing a year-to-year increase of 1 percent in inventory numbers. Some incredulous analysts argued that the correct numbers were more nearly 3-5 percent *below* year-earlier levels. In the September report, the USDA lowered its estimates of sows farrowing in the December 1992-February 1993 and March 1993-May 1993 quarters that had been reported in the June report—and were a reason for the inflated numbers—by as much as 5.3 percent.

Continuing to list the ongoing problems is not extremely productive. It appears to be a case of persistence by many of the problems that Bonnen articulated in 1977. The institutional arrangement and organizational structure of the swine sector have changed dramatically since the mid-1980s, with that change accelerating in the early 1990s. The controversial June 1993 *Hogs and Pigs Report* apparently used sampling procedures that had not been updated since 1988 at the latest, when the "who and where" of hog production was different and the industry was significantly different.

Brock: The hog industry has lost faith in the *Hogs and Pigs Report.* Consequently, they don't rely as heavily on it as they once did. I don't think that confidence will ever be restored.

Allen: Purcell reminds me that we might want to redouble our efforts to provide information on NASS sampling and estimation procedures. In the past eight years, we have sponsored annual data users meetings at which we outline agency procedures, particularly changes that have been made in report contents or sampling. Wayne comments that one possible problem with hog and pig estimates in the past year is that sampling hasn't changed since the early to mid-1980s. In fact, the specific sampling approach that we use for hogs and pigs was implemented in all states as of 1988. This is the Agricultural Survey Program that integrates sampling and survey questionnaires for hogs and pigs with quarterly grain stocks and with *Prospective Plantings*, *Acreage*, and *Annual Crop Production*. The Agricultural Survey program has enabled expanding quarterly hog information from 10 states and grain stocks estimates from 21 states to the entire United States, and has provided probability surveys for prospective plantings and end-of-season production. If we haven't explained this new sampling to Wayne, then surely most data users won't realize it either.

Purcell continued

The importance of recognizing the interdependence in sampling, collecting, measurement, and estimation that Bonnen stressed is obviously still valid. Therefore, in contributing to the dialogue and to a base for policy decisions, there is a need to push beyond the conventional thinking that is already available and probe the issues of interest to the public at large that will be there during the remainder of this decade of the 1990s. In an effort to stimulate and extend our thinking, I will pursue several specific, but surely not unrelated, theses. In each case, the discussion will build on and extend issues that have been presented, discussed, and at least partially validated empirically in the literature of the 1970s, 1980s, and early 1990s. The theses include:

1. The impact of exposure to risk and/or uncertainty, an impact information such as economic outlook could presumably mitigate, on the level of production at the farm level;
2. The accuracy, effectiveness, and value of public involvement in economic information and public outlook efforts;
3. The implications of the effectiveness of public information and outlook efforts to the viability of price-based exchange and

coordinating systems and to long-run market structure; and

4. The possible impacts of the expanding, and highly visible, futures markets on the need for public information and on who the targeted audience for such information should be.

Impact of Risk on Production, Producers' Decisions

Most analysts have reached what would appear to be an intuitive conclusion—that production levels decrease as exposure to risk, especially price risk, increases. Sandmo (1971) showed that a risk-averse firm produces less output when there is significant exposure to price risk than it would in the absence of risk. Ishii (1977) proved that an increase in price uncertainty is associated with a reduced output level if the firm involved exhibits decreasing absolute risk aversion. Similar results were found for crop production by Lin (1977), by Traill (1978), and by Just (1974). Hurt and Garcia (1982) showed that sow farrowings are reduced by exposure to increased levels of price risk, leading to reduced supplies of slaughter hogs.

Brorsen et al. (1985) extended the scope and implications of this basic thesis to an examination of the relationship between the size of marketing margins extracted by middlemen and the level of exposure to price uncertainty. Their examination of the U.S. wheat market suggests that price spreads between the farm and milling levels and from the milling level to retail both increased when the price variability of the 1970s exploded onto the scene. The increase in margins meant lower prices to wheat producers, which would in turn mean a lower level of production other things equal, and therefore increased prices to consumers for given levels of consumer demand.

To the extent that more and better (more accurate) information and related improved outlook analyses reduce the level of price risk exposure at the producer level, it would appear that supplies of food and fiber products will be higher. Increased supplies prompted by improved economic information will, in turn, reduce prices of consumer-level products. The public at large has, therefore, a fundamental, and perhaps largely irrefutable, reason to be involved in supporting the collecting and disseminating of economic information. Since there continues to be a controversy surrounding public efforts to provide an information base for economic outlook activities and economic outlook, there apparently are also issues about the accuracy and value of reports, of related outlook prescriptions, and other, perhaps more indirect, impacts of public involvement. The theses discussed below continue this line of reasoning.

Accuracy, Effectiveness, and Value of Economic Planning and Outlook Information

Bradford and Kelejian (1977) looked at the value of improved information in crop forecasting efforts. Better or more accurate crop forecasts would translate directly, of course, into better planning and outlook information. The authors found that gains from improved information in the presence of relatively sophisticated forecasting agents extend in a very significant way to farmers.

Bullock et al. (1982) found that farmers themselves do not necessarily believe they are helped by public reports and publicly supported information. In a survey of North Dakota and South Dakota farmers, 78 percent of the farmers felt USDA releases of information on their current and planned production result in a transfer of wealth from them to grain buyers, processors, and futures or cash market speculators. The authors suggested the farmers were responding based on at least three basic misconceptions: (1) USDA reports must be perfectly accurate to be of value to producers, and inaccurate forecasts transfer wealth away from producers; (2) if no USDA reports on crop size were

released, prices would be higher, and (3) inaccurate USDA reports are a major cause of resource misallocation in agriculture. The authors' analysis, on the other hand, found USDA reports are generally socially "good" if they help move quantity produced closer to the underlying equilibrium quantity.

Hayami and Peterson (1972) estimated social returns to improving information. They found that social returns were net positive over a wide range of scenarios even after adjusting for possible over estimation of benefit-cost ratios from any errors in supply and demand elasticities.

Hirshleifer (1973), examining the available literature at about the same time Hayami and Peterson reported their work, concluded that most researchers have found favorable externalities in the discovery and dissemination of market information and that such activities should be encouraged by public policy.

Moussa and Murota (1985) add an interesting dimension to the discussion of "value" surrounding public information, a dimension that will be explored in more detail later. The authors conclude that the more nearly perfect (i.e., more effective and efficient) a market becomes in dealing with uncertainty, the greater the social value of public information. Related, the incentives to provide information increase with the effectiveness of the user markets in incorporating the information and registering its influence.

Roe and Antonovitz (1985) analyzed the value of accurate price forecasts for cattle feeders. They found that the value of information embodied in highly accurate forecasts ranges from zero up to $2.97 per hundredweight for fed cattle. An interesting and useful finding, the authors provide an important caveat to their work: The results should apply only to a situation in which the involved producers are too small, individually or in aggregate, to influence market prices by their marketing actions.

