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BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Chairman, Committee On Small Business House Of Representatives

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RELEASED

Electronic Marketing Of Agricultural Commodities: An Evolutionary Trend

Electronic marketing in agriculture refers to selling livestock and other commodities via telephones, teletypes, video equipment, and computers. An electronic marketing system can create a large central market in place of many small local markets without requiring buyers, sellers, and products to be physically together.

This report provides information on Department of Agriculture-funded electronic marketing pilot projects and the benefits and problems associated with electronic marketing in agriculture. Benefits include improved market information capability and increased marketing efficiency. Problems include concerns about cost-effectiveness and an unwillingness of users to participate in electronic marketing.

Because electronic marketing is an evolving trend, some applications of which are still being studied, it is too early to tell what, if any, additional developmental, educational, or regulatory activities may be necessary on the part of the Department of Agriculture or the Congress.



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RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
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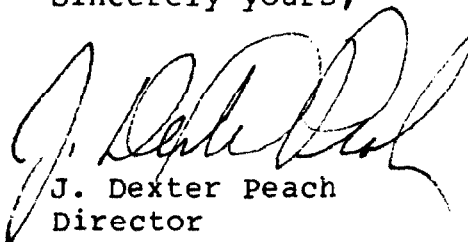
The Honorable Parren J. Mitchell
Chairman, Committee on Small Business
House of Representatives

Dear Mr. Chairman:

As requested in your May 18, 1983, letter, this report provides information on the use of electronic devices to market agricultural commodities. It discusses federal projects designed to demonstrate the feasibility of electronic marketing and points out some of the benefits and problems associated with electronic marketing.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 2 days from its issue date. At that time, we will send copies to the Director, Office of Management and Budget; the Secretary of Agriculture; various Senate and House committees; members of Congress; and other interested parties. We will also make copies available to others on request.

Sincerely yours,



J. Dexter Peach
Director

D I G E S T

Consumers spend more than \$350 billion on food annually, or about 16.1 percent of their disposable income. About 72 cents of each consumer food dollar is used to cover the costs of marketing food products. Raw farm commodities, including livestock, are changed into consumer products and supplied to the consumer through various marketing processes, such as assembly, processing, storage, transportation, and distribution. Electronic marketing can provide the opportunity to trim some of these costs. (See p. 1.)

Electronic marketing in agriculture refers to marketing livestock and other commodities via telephones, teletypes, video equipment, and computers. Electronic systems can provide a means of creating a large central market instead of many small local markets without requiring buyers, sellers, and products to be physically located together. Commodities are traded by description rather than physical inspection. (See p. 1.)

The Chairman, Committee on Small Business, House of Representatives, requested that GAO provide information on (1) the efforts being made by the U.S. Department of Agriculture to develop electronic marketing for agricultural commodities, (2) the benefits and problems of electronic marketing, and (3) the status of electronic marketing in agriculture. (See p. 4.)

ROLE OF THE DEPARTMENT
OF AGRICULTURE

The Department of Agriculture has regulatory, developmental, and educational roles in electronic marketing. The Department's Packers and Stockyards Administration is monitoring the use of electronic systems in marketing livestock as part of its responsibilities under the Packers and Stockyards Act of 1921. The Department is providing educational activities through its Extension Service to persons interested in learning about electronic marketing systems. The Department's Agricultural Marketing Service has funded and is currently funding pilot

projects to demonstrate the feasibility of computerized electronic marketing. (See p. 3.)

ELECTRONIC MARKETING PROJECTS

Beginning in fiscal year 1978, the Department of Agriculture co-sponsored several computerized electronic marketing projects with various state departments of agriculture and land grant universities. The Department provided about \$2.6 million for the projects between fiscal years 1978 and 1983. (See pp. 5 to 10.)

Generally, these projects were designed to test the feasibility of using a network of computer terminals to market various commodities. Projects involved the trading of wholesale meat products, feeder cattle, hogs, lambs, and eggs. One study examined the possibility of selling corn, soybeans, peanuts, pecans, cattle, and hogs on a single computerized marketing system.

One project, which operated from November 1980 to June 1981, demonstrated that slaughter hogs could be accurately graded and sold in an electronic market. The project, however, did not attract a sufficient number of traders to be economically viable. (See p. 5.)

On the other hand, another system, which evolved from a project begun in 1980 by the Virginia Department of Agriculture and Consumer Services and Virginia Polytechnic Institute, is still trading slaughter lambs. This system is now a subsidiary of the National Live Stock Producers Association. (See p. 8.)

Overall, the projects demonstrated that agricultural commodities can be traded electronically and that electronic marketing is a feasible alternative to current marketing systems. The studies also showed, however, that to be successful and economically viable, trading volume must be sufficient to cover the fixed and operating costs of an electronic market as well as attract and keep traders in the system.

As of December 1983, the Department was funding electronic marketing feasibility studies relating to grain in Oklahoma and Virginia and fruits and vegetables in Florida. These projects began in March 1983 and are expected

to be completed by September 1984. (See p. 10.)

BENEFITS AND PROBLEMS ASSOCIATED
WITH ELECTRONIC MARKETING

The federally funded projects and other ongoing electronic marketing systems have shown that there are benefits as well as problems associated with electronic marketing. The benefits include improved market information, increased marketing efficiency, increased competition, and increased access to the market for both buyers and sellers. (See pp. 11 to 13.)

