Journal of Applied Communications

Volume 87 | Issue 1 Article 1

Changing Horses: Shifting Agricultural Experiment Station Publications from Paper to Electronic Format

Eric Rhodenbaugh

Gloria Holcombe

Amy Hartman

Recommended Citation

Rhodenbaugh, Eric; Holcombe, Gloria; and Hartman, Amy (2003) "Changing Horses: Shifting Agricultural Experiment Station Publications from Paper to Electronic Format," *Journal of Applied Communications*: Vol. 87: Iss. 1. https://doi.org/10.4148/1051-0834.2175

Changing Horses: Shifting Agricultural Experiment Station Publications from Paper to Electronic Format

Abstract

CD-ROMs are an emerging alternative to paper publication and should be considered as a format for some Ag Experiment Station and Extension publications. Marketing the change to CDs to authors can be difficult. We emphasized the advantages of CDs, such as keyword searching, ability to hold several publications on one disk, and reduced printing costs. We also shared with authors a rough assessment of the audience's computer capability and willingness to accept a short, summary-type publication at events with the full publication available electronically. We projected savings of more than $20,000 in one year by converting six Agricultural Experiment Station publications to CDs; to date the projections have been within $300 of actual savings. A "print friendly" design was chosen for the CDs because printed copies will be available to the public on demand. Because audience use of information has to be considered, CDs may not be best for publications designed as an in-the-field reference. Adopting CDs over paper publications was necessary to meet budget goals and also was beneficial for much of the public, who will get a searchable, comprehensive package of information rather than a single publication.

Professional Development

Changing Horses: Shifting Agricultural Experiment Station Publications from Paper to Electronic Format

Eric Rhodenbaugh
Gloria Holcombe
Amy Hartman

Abstract

CD-ROMs are an emerging alternative to paper publication and should be considered as a format for some Ag Experiment Station and Extension publications. Marketing the change to CDs to authors can be difficult. We emphasized the advantages of CDs, such as keyword searching, ability to hold several publications on one disk, and reduced printing costs. We also shared with authors a rough assessment of the audience's computer capability and willingness to accept a short, summary-type publication at events with the full publication available electronically. We projected savings of more than $20,000 in one year by converting six Agricultural Experiment Station publications to CDs; to date the projections have been within $300 of actual savings. A "print friendly" design was chosen for the CDs because printed copies will be available to the public on demand. Because audience use of information has to be considered, CDs may not be best for publications designed as an in-the-field reference. Adopting CDs over paper publications was necessary to meet budget goals and also was beneficial for much of the public, who will get a searchable, comprehensive package of information rather than a single publication.

Eric Rhodenbaugh is an Associate Editor, Gloria Holcombe an Assistant Editor and ACE member, and Amy Hartman an Electronic Documents Librarian and ACE member, all with the Department of Communications, College of Agriculture and Kansas State University Agricultural Experiment Station and Cooperative Extension Service.

Professional Development

Introduction

The digital age has provided an opportunity to better serve the information needs of the agricultural community and the public. Changing horses from traditional printed materials to electronic format presents several challenges, not the least of which is convincing researchers to accept this new format as an outlet for their findings. At Kansas State University (K-State), we recently published several of the largest Agricultural Experiment Station publications as CD-ROMs rather than traditional printed publications, primarily in response to the current budget situation. Publishing electronically–whether CD-ROM or through the Web–is an efficient and effective means for presentation of research data to the audience. For large publications, CDs are less expensive; are searchable, allowing readers to pick and chose among articles in one publication or the entire CD; and several publications can be packaged on one CD, providing the reader with several references on a given subject. However, as Rogers (1995) points out, not all innovations that may be an improvement over existing technology are readily accepted by the public. It also can be challenging to convince clients–the researchers, authors, and Extension specialists responsible for coordinating the individual publications–to accept the CD format over traditional printed publications. Consideration also should be given to the audience of the publications, which in the publications we converted includes producers, scientists, administrators, legislators, libraries, and the general public. The objectives of this paper are to describe the approach we took to marketing the new format to our clients and to highlight the advantages and disadvantages of CD-ROMs for the audience.

Changing to electronic publishing had been considered for several years. In fact, nearly all Kansas State University Agricultural Experiment Station and Cooperative Extension Service (K-State Research and Extension) publications have been posted on the Web since 1996, with some appearing as early as 1994. However, Web publication was usually preceded by print versions and very few publications were electronic only. In the new system, CD-ROM and Web versions will be published first with printed versions available only upon request.

