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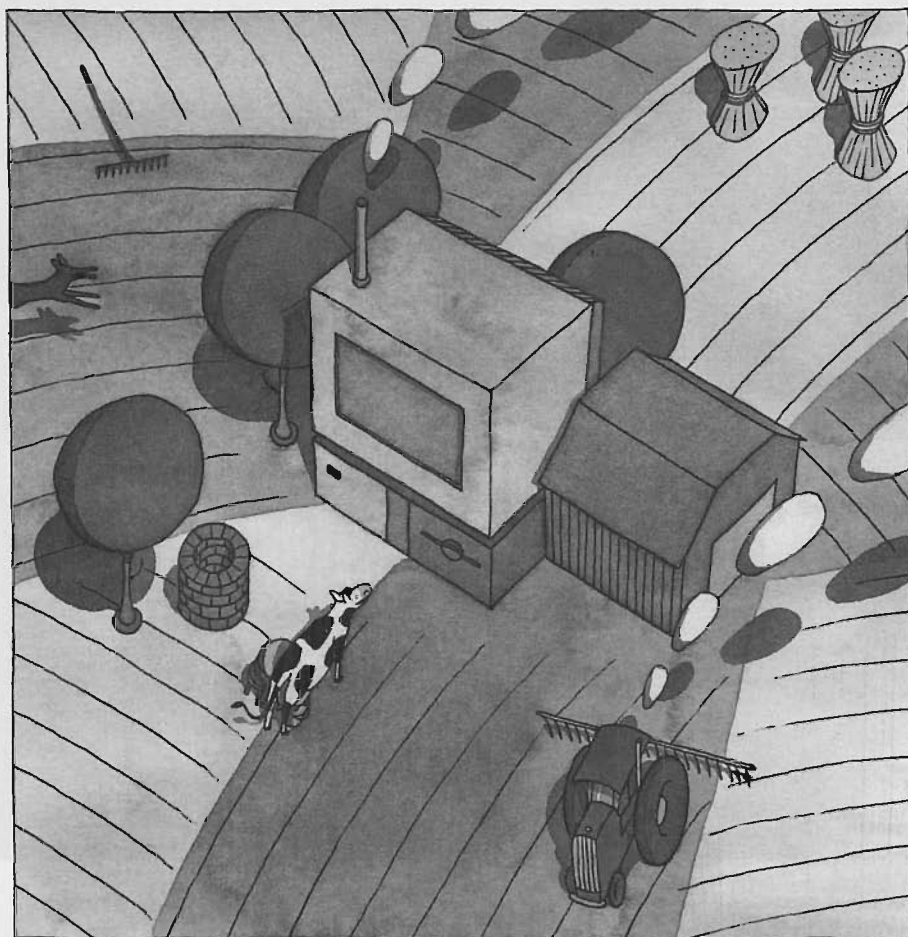
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Harnessing the Internet for Farmers



The Internet is transforming the marketplace for goods and services. But Internet access among farmers has lagged behind other sectors.

