



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Vertical Coordination, Public Information and Market Development: Are New Public Data Policies Needed?

Steve Sonka

University of Illinois at Urbana-Champaign

The title posed by the session organizers is important. An immediate reaction to the title's question is, Yes. However, developing a set of recommended actions in response to the question is intellectually challenging and, at least for me, confusing.

The source of that confusion lies in the sweeping changes in societal demands, organizational form and information technology capabilities that are occurring in the commodity agricultural system with which we are familiar. As this system becomes more like industrial marketing channels, a growth in both the availability and value of "private" information is expected (King; Streeter; Boehlje). Public data policies created for the historic commodity agriculture system are unlikely to be most appropriate given the sweeping changes just noted. For example, contract relationships between supplier and customer firms may involve sharing of resources, including ownership of the product being produced. The traditional concept of market prices and transactions may have little relevance when the supplier is being compensated in terms of the labor and capital resources provided and does not take ownership of the output being created.

Faced with these turbulent events, some might argue that policies to force sharing of such private information would be warranted to "level the playing field" for competitor

firms. However, in most (if not all) similar situations in the American economy, we celebrate the consumer benefits and competitive advantage associated with innovative linkages wherein customers and their suppliers are using information to provide enhanced offerings to final consumers. For example, Hormel Foods achieved considerable success by leading in the innovative offerings of microwaveable products during the 1980s (O'Keefe and Goldberg). Research and development linkages and information sharing with its packaging suppliers was a key factor in that success.

A key difference in the two examples just cited is that in the former, farm firms are involved as either the supplier or customer. Therefore, the concept of what constitutes a farm and the historic role of the family farm in American agriculture and society become part of the discussion. But the family farm as an institution certainly has not been static.

Evaluation of the positive and negative consequences of such possibilities should include input from numerous disciplines. However, careful consideration of the associated economic and managerial implications clearly is warranted. The agricultural economics profession has an important responsibility to contribute to the understanding of both public and private decision makers

regarding the evolving role of information in agriculture.

The following comments will outline a few of the opportunities and challenges associated with the developments just noted. To frame these remarks, the seminal 1975 work of Bonnen regarding information systems in agriculture and rural areas will be reviewed first. Then a brief overview will be provided regarding the innovative applications of advanced information technology being tested and implemented within agricultural systems today. The paper concludes by speculating about associated challenges to the agricultural system and about the potential roles of the agricultural economics profession in addressing these opportunities.

Insights From the Mid-1970s

In an important invited paper, Bonnen addressed the interplay of changes in agriculture and its associated information systems (1975). In doing so, he drew upon his five-year experience chairing the American Agricultural Economics Association Committee on Economic Statistics to challenge the profession regarding its use of the information base it relies upon. The findings of this committee suggested that serious problems were emerging in the agricultural information base.

Bonnen identifies the major source of these problems not as the statistical data collection procedures, but rather the result of behaviors of agricultural economists:

- The underlying concept of the family farm generally employed tied agricultural information systems to an

inappropriate picture of reality in the marketplace.

- Information collection and analysis was framed within the issue of federal farm income support policies to the detriment of providing capabilities to evaluate other questions of growing importance.
- Agricultural economists tended to glorify analysis (with or without appropriate data) at the price of ensuring that data collection systems produced valid data for analysis.

In an assessment that has continuing relevance for us, Bonnen notes that these inadequacies reduced the capability of the agricultural economics profession to serve its clientele and society in general.

A model of the agricultural information system is depicted by Bonnen and used to illustrate how data are transformed into information useful for decision making. The model identifies the direct linkages between the data capture/generation system and the inquiry system that analysts employ to interpret data. Doing so emphasizes the key message that both the data system and the inquiry system have common theoretical and conceptual bases.

In addition to being common to the systems, those theoretical and conceptual foundations need to be realistically representative of reality. "If the concepts are not reasonably accurate reflections of that real world, then no amount of sophisticated statistical technique or dollars invested in data will produce useful numbers" (Bonnen, p. 757). In that regard, the profession's traditional reliance upon the family farm concept was identified as a potential short-

coming. Further, changing needs of public and private decision makers was noted as a contributing factor to the declining relevance of agricultural information systems.