The impetus to adopt the CD-ROM format came from Kansas' budget difficulties for fiscal year 2003, which are expected to continue through the next fiscal year. In fiscal year 2002, the overall budget for the Ag Experiment Station branch of the Publications Unit was $92,000, more than $79,000 of which was spent directly

on printing costs for publications. Because of revenue shortfalls and a stagnant economy, the entire budget for fiscal year 2003 initially was $62,000–$15,000 less than what was spent only on printing in fiscal year 2002–and it may be reduced even more as actual revenue continues to fall short of projections (McLean, 2002). This left approximately $30,000 less in fiscal year 2003 to produce a similar number of Ag Experiment Station publications as had been done in previous years.

One option to meet this challenge was to eliminate several publications altogether. However, in so doing, we would risk losing a large portion of our audience and would fail to meet the information needs of the public. The Ag Experiment Station publishes a minimum of 12 and on average about 18 research reports each fiscal year. Most of these are Reports of Progress, which are summaries of research activities in a given area, such as crop variety performance tests, swine research, dairy and beef cattle research, and turfgrass research. Many of these publications are handed out by researchers and extension specialists at annual events, such as Cattlemen's Day and Agronomy Field Days, or at scientific meetings. Several are mailed to individuals on a mailing list by the academic departments involved. These publications also are distributed to county offices where they can be ordered by patrons, to administrators and legislators, and to libraries throughout the United States. Traditionally, all Ag Experiment Station publications have been distributed in paper form, with electronic versions added to the K-State Research and Extension's Web site following publication. It has been a longstanding policy, dating as far back as inception of the Kansas Ag Experiment Station in 1888 (Shelton, 1888), not to charge for Ag Experiment Station publications. Charging for these publications was not considered an option at this point.

We reviewed printing costs for Ag Experiment Station publications from fiscal year 2001 and found that six Reports of Progress (listed in Table 3) accounted for 41% of the publications budget and more than 35% of the total budget ($32,643 for these six; $79,377 for all 27 Experiment Station publications; $92,000 total budget). Much of the targeted budget reduction could be met by publishing those six items electronically with the remainder met by reducing the number printed of other publications, reducing travel, supplies, and other expenditures. Two forms of electronic publication were considered. Web-only publishing is essentially free. There are costs associated with server maintenance, personnel, and related items; however, these costs are fixed and would not increase with the posting of the targeted items. We did not believe, though, that

Web-only publishing would meet the needs of our clients. Most have Web access, but many do not, and results of our survey, described below, showed us that most would continue to contact K-State Research and Extension for a copy of the publication rather than seeking the publication on a Web site. In our survey we asked in separate questions whether respondents would access a complete version of a given publication from the Web or through a K-State Research and Extension office. For all publications, results were split as to whether they would access the Web ("yes" ranged from 28 to 67%) or a K-State Research and Extension office ("yes" ranged from 51 to 66%). Due to a low response rate, as detailed in a later section, our survey results were not considered strong evidence, but at least indicated to us some reluctance on the part of the intended audience to access large publications from the Web. There can be problems downloading the K-State Research and Extension Web site in rural areas, where phone line capacity and modem speed become issues. Further, surveys in Michigan showed that the majority of farmers do not use Web-based information (Suvedi, Campo & Knight Lapinski, 1999). For these reasons, as well as archiving, availability to libraries, and other considerations, we decided on a CD-ROM format. To market this change to our clients (authors and publication coordinators), we first gathered some preliminary data on the audiences for the six publications, then presented key points of these data to the authors, as well as highlighting the cost savings and other benefits of CDs. Involving the authors and coordinators in the process proved valuable in getting better insight about the various audiences and how the publications were used.

Assessing the Audience

Most successful innovations in agriculture have a clear benefit to users; yet, even these are often slow to be adopted (Ryan & Gross, 1943; Rogers, 1995). Before making the change to CD-ROM, with paper copies available only on request, we wanted a rough assessment of the ability and willingness of the audiences of each these six publications to adopt the CD-ROM format. This is an important first step in marketing the CD-ROM format to our clients. In previous meetings the coordinators expressed reluctance to change from printed materials, and we wanted to present some preliminary data regarding their audiences to help ease the transition.