One characteristic of electronic markets is their information-generating capability. Trading is by standardized description and operating procedures rather than by personal inspection and individual trading arrangements. Therefore, standardized information on product offerings and terms of trade is readily available to buyers and sellers and can be closely related to prices received for the product. Market information can be summarized and delivered almost instantly, and it can be done automatically for a large number of trades.

Transportation costs are typically less in an electronic market than in most conventional marketing systems, such as terminal and auction markets where products and buyers assemble in one location and products must be redistributed after the sale. An electronic market eliminates the need for central assembly of products prior to sale.

Some of the problems associated with electronic marketing include the concerns that products cannot be adequately described, personal interchange between buyers and sellers will be lost, buyers and sellers will not perform according to the terms stipulated in the trade, and it is not cost-effective. Another problem is that some potential users are unwilling to participate or see no advantage in participating. (See pp. 13 to 15.)

Some of these problems, such as concerns about adequacy of product descriptions, might be overcome through pilot demonstrations and educating potential users about the system. Several of the pilot projects demonstrated that livestock and other commodities could be described in sufficient detail to be traded electronically. Other problems, such as some

who are not willing to participate before others adopt the process or who see no advantage in participating, are more difficult to overcome.

Department officials believe, because electronic marketing is an evolving trend, it is too early to tell if the Department or the Congress need to be involved in any additional developmental, educational, or regulatory activities. In the interim, the Department is (1) continuing to sponsor pilot projects to test and demonstrate the feasibility of various applications of computerized electronic marketing, (2) providing educational programs related to electronic marketing through its Extension Service, and (3) monitoring the electronic marketing of livestock within its area of responsibility under the Packers and Stockyards Act.

AGENCY COMMENTS

The Department of Agriculture said that overall the report is a good presentation of the current status and history of electronic marketing of agricultural commodities. (See app. II.)

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ABBREVIATIONS

AMS	Agricultural Marketing Service
CATS	Computer Assisted Trading System
CATTLEX	Cattle Exchange
ECI	Egg Clearinghouse, Inc.
GAO	General Accounting Office
HAMS	Hog Accelerated Marketing System
NEMA	National Electronic Marketing Association
USDA	U.S. Department of Agriculture



CHAPTER 1

INTRODUCTION

At the request of the Chairman, Committee on Small Business, House of Representatives, we reviewed the efforts being made in the public and private sectors to develop electronic marketing of agricultural commodities. Electronic marketing refers to selling agricultural commodities via telephones, teletypes, video equipment, and computers. Electronic trading systems can provide a means of creating a large central market instead of many small local markets, which may save on transportation, warehousing, and other marketing and distribution costs.

THE MARKETING SYSTEM FOR AGRICULTURAL COMMODITIES

Consumers spend more than \$350 billion on food annually, or about 16.1 percent of their disposable income. Approximately 72 cents of each consumer food dollar covers the costs of marketing food products. Raw farm commodities, including livestock, are changed into consumer products and supplied to the consumer through various marketing processes, such as assembly, processing, storage, transportation, and distribution. Although the present marketing system does a commendable job of getting products from the farm to the consumer, opportunities exist to improve the system. For example, buyers and sellers are often incurring costs for transporting their commodities or livestock and themselves to central auction markets or other sales points. Some of these costs may be avoided by developing electronic marketing systems.

Electronic marketing systems for agricultural commodities are not yet widespread, even though they could benefit buyers, sellers, and ultimately, the consumer. This report addresses what has been done to develop these systems and the current status of electronic marketing.

DEVELOPMENT OF ELECTRONIC MARKETING

Electronic marketing of agricultural products has been in use for about 20 years. Four basic types of electronic marketing systems have been most widely used: teletype; telephone; video; and computer-assisted sales, including auctions and bid/offer systems.

Electronic marketing systems were initially developed in Canada. The Ontario hog producers marketing board began marketing slaughter hogs by teletype auction in 1961. Alberta, Manitoba, and the Maritime Provinces later used modified systems. Buyers and sellers in a teletype auction are connected by teletype receivers and transmitters. Sellers' consignments are listed on teletype printers in buyers' offices. Buyers then use their keyboards to place bids during the auction process.

Electronic trading systems for agricultural products in the United States began in the early 1960's with the use of a teleauction, which was conducted via a conference telephone call to sell

slaughter hogs in Virginia. In 1965, a Missouri livestock cooperative began a teleauction for feeder pigs which still exists. The teleauction process requires sellers to list their offerings with an auction manager. At a specified time, potential buyers establish communication with the auctioneer through a conference telephone connection. Each listing or lot is then offered to all buyers simultaneously and sold to the highest bidder.

At least five U.S. farm cooperatives use teleauctions to annually market over one million feeder pigs for producers in more than six states. Teleauctions for slaughter lambs have been in operation since 1971 and have marketed about 100,000 lambs annually in at least nine states. Teleauctions have been held on smaller scales for feeder cattle and slaughter hogs.

Traders began using video with an electronic marketing system for a cattle sale in Montana in 1976. Video tapes were made of cattle on ranches and then shown to buyers assembled at an auction. Delivery of the cattle was arranged after the sale. Videoauctions have increased and are currently being combined with other forms of electronic marketing. For example, many videoauctions are an extension of the teleauction in which groups of buyers in one or more different locations view the tape simultaneously. Buyers located with the auctioneer bid in person, while those in remote areas bid by a conference telephone call.