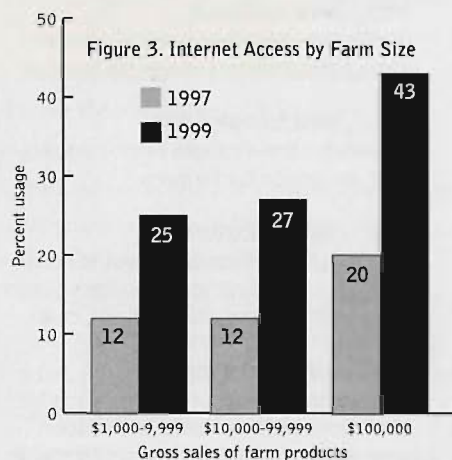
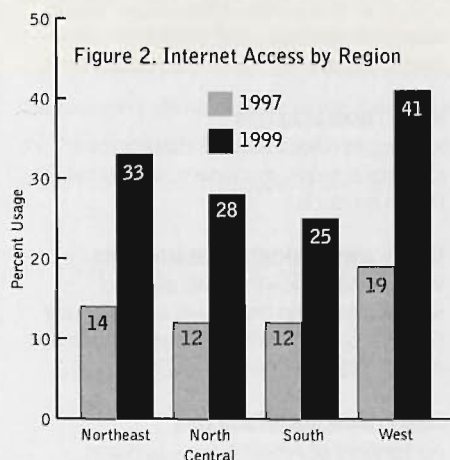
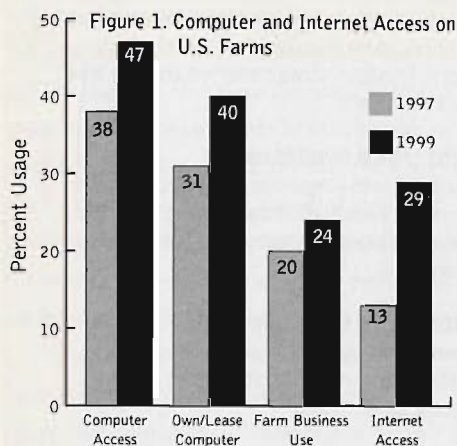
BY DAVID R. JUST AND RICHARD E. JUST

INTERNET ACCESS by farmers was only 13 percent in 1997 and 29 percent in 1999 (Figure 1). The rapid-adoption phase is just now in progress. By comparison, one survey found that adoption in the agribusiness sector exceeded 75 percent by 1997 and was rising at over 20 percent per year. Internet adoption has been slowest in the South (Figure 2) and among smaller farms (Figure 3).

Some of the advantages of the Internet are obvious and highly touted: inexpensive interaction among remote market participants, rapid access to weather forecasts and pricing information, and the like. Because these valuable opportunities are widely publicized, we focus here on an effect of the

Internet that is less clear — the reverse flow of information.

Adverse effects may not outweigh the benefits. Foresight during the rapid adoption phase may generate greater benefits for farmers. We begin by reviewing the potential benefits of the Internet, and the changes that are likely to take place in agricultural markets. We follow this by presenting some potential detracting effects of the Internet associated with the reverse flow of information it creates. Then we consider prescriptive opportunities for empowering farmers that may be missed without careful proactive measures by commodity associations and land-grant extension activities.



Increased Supply of Information to Farmers

The Internet will not increase farmers' access to information in all categories uniformly. Understanding the change in relative availability is key to understanding the economic impacts. Weather forecasts and commodity prices are readily accessible on the Internet, but widely available via other media as well. Commercial agricultural Internet sites such as www.agriculture.com also offer market analyses to attract customers to links, products, and services for which they charge, or at least require registration. Enticements such as these will provide the greatest growth in information availability. Farmers can improve timing of transactions and operations through frequent access to such information. Services such as www.e-markets.com also help farmers save time by quick identification of buyers, sellers or favorable contracts.

Streamlining the Structure of Agriculture: Global Markets, Local Access

A dramatic impact of the Internet will be a transformation of the farm input supply and output marketing sectors. Wider access can make markets more competitive. For example, classified machinery sales provided by

Agriculture.com and auction markets for chemicals and machinery parts provided by XSAg.com will likely contribute to market efficiency and, thus, favorable farm prices as participation increases. Internet sites like DirectAg.com and Ag1.com are already providing a wide range of direct input and output markets through which farmers can buy and learn about most farm inputs. With these services, farmers will increasingly order directly from input manufacturers and shop for the best prices nationwide. Local farm supply stores are expected to lose business as a result. This "disintermediation" effect will detract from already declining rural communities as overnight shipping replaces many of the services performed by local agribusinesses.

While some of these services have been available through 800 numbers, interactive access to parts catalogs and order forms will clarify communication and eliminate errors. Pesticides, seeds, and repair parts can be delivered without the overhead burden of local inventories on prices. Although some of these savings can be captured by local stores offering e-commerce shopping skills, we expect most farmers to become skilled direct Internet shoppers.