Irwin and Gerlow (1989) look specifically at the value of outlook economists' price forecasts. They review briefly a widely quoted effort by Just and Rausser (1981) that compared the accuracy of price forecasts by the USDA and four private consulting firms to those offered by discovered prices in futures markets. Just and Rausser had found that, for most crops and livestock commodities, the futures prices were just as effective as the econometric models being used by the USDA and the consulting firms. The Just-Rausser effort used a very short time span, however, and Irwin and Gerlow extended their analysis to a much longer time period and, therefore, to a much larger sample. As a baseline, they used what they called a naive long position in the underlying futures markets, and they compared the outlook efforts of the USDA, the University of Illinois, and the University of Missouri for comparable time horizons. They conclude that the three outlook programs, for hogs and cattle, do not provide users substantial economic value. As an indirect result, the authors conclude that the hog and cattle futures markets are semi-strong form efficient. Said another way, the outlook forecasts were of little value to users *because* the informational value they might otherwise have provided had already been incorporated in the discovered prices in the futures markets. Again, a theme emerges that will be extended later in the prescriptive part of the paper.

The Irwin-Gerlow findings raise an interesting issue. *If* the public (and private) forecasts were more accurate, *then* they would have more value to users. But they were no more accurate than the futures markets, a price discovery mechanism that is not structured to generate forecasts. It is true that current quotes for distant futures contracts are generally viewed as statistically unbiased estimates of prices for those futures periods. But the futures market has an additional and important

function of providing a risk transfer mechanism, and it is easy to demonstrate that the futures market does not have to be an accurate forecasting mechanism to be an effective risk transfer mechanism.

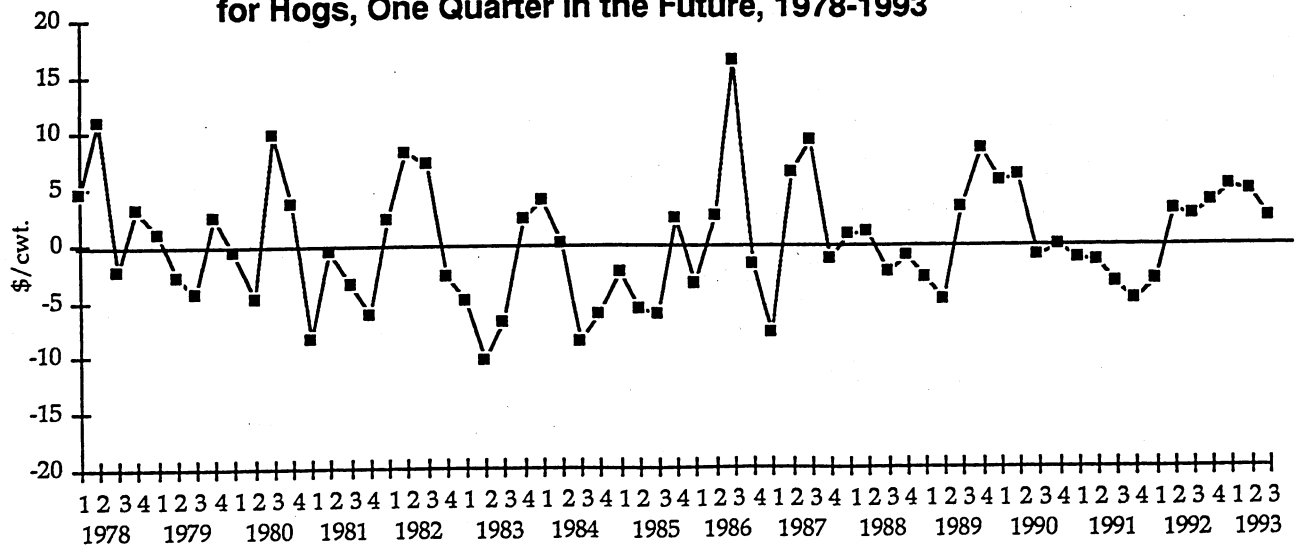
In a 1979 appraisal, Dobson claimed that the then-employed system was operating far below the level permitted by the state of the art. He was concerned that the USDA's record for accurately identifying turning points in prices, an admittedly difficult task, was only about as good as would be produced by chance. Also included in his "need list" was better information on expected future demand, a probability distribution for prices (similar to widely used weather reports), and information on prices under contractual and formula pricing mechanisms.

Without attempting a major effort to update Dobson's work, I wonder whether his criticisms are not still largely valid. The Irwin-Gerlow work is recent, and their findings suggest that either the "state of the art" is not as advanced as many professional agricultural economists would like to believe or that the models being used are in fact far below the prevailing state of the art. It is an interesting question or dilemma, and I pursue it at a very simplistic level in the following.

In its *Livestock and Poultry Situation and Outlook Reports,* the USDA provides a price forecast range for the quarter during which the report is released and for the next two calendar quarters. A November 1993 report, for example, would "forecast" prices for October-December 1993 and for January-March and April-June of 1994. For ease of exposition, let t = the current quarter and t+1 = the next quarter, January-March 1994 in the above illustration using a November 1993 report. The midpoint of the price prediction for quarter t+1 was compared to the eventual average price for the quarter. The forecast errors (actual-forecast) are shown in Figure 1. The average error is only $.05 per hundredweight, but the standard deviation is $5.29. The range of the errors is from near -$10.26 to +$16.13 per hundredweight, and 22 of the 63 observations are $5 or more in error.

Some analysts have criticized using statistical measures such as standard deviation of forecast errors to evaluate effectiveness, since a positive error, as defined here, is as favorable to a producer as a seller. But we should keep in mind that a *buyer* is also involved, and a positive error means the buying firm paid more than the forecast price. So, without getting too deeply into the issue, it would appear that

Figure 1. Forecast Errors (actual-predicted) in the USDA Price Outlook for Hogs, One Quarter in the Future, 1978-1993



looking at the variation, the extremes, and the frequency of errors of various size is in fact useful.

Figure 2 shows a plot of forecast errors across the same time horizon used in Figure 1, using a simple seasonal index as a forecasting mechanism. The average error is -$.01 per hundredweight, and the standard deviation is $4.75. The range in errors was -$10.58 to $13.15, and 22 of the 61 errors were greater than $5.00 in absolute value. It would appear using a simple seasonal index does as well in predicting hog prices one quarter into the future as do the USDA forecasts. In Figure 2, the price was forecast using

$$\frac{SI_t}{P_t} = \frac{SI_{t+1}}{P_{t+1}}$$

and solving for P_{t+1} for known values of the other measures.