We developed a survey and mailed it to subjects from mailing lists maintained by the respective academic departments responsible for Agronomy Field Research, Swine Day, and Cattlemen's

Day; from a listing of Kansas Dairy Association members for Dairy Day; and from a list of attendees at Turfgrass Day. Due to the immediacy of the budget situation, we were unable to attend each event and survey attendees directly, which would have been the preferred approach. The purpose of the survey was to roughly estimate the computer capabilities of the audience; to estimate use of the publication; and to estimate the degree to which the audience would be willing to accept a change from receiving the full publication at the event to receiving a summary publication (abstracts only) with the full publication available electronically. A copy of the survey is available upon request.

Survey Results

We did not anticipate reporting survey results in a refereed journal article, and survey results reported herein should be considered preliminary at best. The purpose of showing these survey results is to present here what we presented when marketing the change to CDs. These data are not intended for generalizing to the public, nor to the population surveyed due to the low response rate, but are only presented to show how we used the data to market this change in format to our clients. The publication coordinators and authors at meetings were informed of the low response rate and tentative nature of the results during our presentations.

Because of budget constraints, we sent only one mailing to each list; there were no follow ups as recommended by Dillman (2000). Thus, response rate of the survey was low, especially for the Dairy Day list, so the results are likely biased and likely do not fully represent the intended population (Table 1). Nonetheless, the survey did provide some insight regarding the audiences for these publications and the results proved useful as a marketing tool in presenting the change in format to the authors and researchers involved in the publications. All percentages reported are valid percentages, which are percentages calculated from the total number answering a question, not total number of respondents.

Most respondents found Ag Experiment Station publications to be useful (Figure 1). This was important in presenting the change to administrators as an alternative to eliminating selected publications altogether. Most respondents reported that they owned a computer and used it in their operations (Table 2). We did not ask whether they had CD-ROM capability. This was an unfortunate oversight. Our field is technology-intensive, and it did not occur to us to assess CD-ROM capability. Use of CDs has been growing since the mid-1980s and we assumed that most computers in use today

Table 1. *Number of Surveys Mailed, Number and Percentage of Respondents for Each of the Target Publications. Details on how the mailing lists were obtained and used are discussed in the paper under "Assessing the Audience."*

Target audience for:	Number of surveys sent	Number of respondents	Percent response[1]
Agronomy field research and fertilizer research	620	121	20
Cattlemen's Day	525	105	20
Swine Day[2]	631	77	12
Dairy Day	400	36	9
Turfgrass Research	447	105	23
Total	2623	444	17

[1] Rounded to the nearest whole number. Surveys returned as undeliverable were not included in percent response calculations, nor included in the number of surveys sent.

[2] Swine Day surveys included 391 that had been sent with the most recent Swine Day publication, as well as an additional 240 sent at the same time as the other groups.

Table 2. *Percent of Respondents From Surveys of Target Audiences That Reported Having Computer Capabilities*

Target audience for:	Percentage that: Own a computer	Use a computer in their operation[1]	Have Internet access
Agronomy field research and fertilizer research	83	78	76
Cattlemen's Day	86	83	84
Swine Day	99	95	94
Dairy Day	69	71	69
Turfgrass research	95	88	93

[1] Combined percentage of those answering either "a little" or "a lot" as to whether they used a computer in their operation. The percentage reporting they used a computer "a lot" ranged from 44% to 71%; the percentage reporting "a little" ranged from 22% to 28%.

