

Agricultural Computing in the United States

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Agricultural Computing in the United States has received much attention since the late seventies and early eighties. Early efforts in computer applications in agriculture centered around mainframe machines accessed by farmers for services such as weather and market information. With a few notable exceptions, the number of users of computer systems in different areas of agriculture was extremely small. Shortly after the introduction of mass-produced microcomputer systems, efforts to extend these computer technologies into production agriculture where conducted through the Land-grant University System by the Cooperative Extension Service. At the same time, an industry addressing the software applications of computers in agriculture emerged. As MS-DOS and IBM compatible machines became the dominant fraction of the microcomputer market, a de facto pseudo-standardization occurred and the percentage of farms using computer systems grew steadily, particularly for record-keeping applications. In 1982 some estimates placed the percentage of computers in agricultural businesses under 5%, by 1988 some of these estimates placed the percentage over 20%.

The role of the government

Government policy has been to diffuse computing technology into agriculture through supporting the development of the required infrastructure and applications that could be used at the

production system level. Development, implementation and distribution has been done mainly through the Cooperative Extension Service.

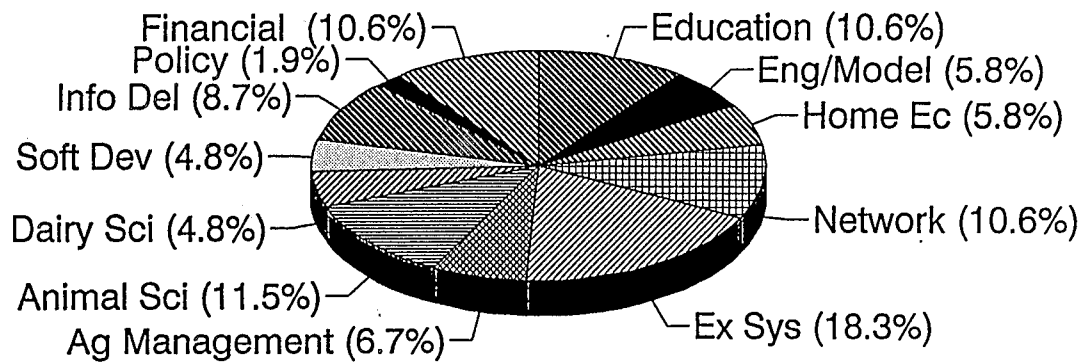
Information Delivery Systems

It was clear since the first applications of computing technologies to agriculture that the computer system can enhance the delivery of information to agricultural audiences. Early efforts relied on central mainframe computers that provided limited services, usually based on the VideoText concept. Because of the high cost to the user, impossibility of developing and maintaining the wide range of the software required, and the increasing availability of low-cost microcomputer systems and general application software, most of these systems disappeared or evolved into networks.

Current computer-based information delivery efforts center around distributed systems and networking, and some rely heavily on CD-ROM media for delivery and distribution. Information delivery is implemented using hypertext systems and includes access to databases, graphic and photographic images, expert systems and applications software for design and management of agricultural systems.

Education of agricultural audiences

A major continuing effort carried out by the Cooperative Extension Service is the education of potential and current users in the application of computers in



Ag. Computing Activities
(US Public Institutions)

agriculture. The mechanisms used by the different extension agencies vary from state to state and have included in the past short courses, conferences, schools, trade shows, user groups and development of publications in the area. However, it seems that the trend today is specialized short courses. In addition, communication between policy makers, developers, and implementors of agricultural software is promoted through the branches of professional societies, specialty conferences and shortcourses at national and international levels.

In some areas, the traditional extension publication has evolved from a printed "fact-sheet" to a piece of software that is distributed through the Extension Service delivery structure. The classes of software as varied as agricultural disciplines. Examples of some of the most often distributed packages are databases that include updated information on insect, weed, nematode, and disease control, in addition technical software such as tools for design and management of irrigation drainage and other water related systems. Although no data are available on level of distribution over the U.S, in Florida alone about 9500 copies of different programs were distributed.

Development efforts that result in deliverables to agricultural audiences vary with agricultural specialties. These efforts are strongly supported by

research activities in the Land-grant University System and other government agencies. Figure 1 shows the relative number of projects in different areas of agriculture related to the application of computers in the field.