Figure 3 shows the forecast errors for hogs for quarters using an elasticity framework. Elasticity of demand for hogs at the producer level was pegged at -.5, and year-to-year changes in supply for a given quarter were converted to price changes using the elasticity framework. The mean

Figure 2. Forecast Errors (actual-predicted) in Price Outlook for Hogs Using a Seasonal Index, 1978-1993

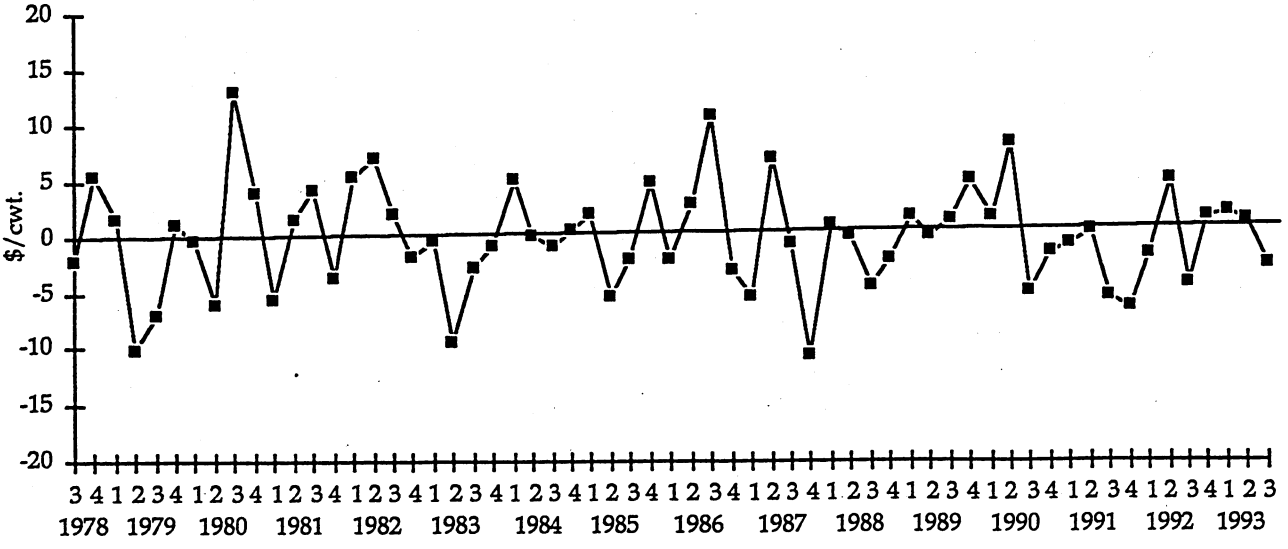
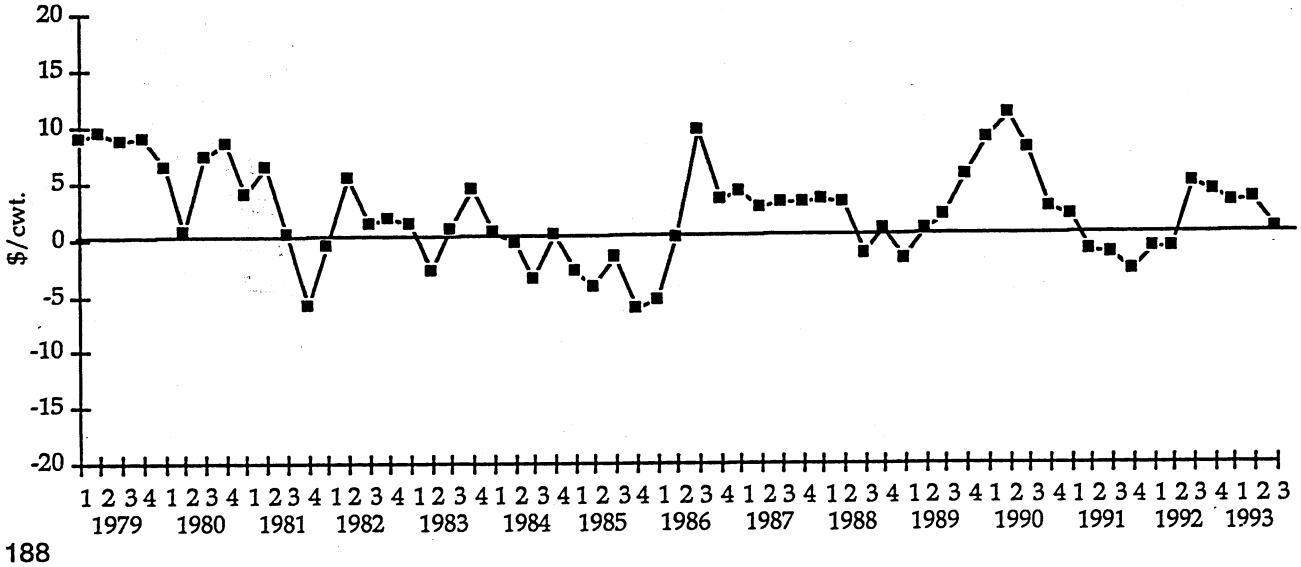


Figure 3. Forecast Errors (actual-predicted) Using Demand Elasticity of -.5 to Predict Year-toYear Prices, 1979-1993



error is $2.32 per hundredweight, and the standard deviation is $4.15. The range in the errors was -$6.03 to $11.15. Only 18 of the 59 possible estimates using this approach were $5 or more in error. This simplistic approach clearly suggests prices were over estimated in 1984-85 when scatter plots suggest pork was experiencing significant demand problems and under estimated prices in 1986-87 and 1989-90 when demand for pork appeared to have improved. A caveat is in order here: The price estimates use *actual* year-to-year production changes. If production estimates for the t+1 quarters were used instead, the forecast errors would likely have been larger and may have been distributed differently. If the errors were adjusted for the $2.32 mean, about 18 of the 59 observations would have been in error by $5.00 or more.

But the important point is obvious. The price forecasts offered by the USDA are error prone, and the errors are often of a financially disastrous magnitude. Across virtually any five-year period, the net margins to hog producers will average less than $5 per hundredweight. This brief and anecdotal look at the accuracy of outlook information suggests major problems in the supply-demand data bases being used in the models, ineffectual modeling and analytical efforts, or both. Performance like that documented in Figure 1 will always be criticized and will raise doubts as to the value of public information and outlook efforts.

Implications of Public Information for the Viability of the Price Mechanism and for Market Structure

The conventional marketing systems for food and fiber products have been open market exchange systems. Prices and pricing signals have been the coordinating mechanism and have, presumably, been the agent of change or the catalyst to ensure that what is produced is consistent with what is in demand at the consumer level. To be effective in this important role, the prices developing from the competitive auctions and the one-on-one negotiations need to be based on good information. Grades must effectively categorize important value-related product attributes, and both buyer and seller must be negotiating from a common understanding of what constitutes value. And very importantly, the seller—especially the small producer of agricultural products—must have something approaching an equal knowledge of the underlying supply-demand forces that determine the "true" price. If these conditions are not met, then the price signals are not sharp, the communication effectiveness of the entire system slips, and we face the possibility of what Williamson and others started to identify as early as the 1970s as a "failure" of the open market price-based systems.

The efforts by Williamson (1971), by Godwin and Jones (1971), and by Purcell in the 1970s continued a theme, a warning, that other agricultural economists had raised in the 1950s and 1960s: If the price-based open exchange systems do not improve inter-level coordination of activity in our production-marketing systems, they will eventually be replaced by contracts or vertical coordination which allow coordination to be ensured by management directives. Purcell and Dunn (1972) and Rathwell and Purcell (1972) found evidence of goal conflicts and operational inconsistencies in the beef systems. Williams and Farris (1974) documented efficiencies and lower cost production in integrated production systems compared to systems where each level of activity involved a purchase and later sale in the open market. Other researchers have reached similar conclusions.