Videoauctions have been commercially developed in eight states and tried experimentally in others. They have been used primarily for feeder cattle, but also for slaughter and breeding cattle, feeder lambs, and breeding sheep.

Computerized trading systems use more sophisticated communication and technology than telephone auctions or videoauctions. The first application of computer networks to electronic marketing was made in 1975 when the Plains Cotton Cooperative Association of Lubbock, Texas, began selling cotton through TELCOT--a network of computer terminals. Growers can offer cotton for sale in several ways on TELCOT. They can offer it at a fixed price and sell when a buyer bids that price or they may opt for the computerized auction and sell if the highest bid is acceptable. TELCOT provides buyers with U.S. Department of Agriculture (USDA) classification data, such as quality factors for firmness, length, and grade, as well as the number of bales available and their location. TELCOT has expanded rapidly and handled the sale of about 790,000 bales, or about 7 percent, of the 1982-83 cotton crop. Seller terminals are located in over 350 gins in Texas and Oklahoma. Over 55 buyer terminals are in major cotton buying offices across the United States. The association guarantees delivery of all cotton purchased over TELCOT.

Although TELCOT did not receive any USDA funding, USDA partially funded 10 projects designed to demonstrate the feasibility of marketing livestock, meat products, and other commodities through computerized electronic marketing systems. Appendix I provides basic information on each of the 10 projects.

Computerized electronic marketing systems enhance the auction process with their capability to store, process, retrieve, and transmit market information, offers to sell, bids, and trade confirmations. A network of terminals can be linked through one central computer, allowing numerous buyers and sellers to interact. Using this process, a buyer can either place one fixed offer or bid with other buyers. Bidding is accomplished by pressing one key on the computer terminal to increase the price by a pre-set amount or by manually entering the desired price, whichever is preferable.

USDA's ROLE

USDA has developmental, educational, and regulatory roles in electronic marketing. USDA's Agricultural Marketing Service (AMS) sponsors pilot research projects. USDA's Cooperative Extension Service is providing, through its normal extension activities, educational programs related to electronic marketing. The Packers and Stockyards Administration is monitoring the electronic marketing of livestock within its area of responsibility under the Packers and Stockyards Act of 1921, as amended (7 U.S.C. 181 et seq.).

AMS officials told us that they do not foresee USDA's becoming the sole source of computer-based information for American agriculture but that they envision USDA's role as one of continuing to serve as a focal point for information on the systems. As discussed in chapter 2, AMS provided funding to start some electronic marketing projects in fiscal year 1983. AMS officials told us that AMS also will continue lending technical support to industry groups as it has done in the past. AMS has no plans to attempt to impose electronic marketing on any segment of the agricultural industry. It is anticipated that public and private computer services will continue to provide the kinds of functions they are currently providing, as well as add any further services that will benefit their constituents.

Officials in USDA's Cooperative Extension Service told us that the Extension Service has been closely involved at the state level in the electronic marketing pilot projects. The Extension Service has been involved in conceptualizing, developing, and implementing the pilot tests as well as educating potential users about the possibilities of electronic marketing.

Officials in USDA's Packers and Stockyards Administration have the responsibility for ensuring the integrity of the marketplace for livestock and meat and ensuring that a free and competitive marketplace exists. The officials told us that their role in the development of electronic marketing for livestock is to maintain an awareness of the situation, but not to promote or hinder the development of such systems. Furthermore, they told us that they believe additional legislation or regulations are not needed since electronic marketing systems are another means of facilitating the trading of livestock between producers and buyers. They believe that present regulations provide adequate authority to ensure prompt payment, delivery of the product, and fair and open competition.

OBJECTIVES, SCOPE, AND METHODOLOGY

At the request of the Chairman, Committee on Small Business, House of Representatives, and in accordance with subsequent discussions with his office, we

- reviewed the federal and private sector actions addressing the electronic marketing of agricultural commodities, including livestock and meat products;
- identified the benefits and problems associated with electronic marketing; and
- obtained current information on the status of electronic marketing in agriculture.

We obtained detailed information on

- the 10 computerized marketing projects for which USDA provided partial funding,
- the commercialized electronic system for cotton, and
- current plans by USDA to sponsor additional projects to further the use of electronic marketing.

We reviewed applicable federal projects administered by USDA and designed to demonstrate the feasibility of electronic marketing. We interviewed USDA program officials in Washington, D.C., and at USDA regional offices in Fort Worth, Texas, and Bedford, Virginia. These USDA regional offices covered two areas in which computerized electronic marketing systems were tested for different types of livestock.

We also interviewed project officials at the following universities that participated in the USDA-sponsored projects: University of Illinois, Ohio State University, Texas A&M University, Oklahoma State University, University of Georgia, and Virginia Polytechnic Institute. We talked with project officials because these schools were involved in the major demonstration projects that USDA sponsored. We also reviewed reports prepared by the universities on the projects.

In addition, we interviewed other persons knowledgeable of electronic marketing systems, including representatives of farm cooperatives and producers' organizations that had been involved in demonstration projects for computerized electronic marketing systems, including the National Live Stock Producers Association in Denver, Colorado, and the National Cattlemen's Association in Fort Worth, Texas.