The role of private industry

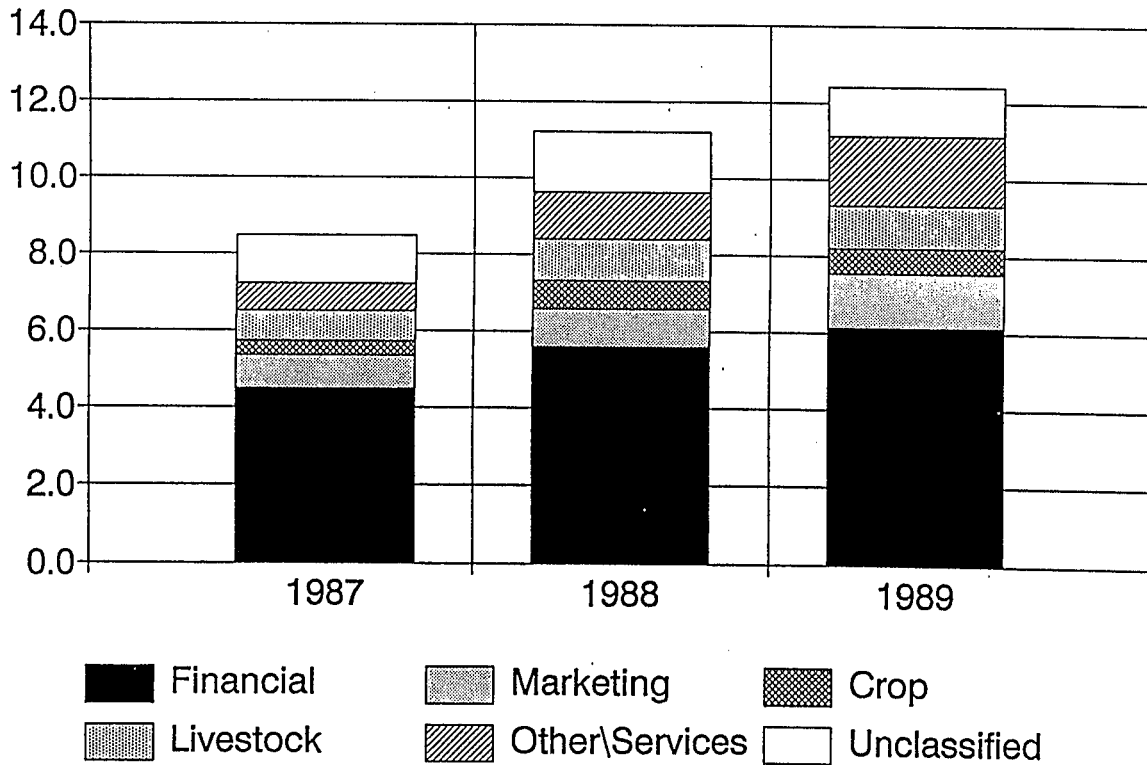
Since the early eighties, the private sector has been providing services and developing software for agricultural audiences, particularly for microcomputer-based systems. The main role of the private industry has been that of developing and marketing products to the agricultural producer and business, in addition to providing close support in the implementation of computer technologies. These professionals and industries have formed a trade association, the Association of Agricultural Computing Companies (AACC), which has identified about 275 developers and retailers of agricultural software. Most of the products provided by AACC members are in the financial, marketing, crop management, and livestock management areas, in addition to other products and services. A recent survey (Bruns, 1991) conducted by AACC indicates that the industry has grown at an average yearly rate of about 20% over the last three years. Figure 2 shows the sales by software category by 44 agricultural computing companies over the last three years. The support area is

the fastest growing area at the present time.

Current trends and concerns

A major concern both for the public and private sector is that most agricultural audiences are lagging behind in the "information age" in most fronts. Approaches to building the required infrastructure, improving technology building skills and educating the audiences, are being developed. Particular attention is being given to networking and some of the problems associated to an exploding number of applications, such as data structure and independence, and the incorporation of new techniques such as real time expert systems, neural networks, fuzzy logic, and object oriented systems.

In addition to technological development the role of the public and the private sector needs to be addressed. For example, although close cooperation has existed between the private and the public sector particularly in educating the audience, a continuing concern has been expressed by the private sector that agricultural software development efforts by public institutions undermine the profitability of the industry. On the other hand, the Extension Service, states that it is continuing to do what it has always done taking advantage of new technologies.



Commercial Software Sales
Millions \$US

Overall, the rate of computer adoption in agriculture has increased, and the present outlook is that it will continue to do so. Although much work remains to be done in developing applications, solving technical problems related to environment and data independence, connectivity, education, support infrastructure, developing sound policies, and in some cases political, it is generally believed that the general public will benefit from the use of computers in agriculture.

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