In the early 1990s, an abundance of evidence suggests the long-standing warnings are coming true—that price-based markets that are not effective in achieving coordination across functions will be

replaced by contractual arrangements and integrated structures. Alchian and Demsetz (1972) had put this issue forward in an interesting way over 20 years ago. They discussed types of cooperative action and organizations and advanced the idea that a *firm*, by bringing a number of the technically related inputs and functions under its control, starts to compete with conventional markets. The firm becomes the coordinating mechanism, ensuring a level of coordination the price mechanism is not able to achieve with available information and within existing market structures. The market structure then changes; and that is precisely what the pork processors of 1994 are doing as they control genetics, reduce quality variability, schedule slaughter from owned or contracted production programs, and bring an alignment between what is being produced and what consumers demand.

There is, then, a possibly compelling reason for public involvement in information and outlook, a reason that may not have received enough attention. *If* society values an atomistic structure in production agriculture made up of many relatively small producers, *then* there is reason to seek to improve the performance and effectiveness of the pricing mechanism by improving the information available to buyers and sellers. That could mean, for example, moving to price wheat more explicitly in terms of protein levels, varieties of soybeans in terms of the quality of the oil they produce, and fed cattle and hogs on a carcass evaluation basis to eliminate the uncertainty that still characterizes liveweight purchases, especially in cattle. It would mean, perhaps, a more pervasive and more sophisticated system than now exists, but one can argue the added investments are worth it because our conventional market systems—which we have valued so highly in our farm and rural development policies—are arguably at risk.

Brock: On the matter of public vs. private information, there's no question that the public role remains important. Some people have more confidence in the unbiased nature of a government report than they do in a report from Brock or Sparks or any other private firm.

It bothers me, though, that some of you in government and at the universities regard us as a competitor in information services. Some in the Extension Service even view us as the enemy—that we're usurping their territory. Rather, I see it as a business where we ought to be working together.

The critic might object to public expenditures and argue that the private sector will provide the needed information. I doubt it. Gorham (1978) argued that private services tend to "fill in the gaps" rather than compete with USDA and other public sources. He is probably right, and the need may reach crisis proportions before the private sector steps in. The current disastrous situation in reporting in the swine sector suggests this presumption is right. And before the crisis swells to proportions private reports *do* fill in, it may well be that the large firms in our increasingly concentrated markets become the "market" and eliminate reliance on prices—which is exactly what is happening in pork, beef, vegetables, and some grains and oilseeds today. It does, in fact, appear that there is a compelling reason for the public to ensure that quality information is available to buyers and sellers in our price-based systems.

Structural Change and S&O Information

Donald: I do think that the USDA has some ongoing responsibility to help assure that the playing field is level for both big and small farm operators. The lack of good information may contribute to the strong trend toward larger and fewer operations. However, I don't see that the dissemination

of very accurate USDA outlook information will be sufficient to slow the rate of decline in numbers of producers nor the increase in farm size. Nor has there been much evidence yet that environmental regulations will dampen these structural trends. In fact, the larger players may well be better able to cope with increased regulation.

Brock: Who is the farm audience for S&O information? Well, this audience is shrinking even faster than you may realize. We've said that sampling procedures need to be changed in the hog and pig industry because it is changing so fast, especially in the last few years. To give you an illustration, a large pharmaceutical company asked us to arrange a seminar with the top hog producers in the nation. We arranged for 29 to come. Well, those 29 producers represent approximately 15 percent of the hogs produced in the United States!

There are also rapid geographical changes taking place in the hog industry. Similar changes are occurring in grain, but not quite as fast. Demographics imply that there are not many entrants into farming. This will accelerate the farm size growth in grain and other commodities.

Purcell continued

Impact of Growing Futures Markets

In earlier discussion, the point by Moussa and Murota on the importance of information in "perfect" markets was examined. It has an interesting if indirect implication. If there is available a market and price discovery process that is highly efficient, where efficiency is related to how completely all available information has been incorporated and imbedded in the discovered price, then the value ascribed to other and separate outlook efforts might well be diminished. This appears to explain the findings of Irwin and Gerlow. Efficient hog and cattle futures markets were already offering, to every observer, the information presumed to be imbedded in the outlook efforts of the USDA and the university studies. Is the same thing happening in the grain and oilseed markets, in cotton, in crude oil, in interest rates, in foreign currency exchange rates? Most analyses conclude these price discovery markets are relatively efficient. How many firms still pay private consulting firms for forecasts of prices, inflation rates, and interest rates?

The possibilities *are* intriguing. Have the persistent and, some would say, growing criticisms of public efforts in providing economic information and outlook paralleled the growth in futures markets offerings and trade? Is there cause and effect, or is there just association? The answers to such questions are not apparent, but the dilemma they raise may deserve attention. It would appear that the quality and accuracy of information and outlook efforts will have to be improved if public involvement in such is to have obvious value over and above the information embodied in futures trade. If that improvement is not to be forthcoming because of a lack of funding, a lack of interest, or a lack of ability, then the other and perhaps complementary side of the coin emerges. Activities might instead focus on the information needs of analysts, traders, and market participants who are active and involved in discovering the futures prices. The needed information then flows somewhat indirectly to the small producers or entrepreneurs, but the viability of their operations and the viability and effectiveness of the open exchange systems might still be effectively protected and enhanced. This theme will be pursued in the prescriptive portion of the paper below.

Brock: The futures market needs buyers and sellers on both sides of a contract, so I expect the hog contract to be dead within five years—or it will be entirely different than it is. Hedging hogs may seem a reasonable way to lock in profits, but if it's profitable only one out of 10 years, it won't last.

A Look Ahead

The discussions about public involvement in information gathering and dissemination will continue as we move toward the year 2000, and they will intensify. The criticisms of recent months and years will not disappear, and they are likely to become more strident. We are caught up in an era of change, pursuing often elusive issues that are somewhat new to us, and this recipe for volatile times will not go away. It behooves us, then, to try to focus attention on the truly important issues and to move the dialogue about policy formation and policy change into the arenas where the public interest is or should be most apparent.

It will not be easy. We need a broad and analytical treatment of an area that has not been, historically at least, conducive to breadth and analytical rigor. In the collection and dissemination of economic information, the public involvement spans the land grant universities, state agencies, the Department of Commerce at the federal level, and many agencies within the bounds of the U.S. Department of Agriculture. It is, then, not difficult to see why actions and policies are often fragmented and micro in orientation when a broader, more nearly macro, and analytical approach that ties all the pieces together is what is needed.

Having recognized it will not be easy, it is imperative that we get it done. The public interest in the 1990s goes far beyond the historical thrusts of getting information to the small producer to level the playing field and to try to ensure producers will be protected by at least a modicum of competition between and across buyers. Those were and still are admirable goals, and we should not ignore them. But in the 1990s, the public efforts are being carried forward in a significantly different operating environment. Markets for food and fiber products are concentrated to an extent without historical parallel. There are huge and powerful players, especially at the processing level, who are becoming increasingly impatient with perceived inadequacies in our traditional exchange-oriented and price-driven marketing systems. If those price-oriented systems do not become more effective as coordinating mechanisms, the predictions that have been a persistent thread in the literature since the 1950s will come true—the price-based systems will be replaced.