We made this review in accordance with generally accepted government auditing standards. We did our review work from May 1983 to November 1983.

CHAPTER 2

USDA-SPONSORED PROJECTS TO

FACILITATE ELECTRONIC MARKETING

USDA's AMS started providing partial funding for pilot electronic marketing projects in 1978. The projects are designed to test and demonstrate the feasibility of using computerized electronic marketing techniques in various situations involving different agricultural commodities.

In March 1979, the Secretary of Agriculture formed a Meat Pricing Task Force to advise and furnish factual information to him with respect to meat marketing, including such factors as pricing and price reporting. One of the Task Force's specific recommendations dealt with electronic marketing. In its June 15, 1979, report, the Task Force recommended that the meat industry be encouraged to proceed with the development and pilot testing of an electronic marketing system; that USDA not own or operate an electronic marketing system, but assist through research in the developmental process of electronic marketing; and that USDA monitor electronic marketing systems as it monitors other live-stock and meat marketing systems.

The Secretary agreed with the recommendations. He said that USDA would continue to assist the private sector in pilot projects to develop electronic marketing. Such projects are discussed in the following section.

USDA PROJECTS

Computerized electronic marketing systems have been developed for cotton; slaughter hogs, cattle, and lambs; wholesale meat; feeder cattle; and eggs. AMS partially funded the pilot projects for many of these systems. AMS can provide up to 50 percent of a project's costs. AMS provides the funds to the state departments of agriculture, and the receiving states must, at least, match the federal dollars. AMS spent about \$2.6 million between fiscal years 1978 and 1983 on the projects described below. Appendix I contains a synopsis of the projects.

Hog Accelerated Marketing System (HAMS)

HAMS was an experimental, demonstration project designed to test the feasibility of using a computer and a network of computer terminals to sell slaughter hogs from Ohio producers to meat packers in the eastern United States. Remote terminals--30 for sellers in Ohio and 17 for buyers in Ohio and four nearby states--were located in meat packing plants, at stockyards, and on farms to conduct the daily auction sale. AMS gave \$693,910 to the project. The Ohio State University, the Ohio Department of Agriculture, and the Ohio Producers Livestock Association designed the system and developed the marketing program.

The project began in 1978. In November 1980, after about 2 years of developmental effort, computer programming, equipment installation, and testing, daily sales began. The system operated for 7 months. Almost 5,200 transactions involving nearly 190,000 hogs were completed on HAMS during the 146 trading days.

A follow-up report on the project by Ohio State University stated that the demonstration proved that hogs could be sold through electronic marketing and that hogs could be accurately graded for that purpose. The report also concluded, however, that a larger trading volume of hogs would have been necessary for HAMS to succeed financially. On the basis of average marketing costs at local auctions and at terminals, HAMS had to move about 900,000 head of hogs annually to compete with local auctions and 700,000 head to compete with other established markets. Hog consignments to HAMS, however, only averaged 6,400 head per week, for an annual rate of approximately 330,000 head.

Furthermore, the average lot size declined steadily from about 50 head per lot at the beginning of the project to about 30 head per lot at the end. Thus, although HAMS was successful in attracting consignments from smaller producers and those without good direct access to buyers, it did not attract larger producers with good direct sales opportunities. Large producers were needed to achieve sufficient trading volume to maintain long-term buyer interest.

According to the report, large commercial producers did not sell hogs through HAMS for several reasons. For example, other marketing organizations and packers making direct purchases increased their purchase prices to maintain their traditional business. Also, some producers were reluctant to switch from an established trading practice to an experimental market with an uncertain future.

Dominance by smaller consignors also created some disadvantages for packer-buyers. The relatively small and declining lot size meant that packers had an increasingly difficult time acquiring full truckloads of hogs without scheduling a truck to make several costly stops for pickup.

In another evaluation of the HAMS project, a researcher at Ohio State University found that attitudes concerning electronic marketing differed among producers, packers, and marketing agents. Producers were more concerned about how easily they could use the system than they were about the organization behind it. The evaluation report stated that to facilitate use of the system, the following factors were important: the ability to sell the product without leaving the farm, participation of the farmers' regular buyers, and low marketing fees. According to the report, packers believed that large volumes, early listings, broad geographic coverage, and low packer investments were important to participation. The report also stated that marketing agents were concerned about the need for sufficient volume, net benefits to their firm, and retention of agency identity in a new organization.

Computer Assisted Trading System (CATS)

CATS was an electronic marketing system designed for trading meat at the wholesale level. The American Meat Exchange, a private company, developed it with technical assistance from the General Electric Information Services Company. AMS provided \$236,650¹ to the University of Illinois to pilot test and evaluate CATS.

The objectives of the project included soliciting the participation of firms in the meat trade, describing in detail the operating procedures and characteristics of the system proposed, identifying and outlining the type and form of data required for the evaluation phase of the project, observing both training and trading on the system and advising on operating issues, conducting an industry survey to provide data for analysis, and evaluating the viability and operation of the system.