Instantaneous, inexpensive, and interactive information about new technolo-

gies can also increase the adoption rate of agricultural innovations. Web-based demonstrations are inexpensive and allow farmers to choose when and if to view them at home, resulting in reduced time and transactions costs. Virtual demonstrations also facilitate tailoring to individual circumstances. More lines of product varieties can be demonstrated than can be carried economically in local inventories. This Internet benefit, however, may complement rather than compete with traditional markets (for example, compare Amazon.com Internet-only shopping versus Barnes & Noble's combination of Internet and "brick and mortar" stores).

Information, Please

Increased availability of cheap information can also improve the accuracy of individuals' perceptions. This impact may be minor for large farms with access to large volumes of high-quality information, and the resources to process that information. But decision makers with limited information-processing capacity will benefit little from more information. A recent survey found that 74 percent of agricultural respondents felt they had enough information, suggesting the importance of information processing rather than acquisition (Wolf, Just, and Zilberman, 2001).

Agricultural Internet Sites

<http://www.agribiz.net>

Agribiz.net—Describes available services, helps agribusinesses harness the Internet.

<http://www.farmpage.com>

FarmPage.com—Provides news, information, and advice for farmers.

<http://www.agriculture.com>

Meredith Corp.—Provides access to news, information, and opinions. Registered users can access auctions, classified ads, chats.

<http://www.rooster.com>

Rooster.com—Allows producers to market their crops and buy inputs. Registration gives access to markets, news, information, and chats.

<http://www.directag.com>

DirectAg.com—Registration provides access to information, news, livestock health, seeds, machine product ordering, financing.

<http://www.ag1.com>

DTN Ag1.com—Registration provides access to information, news, products, financing, and estate planning.

<http://www.quickfarm.com>

QuickFarm.com—Registration provides access to information and discount input products.

<http://e-markets.com>

E-Markets, Inc.—Provides auction markets and other news. Registration allows access to grain marketing tools, production contracting opportunities, and input products.

<http://www.xsag.com>

XS, Inc.—Provides auction markets for chemicals, seeds, machinery, and animal health products.

<http://www.agriculturalweather.com>

Weather Site, Inc.—Provides detailed weather data and crop news as well as useful links to many commodity association and extension sites.

<http://www.powerfarm.com>

Ag Services of America, Inc.—Sells and finances seed, chemicals, and machinery. Provides crop scouting reports based on GIS data, marketing programs, and news. An online agronomist takes questions.

<http://www.agrimall.com>

Agrimall.com—Enables business-to-business transactions including sales of livestock, large equipment, and other inputs. Provides some news and information.

<http://www.padium.com>

Cargill, Inc.; Cenex Harvest States; and Louis Dreyfus Corp.—Will provide online trading of grains and oilseeds. Plans call for merging with Rooster.com

<http://www.progressivefarmer.com>

Progressive Farmer, Inc.; Southern Progress Corp.; Time, Inc.—Provides an online agricultural magazine containing in-depth information on current issues and market conditions. Provides some classified ads and links to advertisers.

<http://www.farmbid.com>

FarmBid.com—Registration provides access to news, information and research for farmers, input products, and farm implements.

<http://www.farms.com>

Farms.com—Registration allows access to information, news, strategy, and online producer auctions.

<http://www.ara1.com>

Agricultural Retailers Association—Provides news and information on agricultural markets, institutions, and lobbying. Subscription allows access to environmental liability insurance, credit, and online product sales.

<http://www.agweb.com>

AgWeb.com—Provides extensive information, links to other agricultural sites, classified advertising, and virtual storefronts.

<http://www.agleader.com>

AgLeader Technologies—Sells precision agricultural products and GPS systems. The site includes downloadable software and upgrades to make use of GPS data.