There are numerous and clear signals in our farm and rural development policies that the public is interested in perpetuating an economic structure characterized by a number of aggressive, innovative, and competitive independent entrepreneurs. That type of structure typically relies on transaction prices to move the food and fiber product from the producer as a profit center to the processor as a separate (but technically related) profit center, and on up toward the final consumer. If the large processor in our increasingly concentrated markets gets the raw material inputs it needs from independent producers when needed and at a consistent quality, the incentive to integrate vertically into production and/or control production by closely specified contractual arrangements is diminished. It is reduced to the incentives associated with being more efficient in production, and there are numerous indicators that an independent producer who is large enough to spread machine costs over at least modest production levels and can put together a truckload lot of consistent, high quality hogs, for example, can compete in production efficiency. The same is true for other food and fiber commodities. It will be the lack of inter-level coordination—the wrong quality, high levels of quality variation, poor or unscheduled timing in the quantity dimension—that will then drive the processor toward coordination by non-price means.

It is essentially a tautology that pricing, price discovery, pricing accuracy, and pricing efficiency are tied closely to the

available information base. Price cannot be effective as a coordinating mechanism if the information on which it is based is inaccurate, inappropriate, or comes up short along important dimensions. A soybean processor/exporter who is developing a market in Japan for high quality soy oil *must* have the right type of soybean, of consistent quality, and when he needs the soybeans. A pork processor who is responding to the consumer market by offering a high quality cut of branded fresh pork that reduces preparation times in the kitchen must have the right hogs consistently if brand identification, promotion, and guarantees of satisfaction are to be extended. If the independent soybean or hog producer is to meet those needs, what the processor needs must be made clear during the pricing process; and all significant value-related dimensions of the product offering must be brought into the pricing process.

The need, then, is for quality information along a broad continuum. Grades and product descriptors must be refined and highly specific. If there is still lots of value variation within #1 barrows and gilts weighing 230-250 lbs., we need (and we *are* getting) much more refined grades and descriptors. If high protein wheat is of value to a miller producing a particular bakery product, then we must have a pricing mechanism that clearly rewards the producer of high protein for at least a part of the increased value. If sampling errors in our *Hogs and Pigs* reports, our *Cattle on Feed* reports, our *Crop Production* reports and our *Stocks* reports are so large the data collected lead to error-prone planning and poor price forecasts, they need to be improved. If a critical report like *Prospective Plantings*, released before planting, which establishes the first estimate of planted acreage (and therefore supply) for each year is ever based on a questionable or out-dated sample, then it needs to be fixed. The final outlook effort will be no better than the base information that goes into the effort.

The first charge, therefore, is to recognize the interdependence of the sampling, modeling, analytical, and distribution efforts and to do all these things well. If we have lacked the public will to make the investment needed when the traditional reasons for public involvement were examined, perhaps the willingness will be there if we recognize that we are also setting the stage for the organizational structures we will see the in decades ahead. We clearly do care, as a collective public, how our markets are structured. Anyone who does not recognize that failures in our pricing mechanisms (traceable at least in part to inadequacies in our information base and our outlook capabilities) have contributed to the demise of our pricing systems in many sectors of our economy has not been paying attention to the real world developments of the past 10 years and particularly the early 1990s.

Lapp: There are data creators (the census, price exchanges between farmers and processors, etc.); data movers (the commodity news service, the DTN, farm programs on TV and radio, futures market data, etc.); and data analyzers (those who do the price projections, the outlook operators.)

The second charge, and it is related, is to recognize the now widely available futures trade as a source of planning and outlook information. But public involvement in information and the existence of a growing futures trade are not necessarily competitive. The one should not be seen as a replacement for the other. In fact, the two may be highly complementary. Spilka (1983) argued that the massive efforts of the USDA in collecting and disseminating information is a reason for the successful introduction and trade in commodity futures, and he is assuredly right. When analysts argue that the futures market offers

planning information that makes outlook information of low value, we have to recognize what is in fact happening. It is the public data, in large part, that has allowed the hog, cattle, corn, cotton, or orange juice futures to discover that useful price for some future month. One might argue that this makes the public outlook effort somewhat redundant, but this argument surely cannot be extended to the base of information on which prices are being discovered. If that wealth of public information were to be withdrawn, the futures markets themselves would falter and be far less effective as a price discovery mechanism.

This second "charge" needs to be extended to look at taking advantage of the complementarity which may be present. *If* the futures prices do in fact contain much or most of the useful information, *then* given its ease of accessibility, public efforts to enrich the information base being pulled into the futures markets ought to be considered. The distribution of at least price information is made easy—everyone has or can get access to futures quotes at zero or nominal costs, depending on the detail desired. Then why not make those prices and the underlying price discovery process as good as they can possibly be? Policies and planning surrounding public collection and dissemination might seek and pay close attention to the information needs or wants of professional market analysts in the brokerage and advisory firms, hedgers who use the futures markets, and speculators who contribute to the price discovery process. The partnership can be extended to futures contract design and modification, to changes in delivery procedures, to moves to cash settlement using public price series, etc. The possibilities are many.

But the first charge will always be there as a necessary condition for improvement. We *must* have high quality information that is not fraught with error and is not presented in such a way that still allows for widely varying interpretation by users. Whatever the distribution mechanism, this need has to be met, and we have to do what is necessary to ensure it is met. If there is no other overriding message in the literature, there is one that points to net value for public involvement to help ensure competitive prices and economic activity. If that persistent message is not sufficient to prompt us to fix a system that appears to be broken along several dimensions, then I hope my adding the reason—helping ensure the viability of pricing systems we have valued as a society—will prompt the needed actions.

References

Alchian, A. and H. Demsetz. 1972. "Production Information Costs and Economic Organization." *American Economic Review* 62 (5): 777-795.

Bonnen, James T. 1977. "Assessment of the Current Agricultural Data Base: An Information System Approach." In *A Survey of Agricultural Economics Literature*, Vol. 2, University of Minnesota Press for the American Agricultural Economics Association, pp. 386-407.

Bradford, D. and H. Kelejian. 1977. "The Value of Information for Crop Forecasting in a Market System: Some Theoretical Issues." *Review of Economic Studies* 44 (3): 519-531.

Bronsen, B. Wade, Jean-Paul Chavas, Warren R. Grant, and L.D. Schnake. 1985. "Marketing Margins and Price Uncertainty: The Case of the U.S. Wheat Market." *American Journal of Agricultural Economics* 67: 521-528.

Bullock, J., D. Ray and B. Thabet. 1982. "Valuation of Crop and Livestock Reports: Methodological Issues and Questions." *Southern Journal of Agricultural Economics*, 14: 668-681.

Dobson, W. D. 1979. "The Adequacy of U.S. Agricultural Marketing and Price Information." *Market Information and Price Reporting in the Food and Agricultural Sector*, Marvin Hayenga, Aaron Johnson, and Bruce Marion, eds. Proceedings of conference sponsored by North Central Regional Committee 117, Madison, Wisconsin, May, pp. 1-14.