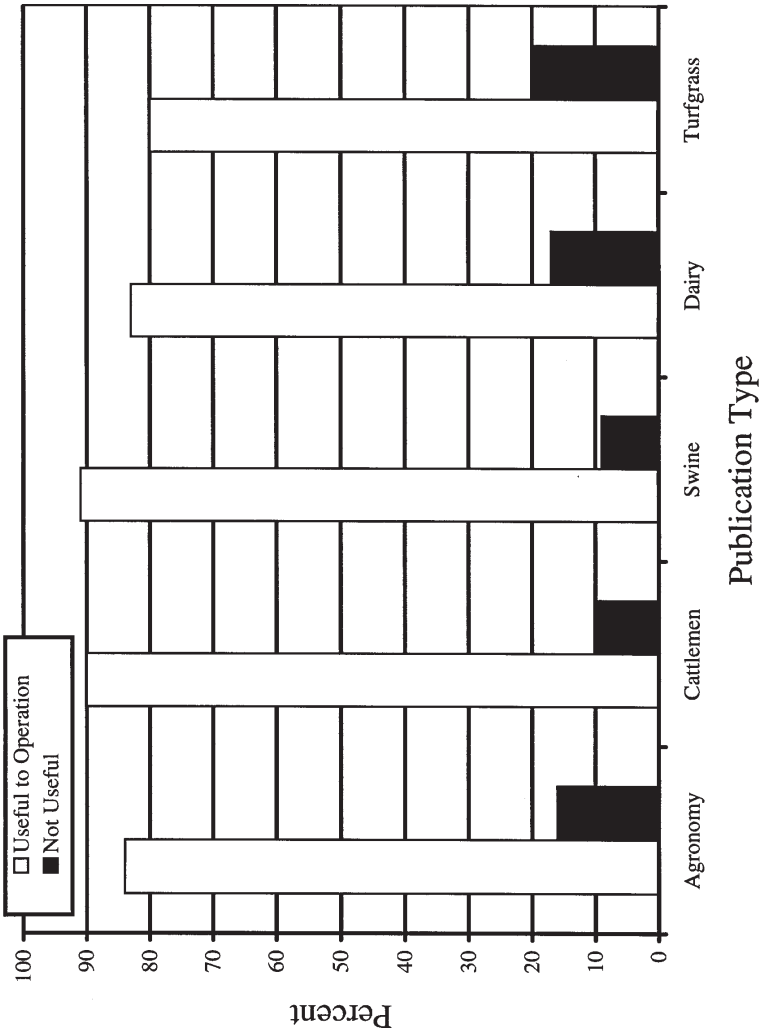

Figure 1. Percentage of respondents reporting they found Experiment Station publications useful to their operation.

Table 3. *Percent of Respondents Who Would Either Prefer to Continue to Receive the Long, Printed Version of the Publication at the Event; Would Accept a Short Version with Summaries of Articles as Long as the Full Version was Available; or Would Prefer to Receive a Short Version with Summaries of Articles at the Event.*

	Percentage that:[1]		
Target audience for:	Prefer long version with full articles	Accept short version if long version was available	Prefer short version
Agronomy Field Research and Fertilizer Research	52	72	50
Cattlemen's Day	63	82	58
Swine Day	72	78	50
Dairy Day	59	78	55
Turfgrass Research	58	70	40

[1] The data presented represent answers to three separate questions, therefore percentages will not add to 100 if summed across columns. Percentages represent the number that answered either "agree" or "strongly agree" to each of the respective questions.

would have a CD-ROM drive. In fact, most of the concern expressed by the authors involved Web access rather than CD-ROM capability, but it is unfortunate that we did not test our assumption. Nonetheless, we were able to point out to the authors that a large majority of respondents had a computer and used computers in their operations; these observations helped us market the CD-ROM format to authors.

Results on how well the intended audience liked the proposed change in delivery of the information were ambiguous. In general, our results indicated that most would accept a shorter paper version handed out at the event with a full version available electronically, but a large number continued to prefer the traditional paper copy (Table 3). We did not distinguish the form of the electronic version in the survey, because at the time the survey was mailed, the decision had not yet been made as to whether it would be CD or Web. As an example of the ambiguity in publication preference, 78% of Swine Day respondents reported they would accept the shorter version at the event, provided the full version was made available; however, nearly the same percentage, 72, preferred the Swine Day Report of Progress as is–a paper copy with full versions of all articles. Trends were similar for the other publications, although with a wider gap (Table 3). In our marketing presentations to the clients, we emphasized the percentages that would accept the short version with the full version available, but we also provided the other data, basically as presented here in Table 3. Our theme to the clients was that the audience would accept a summary handout, even if they may have preferred a printed full version.

Approaching the Authors

Authors and publication coordinators have insights regarding the audience that we do not. Therefore, it was important to consult with them, as well as department heads and other administrators, before forcing this change on them. From a marketing perspective there was much value in consulting with these individuals and promoting the change in format rather than simply telling the clients it was coming, like it or not. As expected, there was some resistance to giving up the traditional paper copy. However, all departments at K-State were feeling the same budget crunch we were, so publication coordinators, authors, and department heads were generally, if reluctantly, cooperative. As noted in the previous section, we first presented data from the survey to the clients. Following this, we discussed the advantages and disadvantages of CDs. By now it had

been decided to use CDs rather than Web-only, so the Web-only option was not discussed in depth, though we did point out our reasons for not publishing in this manner (audience access, size of files, etc.).