Advancing Information Technology and Production Agriculture

Within the last ten years, American industry has experienced massive improvements in productivity. A plethora of buzzwords (Total Quality Management, empowerment, rightsizing and reengineering) have become familiar to describe the managerial innovations employed to enhance productivity. While specific buzzwords have risen and waned, the relentless application of continually improved levels of information technology has been a constant.

Advances in information technology have been employed widely. Operational efficiencies have been earned by applying information technology within production (CAD/CAM) and in distribution and logistics (JIT, EDI). Organizational support similarly has been enhanced (e-mail, the electronic office, groupware, etc.) facilitating both cost reductions and quality improvements. Application of these technologies has changed the way work is done and the nature of relationships between firms. An interesting implication for those of us interested in agricultural systems is that a suite of "proven" technologies exist that may be adaptable within agricultural production and marketing systems.

Of course, advances in information technology capabilities have not ended. Indeed, it is entirely likely that the rate of change may continue to accelerate. As noted by Benjamin and Blount, massive cost declines (in terms of capabilities) can be

expected to continue throughout the 1990s, not just for hardware, but for software and expertise as well. Intriguingly, the way that computer technology is being employed is changing (Sonka):

- Nomadic computing is becoming a reality.
- Technological advances are being dedicated to simplifying use rather than simply to advancing computational power.
- Application emphasis is shifting to communication and away from calculation.

Production agriculture is experiencing experimentation and adoption of information-based technologies that have radical implications for data and information systems. The concept of precision farming is moving the focus of input application and production decision making from the level of the farm unit or the field. Instead, the focus is now on individual animals within animal agriculture and on distinct sub-units (that can be only a few feet square in size) within crop agriculture. A suite of existing technologies are being adapted:

- Global Positioning Satellite-based location identification.
- "Smart" monitor and control devices.
- Remote sensing and visual imaging.
- In-process yield monitors.
- Hand-held computing devices.
- Geographic Information System-based analytical techniques.

If successful, widespread adoption of precision farming techniques would radically alter the economics of data collection in

production agriculture. Beyond data capture, the potentials for real time feedback to decision makers and for learning from internal operations could become realities.

Similarly, the limits to electronic communication capabilities with entities external to the farm production unit similarly is undergoing substantial change. Within farms and rural businesses, access to information residing in remote data bases no longer requires use of an intermediary and excessive time lags. Further, e-mail capabilities are allowing farm workers and managers to become sources as well as recipients of information.

Challenges and Opportunities

It appears we are in the midst of a period of Schumpeterian creative destruction with respect to agricultural commodity markets (Schumpeter). For those of us whose roots are firmly planted in commodity agriculture, the danger embodied in the adage that "we see the world, not as it is, but as we are" needs to be remembered. More formally, Bonnen's 1975 article stresses that our theoretical and conceptual underpinnings, although having served well in the past, can be blinders in our design and use of current and future information systems. Indeed it is time for us to re-perceive the agricultural marketing system and its associated information systems.

As part of that re-perception, we can consider perspectives at several levels within the marketing system. For example, is the relevant point of view that of:

- A farmer—as the farm firm's primary provider of management, labor and owner of resources—or that of a

general contractor/entrepreneur whose primary functions are organization and control, not ownership?

- A farm as a relatively homogeneous economic and social entity with distinct boundaries from the rest of the marketing channel OR that of a business unit providing products and services that may differ significantly by customer?
- Undifferentiated commodities as output of the farm firm OR that of on-farm differentiation for customers who apply quality management principles to suppliers to reduce "sorting" costs at the manufacturer/processor level?
- Farm income support policies as the primary question driving information system structure and operations OR that of a focus on information systems to enhance business effectiveness, international competitiveness and social accountability?

Re-perception of the agricultural marketing system should lead to a similarly productive and challenging reexamination of the appropriate information system concepts to employ. Four questions are offered to aid in that examination:

- Is the dominant role of the "production function" perspective of the farm firm still valid for economic analysis? Historically the homogeneity of the functions performed by the farmer and the commodity nature of farm output made the production function approach a powerful and

appropriate tool. But these characteristics are increasingly less valid as representations of production agriculture. The application of transactions cost economics has assisted in understanding the emerging vertical linkages in many industries but its potential as an aid in the design of market information systems is unexplored.