Godwin, Marshall R. and L. L. Jones. 1971. "The Emerging Food and Fiber System: Implications for Agriculture." *American Journal of Agricultural Economics*, 53: 806-816.

Gorham, Michael. 1978. "Public and Private Sector Information in Agricultural Commodity Markets." *Economic Review* (Spring): 30-38.

Hayami, Y. and W. Peterson. 1972. "Social Returns to Public Information Services: Statistical Reporting of the U.S. Farm Commodities." *Agricultural Economic Review* 62 (1): 119-130.

Hirshleifer, J. 1973. "Economics of Information, Where Are We in the Theory of Information?" *American Economic Review* 63 (2): 31-39.

Hurt, C. A. and P. Garcia. 1982. "The Impact of Price Risk on Sow Farrowings, 1967-78." *American Journal of Agricultural Economics* 64: 565-568.

Irwin, Scott, and Mary Gerlow. 1989. *On the Value of Outlook Economists' Price Forecasts.* Paper presented at NCR-134 Conference, Chicago, IL, April 20-21.

Ishii, Y. "On the Theory of the Competitive Firm Under Price Uncertainty: Note." *American Economic Review* 67: 68-69.

Just, R. E. and G. C. Rausser. 1981. "Commodity Price Forecasting with Large Scale Econometric Models and the Futures Market." *American Journal of Agricultural Economics* 63: 197-208.

Just, Richard. 1974. "An Investigation of the Importance of Risk in Farmers Decisions." *American Journal of Agricultural Economics* 56: 14-25.

Lin, W. 1977. "Measuring Supply Response Under Instability." *American Journal of Agricultural Economics* 59: 903-907.

Moussa, H., and T. Murota. 1985. "Social Value of Public Information Re-examined." *Journal of Economic Behavior and Organization* 6: 249-274.

Purcell, Wayne D. 1973. "An Approach to Research on Vertical Coordination: The Beef System in Oklahoma." *American Journal of Agricultural Economics* 55: 65-68.

Purcell, Wayne D. and T. L. Dunn. 1972. *Economic Implications of Conflict and Inconsistency in the Beef Marketing System: The Feeder-Packer Subsector.* Oklahoma Agricultural Experiment Station Bulletin B-700, Stillwater.

Rathwell, P. James and W. D. Purcell. 1972. *Economic Implications of Conflict and Inconsistency in the Beef Marketing System: The Producer-Feeder Subsector,* Oklahoma Agricultural Experiment Station Bulletin B-704, Stillwater.

Roe, Terry, and Frances Antonovitz. 1985. "A Producer's Willingness to Pay for Information Under Price Uncertainty: Theory and Application." *Southern Economics Journal* 52: 382-91.

Sandmo, A. 1971. "On the Theory of the Competitive Firm Under Price Uncertainty." *American Economic Review* 61: 65-73.

Spilka, Walter. 1983. "An Overview of the USDA Crop and Livestock Information Systems." *Journal of Futures Markets,* 3 (2): 167-176.

Traill, B. 1978. "Risk Variables in Econometric Supply Response Models." *Journal of Agricultural Economics* 29: 53-61.

Williams, Ed and D. E. Farris. 1974. *Economic of Beef Cattle Systems: From Weaning Age to Slaughter.* Texas A & M University, Agricultural Economics Information Report 74-3, Texas Agricultural Experiment Station.

Williamson, Oliver E. 1971. "The Vertical Integration of Production: Market Failure Combinations." *American Economic Review* 61: 112-123.

Brock: To summarize a few points on S&O:

The accelerated trend toward fewer farms affects both data collection and information dissemination.

Changes in the information system are really big.

NAFTA and GATT mean that the market will become even more a worldwide one.

Through history, every 25 years or so there has been a major price shock. Now grain reserves are very low, so there's nothing to cushion any major problems. So, I anticipate a price shock that will affect all of us, and it could be soon.

The changes in the industry we've seen in the last few years are going to seem like nothing, compared to what's coming in the next five years.

Allen: We, like Purcell, are concerned with the hog and pig sampling and our preliminary estimates. Two groups have studied hogs and pigs—one looked at sampling and survey procedures and the other looked at summarization and analysis procedures. One question to the sampling group was to see if sampling seems to have changed in the last five years without it being realized or if samples should be reallocated because the total number of hog operations continues to decline. Any problems in the past year or two are not due to contract operations per se—NASS has been identifying contractor and contractees for the past several years—but more in proper classification of new operations which receive large expansion factors.

Example 2 of my background paper is particularly applicable to the hog and pigs questions. Even though NASS had some of the largest revisions in recent memory in the last six quarters, those revisions still amount to only about one sampling error of the survey. We have been able to do that well because administrative data and balance sheets are used along with the current survey results to set estimates instead of just accepting the survey indications.

Wayne was also critical of the fact that we had large reductions from the October *Crop Production* report to the November report, particularly for corn. While we wish we could have called the final crop size earlier in the season, we are not apologizing for our monthly forecasts. In fact, we have been asked to make a presentation to the Biometrics Society in April on how we were able to do as well as we did because of the unprecedented weather conditions. We have studied our 1993 crop yield data and our review procedures. One thing that is clear is that farmers also had no idea that kernel weights could be as low as they turned out. By October 1, we were forecasting average ear weights for Iowa as low as in the drought years of 1983 and 1988 based on our review of all farmer reports and objective yield data. The actual weights turned out to be significantly below anything ever experienced. One of our best analysts went back to the October survey indications after the November report and tried to see how low he could have read the Iowa yield in October. The lowest he could have concluded was 5 bushels below our October forecast. However, as farmers started harvest and found the extremely light kernels, we dropped 20 bushels in Iowa for the November forecast and ended up another 10 bushels lower in the annual summary. We are looking at possibly adding earlier season ear weights for the future, but it is doubtful we can improve much from the 1993 record if unprecedented weather conditions would ever be encountered again.

Background Paper: Suitability of NASS Data for Situation and Outlook Purposes

Rich Allen

This paper is intended to provide a fuller understanding of characteristics of NASS data series to those engaged in creating Situation and Outlook reports.

There are three factors to be considered when evaluating possible data series for use: continuity, timeliness, and consistency. *Continuity*: Is sufficient data history available and is there reasonable assurance of future data availability to be worth investing analysis time? *Timeliness*: Will data will be available early enough to make outlook forecasts? *Consistency*: Are preliminary data usable or is the data source subject to frequent, large, or unscheduled revisions?

Continuity of NASS Data

No one can provide absolute guarantees of data availability in the future and federal information budgets will likely become tighter. However, NASS data principles should provide a reasonable core of quality data series.

NASS is committed to maintaining the quality of data series that are published. Instead of cutting all data series proportionately when budgets have been reduced, NASS has evaluated each data series and adopted specific cost cutting measures that have left most data series intact. Several alternative measures are now being considered or implemented that will maintain quality while minimizing data collection costs.