The switch in format was more than financially motivated, but we chose to emphasize the savings from publishing on CDs, presenting the other benefits of the CD-ROM format as bonus features. These savings were mostly for our own department, but there also would be some savings in mailing costs for the other departments. All costs for producing Ag Experiment Station publications are borne by the Publications Unit. In general, the academic departments involved are not charged any fee for publishing Reports of Progress. However, departments are responsible for costs incurred for distributing the publications via their own mailing lists. Cost of mailing a CD, which includes purchase of a mailing envelope, were estimated at $0.95; cost for mailing a booklet varied with booklet size, ranging from $1.72 to $3.95 per copy. For the larger publications, savings could be substantial for the individual departments, as well as the Publications Unit, which is responsible for mailing copies to county Extension offices, libraries, and administrators.

Each department had a different reaction to our presentation. This emphasizes the need to assess the affected clients as well as the audience. The Department of Agronomy enthusiastically adopted the change, the turfgrass group from the Department of Horticulture, Forestry and Recreation Resources (HFRR) went along willingly but not enthusiastically, and the Department of Animal Sciences and Industry went along reluctantly–recognizing some of the benefits of CDs but expressing a definite preference for booklets. Agronomy uses their Report of Progress exclusively as a hand-out at their various field day events; they do not have a large mailing list for the publication (the Fertilizer Research report is mailed to about 192 individuals, but not the Agronomy Field Day publication). They saw the change as an opportunity to package Agronomy Field Day with several other agronomy publications and distribute this comprehensive package to producers at Field Day events as well as through the county Extension offices. In later discussions, after the Fertilizer Research CD had been distributed, the Agronomy Department decided to discontinue printing the Field Day publication and will combine both these reports on one CD. This CD will be distributed to those currently on the Fertilizer Research mailing list, as well as standard Ag Experiment Station distribution lists.

The turfgrass group serves a smaller, more specialized audience and saw no great advantage to the CD-ROM format, but were willing to cooperate. The animal sciences group was apprehensive about the potential added workload for authors, as well as their audiences' acceptance of the CD-ROM format. We assured them that there would be no added workload. In practice, the publications are compiled by an office professional at the department so authors don't have to do anything differently. We used the survey results as a marketing tool to show that large percentages of their audience had computers and used them in their operations, and also that many would accept, and some preferred, a shorter version of the publication at the event with the longer version available electronically. In an informal follow up, we contacted the animal science publication coordinators and all reported that the CD-ROMs were well accepted at the event and, to date, we have not had any requests for printed versions nor have we fielded any complaints about the change in format.

The insights of the individuals at the initial meetings proved valuable to augment the results of our survey and helped us to better assess audience needs. In discussing the audience with them, we had assumed the audience was primarily producers. In reality, there are two basic audiences for Ag Experiment Station publications–agricultural producers, and scientists, veterinarians, and other professionals. Many of the publications are mailed by individual departments to the latter audience; a large number are also handed out at the various field events where most attendees are producers. This was a concern of the publication coordinators since attendees had come to expect a handout to help them interpret presentations given at the events. We had considered producing only CDs but following these meetings, decided it would be beneficial to print a small number of summary publications to hand out at the events, along with the CD-ROM. According to the coordinators, this proved successful and will be continued. Cost of the summary publications is included in all costs and savings reported in the following section.

Libraries are not a large audience, but they are an important one as scientists, producers, and students in other states depend on their libraries for access to K-State Research and Extension publications. CD-ROMs are acceptable storage media for print records for the U.S. National Archives and Records Administration (NARA, 2003). However, technological obsolescence of the software that reads the CDs and the medium itself is a concern. As noted on the CD jewel case insert, Ag Experiment Station publications can be freely reproduced for educational purposes. Thus, libraries are free

to make one or more hard copies of any publication on the CDs they receive. Libraries may also request a hard copy from K-State Research and Extension, but may be assessed a small fee for reproduction and mailing costs.