Computers were used to communicate information on wholesale meat to various packers and negotiations were conducted by traders privately on the system using computer terminals. To allow for regional price differences, the system divided the United States into 10 trading regions. The system also provided for three alternative time frames for delivery of products and permitted users to specify different prices for each time period. The first period of operation of CATS, CATS 1, was June 15 to October 16, 1981. CATS 1 was replaced by an improved system, CATS 2, on October 19, 1981. CATS 2 included additional features to enhance the system's efficiency by allowing for quicker execution of commands. Trading on CATS 2 was suspended November 17, 1981, to allow time for further development of the system and to assess the status and future of the project. The pilot project was officially terminated on June 21, 1982.

During the 22 weeks of operation, 109 trades were completed involving 117 carloads of meat and meat products. About 90 percent of all completed transactions were beef items, mostly carcasses. The most frequently traded item was the choice beef carcass.

According to the University of Illinois evaluation report, CATS demonstrated that different meat products could be adequately described and traded by using an electronic system. The pilot test also demonstrated that meat industry commitment by many traders is essential for the implementation of successful electronic wholesale meat trading. CATS had good participation from retailers and small packers, but lacked active selling participation from large packers, thus limiting the project's success.

As part of the evaluation effort, the University of Illinois' Survey Research Laboratory conducted a survey of participants and nonparticipants in the CATS project. According to

¹\$48,850 was returned to the Treasury.

the survey, participants indicated satisfaction with product description and delivery under the system, but had problems with the slowness of the system (CATS trades took an average of 30 minutes to negotiate compared with an average of 7 minutes for a regular negotiated telephone trade) and the lack of trading partners and trading volume. The survey also showed that nonparticipants did not take part in the project because of a desire to observe others using the system first, a belief that the system was unworkable, and the nonparticipation of their trading partners.

The CATS project was unique in that it was the only USDA-funded project to trade a processed product instead of the raw product; i.e., live animals or eggs.

Cattle Exchange (CATTLEX)

CATTLEX, developed at Texas A&M University, was an electronic marketing system for feeder cattle. AMS provided \$673,200 for the project through the Texas Department of Agriculture. Feedlots were the primary buyers on CATTLEX and stocker/operators were the primary sellers. However, 82 percent of the cattle offered for sale through the project were not sold through the system due to a down market (the large supply of cattle offered for sale nationally depressed prices) and sellers' price expectations not being met.

Cattle were described by third-party graders and a description was entered into one of the seller terminals. CATTLEX provided listings to potential buyers. Eleven sales terminals were in operation in September 1980; the system expanded to 29 terminals in March 1981. The project ended in November 1981 because the sales volume was insufficient to make CATTLEX economical. As of August 1983, Texas A&M University was attempting to license its system to a private entity for commercialization.

National Electronic Marketing Association (NEMA)

NEMA evolved from a pilot project, called the Eastern Electronic Marketing Association, which was undertaken by Virginia Polytechnic Institute and the Virginia Department of Agriculture and Consumer Services in 1980. The purpose of the pilot project was to develop an electronic marketing system for lambs and slaughter cattle. AMS gave \$436,498 to the project.

The Eastern Electronic Marketing Association was organized as a nonprofit organization in 1980 to administer the electronic marketing system and to work with potential traders in developing a usable system. The organization provided system development, computer software, a communications system, and a computer to conduct auctions. After AMS funds ran out in 1982, the National Live Stock Producers Association put up capital to keep the system going, and in October 1982, the marketing association's name was changed to the National Electronic Marketing Association when it became a subsidiary of the National Live Stock Producers Association.

Computerized electronic marketing systems were developed by the Eastern Electronic Marketing Association for lambs and slaughter cows. According to AMS, lambs have been traded successfully since May 1980. However, trading of slaughter cattle was not tested until 1982 and was not successful because of the packers' lack of buying interest.

AMS also provided \$32,000 to the North Carolina Department of Agriculture in 1980 to study the possibility of including feeder pigs in the NEMA system. According to AMS, even though a computerized system is technically feasible, a telephone system is currently being used to trade feeder pigs in North Carolina because auction owners desired to stay with more traditional trading methods. There was also some concern that a computerized system would put people out of work.

AMS gave \$14,000 in 1982 and \$15,000 in 1983 to the Missouri Department of Agriculture to assist, in cooperation with the Missouri Sheep Growers Association, in getting additional lamb producers involved in the system. The project succeeded.

During 1983, 12 buyer terminals for slaughter lambs were in operation throughout the United States and Canada; this included most of the major lamb slaughterers. The system facilitated the sale of about 180,000 lambs in 1983.

Egg Clearinghouse, Incorporated (ECI)

ECI began in 1971 to facilitate competitive trading of gradeable eggs. AMS provided \$244,050 through the Georgia Department of Agriculture in 1978 to facilitate converting the trading process from a manual system conducted by telephone to a computerized system. During the first 6 months, five computer terminals were placed with traders each month. The system expanded to include over 55 buyer and seller terminals. ECI includes information on trading activities, best trade alternatives, and other selected data.

In 1980, the volume of eggs traded on ECI represented about one-half of 1 percent of all eggs sold. However, according to AMS, ECI's influence on pricing eggs is greater than that statistic might indicate because activity on ECI is a major factor in the formulation of widely used egg price quotations. Nevertheless, the project did not succeed in achieving the goal of getting more eggs traded on ECI, which is a negotiated pricing system as opposed to traditional formula pricing.