- Where and what is the market? The decline of terminal markets is not a new development, but the reduced reliance on terminal type markets continues. Although we have experimented with electronic markets somewhat unsuccessfully in the past, that experience focused on attempting to electronically replicate the terminal market. Electronic markets for *contracts* may have markedly different characteristics and implications.
- How should we measure the public's best interest regarding public data policies? Information in agricultural production and marketing systems is becoming increasingly more context specific and more valuable. In such settings, can we adequately assess changes in consumer well-being by relying upon traditional measures of changes in prices and quantities? Similarly, if inter-firm sharing of information can improve performance of the marketing channel, what is the best means to encourage development of systems that will allow such sharing?
- Could application of precision technology concepts materially alter the mechanisms by which environmental

regulations are formulated and implemented? In other manufacturing industries, response to societal concerns employs verifiable data collection systems that ensure that appropriate techniques are employed. Precision farming techniques offer similar data collection capabilities in addition to the direct business benefits now associated with evaluation of these approaches.

Conclusion

It is difficult not to become bored with the use of the word "change" in an article such as this. Indeed it appears that relative to agricultural information systems, there are very few constants today. Instead we see fundamental change occurring within:

- Business organizations.
- Technology.
- The questions being asked.

In addition, the public sector's willingness to financially support the agricultural and rural information system in the future to the same extent as it has historically can no longer be assumed.

As always, opportunity lurks behind the challenges that such changes bring. The agricultural economics profession has a responsibility to lead in responding to these changes. The emerging redefinition of agriculture and its information systems begs for analysis at several dimensions. Comprehensive evaluation of desired public data policies will be complex and exhausting. Inherently, such investigations must be dynamic so that policies are relevant for tomorrow, not just for today. Further, assessment of benefits to producers, con-

sumers and the public will be controversial. A commodity-based perspective may not serve that evaluation well, when consumers are soliciting and responding to quality dimensions not incorporated within commodity measures of quantity.

Creation and use of the agricultural data and information system has benefitted agricultural economists well. Indeed, the accolades that the agricultural economics profession has received historically in being perceived as being more relevant in its research perspective probably was a result of data and information availability that fit our analytical concepts and tools. If the profession undertakes to lead in the creation of new public data policies, we again have much to gain. But doing so will cause us to realize that those analytical concepts and tools need to evolve as do the public data policies. Drawing upon Bonnen's insights, we may well find that the most significant impediment to the profession's making a significant contribution in this area is that we, as a group, value analysis for its own sake—not for its potential contribution to problem solving.

NOTES

The author is Professor of Agricultural Management at the University of Illinois at Urbana-Champaign.

REFERENCES

- Benjamin, R.I., and J. Blount. 1992. "Critical IT Issues: The Next Ten Years." *Sloan Mngmnt. Rev.* 33:7-20.
- O'Keefe, E., and R.A. Goldberg. 1990. *George A. Hormel & Co.* Harvard Business School 9-591-026. Boston, MA: Harvard University.
- Boehlje, M. 1994. "Information: What is the Public Role?" Dept. of Agr. Econ. Staff Pap. 94-17. West Lafayette, IN: Purdue University.
- King, R.P. 1994. "The Ever-Changing Agricultural Information System." *The Information Age: What It Means for Extension and Its Constituents*, pp. 1-10. Columbia, MO: University of Missouri.
- Schumpeter, J.R. 1950. *Capitalism, Socialism and Democracy*. New York, NY: Harper & Row.
- Sonka, S.T. 1994. "From Commodity to Quality Management in Agriculture: The Roles of Computers and Information Technology." *Computers in Agriculture 1994*, ed. D.G. Watson, F.S. Zazueta, and T.V. Harrison, pp. 1-6. St. Joseph, MI: American Society of Agricultural Engineers.
- Streeter, D.H. 1988. "Electronic Information—Public or Private Good?" *Agribusiness* 4:39-48.