Advantages of CD-ROM

The biggest advantage to CDs, and the one we emphasized, is the savings in printing costs. Per copy costs of the six targeted publications ranged from $2.89 to $5.10 for the printed versions in fiscal year 2002 (Table 4). We were charged $1.50 per copy for the CDs, which included imprinting the CD, the jewel case, and stuffing the CDs and jewel case inserts. We also paid $0.18-0.25 per insert for printing the jewel case inserts (Figure 2). Cost for printing the booklet of summaries for each event dug into the savings; the summaries averaged about $1.60 per copy (range: $3.05 for 200 Fertilizer Research booklets to $0.71 for 500 Dairy Day summary publications). However, there is marketing value in continuing to distribute some form of paper copy at the event, as well in easing the transition for the publication coordinators. But even considering the cost of the summary reports, savings were estimated to be more than $20,000 for the first year from converting these six publications to CD-ROM (Table 4).

The jewel case inserts were printed in-house. In addition, the master CDs were produced by our Electronic Documents Librarian, and her time was not charged to the publications budget. This is standard as her time is not charged to the publications budget for preparing and posting the documents on the Web. The CDs were produced in house by the Radio Unit, which has a high-volume CD burner used to copy radio programs. The Ag Experiment Station publications budget was assessed cost plus an overhead charge of a little more than $0.50 per CD to cover equipment maintenance, ink cartridges, and labor for stuffing the CDs and jewel case inserts. This charge represents about a 30% markup over actual cost of materials. For large volumes of work, a commercial vendor might be less expensive. As an example, the lowest estimate for 1000 CDs with a three-color imprint and a jewel case was $1.15 per CD plus shipping; costs are more for smaller volumes of CDs produced. Turnaround time was estimated at two weeks. Advantages to in-house production include greater control over the product, faster turnaround time, no shipping costs, and the charge is the same regardless of the number of CDs produced. Getting an outside vendor also may involve some administrative steps, such as developing a specification sheet, getting bids, billing and related tasks.

Table 4. *Fiscal Year 2002 costs (printed versions) and estimated or actual costs for Fiscal Year 2003 (CD-ROM, plus summary publications) for six selected Experiment Station publications. Costs and savings for 2003 are estimated for Cattlemen's Day, Turfgrass and Agronomy; 2003 costs and savings are actual for Dairy Day, Swine Day and Fertilizer Research.*

Department Publication	Number of Pages		Total Cost ($)		Number		Per copy cost ($)		Savings ($)
	2002	2003	2002	2003	2002	2003	2002	2003	2003
Agronomy									
Field Research	128	NA[3]	6854	1225	1600	700	4.28	1.75	5629
Fertilizer Research	79	68	3265	1922	1100	800	2.97	2.40	1343
Animal Sciences									
Cattlemen's Day	174	217	9173	2725	1800	1200	5.10	2.27	6448
Swine Day	144	180	7184	2152	1500	900	4.79	2.39	5032
Dairy Day	66	86	2600	1610	900	600	2.89	1.79	990
HFRR[1]									
Turfgrass Research	101	NA	3567	1650	800	800	4.46	2.06	1917
TOTAL			32,643	11,284					21,359

[1] Horticulture, Forestry and Recreational Resources.
[2] Actual and projected savings and costs include the CD-ROM, jewel case insert, and summary publications.
[3] NA=Not available at the time this paper was published.

https://newprairiepress.org/jac/vol87/iss1/1
DOI: 10.4148/1051-0834.2175

Figure 2. Some of the main components in producing a CD-ROM. Total cost per CD was $1.50. Cost of printing the jewel case insert ranged from $0.27 to $0.40 per insert. The master CD was produced in-house; CDs were produced by the Radio Unit of K-State Research and Extension. An overhead charge of about $0.50 was assessed to the Agricultural Experiment Station for equipment maintenance, replacing the ink cartridge used to imprint CDs, and labor for stuffing the jewel case inserts and CDs.

However, for large volumes, it may be worthwhile to get estimates from outside vendors.