ECI guarantees buyer and seller performance on all trades made over the trading network. Only ECI members may trade on the network, but anyone in the egg business may become a member of ECI.

The multi-commodities project

The multi-commodities project was a feasibility study, conducted in 1980, which examined the possibility of selling corn,

soybeans, peanuts, pecans, feeder cattle, and slaughter hogs on computerized marketing systems. AMS provided \$60,000 through the Georgia Department of Agriculture to the University of Georgia to conduct the study. The study's purpose was to determine producer acceptance of electronic marketing and to develop data on comparative costs of different types of electronic marketing systems, including comparing alternative communications methods for a computerized system.

The study team surveyed producers in southwest Georgia to obtain their attitudes concerning electronic marketing. The results of the survey indicated that about 50 percent of the producers had positive attitudes about electronic marketing. The survey showed that grading adequacy was the main concern of potential users. Also, respondents indicated a preference for third-party grading and third-party ownership of the system. About two-thirds of those with positive attitudes toward electronic marketing preferred a computerized system to teleauction because of the greater capacity of the computerized system.

Regarding the costs of the systems, the study concluded that a time-sharing system was the most cost-effective approach to computerized marketing for moderate levels of computer connect time. A leased computer system with private lines was cost-effective only at extremely high levels of computer connect time.

Tennessee project

AMS provided \$60,000 to the Tennessee Department of Agriculture and the University of Tennessee in October 1979 to examine livestock marketing in that state. The project had three objectives: to encourage livestock auctions to use the USDA grading system; to test the concept of selling feeder pigs between different locations to accumulate full truckload lots; and, due to the limited number of hog growers and buyers in the state, to test methods, including computerized electronic marketing systems, of selling slaughter hogs. However, according to AMS, when the buyers had identified the available growers, they chose to use direct sales, thus avoiding the need for computerized sales.

New projects

As of December 1983, AMS was funding three feasibility studies of electronic marketing for agricultural commodities. It gave Oklahoma and Virginia \$75,000 each for grain studies and Florida \$67,720 for a fruit and vegetable study. All of the studies were funded by AMS through the states' respective departments of agriculture in March 1983 and are expected to be completed by September 1984. These feasibility studies are designed to determine if the industries would accept and need electronic marketing systems and to determine what parties should be connected with the systems.

CHAPTER 3

BENEFITS AND PROBLEMS

ASSOCIATED WITH ELECTRONIC MARKETING

On the basis of the experiences of persons associated with electronic marketing systems, USDA projects, and the marketing industry, we have several observations about the benefits and problems associated with electronic marketing of agricultural products. Benefits include improvements in market information, market efficiency, pricing efficiency, competition, and market accessibility. Problems include concerns about the adequacy of product descriptions to facilitate trading, the lack of personal interchange among users of electronic systems, concerns about trader performance, concerns about cost-effectiveness and potential users who are unwilling to participate or who see no advantage gained by participating in electronic marketing systems.

Some of the problems, such as concerns about adequacy of product descriptions, can be overcome through pilot demonstrations and educating potential users. Other problems, such as the unwillingness of potential users to participate because the system is new or because it is not to their advantage to do so, are more difficult to overcome.

BENEFITS ASSOCIATED WITH ELECTRONIC MARKETING

Electronic marketing offers several benefits, including improved market information, increased market efficiency, greater pricing efficiency, and increased competition and market access.

Improved market information

One characteristic of computerized electronic marketing is its information-generating capability. Trading is by standardized descriptions and operating procedures rather than by personal inspection and individual trading arrangements. Therefore, standardized information on product offerings and terms of trade are readily available to buyers and sellers and can be closely related to prices received for the products. In computerized markets, market information can be summarized and delivered almost instantly and it can be done automatically for a large number of trades. Also, according to USDA, users of the system should have few doubts concerning the accuracy of this information.

Increased marketing efficiency

The costs of searching for trading partners, successfully negotiating and completing transactions, and physically moving products from seller to buyer are major factors influencing marketing efficiency. Using the same communications method, buyers bid against each other in the auction system or negotiate with sellers in the private negotiation system until acceptable terms

or a stalemate is reached. Electronic trading systems can reduce communications to one contact and the time required for a transaction to just a few minutes, depending upon the system of bidding.

Physical movement of products is typically less costly in an electronic market, especially when compared with terminal and auction markets where products and buyers assemble in one location and products must be redistributed after the sale. Transportation efficiencies can be achieved by eliminating the need for central assembly of products prior to sale, which helps to eliminate cross hauling. For example, one farmer participating in a symposium on electronic marketing at Texas A&M University in March 1980 gave the following illustration:

"There is a packer who lives three miles north of me. We have an auction every Tuesday 30 miles south of me. So, on Mondays we load up our cows; we go 30 miles south. And the packer gets in his car and drives 33 miles, sits on his duff for half a day and bids on my cows. And he hauls them back 33 miles. So, these cattle travel 63 miles to make a three mile journey."

Increased efficiency in marketing livestock results from less handling, bruising, exposure to disease, and stress. Improved efficiency in marketing crop commodities may mean less handling and waste in transit and better coordination of transportation, storage, and processing facilities.

Greater pricing efficiency

Pricing efficiency is concerned with how quickly and how accurately transaction prices reflect market values for specific products at defined locations at a given point in time. Pricing efficiency can be enhanced by electronic marketing because such marketing is characterized by many dispersed sellers and buyers and by the exchange of price and quantity data. Price is less likely to be affected by the unequal bargaining strength of different traders.