Improved decision-support software may be necessary to take advantage of additional information through better farm-record keeping and analyses of farm-specific data. Farm management and decision-support software is either not highly developed or requires learning and investment economical only to large farms. Comparison of Figures 3 and 4 shows that adoption of computers for farm business use is occurring mainly on large farms and much slower than Internet access. Increasingly, remote Internet access to GIS and other highly-tailored information will facilitate improved micro-management.

One view is that decision support through the Internet will improve profits only as decisions are made by machines rather than individuals (for example, weather data could trigger water, pesticide,

or fertilizer application). If so, the need for local entrepreneurial talent could decline or change forms. Hired managers could micro-manage large farms effectively by uploading data for information processing and downloading tailored management instructions. If effective, some of the family-farmer advantage in tailoring production practices to local circumstances may be lost.

The Reverse Flow of Information

An often-overlooked effect of Internet site visits and transactions is that information is typically collected on visitors and buyers. By posting information clips with baiting headlines and tracking visitor choices, site providers identify customers' interests. Thus, the exchange of information runs two ways whether transactions take place or not. Commercial Internet sites,

both agricultural and nonagricultural, collect and use such information— both overtly through registration and covertly by leaving small software programs known as “cookies” on users’ hard drives. While protection software exists to block cookies and other tracking mechanisms, tracking techniques tend to stay ahead of protection software, much in the way that hackers continue to penetrate highly protected computers (Barnett, 2000).

We suggest this reverse flow of information will have an unanticipated effect on agriculture. Agribusinesses will be able to know their customers better. As in other sectors, large-scale agricultural Internet site providers will use this reverse flow of information to increase their profits, which is their incentive for providing free information to farmers. Thus farmers may gain access to some forms of information that were previously uneconomical, but obtaining the information may have hidden costs.

Potential Impacts of the Reverse Flow of Information

Examination of economic incentives suggests that the types of information that will increase in relative abundance will be those that allow large-scale information collectors and users to gain a competitive advantage with it. As in other Internet sectors, information producers on the web will find mining data and selling information collected on customers highly profitable. The purpose of such information is to improve commercial targeting of farmers. Marketers would accomplish this by analyzing the “reverse flow of information” farmers generate as they explore the Web.

Farmers may thus become more informed, but being targeted has costs. The costs are not only extra calls or emails from salesmen, but also targeted pricing and bundling of products that, in this case, give agribusinesses a competitive advantage over farmers.

The Internet has two important advantages over other media such as radio and television: random access to information by users, and interactive feedback for broadcasters about who is using their service. Shapiro and Varian (1998) argue that these features of the Internet encourage

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price discrimination contingent on past purchases and individual characteristics. The reverse flow of information enables effective targeted advertising that is beneficial for agribusinesses only when it alters demand, which enhances price discrimination potential. If this is the motivation for providing information, the Internet will be an important tool for taking information from farmers.

The development of niche markets has also been cited as a benefit of the Internet. Some niche market producers, such as Harry & David, have been able to successfully use the Internet to find broader markets for their products. However, farmers who do not achieve public recognition may be isolated from the benefits of market competition by niche marketing, which is one way targeted use of the reverse flow of information can enable marketing firms to capture relatively more market benefits.

The Wired Commodity Association

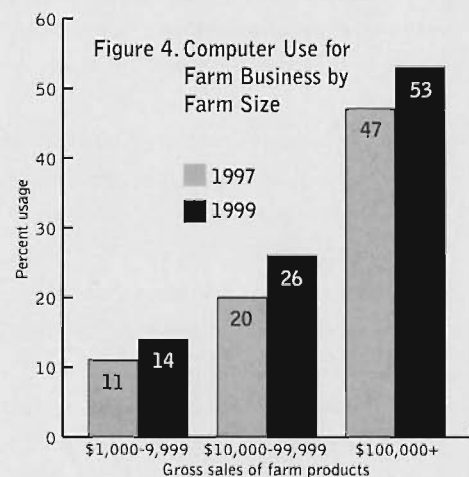
With foresight and preparation, farmers may be better able to capitalize on the information benefits of the Internet.