Total savings reported is only an estimate at this point; we will not know the actual savings until the end of Fiscal Year 2003. At the time this article was written, we had reduced Dairy Day costs by $990; Swine Day costs by $5062; and Kansas Fertilizer Research by $1273 (which included 200 printed copies requested by the coordinator for a meeting). These costs all were within $300 of the costs we had projected for these publications. The other items had not yet been produced or our account had not yet been billed at the time of this writing. Further savings may be garnered indirectly through reduced distribution costs, both for the departments and for the Publications Unit as described earlier, and by reducing the total number printed. These savings were not assessed directly, but we were able to reduce the number of copies of Dairy Day from 900 to 600; Swine Day from 1250 to 900; Cattlemen's Day from 1800 to 1600; Kansas Fertilizer Research copies from 1100 to 800; and Turfgrass Research from 800 to 600. This reduction was possible because there is no incentive to stock 200-300 extra copies, as had routinely been done in the past. With CDs there are no set-up costs, which means there is no incentive to overrun a job as there is in printing hard copy. In printing a booklet, running an extra 500 at the time the job is being done is much cheaper than completing a job and having to print an extra 500 later. This is not the case with CDs. The cost is the same, provided the price of CDs and jewel cases remains similar, whether produced all at once or spread over time. In case more CDs were needed, jewel case inserts were overrun by 200 at a cost of about $50 for each publication.

In marketing the CD-ROM format, we acknowledged the limitations of CDs, but focused on the benefits and found this was an effective strategy in getting administrative and author support. One advantage the authors appreciated was that several publications could be placed on one CD without any added expense and with little added time. K-State Research and Extension routinely posts its publications on the Web and has been doing so since 1994. Thus, PDF files of publications are already available and our Electronic Documents Librarian had only to burn the file on the master CD. It would be more time-consuming to burn several documents on a CD if the documents were not already in the appropriate format. Thus, the decision to include several documents on a CD is likely a matter of document availability rather than space available on the CD. For example, one individual 180-page Swine Day report would take up 1% or less of the storage space on a 700 megabyte disk. This leaves

ample room to include related publications, such as Extension fact sheets, past issues of the report, or even audio or video clips of speakers at the related event (something we considered but decided against because of copyright and timeliness issues). We included reports over a five-year period (the current report plus the last four), and in some cases included related reports; for example, we included Roundup (a report regarding cattle and range research from the K-State Agricultural Research Center–Hays) on the Cattlemen's Day CD. Including past reports and related materials allows users to review progress of research developments over time and provides readers with a more comprehensive package of information than can be included on a single report.

As mentioned earlier, the enthusiasts in Agronomy immediately recognized this advantage. Agronomy has three major annual publications–Agronomy Field Day; Kansas Fertilizer Research; and Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland. Combining these, along with all the Kansas Performance Test publications, onto one CD-ROM would allow consolidation of department mailing lists, as well as providing producers and researchers with all the latest agronomy information on one CD. Agronomy Field Day and Fertilizer Research were converted to CD publication; however, because of other considerations, the Chemical Weed Control guide and Kansas Performance Test reports remained printed publications, but were also included on the Fertilizer and Agronomy CDs.

Another advantage with CDs is the ability to do key word searches and print or download only those articles of interest to the reader. For example, a veterinarian interested in dairy cow reproductive physiology could search and download only articles of interest, bypassing dairy product and food safety articles in the Dairy Day report.

Printability of articles is important because, as research has shown, even in this digital age, about 60-70% of scientists will print items of interest rather than only reading them onscreen (Tenopir & King, 2000; 2001; Schauder, 1994). Bookmarking is an effective way for readers to go directly to items of interest. Bookmarking is the creating of a shortcut within the Adobe PDF document that allows the user to click on a bookmark and go directly to the page marked. In our case, article titles were listed in a Table of Contents to the side of the main page and bookmarked to the starting page of each individual article. If a document is burned on the CD as a monograph, which is one file rather than several smaller files,

printing sections of the report is more difficult and involves an extra step by the user. One must be sure to select the option that allows printing only of pages specified, rather than printing of the entire report, which is the default in most cases. Reports published as individual articles rather than a monograph will print only the article selected; however, there are complications with this system for posting on the Web. It may be advisable to create a monograph for Web publishing but a split version for CDs. Details are available from author Amy Hartman (ahartman@oznet.ksu.edu). Splitting the report creates more work for the compiler. For example, it took approximately eight hours to compile one of the larger publications, the 180-page Swine Day report, and splitting it into individual articles added four hours to the task.