According to a USDA Extension Service analysis, one of the results of electronic marketing has been that producers are getting higher market prices. For example, prices received by producers increased about \$3 per hundredweight for lambs in Virginia. Price enhancement appears to be primarily a function of increased buyer competition and increased marketing efficiency. To the extent that marketing efficiencies reduced buyers' costs, at least some of the savings could be bid into prices paid to the producers.

Increased competition

A major objective of electronic marketing is to increase effective competition among market participants. Increased competition is accomplished by exposing the offers of various

sellers to a larger number of buyers and by creating trading procedures that facilitate competitive interaction among buyers. Electronic markets enable buyers separated by long distances to be interconnected simultaneously, therefore increasing the number of buyers competitively interacting at any given time.

Increased market access

Electronic markets can provide increased market access for both buyers and sellers. The large number of potential market participants and the impersonal nature of trading diminish the influence of size, status, and other characteristics of an individual trader that could be an advantage in more traditional markets. Remote access via electronic communication media facilitates market entry and all traders on the system have equal access to the market information developed by the system. With electronic marketing, sellers have instant access to alternative outlets when their traditional buyers offer less favorable terms. According to USDA, although electronic markets facilitate market access for all traders, smaller and more geographically remote traders appear to gain the most from electronic markets.

PROBLEMS ASSOCIATED WITH ELECTRONIC MARKETING

Electronic marketing has had some problems. These include concern about standardization, loss of personal interchange, concern about cost-effectiveness and trader performance, and getting buyers and sellers to participate.

Concerns about standardized terms, grades, and product descriptions

Industry participants are concerned about the standardization of terms, grades, and product descriptions. Buyers have been used to seeing what they are buying, but using electronic marketing means products are often sold based solely on verbal descriptions. Because a large volume of rather detailed information can be communicated and processed within a computerized system, electronic markets lend themselves to the marketing of heterogeneous products. TELCOT, for example, keeps track of 3,000 to 4,000 combinations of variables related to cotton.

When dealing with a large variety of products traded, an important factor to consider is consistency of product descriptions. Product descriptions need to be accurate so as to not mislead the buyer regarding product type and quality. Descriptions should describe product characteristics that are meaningful so the buyers can make accurate assessments of product values. Projects such as HAMS, CATS, and CATTLEX showed that concerns about product descriptions can be overcome.

Lack of personal interchange

Some traders expressed concern that the nature of the electronic marketing systems is impersonal and that negotiations

through a computer are not as flexible as voice communications or face-to-face contacts. Additionally, some people claim that voice contact is necessary to get the "feel" of the market. Others claim they cannot trust a person they do not know.

Also, nonprice factors that are difficult to quantify, such as reputation of the other trading partner, credit risks, normal terms of payment, and implied conditions of sale, enter into trade considerations. Buyers and sellers who regularly deal with each other may not have to agree on the nonprice factors on each trade, but agreeing on these factors is more difficult in an electronic setting where traders may not know each other.

Some of these concerns can be overcome. For example, the agency operating the electronic market can guarantee all transactions or the buyer and seller can be identified in the computerized information and buyers and sellers can limit trades to those in which they have confidence. However, lack of personal interchange will continue to be a problem for those traders desiring face-to-face contact.

Concerns about trader performance

Traders have expressed concerns that the nature of electronic marketing adds to the possibility that buyers and sellers may not perform according to terms stipulated in the negotiated trade. Some form of assurance must be evident that the seller and buyer will each perform for traders to have confidence in a remote-access system. Potential buyers must have some assurance that potential sellers have commodities of the quantity offered and the quality described. Sellers need some assurance that they will receive payment for their products.

The question of trader performance is not unique to an electronic marketing system. Conventional marketing systems cope with these performance questions daily. Concern about performance can be resolved through techniques such as bonding, insurance, or third-party guarantees.

Concerns about cost-effectiveness

Cost-effectiveness of electronic marketing systems is a real concern. Persons associated with electronic marketing have found that these systems must be economically feasible for buyers, sellers, and sponsoring agents or organizations to participate. The initial fixed cost for the base system is a disadvantage in the early stages of development when volume is not large.

The costs of operating various electronic marketing systems can vary substantially depending upon the equipment, software, and communications alternatives used. However, from the electronic marketing projects discussed in chapter 2, we know that dedicated telephone lines are expensive in most situations; software development can be expensive and previous or existing systems should be used when possible; time-sharing arrangements for both the host computer and the communications network can be less

costly than having equipment dedicated only to the system; and technology should continue to lower the real cost of electronic marketing, making it less costly in the future. However, although telecommunications technology has reduced prices for computer systems, the initial and operating costs of the new facilities must be able to compete with the costs of the established market facilities.

Not willing to participate
or no advantage gained by
participating

Some buyers and sellers do not wish to participate in electronic marketing systems because they prefer to remain with established traditional methods of marketing commodities or it is not to their advantage to participate. Buyers and sellers have expressed concern about breaking established trading relationships. They are especially concerned that if the electronic market fails, they may not be accepted back into their old relationships. For example, in the HAMS project, some producers said they were reluctant to switch from an established trading practice to an experimental market with an uncertain future. Some potential traders have adopted a "wait and see" attitude. For some, especially those buyers and/or sellers with well-established supply or sale channels, there may be no economic advantage to participating in an electronic marketing system. This is especially true in the short run because one of the recurring problems with pilot tests of electronic marketing systems has been the small volume of commodities traded.