Because commodity associations have limited budgets, little competition, and indirect incentives, some have been slow to discover effective uses of the Internet to serve their members. “Niche” grower groups are particularly behind the adoption curve. While a few major commodity associations have informative websites, few use sophisticated tracking of website visitors to improve lobbying efforts or determine member needs. For example, Salin (2000) finds that beef cattle alliances mismanage their data in a way that allows growers to be dominated in their transactions. Beef processors and retailers began investing in electronic business-to-business information exchanges before 1997.

Other Internet possibilities may involve cooperative information and lobbying efforts with other organizations. With further effective Internet use, commodity associations can counteract information use by large firms that would otherwise extract more benefits from farmers. These opportunities are better explored before information-using monopolies are well developed and thoroughly entrenched.

The Wired Land-Grant University

Land-grant university actions can also mitigate the tilting of information benefits away from farmers. Publicly-provided Internet sites can help farmers



avoid adverse impacts of targeted advertising and pricing by providing interac-

tive product comparisons, decision-support software, information on conservation and environmental practices, and information pre-processing. These products are (partially) public goods typically underdeveloped by the private sector and, hence, may not be developed by the current trend toward public-private partnering.

ronmental and social opportunities can also enhance the public good. Negative effects for farmers can be reduced if the USDA, land grant extension, and commodity associations utilize the Internet to promote competition among agribusinesses, improve information processing among farmers and provide better understanding of privacy issues. By postponing such investments, large firms already skilled in information extraction and use will be able to take a commanding lead in the information race.

Federal Statistics in Research: E-Commerce Counts, But Is It Counted?

The growth of the Internet could have an important adverse effect on agricultural economic research. The time required to assemble substantial data sets and related research manuscripts has been cut from months to minutes, as has the time required to disseminate research. However, over the long term the ability of public data to represent agriculture may be reduced.

The increasing volume of Internet-transacted sales itself poses risks. Internet sales may escape federal statistics and public data may under-represent Internet transactions unless public data-gathering is expanded. Moreover, bundling of products and information on the Internet makes prices misleading. Mesenbourg (2000) in a Census Bureau report concludes, "While burgeoning use of electronic devices in our economy is widely acknowledged and discussed, it remains largely undefined and unrecognized in official economic statistics."

The implications are twofold. Most obvious is the loss of sales tax revenue (although there are several bills working through Congress at this writing, and the current sales tax moratorium is set to expire in October 2001). Perhaps even more significant, though, are the implications for public research if federal statistics are based on increasingly incomplete data. Can research based on such data represent the truth as we currently understand the term?

Measurement of Internet-based transactions has been delayed by lack of official definitions of "e-commerce" and "e-business." Undoubtedly, public data as currently available will represent a declining share of economic activity. Researchers may have to use small surveys to investigate new forms of transactions. Also, as the Internet fosters the establishment of niche markets, research may become less broadly relevant.

The Ultimate Effects Are Not Yet Clear

Before wireless communication, rural Internet access entailed long-distance charges and was not affordable in some areas. Many farms did not have access as of 1999 (Figures 1-3). Farm access in Kentucky, Missouri, South Carolina, and West Virginia was only 14-19 percent, up only 6-9 percent from 1997 in each case. Thus, farmer Internet use is yet in its infancy. Much can be learned from non-agricultural sectors about how Internet information can be used and controlled before the full effects are realized in agriculture. Now is the time to develop commodity association and research agendas to help farmers realize a competitive share of Internet benefits.

Farmers will experience both benefits and costs. If all agricultural Internet sites promote private products, farmers will likely face a competitive disadvantage because the information exchange will favor profit motives of site providers. Balance can be greatly improved by providing major public Internet sites that provide farm management and marketing tools and facilitate productive communication among farmers. Including information on envi-

For More Information

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David R. Just is a Ph.D. candidate in the department of Agricultural and Resource Economics at the University of California at Berkeley. Richard E. Just is Distinguished University Professor in the Department of Agricultural and Resource Economics at the University of Maryland.