When confronted with data series reduction decisions, NASS places priority on maintaining annual inventory and end-of-year production statistics. This means that fewer *forecasts* of production might be made for some commodities. NASS would like to provide at least once-a-year data for as many commodities as feasible.

While NASS strives to maintain continuity of data series, it also works to improve quality and relevance of each series. The *Cattle on Feed* data series provides an example of such improvement efforts. Nearly two years were spent in interviews with cattle feeders and in pretesting a new definition of cattle on feed which could be answered more consistently and which minimized inclusion of "warmup" lots and other nonfeeding situations. Efforts were made over a three-year period to increase response rates on weight group and expected marketings questions. When it became evident that sufficient quality could not be achieved for certain questions, they were dropped (starting in 1994) in order to maintain response rates and quality of other data items. A new aspect to the cattle on feed program is that all lots of 1,000 plus capacity across the country will be surveyed quarterly with the possibility of adding that new data series in the future.

Timeliness of NASS Data Series

The first aspect of timeliness is knowing when data will be available. NASS excels in this regard. Dates and times of release of the nearly 400 reports issued by the Agricultural Statistics Board each year are published before December 1 of the previous year. Relative dates of most reports usually do not change much from year-to-year so data users can fairly well anticipate the schedule even before it is published.

The second aspect of timeliness is the currency of the data at time of publication. NASS reports are produced on tight timetables, but those vary by report due to complexity of data collection efforts, sample sizes, and amount of analysis needed.

The freshest data issued by NASS (although not usually used for S&O analyses) are the weekly *Crop Progress* reports issued on Mondays from planting through harvest. State statistical offices receive completed questionnaires on Monday morning and the report is issued in Washington, DC, after 4:00 p.m., Eastern Standard Time, the same day.

Data collection for monthly *Crop Production* yield forecasts starts about the 22nd of the previous month for in-field objective yield visits and about the 25th for mail and telephone inquiries to farm operators. All data are edited and summarized by state offices and recommendations submitted to headquarters for this report which by law must be issued by the 12th of the month.

Collection for most monthly reports such as *Cattle on Feed, Milk Production,* and *Egg Production* starts shortly after the first of the month with data releases between the 15th to 25th. Data collection efforts for the monthly *Agricultural Prices* report take place about the 15th to 20th of each month with the report issued the last or next to last working day of the month.

The largest periodic data collection effort is the Quarterly Agricultural Survey program which supplies data for *Hogs and Pigs, Grain Stocks, Acreage, Prospective Plantings,* and *Crop Production—Annual* reports. Data collection starts the first of the month since hogs and pigs and grain stocks are on a reference date basis. About 85,000 farm operators are contacted each quarter, except for June. In June, approximately 200,000 contacts are made because the annual June Area Frame survey is conducted in conjunction with other data collection efforts. Data collection takes place during the first half of the month followed by extensive editing, analysis, and summarization efforts. Reports from this program are issued by the end of the month except for December *Grain Stocks* and *Crop Production—Annual* which are issued in conjunction with the January *Crop Production* and *World Agricultural Supply and Demand Estimates* reports.

In January and July, the Agricultural Survey approach is extended to cattle and sheep data through specific samples. Time requirements and survey procedures are similar to hogs and pigs.

While NASS normally issues each statistical report as soon as possible, there are some modifications. The cattle industry has requested that all cattle related reports be issued on Fridays and NASS has adopted that practice. Data collection dates and survey processing timetables have been adjusted for the new schedule but, without the Friday release requirement, some cattle reports could be issued a day or two earlier.

Consistency of NASS Data

Perhaps the most important aspect to be considered in deciding on data sources is consistency of information published. NASS encourages data users to learn as much as possible about data definitions, data collection, and estimation procedures in order to more fully understand applicability of each data series. To aid in understanding, NASS includes reliability writeups in major quarterly and annual reports as well as in monthly *Crop Production* reports. Writeups describe sample sizes, survey schedules, and procedures. They also include estimates of sampling errors, if applicable, and measures of how well previous reports have performed relative to final estimates. Multiple comparisons are often made to best describe past performance.

NASS revises data series when later information becomes available in order to provide the best historic data relationships for data users. Since both state and national data are reviewed, revisions are occasionally made which are almost infinitesimal at the national level. For instance, revisions are rarely made in off-farm grain stocks numbers but if a state determines that a firm made a previous quarter reporting error, the revision will be made if it materially affects the published level for that state.

There are some important points to be made about revisions. First, *Crop Production* monthly yield forecasts are never revised but are replaced the next month with new forecasts based on changes in conditions during the month. Instead, NASS publishes information on past performance of the monthly forecasts compared to final estimates as can be seen in Example 1 from the November 1993 report.

Second, most revisions are quite small relative to statistical sampling errors of underlying data series. This is because available administrative data on supplies and disappearance are used to create NASS estimates, instead of only publishing raw survey indications. Example 2 illustrates the hog and pig series revision record compared with the survey confidence interval. Most revisions have been on the order of a few hours slaughter. However, Example 2 illustrates that an incorrect estimate in one quarter can lead to problems in subsequent quarters before enough administrative data are available for proper revisions.

NASS does have some special publication update situations. For example, the *Agricultural Prices* reports publish current month prices received by farmers based on data about mid-month. A month later, new figures for that month are based on probability surveys of actual volumes purchased and dollars paid. NASS did extensive work trying to develop time series forecasting models to predict the current month "final" from the mid-month data. However, those efforts did not prove to add stability over the present approach of publishing the preliminary data and replacing it a month later. Example 3 presents reliability measures for a recent three-year period. Example 4 presents reliability comparisons for the five-month average prices, important to government farm programs and situation and outlook work.

Example 1. Reliability of November 1 Crop Production Forecasts

Survey Procedures: Objective yield and farm operator surveys were conducted between October 22 and November 2 to gather information on expected yield as of November 1. The objective yield surveys for corn, soybeans, and cotton were conducted in the major producing States that usually account for at least 80 percent of the U.S. production. Randomly selected fields and plots within fields are surveyed each month. The items counted within the selected plots depend on the crop and the maturity of that crop. In all cases, number of plants are recorded along with other measurements that provide information to forecast the number of pods, ears, or bolls and their weight. The counts are used with similar data from previous years to develop a projected biological yield. The five-year average harvesting loss is subtracted to obtain a net yield. The plots are revisited each month until crop maturity when the fruit is harvested and weighed. After the farm operator has harvested the sample field, another plot is sampled to obtain current year harvesting loss.

The farm operator survey was conducted primarily by telephone with some use of mail and personal interviews. Approximately 20,000 producers were interviewed during the survey period and asked questions about probable yield.

Estimating Procedures: National- and state-level objective yield and grower reported survey estimates were reviewed for errors, reasonableness, and consistency with historical estimates. The survey data were also reviewed considering weather patterns and crop progress compared to previous months and previous years. Each state statistical office submits its analysis of the current situation to the Agricultural Statistics Board (ASB). The ASB uses the survey data and the state analysis to prepare the published November 1 forecast.