The primary disadvantage with CDs is the capability of the audience to use them. As noted earlier, more than 80% of our clients surveyed had access to and used computers. However, the other 20% did not, and we did not assess the number that had CD capability. It is also likely the 80% figure is inflated because of bias from the small rate of return. Since some copies may be printed, our publication design leaned toward print rather than on-screen formats. For example, we kept the publications in two columns rather than the more screen-friendly single column, and used fonts and other design elements that would reproduce well from a laser printer. Paper copies also hold up better than CDs on the dashboard of farm trucks. If a publication is designed primarily for in-field use as a reference, then CD-ROM may not be the best format.

Creating the CDs

To create a good, usable CD, someone on staff must have the experience and know-how necessary to do this. There also are hardware and software required, beyond a CD burner, to convert files into a format suitable for publishing on CD-ROM. Further details on creating the master CD, hardware and software requirements are available from author Amy Hartman (ahartman@oznet.ksu.edu).

Conclusion

Budget problems drove our decision to publish six Ag Experiment Station publications on CD rather than paper. However, changing to an electronic format had been under consideration for some time. CDs have several advantages–they are far less expensive to produce, can hold several documents, are easier to search, and take up less storage space. Disadvantages include end-users' ability to use CDs,

and they are not well adapted for use as an in-field reference. In marketing the CD format to authors, it is important to provide some data regarding the capability and desire of the audience to use CDs or other electronic formats. It is equally important to consult with authors and administration to get a complete picture of the audience. Converting the six publications to CD resulted in an estimated savings of $20,000 to K-State Research and Extension. We had a person on staff with knowledge and experience in converting documents to Adobe format, and we have an in-house, large-volume CD burner. Even though we were assessed an overhead charge of 30%, producing the CDs and jewel case inserts likely was less expensive than had we used a commercial vendor. We also saved on distribution costs and garnered indirect savings by reducing the number of copies printed.

Key Words

CD-ROM, Budget, Audience assessment

References

Dillman, D. A. 2000. Mail and Internet Surveys: The Tailored Design Method. 2nd Edition. New York: John Wiley & Sons, Inc.

McLean, J. 2002. State Budget Mess Deepens: Revenue: $100 million in additional cuts will have to come from current budget. Topeka Capital Journal, online version, accessed 10/14/02 at http://www.cjonline.com/stories/100202/Kan_budget.shtml.

NARA. 2003. Frequently Asked Questions about Optical Media. National Archives and Records Administration Web site accessed 04/23/03 at http://www.archives.gov [select "Records Management"; select "Policy & Guidance"; select "Records Management FAQs"; select "FAQs about Optical Media"].

Rogers, E. M. 1995. Diffusion of Innovations. 4th Edition. New York: The Free Press, a division of Simon & Schuster, Inc.

Ryan, B., & Gross, N. C. 1943. The Diffusion of Hybrid Seed Corn in Two Iowa Communities. Rural Sociology 8: 14-24.

Schauder, D. 1994. Electronic Publishing of Professional Articles: Attitudes of Academics and Implications for the Scholarly Communications Industry. J. American Society for Information Science 45: 73-100.

Shelton, E. M. 1888. Bulletin No. 1. Experiment Station Kansas State Agricultural College. Accessed 4/21/03 at http://www.oznet.ksu.edu/historicpublications/pubs/SB001.pdf.

Suvedi, M., S. Campo, S., & Knight Lapinski, M.. 1999. Trends in Michigan Farmers' Information Seeking Behaviors and Perspectives on the Delivery of Information. J. Applied Communications 3: 33-50.

Tenopir, C., & King, D. W. 2000. Towards Electronic Journals: Realities for Scientists, Librarians, and Publishers. Washington DC: Special Libraries Association.

Tenopir, C., & King, D. 2001. Electronic Journals: How User Behaviour is Changing. Online Information 2001 Conference Proceedings. Accessed 10/24/02 at http://www.online-information.co.uk/proceedings/online/2001/tenopir_c.asp.

Acknowledgments

Thanks to Pat Hackenberg for designing Figure 2. We thank Kris Boone for her suggestions on an early draft of the manuscript and the three anonymous reviewers for their helpful suggestions and thorough review of the article. Special thanks to Larry Jackson of the Radio Unit for his help and suggestions in getting the CD-ROMs produced. On another note, in 2003 authors Amy Hartman and Eric Rhodenbaugh received a Bronze Award from ACE in electronic publications for the Swine Day CD.

This paper is Contribution No. 03-319-J of the Kansas Agricultural Experiment Station.