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The federally funded projects and other ongoing electronic marketing systems have shown that electronic marketing of agricultural commodities is feasible. They have also shown that, like all marketing systems, electronic marketing of agricultural commodities has benefits as well as problems associated with it.

Department officials believe that because electronic marketing is an evolving trend, it is too early to tell what, if any, additional developmental, educational, or regulatory activities may be necessary on the part of USDA or the Congress. In the interim, USDA's AMS is continuing to sponsor pilot projects to test and demonstrate the feasibility of various applications of computerized electronic marketing; USDA's Extension Service, through its normal extension activities, is providing educational programs related to electronic marketing; and USDA's Packers and Stockyards Administration is monitoring the electronic marketing of livestock within its area of responsibility under the Packers and Stockyards Act.

USDA commented on a draft of this report. It said that overall the report is a good presentation of the current status and the history of electronic marketing of agricultural commodities. (See app. II.)

DESCRIPTION/ SYSTEM	HAMS	CATS	CATTLEX	NEMA	ECI	MULTI- COMMODITIES	TENNESSEE	FEDERALLY SUPPORTED OKLAHOMA	FEDERALLY SUPPORTED VIRGINIA	FLORIDA
COMMODITY	Hogs	Wholesale meat products	Feeder cattle	Lambs, slaughter cattle, feeder pigs	Eggs	Corn, soybeans, peanuts, hogs, pecans, cattle	Hogs	Grains	Grains	Fruits and vegetables
TYPE OF PROJECT	Demonstration of sales	Demonstration of sales	Demonstration of sales	Demonstration of sales	Upgrade system to electronics	Feasibility study	Test various marketing sys- tems	Feasibility study	Feasibility study	Feasibility study
INVOLVED ENTITIES	Ohio State University, Ohio Depart- ment of Agri- culture, Ohio Producers Livestock Association	University of Illinois, American Meat Exchange	Texas A&M University, Texas Depart- ment of Agri- culture	Virginia Polytechnic Institute, Virginia Department of Agriculture and Consumer Services	Egg Clearing- house, Inc., Georgia Department of Agriculture	University of Georgia, Georgia Depart- ment of Agri- culture	University of Tennessee, Tennessee Department of Agriculture	University of Oklahoma, Oklahoma Department of Agriculture,	University of Virginia, Virginia Department of Agriculture and Consumer Services	University of Florida, Florida Department of Agriculture
FEDERAL ^a FUNDS	\$693,910	\$187,800 ^b	\$673,200	\$497,498 ^c	\$244,050	\$60,000	\$60,000	\$75,000	\$75,000	\$67,720
PERIOD OF OPERATION	11/80 - 6/81	6/81 - 11/81	9/80 - 11/81	3/80-present	1971 ^d - present	summer 1980	10/79 - present	3/83 - present	3/83 - present	3/83 - present
NUMBER OF PARTICIPANTS	47 remote computer terminals	16 meat firms	29 remote computer terminals	12 remote computer terminals	55 remote computer terminals	258 respondents to question- naires	Varied	(e)	(e)	(e)
STATUS	Terminated	Terminated, alternatives being studied	Terminated, attempting to lease to pri- vate sector	Ongoing	Ongoing, sell 1/2 of 1 per- cent of all eggs traded	Terminated	Project on- going, but electronic marketing part complete	Ongoing	Ongoing	Ongoing
RESULTS	Developed system for hogs; showed need for larger volume to be suc- cessful	Showed system could trade wholesale meat prod- ucts; showed need for larger volume to be suc- cessful	Developed system for feeder cat- tle; showed need for larger volume to be suc- cessful	System work- ing and expanded to several regions	Converted from a manual sys- tem to an electronic system, but no increase in volume traded	Examined atti- tudes toward electronic mar- keting and developed cost analysis	Traders chose to use direct sales rather than elec- tronic market- ing	In early stages of project; results ex- pected in September 1984	In early stages of project; results ex- pected in September 1984	In early stages of project; results ex- pected in September 1984

^aTotal of all projects is \$2,634,178.

^bFunding provided was \$236,650, but \$48,850 was returned to the Treasury.

^cIncludes \$32,000 for North Carolina to study the possibility of including feeder pigs in the NEMA system and \$29,000 for Missouri to assist in getting additional lamb producers involved in the system.

^dFederal funding was provided in 1978 to assist in converting from a manual to an electronic system.

^eData not available.



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

FEB 7 1984

Mr. J. Dexter Peach
Director
Resources, Community, and Economic
Development Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

Thank you for the opportunity to comment on the draft report entitled, "Electronic Marketing of Agricultural Commodities: An Evolutionary Trend." Overall, the report is a good presentation of the current status and the history of electronic marketing of agricultural commodities.

We have discussed specific, minor points in the report with Mr. Walter Hess of your office.

Sincerely,

A handwritten signature in cursive script that reads "C. W. McMillan".

C. W. McMillan
Assistant Secretary
Marketing and Inspection Services

(097699)





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