Revision Policy: The November 1 production forecast will not be revised; instead it will be followed by an end-of-season estimate. At the end of the marketing year, administrative records and a balance sheet are utilized using carryover stocks, production, exports, processing, feeding, and ending stocks. Revisions are then made if data relationships warrant changes. Harvested acres may be revised any time a production forecast is made if there is strong evidence that the intended harvested area has changed since the last estimate.

Reliability: To assist users in evaluating the reliability of the November 1 production forecasts, the root mean square error, a statistical measure based on past performance, is computed. The deviation between the November 1 production forecast and the final estimate is expressed as a percentage of the final estimate. The average of squared percentage deviations for the 1973-1992, 20-year period, is computed; then the square root of the

average becomes statistically the root mean square error. Probability statements can be made concerning expected differences in the current forecast relative to the final end-of-season estimate, assuming that factors affecting this year's forecast are not different from those influencing recent years.

For example, the root mean square error for the November 1 corn for grain production forecast is 2.4 percent. This means that chances are 2 out of 3 that the current production forecast of 6.50 billion bushels will not be above or below the final estimate by more than 2.4 percent or approximately 156 million bushels. Chances are 9 out of 10 (90 percent confidence level) that the difference will not exceed 4.1 percent or approximately 267 million bushels.

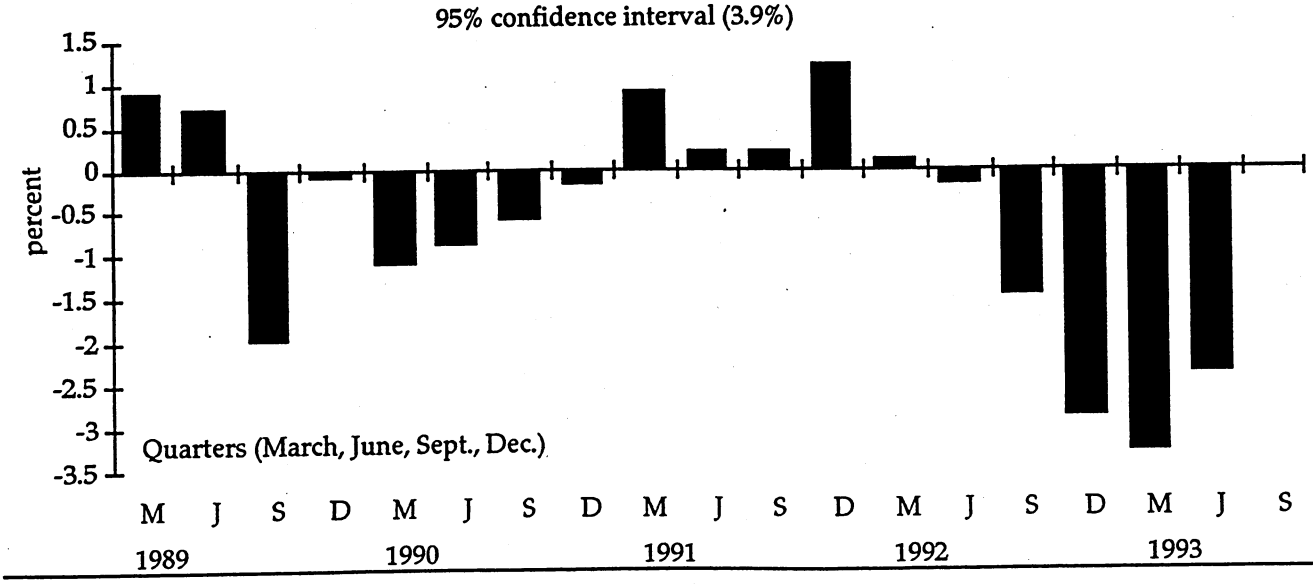
Also, shown in the table is a 10-year record for selected crops of the differences between the November 1 forecast and the final estimates. Using corn again as an example, changes between the November 1 forecast and the final estimate during the past 10 years have averaged 88 million bushels, ranging from 1 million to 258 million bushels. The November 1 forecast has been below the final estimate six times and above four times. This does not imply that the November 1 corn forecast this year is likely to understate or overstate final production. For most crops, the number of years the forecasts have been below or above the final estimate is about equally distributed.

Example 1. Reliability of November 1 Crop Production Forecasts

Crop	Root mean square error			10-year record of differences between forecast and final estimate				
		90% conf. level		quantity			no. of years	
			quantity	ave.	min.	max.	below final	above final
	%	%	million	----------million----------				
Feed grain[a] (mt)	1.9	3.4	7	3	0	7	7	3
Corn for grain (bu)	2.4	4.1	267	88	1	258	6	4
Sorghum for grain (bu)	3.1	5.3	33	19	6	53	7	3
Rice (cwt)	2.7	4.7	8	3	0	11	6	4
Soybeans for beans (bu)	2.9	5.0	92	38	13	99	5	5
Cotton (1000 bales)[b]	3.6	6.3	1,027	386	14	824	6	4
Dry edible beans (cwt)	3.5	6.0	1	.4	0	1	6	4

[a]Corn for grain, sorghum for grain, oats, and barley.
bQuantity is in 1000s of bales, not millions.

Example 2. Hogs and Pigs Reports: Change First to Final Estimates



Example 3. Reliability of Mid-Month Prices Received Estimates

September 1990-August 1993

Commodity	Root mean square error			36-month record of differences between mid-month and entire month				
		90% conf. level		dollars			no. of months	
	%	%	$	ave.	min.	max.	below entire	above entire
Corn	1.7	2.9	.06	.03	.00	.09	22	9
Wheat	2.3	4.0	.12	.05	.00	.20	17	17
Soybeans	2.2	3.9	.22	.09	.00	.35	26	9
Lettuce	19.9	34.5	4.73	2.29	.06	8.10	13	23
Cattle	1.3	2.2	1.64	.71	.20	2.40	14	22
Hogs	1.3	2.2	1.01	.45	.00	1.70	18	17

Example 4. Reliability of Five-Month Prices Received Estimates

1983-1992

Commodity	Root mean square error			10-year record of differences between preliminary and final				
		90% conf. level		dollars			no. of months	
	%	%	$	ave.	min.	max.	below final	above final
Corn	.2	.3	.008	.001	.000	.010	0	1
Wheat	.1	.2	.007	.002	.000	.010	2	0
Sorghum	.2	.3	.007	.002	.000	.010	1	1
Barley	.5	.9	.020	.006	.000	.030	1	2
Oats	1.4	2.5	.035	.010	.000	.060	1	2

Comment: Outlook operators are really in an untenable position. The traditional information is not what is needed. The range of outlook needs to be expanded and become more sensitive to what information will be useful. For instance, when there is not enough differentiation in what is reported, when the grades are too gross, they cannot reflect value differences, so they're useless. (Futures markets suffer from the same flaw—contracts are very gross compared to the detailed characteristics desired.) But at the same time as the call for expansion of information comes a tightening of public resources devoted to the effort.

Comment: If you can't consistently get what you want in an open exchange system, then the system goes away. If we value the open type of system, then we've got to get better information. However, so far, the price mechanism has not prompted production of particular hog or soybean characteristics, for example. Instead people are contracting for exactly what they want, with the contracts carrying all the details about the characteristics and quality demanded.